

MASTER THESIS

The impact of industry-specific determinants on the capital structure of Dutch SMEs.

Rik van Oldeniel

S2027526

Department of Finance & Accounting

Prof. Dr. Rezual Kabir

EXAMINATION COMMITTEE

Prof. Dr. Rezual Kabir

Dr. Xiaohong Huang

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Abstract

In this thesis, I examine the impact of industry-specific determinants on the capital structure of Dutch SMEs. The sample consists of 499 manufacturing firms that are divided into different industries based on the two-digit NACE codes. The study uses multilevel modelling to account for the variance between the nested data. The variables are included in a hierarchical matter. Started with an empty model, where no independent variables are included to see the variation between the different levels. Next, the firm-specific variables are included and at last, the industry-specific variables are separately included. Only 5% of the variation in debt is accounted by the industry-level. The results show that there is a weak link between the industry-specific determinants and the capital structure of Dutch SMEs.

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1 Introduction

In recent years, an increasing amount of studies have looked into small and medium-sized enterprises (SMEs) and the determinants of their capital structure. (Psillaki & Daskalakis, 2009; Degryse, De Goeij, & Kappert, 2012; Hall, Hutchinson & Michaelas, 2004). Moreover, it is recognized that this sector is an important driver of economic growth (Kumar, Colombage, & Rao, 2017). Chen and Hambrick (1995) show that small firms act differently than large firms and, hence, that small firms are not just a small duplicate of large firms. Moreover, SMEs are often more constrained in their access to external finance than larger firms and tend to rely more on internal financing (Rahaman, 2011; Psillaki, & Daskalakis, 2008). Since SMEs are important in the economy and differ from large companies, it is interesting to see what the determinants of the capital structure of SMEs are. Furthermore, the literature on the capital structure determinants of SMEs is still unclear. Given the economic significance of the capital structure decisions, a better understanding of the relative importance of the determinants of the capital structure of SMEs is a valuable topic. Therefore, this thesis focuses on the capital structure of SMEs. Even more specific, in this thesis, the study of Degryse et al. (2012) is extended by adding industry-specific determinants (dynamism, munificence, and concentration). This provides more insight into the impact of industry-specific determinants on the capital structure of Dutch SMEs.

Most of the previously mentioned studies are based on Modigliani and Miller's theory (M&M) (1958). M&M discuss that under perfect market conditions the capital structure of a firm is irrelevant. However, once taxes are included, there is an optimal capital structure. A theory derived from the M&M on is the pecking order theory of Myers and Maljuf (1984). In this theory, preference is giving to internal financing over debt and equity because of information asymmetry. Myers and Maljuf (1984) argue that firms are reluctant to issue new equity to raise capital, because investors may perceive this issuing of new equity as a signal that the firm is currently overvalued. As a result, investors may lower their valuation of the firm's equity. Equity is less preferred to raise capital because when a firm issue new equity, investors believe that the firm is overvalued, and the firm is taking advantage of this overvaluation. Frank and Goyal (2003) suggest that SMEs are particularly affected by asymmetric information problems like moral hazard and adverse selection. López-Gracia and Sogorb-Mira (2008) suggest that managers, who are often owners of SMEs do not seek financing that dilutes their shareholding position in the company. So, preference is giving to internal financing over external financing, especially over those external financing forms that dilute their current shareholding position of the firm.

Kraus and Litzenberger (1973) further developed the inclusion of taxes. This theory became known as the trade-off theory. Based on this theory, Kraus and Litzenberger (1973) suggest that there can be an optimal capital structure. Kraus and Litzenberger (1973) considered that the marginal benefit

of further increases in debt declines as debt increases, while the marginal cost increases. So, firms try to optimize their firm value by a trade-off between tax advantages and the costs of debt.

However, the trade-off theory seems not applicable to SMEs. Pettit and Singer (1985) say that SMEs are often less profitable and, hence, have fewer tax advantages. Moreover, López-Gracia and Sogorb-Mira (2008) say that the trade-off theory suggests a relatively high debt level as optimal. This may not be optimal for SMEs because they suffer from high transaction costs, which makes the debt less attractive.

In addition, there is also an agency problem associated with making capital structure decisions. Agency problems arise in situations where a person or organization has the authority to make decisions on behalf of another person or organization. This situation can cause inefficiency, because the agent may not only pursue the interests of the client but also their self-interests. A solution to this inefficiency put forward by agency theory is to monitor individuals through independent persons or authorities (Jensen & Meckling, 1976). SMEs face greater costs of eliminating the agency problem because it is more difficult for them to reveal their true nature to providers of capital and they may have greater flexibility to changes (Pettit & Singer, 1985). Sudden changes can cause the nature of the firm to look differently, which can influence the interest of the owner, thereby increasing agency costs.

So, plentiful research has been done to test these theories (Rajan & Zingales, 1995; Titman & Wessels, 1988; Chirinko & Singha, 2000; Rauh & Sufi, 2010). Many of these researches look into firm-specific determinants since the researchers believe that firm-specific determinants influence the capital structure that firms choose.

However, another strand of research indicates that industry-specific factors might also influence the capital structure decisions of firms. Boyd (1995) suggests that industry-specific determinants influence the chosen capital structure. Boyd (1995) shows three industrial factors that influence capital structure: dynamism, munificence, and concentration. Dynamism shows the degree of instability of a given industry (Boyd, 1995). High volatility could lead to smaller debt levels because it is unclear whether the firm can meet its payment obligations in the future (Ferri & Jones, 1979). Munificence shows the degree of the environment's capacity to support growth (Dess & Beard, 1984). According to Dess and Beard (1984) firms operating in high munificence have abundant resources, low levels of competition, and consequently, high profitability. According to the pecking order theory, firms with high profits will use these profits before searching for external capital. However, the trade-off theory expects companies with high profits to take on external capital in the form of debt because interest is tax-deductible. Concentration could also influence the capital structure. Firms operating in highly concentrated industries often have higher profitability and are larger. Moreover, they are less obliged to pay strict attention to their capital costs because they experience less financial distress than companies in highly competitive industries (Mackay & Philips, 2005). Simerly and Li (2002), Kayo and

Kimura (2011), Smith, Chen, and Anderson (2015), and Mackay and Philips, also show the impact between these industry-specific determinants on the capital structure.

However, most of these studies are based on listed firms and little is known about the impact between industry-specific determinants on the capital structure decisions of SMEs. Li and Islam (2019) research the impact of industry-specific determinants on the capital structure of Australian SMEs, showing that industry beta, growth, profit margin, and market competition influence the capital structure. Hall, Hutchinson, and Michaelas (2000) show that the capital structure of SMEs varies between industries. Degryse et al. (2012) investigate the impact of industry and firm-specific determinants on the capital structure of Dutch SMEs but only used industry fixed effects

This thesis aims to extend the knowledge of the impact of industry-specific determinants on the capital structure of SMEs in the Netherlands. Therefore, the research question of this thesis is: "What is the impact of industry-specific determinants on the capital structure of Dutch SMEs?"

It is interesting to find out whether these industry-specific determinants: munificence, dynamism, and concentration are important determinants of the chosen capital structure of Dutch SMEs. This thesis contributes to the general literature investigating the role of industry-specific determinants but mainly contributes by investigating whether industry-specific determinants influence the capital structure choices of Dutch SMEs. Research on the capital structure of Dutch SMEs is not very extensive compared to other countries. This thesis reduces this gap by investigating the capital structure of Dutch SMEs. Industry-specific determinants are added to explain the capital structure of Dutch SMEs. The role of these determinants for the Dutch SME can be compared to the role of SMEs in other countries/other periods. This research also helps SMEs in understanding the determinants of their capital structure. With this knowledge, it is possible to get a better insight into the capital choices that are made in the SME environment.

The outline of this thesis will be as follows: In chapter 2 the existing literature will be discussed and based on these theories different types of hypotheses can be made. Next addressed in chapter three are the data, variables, and research method. The results are presented in chapter 4, followed by the conclusion in chapter 5.

2 Literature review

In this chapter, I will present a review of the literature. First, I will explain the different capital structure theories. These consist of pecking order theory, trade-off theory, and agency theory. The theories are first explained based on the literature, the last paragraphs of the given theory explain the link between the theory and SMEs. Next, I will explain the different characteristics of an SME. Thereafter, the determinants of the capital structure are discussed at three different levels: firms, industry, and country. Next, several empirical papers are discussed, and hypotheses are formulated using the various theories and empirical evidence.

2.1 Capital structure theories

Before Modigliani and Miller (M&M) (1958) there was no generally accepted theory about capital structure. M&M (1958) laid the foundation for the still-used principles of capital structure theories. Initially, M&M claimed that no perfect capital structure exists under perfect market conditions. However, there are several assumptions under which a market is entirely efficient. These assumptions are no transaction costs, no taxes, no agency costs, no bankruptcy costs, and no information asymmetries. This matched the law of conservation of value. This means that the value of a company is determined by the left-hand side of the balance sheet and not by the equity and debt ratio on the right-hand side of the balance sheet. This means that it does not matter if the financial pie is sliced with share repurchases, acquisitions or other financial forms; only improving cash flows leads to more value. These perfect market assumptions do not hold in the real world. Therefore, M&M (1963) adapted their work and included the effects of corporate taxes on the optimal capital structure. M&M (1963) explains that interest expenses are tax-deductible and thus work as a tax shield. This means that debt leads to lower tax payments and that the value of the levered firms should increase. Based on this, debt will be chosen over equity to increase the tax shield. However, in the real world, no company finances everything with debt. That is why other researchers have extended the M&M theories to explain the capital structures observed in the real world. The most well-known theories are pecking order theory, trade-off theory, and agency theory. These are explained in more detail below.

2.1.1 Pecking order theory

The pecking order theory explains the influence of information asymmetry on capital structure. Myers and Majluf (1984) state that firms prefer internal finance to finance their investments over other sources of financing. Myers and Majluf (1984) claim that companies that provide little information to outside stakeholders rely more on internal sources and prefer debt over equity. The information asymmetry between the firm and its shareholders could lead to adverse selections of financial sources. To elaborate on that, Myers and Majluf (1984) state that retained earnings are the most preferred source to finance investment needs, followed by debt as the second source which will be used if the

retained earnings of the firm are insufficient to finance investments. The third choice, often only on special conditions, equity will be issued to finance investments. Myers and Majuf (1984) say that issuing equity leads to the most problems because of the information asymmetry. Finance investments using equity leads to a fall in the share price. Shareholders only have publicly available, while management also has internal information. This creates large information asymmetry. The high information asymmetry gives the shareholders an incentive that the share price is overvalued if the firm decides to issue shares. A drop in the share price is often the case if the company does not disclose additional information about issuing additional shares. However, firms cannot provide competitive information to outsiders. This could lead to a pass of positive net present value projects.

Debtors often lend money in the form of principal payments and interest. They demand first to receive additional information before they make money available. Even though information asymmetry still exists, debtors often get enough information to cover themselves against high risks. Moreover, debtors take precedence when a firm goes bankrupt. Therefore, debtors are slightly less information dependent. Even if a firm chose to profit from overpricing shares will issue new share. And because of the information asymmetry, investors do not know if the firm chooses equity because the firm is overpriced or for other reasons (Myers & Majuf, 1984). So, if a firm issued equity there is a possibility that they do this because of the overpriced shares if the firm issued debt that possibility does not exist. That is why debt has only a small information asymmetry problem. Thus, logically, firms will rather issue debt than issuing equity, and issuing equity without any additional information will probably lead to a decrease in the share price. In other words, debt issues will be higher in the pecking order theory than equity.

Following the theory, firms only need external finance if internal finance is insufficient. However, sometimes the only option is issuing equity to finance investments because the deficit is higher than the available retained earnings and debt that can be attracted without getting into financial difficulties combined. In this case, the firm could decide to issue new equity at an under-price value of the current share price to attract new investors. However, Harris and Raviv (1991) say that if the under-pricing is too high new investors gain more than the net present value of the investment which is equal to the net loss of the existing shareholders. This could lead to a rejecting of the investment despite the positive net present value of the investment. Hence, directors who act in the interest of the existing shareholders may therefore not issue new equity. In the end, the firm gives up on the positive investment opportunity. That is why companies want to have a certain degree of financial slack to invest in such positive investment opportunities if they arise. Myers and Majuf (1984) come up with several examples to build a certain amount of financial slack. Some examples are restricting dividends when investment requirements are modest, issuing stock in periods when managers' information advantage is small, and firms should not pay out dividends if they must issue

new shares to earn back these dividends. The first and last ones are related to dividends policies. Dividends are paid from retained earnings which leads to a decrease in internal funds and an increase in the need for external financing increase.

Hall, Hutchinson, and Michaelas (2004) say that smaller firms need to borrow more than larger firms when they face investment opportunities because they have less internal finance available. Hall et al. (2004) show indeed that firms with a lower level of retained earnings make more use of external financing and that size is negatively related to debt.

Even though SMEs are often privately held, the pecking theory still applies (Degryse et al., 2012). Pettit and Singer (1985) say that the information asymmetry is greater for smaller firms because they may find it too expensive to supply audited financial statements, which are often not legally necessary to publish, and they lack other sources of information to compensate for this. So, smaller firms prefer internal financing over external financing. Degryse et al., (2012) say that this is the reason that collateralized lending is important for SMEs.

The managers of an SME are usually the shareholders of the firm. They do not like to lose their property and control over the firm (Hamilton and Fox, 1998). Therefore, issuing share will be less favoured because a part of their control will be transferred to the new shareholders. Internal financing is preferred over external financing to finance firms' activities. If SMEs need external capital, they will likely choose debt that does not decrease managers' operability (Sogorb-Mira, 2005). This form is often short-term debt which is not expected to include any form of restrictive covenants. So, the underlying idea of internal financing over external financing for SMEs is also about not losing control.

The pecking order theory only deals with the hierarchical order of financing investments. It does not say something the level of debt. The pecking order theory only explains a change in the capital structure based on the preference of the managers.

2.1.2 Trade-off theory

M&M (1963) expanded their research by adding the effect of corporate taxes and concluded that debt creates value because of the advantage of the interest tax shield. Kraus and Lizenberger (1973) extended this and came up with the trade-off theory. Kraus and Lizenberger (1973) say that the capital structure is determined by the benefits of debt and the costs of debt. The benefits of debt are the advantage of the tax shield and financial distress is the cost of debt.

The advantage of debt is that the interest can be subtracted from the taxable income which leads to fewer tax payments (Myers, 1977). Dividends are paid from the remaining earnings on which tax has already been paid (Graham, 2003). So, it is not possible to get tax advantages from equity. More profitable firms should have higher debt levels because they benefit more of the tax shield (Kraus, & Lizenberger, 1973).

There are also disadvantages of financing in the form of debt. The debt must be repaid in the future. This repayment often consists of interest and a principal. Dividend payouts are free and can be changed at any time. This differs from debt whereas the payments are obligatory. Debt obligations involve certain concerns that could lead to financial distress. Financial distress includes all types of costs that can arise when a company is borrowing money (Opler & Titman, 1994). At a certain point, a firm may even experience bankruptcy costs. These costs are related to everything about going bankrupt, like reorganization costs, lawyer costs, etcetera. Firms try to avoid a high level of financial distress costs by not exceeding their debt target (Myers, 1984). According to Myers (1984) debt targets are determined by assessing tax benefits and the costs of financial distress. This is in line with Kraus and Litzenberger (1973) who say that the capital structure should be a trade-off between tax advantages and financial distress costs by profiting as much as possible of the tax-deductible interest and not getting into financial distress.

Figure 1 shows a visual representation of the trade-off theory. It shows the developments of the market value of a firm and the debt level. It is a U-shaped curve between the market value of a firm and the debt level. In the first part of the figure, debt has a positive effect on the market value of a firm. As stated before, this has to do with the fact that interest can be deducted from the taxable income. Towards the middle, the positive line starts to flatten and decline after the optimum level. Even behind the optimum point, the tax shield will continue to benefit the firm. However, the costs of financial distress exceed the tax shield benefits at this part of the curve. Firms increase their debt to take advantage of tax deductibles until it reaches the marginal point where the marginal costs of financial distress start to exceed the marginal benefits of the tax shield (Myers, 1984). Hence, firms are looking for the optimum level by balancing between the interest tax shields and the costs of financial distress. However, it cannot be said that it is simply a trade-off between debt bankruptcy costs and tax advantages to determine the optimal debt ratio. DeAngelo and Masulis (1980) show that this effect can be delusive due to other non-debt tax shields. They state that depreciation deductions or investment tax credits can be used as tax shield substitutes.

There are studies with different explanations about the trade-off theory regarding SMEs. Pettit and Singer (1985) show that the trade-off is not often applied in the SME context. They state that SMEs are less likely to be profitable or at least have abundant benefits. Therefore, SMEs are less likely to use debt to get a tax advantage. DeAngelo and Masulis (1980) show alternatives of tax shields (R&D expenses, depreciation, investment deductions, etcetera.) that could replace the role of debt.

On the other hand, one can also look at a financial distress perspective. Pettit and Singer (1985) and Warner (1977) say that larger firms are likely to be more diversified and fail less often. This suggests that firm size can be negatively related to the probability of going bankrupt. Also, SMEs tend to have relatively higher bankruptcy costs than larger firms and therefore prefer not to take on debt

(Ang, Chua & McConnell, 1982). Considering the above, the trade-off theory is not (often) used in the SME context and therefore not applied in this thesis.

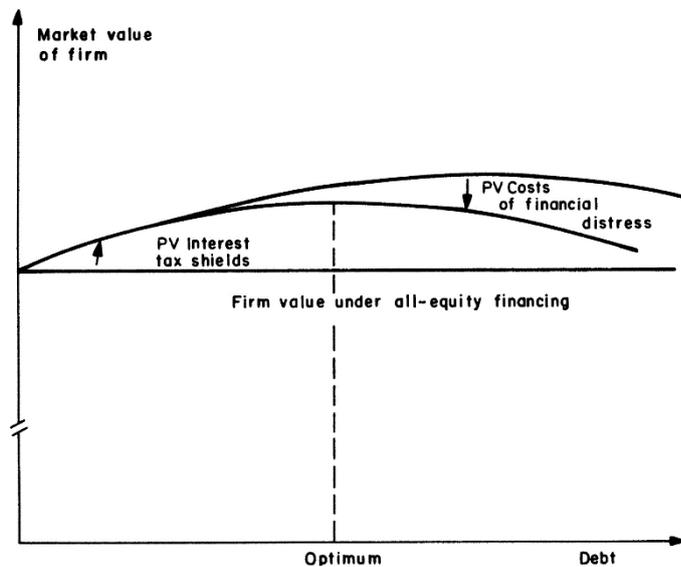


Figure 1: Trade-off theory
Source: Myers (1984)

2.1.3 Agency theory

Jensen and Meckling (1976) put forward the concept of agency costs and showed the impact of the conflict between managers and shareholders (agency costs of equity) and the conflict between debt holders and shareholders (agency costs of debt) on financial decisions. Agency problems are divided into three problems. First, the underinvest problem whereby a firm foregoes a positive net present value project because debtors get a portion of the benefits. Second, the free cash flow problem whereby free cash flows are used for marginal or negative net present value projects. Third, asset substitution problem whereby the lower-risk investment is exchanged for higher-risk investment. Also, I examined how applicable these theories are in the SME context.

2.1.3.1 Underinvestment problem

An underinvestment problem occurs between shareholders and debt holders when a firm foregoes profitable investment projects because debt holders would obtain a portion of the project benefits, leaving insufficient returns to the shareholders (Myers, 1977). Shareholders bear all the risk of the investment, but only gain a portion of the generated benefits. Shareholders forced firms to invest in high-risk investments to raise the value of their shares instead of low-risk investments. However, the lower risk investment would have been more likely to result in an actual cash flow for the firm. So, the funds are used for sub-optimal investments to keep the shareholders satisfied.

Shareholders have an incentive to increase leverage and move the wealth from debtors to shareholders (Jensen & Meckling, 1976). Stockholders of levered firms gain when business risk increases. Management who acts in the benefits of shareholders' interest will pick the riskier projects

over the safe ones. They may even take risky projects with negative net present values. Since debtors only get fixed payments of interest and principal they do not benefit from a risky investment. If more conflicts arise between shareholders and debtors, mainly due to investing in risky projects, the agency costs of debt may increase because shareholders prefer risky investments and debtors prefer safer investments. The underinvestment problem contradicts M&M assumption that investment decisions can be made independent of financing decisions. Myers (1977) argues that managers of leveraged firms do take the amount of debt that needs to be serviced into account when considering new investment projects.

The underinvestment problem theoretically affects all leveraged firms, although it is most pronounced for highly levered firms in financial distress (Brealey & Myers, 2005). The higher the probability of default, the more debtholders gain from positive net present value projects. According to Drobetz and Fix (2005), the underinvestment problem bends capital structure towards equity. On the one hand, mature firms with a good reputation but with a limited number of positive net present value projects, choose for safer projects to generate cash flow. On the other hand, young firms that are growing fast and have little reputation may choose for riskier projects. If they survive, they will eventually switch to safer projects (Drobetz & Fiz, 2005).

2.1.3.2 Free cash flow problem

Jensen (1986) underline that firms, where the cash flow exceeds the financial needs to finance positive net present value projects, face greater agency problems as the free cash flow intensifies the conflict of interest between shareholders and managers. Managers with excess cash flow will be pressured to pay out the excess cash flow to investors as opposed to reinvest the cash in less profitable opportunities (Drobetz & Fix, 2005). According to Jensen (1986), the problem lies at the motivation of managers to distribute excess funds rather than investing it below the cost of capital or wasting it on organization inefficiencies. Managers can promise to pay out future cash flows by announcing an increase in dividends. However, such announcements are weak because dividends can be reduced at any time in the future (Jensen, 1986). Debt could be a good substitute for dividends because issuing debt comes with contractually obliged payments of principal and interest. In this way, managers are bonding their promise to pay out future cash flows that cannot be accomplished by dividend increases.

Small firms are often managed and owned by one person. Hence, these firms do not face agency problems between managers and the owner(s). Degryse et al. (2012) say that the problem of free cash flow is non-existent in SMEs since SMEs do not have public equity and normally the ownership is concentrated. As a small firm grows, the manager-owner entrepreneur delegates some decision-making responsibility to someone else to not worry about small decisions. As a consequence, agency conflicts arise in the form of free cash flow problems (Lopez-gracia & Mestre-Barberá, 2015). However, Sogorb-Mira, (2008) state that SMEs do not need to discipline directors by increasing debt,

as managers-ownership very often overlap. Besides, according to Vos et al. (2007), the manager-owner wants to stay in control and avoid debt as much as possible.

2.1.3.3 Asset substitution problem

An asset substitution problem arises when managers willingly deceive others by switching higher quality projects with a lower quality project (Jensen & Meckling, 1976). As an example, a firm could sell a project with low risk to get favourable terms from creditors, after loan financing, the firm could use the funds for risky projects, hence, passing the unforeseen risk to creditors.

Barnea, Haugen, and Senbet (1980) argue that shorter-term debt can reduce the incentives to increase risk by controlling two parameters: the face value, and the time to maturity. The problem is neutralized because the value of the shorter-term debt is less sensitive for a shift into lower quality-higher risk projects. First, the underlying bond is less sensitive to a change in the value of the underlying assets of the firm if the riskier project is greater than the discounted face value. Second, the value of the shorter-term option is less incentive to a change in variance (Barnea et al., 1980). Leland and Toft (1996) argue that short-term debt can reduce or eliminate agency costs associated with asset substitution because short-term debt holders do not have to defend themselves from wrong incentives by demanding higher coupon rates. Further, Rajan and Winton (1995) say that short-term debt provides creditors with extra flexibility to monitor managers with minimum effort.

Hall et al. (2000) claim that SMEs have problems with asset substitution because of being controlled by one or a few persons and have fewer disclosure requirements. Lopez-Gracia and Mestere-Barberá (2015) say that SMEs have frequently less fixed assets on their balance sheets. Therefore, creditors find it more difficult to monitor the progress of SME projects. Lopez-Gracia and Mestere-Barberá (2015) suggest that a greater proportion of short-term debt allows creditors to more effectively control how SMEs use their funds. Moreover, short-term debt forces firms to periodically report its performance and operating risks to creditors (Jun & Jen, 2003). Pettit and Singer (1985) suggest that SMEs have more flexibility what makes it easier to substitute one asset for another which could lead to a change in the risk of the firm. They argued that SMEs can compete with larger firms because they can maintain (more) flexible operations. This means that they can easier change their business operations to changes in technology or other economic conditions. Growth and substitution of assets often lead to a change in the risk of a firm. However, the flexibility of an SME may also allow the owner-manager to hold the firm risk equal because an SME can more easily move and adapt. However, this flexibility and asset substitution could be controlled by external parties through restrictions included in contracts to provide certain collateral (Pettit & Singer, 1985).

2.2 SME characteristics

According to Storey (1994), there is no uniformly accepted definition of an SME. Bolton (1971) defines SME as an independent business managed by its owner(s) and having a small part of the total market. SMEs are an important driver of economic growth (Kumar, Colombage, & Rao, 2017).

SMEs are different on many points compared to large firms. Job creation and job resignation are on average much larger in the SMEs environment than by larger firms. This fluctuation in jobs has a connection with the conjuncture cycle. Smaller firms perform better than big firms in good economic times. Small companies are, therefore, less shock-resistant than large firms. Furthermore, small firms are quickly created in good economic times, but also fail relatively quickly in bad times (Ghobadian & Gallear, 1997). Another important difference between small and large firms concerns the composition of their sales area. Small firms operate closer to their home than larger firms. The majority of the sales of the SMEs are sold in their own country. Whereas, large firms, operates more on the foreign markets. Thereby, it seems that the size is related to the distance of the sales area. The buyers of SME products live closer to the SME than buyers of large firm products. So, smaller firms depend more on domestic developments.

The structure of an SME has several differences compared to larger firms. SMEs have fewer employees but feel better heard because they have a closer relationship with the company and the owner. It could bring benefits if the firm has fewer employees than larger firms because it is easier to let all employees participate in an initiative and implement a change (Axland, 1992). Collaboration is often better because employees know each other more intimately. However, SMEs do not always have personnel with the appropriate information, technology, and communication skills to implement a new initiative properly (Jeffcoate, Chappell, & Feindt 2000). SMEs managers are also often the owner, often with one person in control. In addition, the organizational structure is often simpler and flatter (Ghobadian & Gallear, 1997). The advantage of this is that decision-making often goes faster because there are less hierarchical levels in the organization. However, a disadvantage of this may be that the management is too concerned with operational matters and not with long-term strategy (Spence, 1999).

The capital structure of SMEs is likely to differ from large firms (Jõeveer, 2012). Small firms face larger informational asymmetry and hence they are likely to rely more on internal funds as the first choice of financing investments. Hence, profitability is expected to be negatively related to leverage. In addition, because of the lack of information, creditors are likely to request more collateral from SMEs. SMEs are also less diversified than larger firms and hence, face a higher likelihood of bankruptcy (Warner 1977; Pettit & Singer, 1985). Next to that, the cost of equity financing compared to debt financing is higher for unlisted firms because equity financing is more information sensitive than debt financing (Jõeveer, 2012). Pettit and Singer (1985) summarize the financial position of SMEs

as follows. First, SMEs do not control, in the aggregate, as large a volume of assets. Second, SMEs use more debt financing (particularly current debt). Third, SMEs rely more on internal financing and loans from stockholders to finance their operations. Fourth, SMEs use less external equity relative to larger firms.

2.3 Determinants capital structure

In this chapter, the determinants of capital structure are discussed at different levels. Starting with the firm-specific determinants, followed by industry-specific determinants, and lastly country-specific determinants.

2.3.1 Firm-specific determinants of the capital structure

Most capital structure studies show firm-specific determinants that have a positive or negative impact on the capital structure of SMEs. A positive impact indicates that an SME takes on more debt and a negative impact indicates that the firm takes on less debt. In this thesis, the most important firm determinants are discussed to test the pecking order theory and agency theory. As mentioned earlier, the trade-off theory is not considered for SMEs. The previous studies of the firm-specific determinants show that profitability, asset structure, growth, size, and age are the most important firm-specific determinants of the capital structure of SMEs. I will use these determinants to test the pecking order theory and agency theory.

Profitability: according to the pecking order theory of Myers (1984), firms prefer internal financing over external financing. Firms with higher profitability have more internal financing available and may use this as a primary source of financing. Studies on SMEs show a significant negative impact of profitability on debt (Sogorb-Mira, 2005; Michaelas et al., 1999; López-Gracia & Sogorb-Mira, 2008). However, on the one hand, Michaelas et al. (1999) show that profitability has a larger negative impact on long-term than short-term debt. They discuss that SMEs prefer short-term debt and that long-term debt will be substituted first by internal financing. On the other hand, short-term debt carries higher interest rates and can be amortized more easily. This would indicate a stronger effect on short-term debt (Degryse et al., 2012). This is supported by several SME studies (Cassar & Holmes, 2003; Sogorb-Mira, 2005; Van der Wijst & Thurik, 1993).

Asset structure: Jensen and Meckling (1976) say that there will be always agency costs between equity and debt investors. These conflicts arise when there is a risk of default. However, equity agency costs are very low or even zero in SMEs because most of the owners of an SME are also the managers. Nevertheless, there is still an agency conflict between equity holders and lenders. Michaelas et al. (1999) suggest that it is common for lenders to require collateral as insurance. Collateral also reduce the problems resulting from the information asymmetry. Information

asymmetry plays an important role in SMEs context. As previously stated, SMEs do not have to provide financial statements. Therefore, firms which have fixed assets with high collateral value may have easier access to external finance and are likely to have higher levels of debt relative to firms with lower levels of collateralizable assets (Michaelas et al., 1999). The study of Degryse et al. (2012), Sogorb-Mira (2005), and Psillaki and Daskalakis, (2009) show a positive impact of collateral on the debt of SMEs.

Growth: The pecking order theory suggests that firms with high growth potential usually need external finance because the investment needs exceed internal funds. Likewise, firms with high growth opportunities fund themselves with external finance to finance all the positive net present investments. Degryse et al. (2012), Michaelas et al. (1999), and Sogorb-Mira (2005) find a positive impact of growth opportunities on the debt of SMEs.

Age: Michaelas et al. (1999) and Hall et al. (2004) suggest that age is negatively related to debt because young firms tend to be more financed by debt while older firms rely more on retained earnings. Berger and Udell (1998) suggest that older firms can use retained earnings relatively more easily. The results of previous studies of SMEs who tested the impact of age on debt shows a significant negative impact (Michaelas et al., 1999; Heyman et al., 2008; Hall et al., 2000).

Size: Large firms tend to be less volatile in earnings which reduces the chance of bankruptcy. Less volatility in earnings can also reduce problems in asymmetric information (Fama & French, 2002). This will result in a decrease in costs of debt compared to other sources of finance because less volatile earnings reduce indirect bankruptcy costs so firms can take on more debt. The pecking order theory also predicts a positive impact of firm size on debt because less volatile earnings and more diversification mitigate information asymmetry problems. Even though this research is only focused on SMEs, there can still be differences in the size of these companies. Sogorb-Mira (2005), Degryse et al. (2012), and López-Gracia and Sogorb-Mira (2008) find a positive impact of firm size on the debt of SMEs.

2.3.2 Industry-specific determinants of the capital structure

An organization must find a match between the demands of its competitive environment and its internal management system to survive and succeed (Venkatraman, 1990). The management system and the organizational structure must be aligned with each other to overcome environmental obstacles (Drazin & Van de Ven, 1985). According to Hambrick (1984), there are only a few uniformly effective designs that can match the environmental obstacles in a given environmental context (Simerly & Li, 2000). So, at the industry level, this means that some environmental characteristics are likely to affect all organizations within that industry in the same way. These environmental characteristics can influence different industries in other ways. Harris and Raviv (1995) and Kayo and Kimura (2011) say that it is reasonable to assume that firms in the same industry have similar behaviour

regarding financing decisions and that these patterns differ across industries. Harris and Raviv (1995) show a strong impact of industry classification on average firm debt level ratio. Moreover, Bradley et al. (1984) show that industry is a significant determinant of leverage and shows that there is more variation between industries than in firm leverage ratios within industries. This shows the existence consistency within an industry and differences across industries.

Gaud et al. (2005) show that the industry in which a firm operates also affect SMEs. SMEs within a given industry also face similar prevailing circumstances and tend to adopt an equivalent financing pattern. In addition, Hall et al. (2004) provided evidence that agency costs may also vary across industries and gives inter-industry differences in the debt of SMEs. La Rocca et al. (2011) suggest that industry-specific characteristics affect the role of business risk, tangible assets, and growth opportunities and therefore influence the debt ratio. So, industry-specific determinants may have an impact on the capital structure of SMEs.

Most studies on industry determinants of the capital structure of a firm have been tested using industry effects using a dummy variable or median industry variables like the study of De Jong, Kabir, & Nguyen, (2008), and Degryse et al. (2012). Mackay and Philips (2005) analyze a single industry-specific determinant, industry concentration. Dess and Beard (1984) analyze industry-specific determinants through three determinants: dynamism, munificence, and concentration. Kayo and Kimura (2011) and Smith, Chen, and Anderson (2015) used the three industry-specific determinants used by Dess and Beard (1984). Other industry-specific variables have been used to investigate the impact on capital structure. However, these industry-specific determinants overlap with the previously mentioned determinants. Brook, Faff, and McKenzie (1998) use industry beta, this overlaps with industry-specific determinant dynamism that (explained below) measures market instability. The industry growth rate is also used as an industry-specific variable by Mcdougall et al. (1994), which in turn is measured by munificence. Therefore, the focus will be on, dynamism, munificence, and concentration as industry-specific determinants of capital structure because, to the best of my knowledge, these are the most used industry-specific determinants of capital structure.

Dynamism (also known as environmental dynamism) refers to the degree of market instability or unpredictable change (Mintzberg, 1979; Dess & Beard, 1984). Market instability comes from the limited knowledge available to determine the outcome in the future. A good example may be the dot.com bubble. In this time the knowledge of the expected impact of the internet on the economy was limited. The available information was relatively limited and so the market uncertainty was high. This led to an unpredictable change in 2000, where the market collapsed. Thus, an increase in environmental dynamism will result in an increased inability of actors' (top managers, stockholders, debtholders, and others) to assess accurately the present and future state of the environment (Simerly & Li, 2000). The inability to predict the future reduces their ability to determine the potential impact

of their decision on current and future business activities (Milliken, 1987). Dess and Beard (1984) say that firms try to deal with uncertainty by incorporate strategies and tactics like a risk management department, long-term contracts, buffering, and information processing. The concept of an individual firm's business risk and industry dynamism may be interrelated. Firms operating in a highly dynamic industry may have a higher probability of bankruptcy or a higher level of business risks. Furthermore, firms operating in the same given industry tend to have similar products, using similar technologies and have similar labour and material costs, hence showing similar patterns of business risks (Dess & Beard 1984; Kayo & Kimura, 2011). Firms operating in low dynamic industries are often held under severe government control, which shows that the market is highly regulated, and the business risks are low (McArthur & Nystrom, 1991). In this way, industry-wide risks have a relation on the capital structure decision making of a firm which is related to the concept of an individual firm's business risks (Kayo & Kimura, 2011). According to Ferri and Jones (1979) which expects that the larger the business risk the lower the level of firm leverage because variability in profit is an estimate of the firm's ability to pay off their fixed obligations. This high variability in profits could lead to an increase in financial distress costs. Simerly and Li (2000) argue that riskier business activities, associated with more dynamism, may find it more difficult to find debtors since debtors may prefer not to invest in firms with riskier business activities. Or debt may be more expensive because it reflects the increased risk of uncertainty. Creditors may therefore oblige more control and limit the manager's ability to control the firm in their way.

Another industry-specific determinant is munificence (also known as environmental munificence). Munificence refers to the extent of the capacity of an environment to maintain sustained growth (Dess & Beard, 1984). According to Dess and Beard (1984) munificence is related to the rate of sales and growth opportunities serve as a key indicator of munificence. Aldrich, (1979) say that sustained growth allows firms in munificent environments to build abundance resources. These abundance resources could be reflected as organizational slack. This organizational slack can turn in a buffer for the organization during periods of scarcity. Firms operating in a growing industry often need additional external financing to cover their investment opportunities because internal financing may not be enough to cover up for all further opportunities (La Rocca et al., 2011). So, firms operating in high munificent industries tend to have an abundance of resources, plenty of growth opportunities, and high profitability (Kayo & Kimura, 2011). On the contrary, firms in a low munificent industry have fewer growth opportunities, profitability starts to sustain at a certain level, or even start to decline (Kayo & Kimura, 2011). On the one hand, firms operating in high growth industries have stronger incentives to signal that they do not involve in moral hazard costs and adverse selection in the form of asset substitution and underinvestment. On the other hand, firms operating in low growth industries would use debt because of their disciplinary purpose to avoid the misuse of free cash flows (La Rocca

et al., 2011). But SMEs in high growth industries have a higher demand for funds and hence, have a higher preference for external financing through debt (Michaelas et al., 1999). Young firms, and particularly young firms operating in fast-growing industries tend to have higher external financing requirements than firms in low growth industries.

Lastly, concentration (also known as environmental concentration or industry concentration) which describes the degree of heterogeneity and dispersion of the activities of an organization (Dess and Beard, 1984). Firms operating in a highly concentrated industry (less competitive) tend to have a high market share and are exposed to a low business risk (more distance from bankruptcy) because firms operating in highly concentrated industries have often plenty of resources available (Kayo & Kimura, 2011).

2.3.3 Country-specific determinants of the capital structure

A level higher than industry-specific determinants are the country-specific determinants that may influence the capital structure. Conflicts between corporate insiders and external investors are important factors that form policy and productivity (Fan et al., 2011). As discussed by La porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) which say that contracts can be used to ease these conflicts depends on the legal system. This involves the quality of their enforcement and the content of the law. Fan et al. (2011) say that financial instruments (e.g. short-term debt) that allow insiders less discretion and are contractually better to understand are expected to dominate in countries with weak laws and enforcement. La Porta et al., (1998) show variation between the legal protection of external investors across both developing and developed countries. They argue that legal systems based on common law offer investors better protection than countries based on civil law. Hence, this could indicate that common law countries use more outside equity and long-term debt. Demirguc-Kunt and Maksimovic (1999) find that firms have more long-term debt in countries where the legal system is more integer. Integer reflects the extent of individuals who are willing to rely on the legal system to implement laws and enforce contracts. Moreover, Fan et al. (2011) say that firms in more corrupt countries use more debt relative to equity because it is easier to expropriate equity holders than debt holders.

The tax system in general and specifically the tax system on interest and dividend payments have been a recognized relation on the capital structure (Fan et al., 2011). Fan et al. (2011) expect that debt will be lower in countries with tax relief systems (reduced rate for dividend payments at the personal level) or dividend imputation (firm can deduct interest payments, however, the domestic shareholder of a firm get a tax credit for the taxes paid by the firm) than in countries with classical tax systems (dividend payments are taxed at corporate and personal levels and interest payments are deductible corporate expenses).

Bond market development has a positive relationship on the firm-level of debt because firms have more options to borrow and lenders are more willing to provide a loan (De Jong et al., 2008). Development of the stock market reduces the costs of equity because firms have more supply of funding (De Jong et al., 2008). They show a positive impact on bond market development and the level of debt.

2.4 Empirical evidence on industry-specific determinants

In this chapter, empirical evidence about industry-specific determinants of the capital structure is discussed because the focus of this thesis is on the industry-specific determinants of the capital structure.

2.4.1 Dynamism and the capital structure

Chung (1993), Thies and Klock (1992), and Baker (1973) show that the output of market uncertainty (dynamism increased) have a negative impact on the debt of firms. This indicates that firms with relatively low levels of market uncertainty will have higher levels of debt. Smith et al. (2015) study the adjustment speed towards their target debt leverages ratios with industry characteristics. Smith et al. (2015) suggest that the greater the industry dynamism and the more their leverage ratio exceeds their target leverage ratios, the more likely they adjust towards their target leverage ratios. Firms in high volatile industries are likely to have higher business risks and may consequently adjust back to their targets to reduce the potential of financial distress. Firms in low industry dynamism with above-target leverage ratios also show a negative impact on the firms' debt. Thus, the lower the industry dynamism, and the more their leverage ratio surpasses their target leverage ratios, the more likely firms adjust towards their target leverage ratios. This is not the case for firms in less dynamic industries with below target debt where the coefficient is not significant. Furthermore, Smith et al. (2015) suggest that these firms adjust to their target leverage ratios faster than firms in high dynamic industries. A possible explanation for this is that firms in low dynamic industries have greater stability in sales growth which allows them to adjust back faster to their target ratios by just use retaining earnings or paying off debt faster. So, based on the adjustment speed both firms in high dynamism and low dynamism industries reduce their debt ratio when this exceeds their target debt ratio.

McArthur and Nystrom (1991) show a positive statistically significant effect of dynamism as a moderate variable on performance. The pecking order theory predicts that firms with higher risk (high dynamism environments) have higher volatility in their profits and will, therefore, use internal finance as the first finance source for new investments. This would lead to lower levels of debt. According to D'aveni (1994) firms in high dynamism environment investing in firm-specific investments that build temporary competitive advantages entails greater risk. Since firm-specific investments have limited economic value in alternative strategies. If the investments are unexpectedly terminated due to

environmental changes, firms can barely reuse their initial investment (D'Aveni, 1994; Grimm & Smith, 1997).

The agency theory predicts that firms chasing riskier business activities, which are associated in more dynamic environments, tend to find it difficult and undesirable to use a greater amount of debt. Simerly and Li (2000) show a negative impact of the moderator dynamism of leverage on firm performance in high dynamism industries. Simerly and Li (2002) show that firms in stable environments (lower dynamism), debt has a positive impact on firm performance and in high dynamic environments, debt has a negative impact on firm performance. As Allen (1993) argues that bank in stable environments (low dynamism) may have a better source of financing for risky projects and that the stock market may be a better source of financing for firms in dynamic environments.

2.4.2 Munificence and the capital structure

Sinha and Samanta (2018), Haron (1991), Chung (1993), and Yasin (2014) show that munificence has a negative impact on debt. Smith et al. (2015) find a positive and significant impact of munificence on the debt of firms. This is significant in both high- and low munificence industries. So, irrespective of their existing levels of debt, firms in both high and low munificence industries tend to increase their debt. So, most of the studies on the impact of munificence on the debt of firms show a negative impact. This supports the pecking order theory since munificence reflects the higher profitability, firms in high munificence environments have more retained earnings and thus needs less debt.

McArthur and Nystrom (1991) study the impact of munificence on performance. They found no significant impact of munificence on performance. So, firms in less munificent industries do not tend to have lower performance. This contradicts Kayo and Kimura (2011) who claim that firms in high munificence industries tend to have higher profitability. Yet, Rajagopalan, Rasheed, and Datta (1993) show that munificent environments, like high growth industries with plenty of resource sources, significantly varies from less munificent environments, like mature industries with declining growth and increasing competition. Also, firms in low munificence environments dedicate greater attention to understanding threats (Khandwalla, 1973). Moreover, Staw and Szwajkowski (1975) found that firms operating in less munificent environments are more likely to engage in irresponsible action to gain external resources to support their survival. While Chen, Zeng, and Ma (2017) found that firms in munificent environments do not necessarily invest in environmentally responsible actions.

2.4.3 Industry concentration and the capital structure

Sinha and Samanta (2018) show a positive impact of industry concentration on the debt of firms. Smith et al. (2015) show that the lower the industry concentration and the more their leverage ratio exceeds their target leverage ratios, firms are more likely to reduce their debt or by retaining earnings. This suggests that firms with less market power are more likely to move back to target debt ratios. Almazan and Molina (2005) show a positive impact of concentration on short-term debt. However, Scott's

(1980) results show that short-term debt decreases with market concentration. This indicates that creditors may view firms in more concentrated industries less risky and therefore lend for longer periods. Chen et al. (2017) show that concentration has a negative impact on corporate environmental responsibility. Kayo and Kimura (2011) show a negative impact of concentration on the debt of a firm. So, firms in highly concentrated industries have lower levels of debt. However, this is in contrast with the results of Mackay and Philips (2005). They found that firms in more concentrated industries have higher levels of debt. Lyandres (2006) show a negative significant impact of the number of firms in an industry on leverage. More number of firms in an industry are associated with highly competitive industries (low concentration). Considering this, this result is in line with Mackay and Philips (2005) and the opposite of the results of Kayo and Kimura (2011) as described before.

2.5 Hypothesis formulation

In this chapter, the hypotheses are formed and analyzed. This thesis will test the effect of dynamism, munificence, and industry concentration on the capital structure of Dutch SMEs.

2.5.1 Impact of dynamism on the capital structure

Dynamism reflects the level of non-predictable change or instability of an industry (Kayo, & Kimura, 2011). According to Palmer and Wiseman (1999) dynamism threatens a firm's survivability because firms in more dynamic industries find it harder to respond to required changes and will face considerable levels of volatility in firm performances. An increase in industrial volatility makes it more difficult for managers to determine the outcomes of their decisions to mitigate these contextual effects. The concepts of dynamism and individual business risk may be interconnected. Firms operating in very dynamic industries may have a high level of business risk. Ferri and Jones (1979) say that business risk can be described as the expected variability in future income. High volatility of profits may lead to financial distress because of the uncertainty to be able to pay fixed obligations. Therefore, it is attractive to keep a low level of leverage (Ferri & Jones, 1979). Companies in the same sectors often show the same patterns or business risk, they deliver the same products/services, have similar labour costs, and depend on the same technology (Ferri & Jones, 1979). So, Kayo and Kimura (2011) suggest that firms in a more dynamic (less predictable) industry have smaller debt levels because an industry that aggregates these riskier firms also have lower average leverage. The agency theory predicts that firms chasing riskier business activities, which are associated with more dynamic environments, tend to find it more difficult and more undesirable to use a greater amount of debt because debt may be more expensive due to the higher risk of uncertainty (Kraus & Lizenberger, 1973).

Smith et al. (2015) show that firms operating in highly dynamic industries with above-average debt levels will quickly adjust their debt level by decreasing debt or raising equity to avoid financial distress. Kayo and Kimura (2011) show a negative impact of dynamism on debt. Thies and Klock (1992)

show a negative impact of dynamism on long-term debt. Chung (1993) show that market uncertainty has a negative impact on debt. Simerly and Li (2000) show that debt in a highly dynamic industry has a negative impact on firm performance.

Given the above literature and empirical evidence, Firms operating in riskier industries (higher dynamism) have lower levels of debt because of the uncertainty of the firm's ability to pay their fixed debt obligations because of the high-profit volatility of these firms. The hypothesis is, therefore:

H1: Dynamism has a negative impact on debt.

2.5.2 Impact of munificence on the capital structure

Another determinant that could influence Dutch SMEs is munificence. Munificence is the environmental ability to support sustained growth by looking at the abundance of resources in the environment (Kaya & Kimura, 2011; Dess & Beard, 1984). A munificent context indicates external growth opportunities that allow firms to create organizational resources by accumulating high financial revenues (Dess & Beard, 1984). According to Dess and Beard (1984), environments with high munificence have a low level of competition, plentiful resources, and high profitability. Given this nature, it is logical that companies operating in munificent industries tend to have high levels of profitability because munificence supports consistent growth, low competition, and abundant resources. On the other hand, less munificent industries could show scarcity or hostility, which worsens the business conditions for firms with low-profit margin forecasting. Moreover, this offers a smaller number of growth opportunities (Chen et al., 2017). Staw and Szwajkowski (1975) found that organizations competing in an environment characterized by low munificence tend to engage more in irresponsible action to attain external resources to survive. Munificence is related to profitability and growth. At the firm level, the theoretical stream of the pecking order theory expects a negative impact of profitability on leverage because, due to information asymmetry, preference is given to internal financing over external financing. And since a firm with high profitability has more retained earnings at its disposal, a negative impact is expected.

Yasin (2014) shows a negative impact of munificence on debt. Baker (1973) says that industries with larger growth rates (high munificence) have higher ratios of equity to assets. Sinha and Samanta (2018), Kayo and Kimura (2011), and Haron (2018) show a negative impact of munificence on debt.

The impact can be tested in two ways: profitability and growth opportunities because munificence is interrelated to these two factors. The first is from profitability where a negative impact of profitability on debt is expected because firms prefer internal financing to external financing to finance investments due to information asymmetry. Therefore, the first hypothesis for munificence (a) is:

H2a: Munificence has a negative impact on debt.

The second is from growth opportunities. A positive impact is expected because if a firm has many positive net present value opportunities, they may not have sufficient retained earnings to finance all investments. Consequently, take on external finance to cover up the deficit. Therefore, the second (b) hypothesis is:

H2b: Munificence has a positive impact on debt.

2.5.3 Impact of industry concentration on the capital structure

The influence of industry concentration on leverage will be addressed. Concentration is a derivative of complexity which refers to the heterogeneity within an industry (Dess & Beard, 1984). Complexity is likely to increase as industry concentration declines because numerous firms in the industry make external factors more diverse. High complexity (low concentration) goes hand in hand with fierce competition resulting in tighter profit margins (Chen et al., 2017). According to Mackay and Phillips (2005) firms operating in highly concentrated industries are being exposed to lower risk. They have higher and more stable levels of profitability. And they tend to use more debt than firms in low concentrated industries that are more exposed to risk, lower and unstable profitability and therefore use less debt. According to Smith et al. (2015) firms in competitive industries tend to have less market power and they may consider themselves at a disadvantage if they deviate from their optimal level of leverage. For that reason, these firms may have a higher incentive to move to their optimal leverage target where the difference between the tax advantages and costs of debt is the highest. Kayo and Kimura (2011) suggest that in higher concentrated industries, size, profitability, and risk are also higher. The higher risk is an incentive of equity holders to pursue riskier strategies if the debt is too high because shareholders ignore reduction in returns in bankrupt states (Brander & Lewis, 1986)

The study of Mackay and Phillips (2005) shows that highly concentrated industries have higher levels of leverage than industries with low concentration levels. Lyandres (2006) show also that the number of firms in an industry has a negative impact on debt. Kayo and Kimura (2011) show a negative impact of concentration on debt. They suggest that industrial concentration may affect leverage in different ways depending on the country's characteristics. Mackay and Phillips (2005) say that firms in higher concentrated industries are often larger in sizes than firms in low concentrated industries.

Firm size is positively related to debt because information costs are lower for larger firms because of better transparency and accuracy of financial information (Psillaki & Daskalakis, 2009). Firms in high concentrated industries have more market power and more stable levels of profitability and can therefore permit themselves to use more debt.

Therefore, the next hypothesis is:

H3: Industry concentration has a positive impact on debt.

3. Methodology

This chapter discusses the method used to test the hypothesis. First, the research model is explained. Second, the dependent, independent, and control variables are explained, and lastly the dataset.

3.1 Research model

Previous research investigating the impact of firm-specific variables on capital structure often relied on ordinary least squares regression (OLS) (Hall et al., 2004; Psillaki & Daskalakis, 2009; Rajan & Zingales, 1995; Cassar & Holmes, 2003). OLS is the most common form of linear regression. OLS explains the relationship between a dependent variable and one or multiple independent variables. OLS chooses the parameters of a linear function of explanatory variables by minimizing the sum of squares of the residuals. This means that OLS determines the regression coefficient in a way that the regression lines lie as close as possible to the observed data. The difference between the regression line and an observed data point is called a residual. There are several assumptions the OLS needs to meet to become a valid regression model. These assumptions are linearity, homoscedasticity, normality, independence, and no multicollinearity.

However, this thesis also includes industry-specific determinants. Fama and French (2002) say that the use of cross-section regressions ignores the correlations of residuals across firms and that panel regressions lead to problems of correlated residuals. The assumption of independent observations is violated because observations of one individual are more related to each other than observation across different individuals (Van Duijn, Busschbach & Snijders, 1999). The capital structure determinants of this thesis can be divided into two levels: level 1, firm-specific determinants, and level 2, industry-specific determinants. The expectation is that the characteristics of a higher-level are likely to influence the characteristics of a lower level (industry characteristics are likely to influence firm characteristics). As an example, firms (lower level) operating in a given industry (higher level) show similar patterns of behaviour and, therefore, have comparable leverage ratios (Kayo & Kimura, 2011). So, firms may have a strong within-cluster correlation. But these firms may vary from other firms of different industries. This will lead to differences across clusters. Kayo and Kimura (2011), Smith et al. (2015), and Simerly and Li (2000) use multilevel modelling to mitigate the econometric problems in their research. Therefore, multilevel modelling is applied to take nested data into account. Moreover, with the multilevel model, the variance decomposition of the different levels can be examined.

A multilevel model varies at more than one level and is appropriate for studies where data of individuals are grouped at more than one level (nested data) (Aitkin & Longford, 1986). This thesis also used nested data because firms are nested in their industry. The level of analysis is usually individuals (level 1) who are nested in a higher level (level 2). So, as mentioned before, firms (level 1) are nested in industries (level 2). Multilevel model is hardly used in research regarding capital structure, and the

topic of this thesis is rarely investigated by other scholars, hence the evidence is scarce. Kayo and Kimura (2011) applied a multilevel model in their research into determinants of capital structure and to the best of my knowledge they are the only ones who have applied this. Therefore, the method of Kayo and Kimura (2011) is used as a basis.

3.1.1 Empty model

The first step in the analysis is to develop an empty model. In this model, independent variables are not included. The empty model ignores fixed effects and focuses on random effects (Aitkin & Longford, 1986). This provides information about the variance of the dependent variable, which estimates the relative importance of each level in the variance of leverage (Kayo and Kimura, 2011).

The empty model is specified by Eq. (1a)–(1c). Eq. (1a) where LEV_{ijt} refers to the average leverage of firm i , which operates in industry j , in year t . LEV_{ijt} is a function of the mean leverage of firm i in a given industry j (β_{0ij}) and a random error of the variance across time (e_{ijt}).

$$LEV_{ijt} = \beta_{0ij} + e_{ijt} \quad (1a)$$

Eq. (1b) show the analysis of firm-level, where y_{00j} refers to the mean leverage of industry j and a random error r_{0ij} which refers to the variance between firms.

$$\beta_{0ij} = y_{00j} + r_{0ij} \quad (1b)$$

Eq. (1c) specifies the analysis of the industry level, where δ_{00} refers to the overall mean and s_{00j0} refer to the random error of the variance between industries.

$$y_{00j} = \delta_{00} + s_{00j0} \quad (1c)$$

By consolidating Eqs. (1a)–(1c), the mixed-effect model in Eq. (1d) is obtained. Eq. (1d) is our model 1. The intraclass correlation can be calculated which gives the proportion of the total variation at the industry level (Kayo & Kimura, 2011). The terms s_{00j0} , r_{0ij} , and e_{ijt} correspond to the random effects, which variances represent the importance of industry, firm, and time, respectively. To test the significance of industry effects, a likelihood ratio test can be performed to compare the empty multilevel model with an empty single-level model (Aitkin & Longford, 1986; Berkhof & Snijders, 2001).

$$LEV_{ijt} = \delta_{00} + s_{00j0} + r_{0ij} + e_{ijt} \quad (1d)$$

3.1.2 Random-intercept model with covariates

After the variance decomposition of leverage through the empty model, the basic model is extended with explanatory variables as determinants of random intercepts (Sinha & Samanta, 2018). The intercept of the group regression may vary between industries. This means that the intercept can take different values. While the intercept can vary between industries, the slope is assumed to remain the

same (Kayo and Kimura, 2011). The inclusion of explanatory variables happens gradually in subsequent models according to the hierarchical level of the variables. So, in this analysis, the variables related to firm-level are included first, and the industry-level variables second. Model 2 will include the firm-level determinants outlined in section 2. The firm-specific determinants are included in our model 2. These are: Profitability ($PROFIT_{ijt}$), asset structure ($ASSET_{ijt}$), growth ($GROWTH_{ijt}$), age (AGE_{ijt}) and size ($SIZE_{ijt}$). A time dummy ($Year_{ijt}$) variable is included to represent each year in the analysis, except for the first year. This leads to Eq. (2a). Eq. (2a) is our model 2.

$$LEV_{ijt} = \beta_{0ij} + \beta_{1ij}PROFIT_{ijt} + \beta_{2ij}ASSET_{ijt} + \beta_{3ij}GROWTH_{ijt} \quad (2)$$

$$+ \beta_{4ij}AGE_{ijt} + \beta_{5ij}SIZE_{ijt} + \beta_{6ij}Year_{ijt} + e_{ijt}$$

Subsequently, the variables related to the industry-level are added separately which leads to model 3, 4 and 5. These variables are dynamism ($DYNAM_{jt}$), munificence (MUN_{jt}) and industry concentration ($CONC_{jt}$). β_{0ij} will now be a random variable determined by industry-specific variables and a random error which represent the variance between firms (r_{0ij}).

$$\beta_{0ij} = \gamma_{00j} + \gamma_{01j}DYNAM_{jt} + \gamma_{02j}MUN_{jt} + \gamma_{03j}CONC_{jt} + r_{0ij} \quad (3a)$$

Now, the different industry-specific variables are included separately. Dynamism is the first industry-level variable that is separately added which leads to Eq. (3b) and our model 3.

$$LEV_{ijt} = \delta_{00} + \gamma_{01j}DYNAM_{jt} + \beta_{1ij}PROFIT_{ijt} + \beta_{2ij}ASSET_{ijt} \quad (3b)$$

$$+ \beta_{3ij}GROWTH_{ijt} + \beta_{4ij}AGE_{ijt} + \beta_{5ij}SIZE_{ijt} + \beta_{6ij}Year_{ijt} + s_{00j0} + e_{ijt}$$

Munificence is the second industry-level variable that is separately added which leads to Eq. (4) and our model 4.

$$LEV_{ijt} = \delta_{00} + \gamma_{02j}MUN_{jt} + \beta_{1ij}PROFIT_{ijt} + \beta_{2ij}ASSET_{ijt} \quad (4)$$

$$+ \beta_{3ij}GROWTH_{ijt} + \beta_{4ij}AGE_{ijt} + \beta_{5ij}SIZE_{ijt} + \beta_{6ij}Year_{ijt} + s_{00j0} + r_{0ij} + e_{ijt}$$

Concentration is the third industry-level variable that is separately added which leads to Eq. (5) and our model 5.

$$LEV_{ijt} = \delta_{00} + \gamma_{03j}CONC_{jt} + \beta_{1ij}PROFIT_{ijt} + \beta_{2ij}ASSET_{ijt} \quad (5)$$

$$+ \beta_{3ij}GROWTH_{ijt} + \beta_{4ij}AGE_{ijt} + \beta_{5ij}SIZE_{ijt} + \beta_{6ij}Year_{ijt} + s_{00j0} + r_{0ij} + e_{ijt}$$

Combining equations (3b)-(5) produce our latest random-intercept model 6, Eq. (6).

$$LEV_{ijt} = \delta_{00} + y_{01j}DYNAM_{jt} + y_{02j}MUN_{jt} + y_{03j}CONC_{jt} + \beta_{1ij}PROFIT_{ijt} \quad (6)$$

$$+ \beta_{2ij}ASSET_{ijt} + \beta_{3ij}GROWTH_{ijt} + \beta_{4ij}AGE_{ijt} + \beta_{5ij}SIZE_{ijt} + \beta_{6ij}Year_{ijt} + s_{00j0} + r_{0ij} + e_{ijt}$$

3.1.3 Random-slope model with covariates

Now a more complex model is applied in addition to the random intercept. It is also assumed that the firm-level variables may vary across industries and are influenced by industry factors. By allowing the slope of firm-level variables to be random, the indirect influence of industry characteristics levels on leverage can be analysed (Kayo and Kimura, 2011). There is a relation between firm-level determinants growth and industry-specific determinant munificence and between the firm-level variable profitability and industry-level variable munificence. Since firms in high munificence industries are expected to have more profitability and growth (Sinha & Samanta, 2018; Kayo & Kimura, 2011). The new term in Eq. (7c) ($y_{11j}Z_{jt}$) and Eq. (7e) ($y_{21j}Z_{jt}$) represents the interaction between the industry-level variable and firm-level variable. So, written out in variables labels gives the following $y_{11j}MUN_{jt} * PROFIT_{ijt}$ and $y_{21j}MUN_{jt} * GROWTH_{ijt}$.

$$LEV_{ijt} = \beta_{0jt} + \beta_{1ij}PROFIT_{ijt} + \beta_{2ij}ASSET_{ijt} + \beta_{3ij}GROWTH_{ijt} \quad (7a)$$

$$+ \beta_{4ij}AGE_{ijt} + \beta_{5ij}SIZE_{ijt} + \beta_{6ij}Year_{ijt} + e_{ijt}$$

$$\beta_{0ij} = y_{00} + y_{01j}Z_{jt} + r_{0ij} \quad (7b)$$

$$\beta_{1jt} = y_{00} + y_{11j}Z_{1jt} + r_{1ij} \quad (7c)$$

$$\beta_{2jt} = y_{00} + r_{2ij} \quad (7d)$$

$$\beta_{3ij} = y_{00} + y_{21j}Z_{1jt} + r_{3ij} \quad (7e)$$

Consolidating Eqs. (7a)-(7e) leads to Eqs. (7f). Eqs. (7f) represents the complete set of hierarchical variables in simultaneous analysis of the industry and firm levels.

$$LEV_{ijt} = \delta_{00} + y_{01j}DYNAM_{jt} + y_{02j}MUN_{jt} + y_{03j}CONC_{jt} + \beta_{1ij}PROFIT_{ijt} \quad (7f)$$

$$+ \beta_{2ij}ASSET_{ijt} + \beta_{3ij}GROWTH_{ijt} + \beta_{4ij}AGE_{ijt} + \beta_{5ij}SIZE_{ijt} + \beta_{6ij}Year_{ijt}$$

$$+ y_{11j}(MUN_{jt} * PROFIT_{ijt}) + y_{21j}(MUN_{jt} * GROWTH_{ijt}) + r_{1ij}PROFIT_{ijt}$$

$$+ r_{2j}ASSET_{ijt} + r_{3ij}GROWTH_{ijt} + r_{4ij}AGE_{ijt} + r_{5ij}SIZE_{ijt} + s_{00j0} + r_{0ij} + e_{ijt}$$

To test the hypotheses, the random-intercept model with covariates and random-slope model with covariates are tested to see which model has the best model fit to determine which model is statistically better (Kayo & Kimura, 2011). The equation used for the random-intercept model is Eq. (6) and for random-slope model Eqs. (7f). The models are also compared with the models with

only firm variables to see whether adding industry-specific determinants leads to a better model fit (Sinha & Samanta, 2018; Kayo & Kimura, 2011). The model with the best fit can then be used to conclude the hypotheses.

3.2 Variables

In this chapter, the variables are explained in more detail. Starting at the dependent variables. Secondly the independent variables and at last the control variables.

3.2.1 Dependent variables

The most common dependent variable as a proxy for the capital structure is leverage. Leverage is defined as total debt over total assets (Psillaki & Daskalakis, 2008; Rajan & Zingales, 1995; Degryse et al., 2012; De Jong, 2002; Chen, 2004). Also, short- and long-term debt is split up and used separately as a dependent variable to better understand the different determinants on different leverages sorts. Long-term debt is defined as long-term debt over total assets (Degryse et al., 2012; Michaelas et al., 1999; Hall et al., 2004). Short-term debt is defined as short-term debt over total assets (Degryse et al., 2012; Hall et al., 2004; Michaelas et al., 1999). Degryse et al. (2012) state that market values are not known for SMEs and that most SME managers base their financial decisions on book values. Therefore, this thesis also measures debt by its book value.

3.2.2 independent variables

There are three different variables used to see the impact of industry-specific determinants on debt. Munificence describes the environment's capacity to support growth within an industry (Dess & Beard, 1984). The industry growth rate is a key indicator of the munificence context. Following the studies of Palmer and Wiseman (1999) and Keats and Hitt (1988), a five-year average growth in sales of the industry is taken to measure munificence. The average growth rate of the industry is calculated in two steps. First, the natural logarithm of the total industry sales and a variable of years, with time as an independent variable are regressed. Estimate for each given year is based on the five previous years (Boyd, 1995; Kayo & Kimura, 2011). As an example, the munificence estimate for 2008 is based on the data from 2004-2008. Then, the anti-log of the regression coefficient capturing the growth rate of sales is used as the measurement of munificence (Chen et al., 2015; Keats & Hitt, 1998). The equation for this indicator looks as follows: $y_t = \beta_0 + \beta_1 t + a_t$. Where y represents industry sales, t stands for year, and a is the residual.

Dynamism reflects the degree of volatility and non-predictable change of a given industry (Dess & Beard, 1984). According to Keats and Hitt (1988), dynamism is usually being measured as the volatility of industry sales. Following Keats and Hitt (1988) and Chen et al. (2015), the same measurement is taken to identify dynamism in this thesis. Following them, the anti-log of the standard

error of the regression coefficient of munificence is used to determine the volatility of the industry growth sales rates as a measurement for dynamism.

Lastly, industry concentration is measured. Concentration is often used to indicate the complexity of an industry (Kayo & Kimura, 2011; Chen et al., 2015; Keats and Hitt, 1988; Palmer & Wiseman, 1999). Complexity is often explained as the amount of heterogeneity in the general business context (Dess & Beard, 1984; Aldrich, 1979). Companies operating in highly concentrated industries will often use the same corporate strategy which results in considerable homogeneity (Miller & Friesen, 1984). This leads to a reduction in the complexity of that industry. In comparison, according to Palmer and Wiseman (1999) low concentrated industries often consist of numerous firms that apply all kinds of different strategies, leading to more complexity. To measure industry concentration the Herfindahl-Hirshman (HH) index is taken which is measured by the sum of the squares of market shares of firms within an industry (Kayo & Kimura, 2011; Smith et al., 2015; Mackay & Phillips, 2005). The market share of a specific company is represented by the ratio of its sales to the total sales in an industry. This can take a value between 0 and 1. where 0 represents 0% of the market share and 1 represents 100% of the market share. So, a higher HH-index indicate a more concentrated industry.

3.2.3 Control variables

The control variables are described below. These consist of the most commonly used firm-specific determinants of capital structure. Profitability is measured by the earnings before interest, tax, depreciation, and/or amortization divided by total assets (Degryse et al., 2012). Pecking order theory predicts a negative impact of profitability on leverage because internal financing is preferred over external financing. Asset structure will be measured as the tangible assets ratio, which is all fixed assets except intangible fixed assets and inventories divided by total assets (Sogorb-Mira, 2005; Titman & Wessels, 1998). Inventories are considered short-term assets and therefore have a poor collateral function (Degryse et al., 2012). Since assets can serve as collateral for taking on debt, a positive impact on debt is expected since collateral provides better security for lenders. The proxy for growth is measured by the relative yearly change in total assets (Degryse et al, 2012; Hall et al, 2000; Hall et al 2004). Firms that are growing fast often have insufficient internal financing to finance all positive net present value projects with internal funds. Therefore, these fast-growing companies often finance themselves with external finance. Age will be measured as the age of the firm in years since the incorporation year, so, the year 2020 minus the year of incorporation (Hall et al., 2004; Hall et al., 2000; López-Gracia & Sogorb-Mira, 2008; Michaelas et al., 1999). Berger and Udell (1998) suggest that older firms can use retained earnings relatively more easily. So, age will be negatively related to debt because, according to the pecking order theory, firms prefer internal financing over external financing (Michaelas et al., 1999; Hall et al., 2004). Size is defined as the log of the total assets (Degryse et al., 2012; De Jong et al., (2008). Degryse et al. (2012) say that firm size is an inverse proxy of bankruptcy

costs. Firm size is seen as a proxy for earnings volatility and larger firms are often more diversified and show less volatility. More diversified and less volatile earnings reduce information asymmetry problems. This decreases the cost of debt and, hence, a positive impact of firm size on debt is expected.

The definition of the variables is also described below in table 1.

Table 1. **Definition variables**

Variables	Description
Dependent variable	
Total debt	Total debt/total assets
Long-term debt	Long-term debt/total assets
Short-term debt	Short-term debt/total assets
Industry-specific variables	
Dynamism	Antilog of the standard error of the munificence regression slope coefficient.
Munificence	The natural logarithm of total industry sales and a variable of years (5 preceding years), with time serving as an independent variable. Then, the anti-log of the regression coefficient is taken.
Industry concentration	Herfindahl-index Sum of squares of market shares of firms with an industry
Control variables	
Profitability	EBITDA/total assets
Asset structure	Tangible assets/total assets
Growth	Tot. assets (t)-tot. assets (t-1)/tot. assets(t-1)
Age	Active operating years (2020 – incorporation year)
Size	Log of total assets (are in EU€ thousands)

3.3 Data

The data of the SMEs is gathered from the database of Reach, a Dutch database for SMEs. The database contains financial statements of Dutch SMEs. I have access to the data of Reach of Dutch SMEs from 2003-2012. The sample period used for this thesis is 2007 till 2012, 2003 to 2006 has been omitted because some variables depend on several previous years. The database holds data of 14549 firms in total. A company is included in the sample if the balance sheet total is equal or below 43 million euros and the number of employees is below 250¹. The data selection procedure is shown in table 2.

Since the data concerns Dutch SMEs, the European NACE-codes have been applied². These codes classify companies into given industries. The database is limited to manufacturing industries and divided into 2-digits NACE codes reaching from 10 till 33. There is no data from firms in the industry with NACE codes 12 and 19, so a total of 22 industries will be used. Remmers, Stonehill, Wright, and Beekhuisen (1974) argue that just increasing the number of industries in a study does increase the likelihood of adding one or several industries that have distinctive debt ratios. Mackay and Phillips

¹ this is in line with EUs' definition of an SME: https://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_en

²

https://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=NACE_RE_V2&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=HIERARCHIC

(2005) also use only manufacturing industries while also using an industry-specific determinant (concentration). Chen et al. (2015) also use only manufacturing firms to study the impact of industry-specific determinants (munificence, dynamism, and concentration) on corporate sustainability. Therefore, the database is limited to manufacturing firms.

Out of the 14549 SMEs, 4071 have been removed because there is no data on the selected criteria. 6225 SMEs have been removed because these SMEs operate in the financial sector, NACE codes from 64 till 66.3. Sectors that are not aimed at making a profit have also been removed. Examples of this are philosophical and political parties, sports, culture, recreation, and education. In total 47 of these SMEs have been removed. lastly, 227 SMEs are removed because their total balance exceeds 43 million euros. There are 3980 SMEs left that meet the requirements. Now only manufacturing companies are chosen with NACE codes from 10 till 33 leaving 499 companies. Table 2 provides an overview of the data filtering process. The distribution of SMEs among the various industries is shown in table 3.

Table 2. **Sample**

Actions	Company's filtered out	SMEs left	% of the total
Starting data	0	14550	100
No financial data	4071	10479	72
Financial sector	6225	4254	29
Not profit-orientated	47	4207	29
SME criteria	227	3980	27
NACE Codes 10-33	3481	499	4
Total	14051	499	4

Table 3. Classification industry

Industry	NACE code	Number of companies	%
Manufacture of food products	10	46	9
Manufacture of beverages	11	3	1
Manufacture of tobacco products	12	0	0
Manufacture of textiles	13	18	4
Manufacture of wearing apparel	14	10	2
Manufacture of leather and related products	15	4	1
Manufacture of wood and of products of food and cork, except furniture; manufacture of articles of straw and plaiting materials	16	13	3
Manufacture of paper and paper products	17	20	4
Printing and reproduction of recorded media	18	9	2
Manufacture of coke and refined petroleum products	19	0	0
Manufacture of chemicals and chemical products	20	17	3
Manufacture of basic pharmaceutical products and pharmaceutical preparations	21	8	2
Manufacture of rubber and plastic products	22	30	6
Manufacture of other non-metallic mineral products	23	21	4
Manufacture of basic metals	24	6	1
Manufacture of fabricated metal products, except machinery and equipment	25	71	14
Manufacture of computer, electronic and optical products	26	25	5
Manufacture of electrical equipment	27	19	4
Manufacture of machinery and equipment n.e.c.	28	88	18
Manufacture of motor vehicles, trailers, and semi-trailers	29	11	2
Manufacture of other transport equipment	30	19	4
Manufacture of furniture	31	21	4
Other manufacturing	32	27	5
Repair and installation of machinery and equipment	33	13	3
Total		499	100

4. Results

In this chapter, the results will be discussed. First, univariate analysis is performed. The descriptive statistics are compared and analysed with previous studies. Secondly, a bivariate analysis was performed in which the correlation matrix is explained in more detail. Lastly, the results of the multi-level analysis are discussed.

4.1 Descriptive statistics

The descriptive statistics of this thesis over the period of 2007-2012 are shown in table 4. To avoid the influence of outliers, all variables were winsorized at the level 5% on both sides of the distribution. To test for normality, the error terms at every level of the model should be normally distributed because it can produce unstable predictions when the assumption of normality is not met (Ryan, 1997). This can be tested by analyzing a histogram, the Predicted Probability (P-P) plot, and by comparing mean and median (Anderson & Schumacker, 2003). The P-P plots and the histograms are included in appendix A. The histograms in Appendix A show that it can be assumed that the residuals for total debt, long-term debt, and short-term debt are normally distributed. The histogram of long-term debt seems the most skewed. However, it seems acceptable for a normal distribution. The P-P plots follow the normally distributed line and confirm that the residuals are normally distributed (De Veaux, Velleman, & Bock, 2007). If the mean values are compared with the median values, it becomes clear that these two are relatively close to each other for the variables total debt, short-term debt, dynamism, munificence, profitability, asset structure, and size. The other variables, namely: long-term debt, industry concentration, growth, and age, show a higher mean value compare to the median values. This suggests that these variables are a bit right-skewed. Two different scatterplots have been made to test homoscedasticity (De Veaux, Velleman, & Bock, 2007). The first scatterplot is the dependent variable against the residual and for the other, the predicted values are plotted against the residual values. These scatterplots are shown in appendix A. It can be seen from these scatterplots that the values are equally distributed. So, it can be concluded that the residuals are normally distributed and homoscedastic. Therefore, the linearity assumption is valid.

The mean and/or median values of the descriptive statistics in table 4 are now being compared with other studies on European SMEs. The industry-specific variables are compared with other studies because not much research has been done on Dutch SMEs regarding these variables. The three dependent variables are now compared. The mean and median values for the total debt variable are, respectively, 0.607 and 0.606. The total debt mean seems a bit higher than the values found by Hall et al. (2004) of 0.484 which used European SMEs in 1995. Gaud et al. (2005) show a mean of 0.566 in a time of 1991-2000 for Swiss companies. Degryse et al. (2012) researched Dutch SMEs from 2002 to 2005 and show a mean value of 0.492. The data of this thesis shows in comparison to the other studies

a relatively higher debt ratio. The data of this thesis is of a later period: 2007-2012. Given that this period is around the financial crisis, the reason for the higher debt ratio is not entirely clear given the reluctant policy of banks to lend money. A possible reason could be that companies take on extra loans to survive the crisis. Another reason could be that assets have become less valuable, so the debt ratio will increase as a result. The total debt could change over time. The long-term debt variable the mean and median are respectively, 0.206 and 0.164. Degryse et al. (2012) find a mean of 0.308 which is higher than ours. Hall et al. (2004) find a long-term debt ratio of (0.021) which seems considerably lower. A possible explanation for the lower debt compared to the study of Degryse et al. (2012) could be that the financial crisis reduced the firm's long-term debt. Michaelas et al. (1999) show a long-term debt value of 0.119. The mean and median values of short-term debt are respectively, 0.394 and 0.377. Degryse et al. (2012) indicate a short-term debt value of (0.184). Hall et al. (2004) find a short-term debt value of 0.463. It seems that short-term debt varies between studies. It may be that just after the crisis, SMEs are taking on more loans in the form of short-term debt, given that banks are reluctant to lend money.

The three industry-specific variables are now being compared. Chen et al. (2017) find a mean value of (1.04) for dynamism. The data contains Shanghai and Shenzhen public listed companies from 2008 to 2010. The mean of dynamism in this thesis is 1.011. Keats and Hitt (1988) show a mean of 1.11. Keats and Hitt (1988) used companies in the Fortune 500 (500 largest U.S. companies). So, our dynamism is lower than the study of Chen et al. (2017) and identical to the study of Keats and Hitt (1988) so it seems comparable to these two studies. Dynamism is measured by the volatility of industry sales. So, the volatility of an industry is compared to the volatility of all industries. A mean of 1 indicates that the industry moves the same as all industries together. A value below 1 indicates that an industry is more stable than most industries. A value above 1.0 indicates that the industry is more volatile than other industries. So, our mean of 1.11 indicates that an industry is more volatile than most industries. The mean value of munificence is 0.980 compared to a mean value of 1.21 of the study by Chen et al. (2017) and a mean of 1.11 of Keats and Hitt (1988). Our munificence mean seems quite lower than the other study. Munificence shows an index value of the average growth rate of the industry. A value above 1.0 indicates growth and below 1.0 negative growth. So, the mean in this thesis of 0.98 indicates that the industry average sale growth rate has decreased by 2%. For industry concentration, I find a mean of 0.022. Chen et al. (2017) show a mean of 0.06. Industry concentration can have a value between 0 and 1. The more there is a concentration of the total turnover with one provider, the higher the index. A mean of 0.022 indicates that on average each provider has 2.2% of the market share.

Lastly, the control variables are compared to previous studies (firm-specific variables). The mean of profitability is 0.126. Degryse et al. (2012) show a mean of 0.153. Gaud et al. (2005) found a mean of 0.077. Michaelas et al. (1999) find a mean of 0.069. The mean for asset structure is 0.31 which

is lower than the means of 0.49 and 0.353, which are reported by Degryse et al. (2012) and Michaelas et al. (1999) respectively. However, it is higher than the mean of 0.248 in the study of Psillaki and Daskalakis (2009) and Hall et al. (2004) which reported a mean of 0.301. This may suggest that Dutch SMEs have fewer collateral assets, which may have to do with the provision of mortgage to SMEs since the financial crisis. Growth shows a mean of 0.062. This mean is lower than the mean of Degryse et al. (2012) which shows a mean of 0.133. For the variable age, I find a mean of 29.354. Hall et al. (2004) show a mean of 23.4 and Hall et al. (2000) have a mean of 21. So, the mean value of age looks a bit higher than those two studies of European SMEs. The last variable is firm size with a mean value of (9.397). The geometric mean indicates approximately 12 thousand, which means that on average an SME from this sample has 12 million in assets. The original total assets (not presented) showed a mean of 12.5 million. Mackay and Phillips (2005) have a mean of 4.406 for companies in competitive industries in the US and a mean of 5.826 for companies in concentrated industries. Degryse et al (2012) find a mean of 6.045. However, it is unclear whether these studies have also calculated total assets in thousands.

Table 4. Descriptive statistics

Variable	N	Mean	STD	Median	Min	Max
<i>Dependent variable</i>						
Total debt	1711	0.607	0.204	0.606	0.237	1.004
Long-term debt	1711	0.206	0.175	0.164	0.006	0.631
Short-term debt	2522	0.394	0.209	0.377	0.067	0.815
<i>Industry-specific variables</i>						
Dynamism	132	1.011	0.009	1.008	1.001	1.053
Munificence	132	0.980	0.134	0.996	0.570	1.402
Concentration	132	0.216	0.191	0.167	0.000	1.0
<i>Control variables</i>						
Profitability	1484	0.126	0.104	0.116	-0.055	0.350
Asset structure	2411	0.310	0.204	0.284	0.0230	0.714
Growth	2455	0.062	0.227	0.018	-0.281	0.688
Age	2952	29.354	23.595	22.0	4.0	89.0
Size (log assets)	2527	9.397	0.797	9.486	7.676	10.676

4.2 Correlation matrix

The correlation matrix is shown in table 5. All dependent variables significantly correlated with each other at the 1% level. There is a positive correlation between total debt and long-term debt (0.13) and total debt and short-term debt (0.121). There is a negative correlation at a significance level of 1% between long-term debt and short-term debt (-0.350). Not all independent variables show a significant correlation with total debt. Dynamism (0.02), munificence (-0.024), concentration (-0.048) asset structure (0.007) and size (-0.027) are not significant. For long-term debt, all variables correlate at a significance level of 1% except growth with a significance level of 5%, dynamism and concentration

show no significant correlation. All the correlations coefficients seem relatively low. Only asset structure with a correlation coefficient of 0.397 is an exception. Independent variables correlate with each other. Dynamism correlates significantly with munificence, concentration, profitability, and age. Munificence shows a significant correlation between concentration and profitability. Most of the coefficients seem relatively low. Meaning that there is no concern for multicollinearity. Concentration is significantly correlated with munificence and dynamism is as expected because parts of munificence and dynamism are expected to be related to the concentration of the industry.

Since independent variables have significant correlations with each other, there is a possibility of multicollinearity between these variables. To exclude this, the VIF values and tolerance values are calculated, which is included in Appendix A. The VIF values are below 5 and the tolerance values are higher than 0.2 indicating that multicollinearity is not present (Hair et al., 2010).

Table 5: Correlation matrix

	Total debt	Long-term debt	Short-term debt	Dynamism	Munificence	Industry concentration	Profitability	Asset structure	Growth	Age	Size
Total debt	1										
Long-term debt	0.130**	1									
Short-term debt	0.121**	-0.350**	1								
Dynamism	-0.020	0.018	0.038	1							
Munificence	-0.024	-0.087**	0.077**	-0.065**	1						
Concentration	-0.048	0.020	0.018	0.429**	-0.362**	1					
Profitability	-0.124**	-0.208**	-0.100**	-0.063*	0.016	0.004	1				
Asset structure	0.007	0.397**	-0.320**	0.006	-0.080**	0.019	-0.036	1			
Growth	0.095**	0.052*	0.063**	0.005	0.008	-0.002	0.180**	-0.066**	1		
Age	-0.119**	-0.164**	-0.069**	-0.041*	-0.005	-0.041*	-0.052*	0.091**	-0.108**	1	
Size	-0.027	0.096**	-0.188**	0.002	-0.001	0.025	-0.074**	0.188**	0.025	0.073**	1

This table show the correlation coefficients between the variables over the time period 2007-2012. The definitions of the variables are given in table 1. ** and * represent a correlation significance at 0.01 level and 0.05 level respectively (2-tailed).

4.3 Regression analysis

This chapter shows the results of the regression analysis. These analyses are performed to test the hypothesis. The results of the analyses are discussed for each hypothesis. The empty model, random-intercept model with covariates, and the random-slope model with covariates are discussed in this order. The results of the regression for total debt, long-term debt, and short-term debt are reported in tables 8 and 9. The industry-specific determinants are addressed first and the firm-specific determinants as second. Table 10 gives an overview of the results.

4.3.1 The empty model

The empty model, also called model 1 here, is of special interest. Without adding covariates, the relative importance of the industry-level can be derived (Kayo & Kimura, 2011). Table 6 shows the results of the variance decompositions analysis of the level of debt. The results of model 1 (empty model) are of special interest. Model 1 does not add determinants, so the relative importance of each level on the variance of leverage can be estimated. The largest portion of the debt variance comes from the level of the firm and time-level. It is estimated that 53.1% of the debt variance is accounted for the time-level. Time reflects an important role in the capital structure because it reflects the important period shocks a firm may feel in a given year. In the second place, firm-level characteristics. It is estimated that the intraclass correlation accounts for 41.6% of the debt variance. This suggests that the intrinsic firm characteristics play an important role in financial decisions making. The industry-level accounts for 5.3% for the variance in the level of debt. Despite the relatively low percentage, industry characteristics also remain an important research area for explaining the level of debt. So, the lower levels (time and firm) seem to be the most responsible for the level of debt variance. Firm characteristics tend to be more volatile and dynamic and are more likely to change across time than higher levels (industry) (Kayo & Kimura, 2011). However, it cannot be said that the higher levels are less important because their role in the debt variance is lower. It could be that the portion of the variance of higher levels (industry) is only lower because they vary less than the lower level. To test the significance of industry effects, a likelihood ratio test is performed to compare the empty model with a single-level model (Berkhof & Snijders, 2001). The likelihood ratio tests are reported in table 7. The likelihood ratio tests are calculated as the difference in the $-2\log$ likelihood value for the models. ($LR = -590.185 - -672.305 = 82.12$) on 1 df. Knowing that the 5% point of a chi-squared distribution on 1 df is (3.84), there is evidence of industry effects on total debt. The variation decomposition for long-term debt in the empty model is 6.9%, 71%, and 22.1% for industry, firm, and time-level respectively. The variation for short-term debt in the empty model is 4.3%, 71.6%, and 24.1% for industry, firm, and time-level, respectively. These are not presented for the safe of space. Industry-level accounts for a slightly greater percentage of the leverage variance for long-term debt and short-term debt. The firm intraclass correlation increases to 71%. And the time intraclass correlation decreases by about 30%.

Therefore, there is evidence of between-industry variation in total debt, long-term debt, and short-term debt. So, the multilevel model is appropriate for this data (Berkhof & Snijders, 2001).

Table 6. Estimations of leverage variance

	Model 1	Model 2	Model 3
<i>Variance decomposition</i>			
Industry-level (s_{00k0})	0.0022 (0.0009)	0.0146 (0.0009)	0.0009 (0.0009)
Firm-level (r_{0ij})	0.0176 (0.0018)	0.0225 (0.0024)	0.02247 (0.0024)
Time-level (e_{ijt})	0.0225 (0.0008)	0.0146 (0.0008)	0.0147 (0.0008)
<i>Percentage of the total variance</i>			
Between industries	5.3%	2.5%	2.5%
Between firms	41.6%	59%	59%
Across time	53.1%	38.5%	38.5%

This table shows the fixed-effect results from multi-level modelling with random intercepts. The table shows the variance decomposition estimates for the industry-level, firm-level, and the time-level for the total debt. The main interest relies on model 1. Model 1 shows the importance of each level on debt without the inclusion of determinants. Model 3 in this table is different from tables 8 and 9. Model 3 in this table is the full model Eq. (6) (inclusion of all variables).

Table 7. Likelihood ratio

Total debt	Empty model	Single-level model	Difference
-2log likelihood	-672.305	-590.185	82.12
Long-term debt	Empty model	Single-level model	Difference
-2log likelihood	-1294.938	-1119.360	175.578
Short-term debt	Empty model	Single-level model	Difference
-2log likelihood	-871.985	-749.145	122.84

This table shows the likelihood ratio test. The empty model is specified $LEV_{ijt} = \delta_{00} + s_{00j0} + r_{0ij} + e_{ijt}$. The single-level model removed the between-industry and firm effects. The single-level model is estimated by $LEV_{ijt} = \delta_{00} + e_{ijt}$.

4.3.2 Random-intercept model with covariates

First, the results of the random-intercept model are compared with the empty model. Table 6 shows that industry variance has decreased from 5.3% to 2.5%. So, after accounting for firm-specific determinants, 2,5% of the unexplained variance in total debt is due to differences between industries.

Table 8 shows the results of the random-intercept model with covariates of total debt, long-term debt, and short-term debt. Following Simerly and Li (2000), a negative impact is expected of dynamism on leverage because firms in a dynamism environment show higher volatility in profits.

Table 8 shows that dynamism has no impact on total debt, long-term debt, and short-term debt because the coefficients are not significant in the full model. Dynamism has only a positive significant impact on short-term debt if only this industry-specific determinant is measured. This contradicts the expectation that dynamism has a negative impact on debt. One reason for a positive impact of dynamism on short-term debt may be that long-term debt is unavailable or issued at high rates because of the higher uncertainty. However, no meaningful conclusions can be drawn from this. There is weak statistical evidence that more dynamic environments use more short-term debt which contradicts the findings of Kayo and Kimura (2011) showed.

Firms in highly munificent industries have sufficient resources, high growth, and often generate high profits (Kayo & Kimura, 2011; Smith et al., 2015). Therefore, the expectation is that firms in high munificence industries use less leverage because firms in munificent environments have more internal finance at their disposal. On the other hand, internal resources may not be sufficient to finance all growth opportunities, and external finance is therefore required. The results in table 8, shows that there is no impact of munificence on any form of debt. This means that there is no evidence that firms in higher munificent environments take on more/less debt than firms in less munificent environments.

The last industry-specific variable is industry concentration. Table 8 shows that industry concentration has only a positive significant impact on short-term debt. So, SMEs operating in higher concentrated industries tend to have higher forms of short-term debt. Since it is only positive statistically significant with short-term debt. A possible explanation for this may be that firms in highly concentrated industries do not want to share competitively sensitive information with investors because their market position may decrease. That is why they prefer to take on short-term debt instead of long-term debt because investors often ask for additional information if they provide long-term debt.

The first firm-specific determinant is profitability. Profitability shows a negative statistically significant effect on total debt, long-term debt, and short-term debt at 1% level in the full model 6. So, SMEs with higher profits have lower levels of debt. This is in line with the pecking order theory, which prefers internal financing over external financing. These findings are consistent with Hall et al. (2004), Sogorb-Mira, (2005), and Degrese et al. (2012).

Asset structure is expected to be positively related to debt according to the pecking order theory and agency theory. Table 8 shows that asset structure have a positive impact on long-term debt. Collateral is important for SMEs to overcome information asymmetry problems. So, SMEs used most or all their collateral to attract long-term debt. Since we see a negative statistically significant effect of asset structure on short-term debt. These results are in line with Degreyse et al. (2012) and Michaelas et al. (1999).

Growth is positive statistically significant at 1% level on total debt and short-term debt in table 8. This is in line with Michaelas et al. (1999) and Degreyse et al., (2012) who suggest that firms with high growth opportunities are more likely to exceed internal funds and require external capital.

Table 8 shows that age has a negative statistically significant impact on total debt, long-term debt, and short-term debt at 1% level. The results are in line with previous researchers Hall et al. (2000) and Michaelas et al. (1999). The negative impact supports the pecking order theory. Young firms often need more external finance than older firms who generate more profits and can use accrued internal resources.

The last firm-specific determinant is size. Size shows a positive significant impact on long-term debt. For short-term debt, there is a negative significant impact on size. According to Hall et al. (2004) who expect that smaller firms have more difficulties raising long-term debt and hence, long-term debt would be positively related to firm size. On the other hand, the absence of long-term debt, smaller firms would make more use of short-term debt and this would be negatively related to size. Thus, the contradictory impacts of long-term debt and short-term debt have to do with the absence of long-term debt and the usage of short-term debt as an alternative.

There are three different model-fit statistics included AICc (Akaike Information Criterion), CAIC (Consistent Akaike Information Criterion), and BIC (Bayesian Information Criterion) to provide us with information to compare the three different models (Kayo & Kimura, 2011). The inclusion of different covariates increases the model fit (the lower the statistics, the better the fit) only for short-term debt. It was expected that adding the covariates will increase the model fit. However, the analysis shows that some covariates do not have a significant impact on the dependent variables. This result in not improving the model fit compared to the other models. Our model produces negative model-fit values. The absolute values do not matter in these model-fit because it is about the relative values over the set of models used and the differences between the values that are important. A lower value represents a better model fit even if the values are negative (Burnham & Anderson, 2002).

Table 8. Random-intercept model with covariates

	Total debt						Long-term debt					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.5935*** (0.0130)	0.5916*** (0.0134)	0.5880*** (0.0180)	0.5889*** (0.0184)	0.5892*** (0.0182)	0.5924*** (0.0135)	0.1940*** (0.0126)	0.160*** (0.0106)	0.1427*** (0.0134)	0.1416*** (0.1390)	0.1458*** (0.0136)	0.1640*** (0.0104)
Dynamism			0.0207 (0.8121)			-0.0440 (0.7895)			-0.4516 (0.5907)			-0.1403 (0.5748)
Munificence				-0.0130 (0.0631)		-0.0208 (0.0564)				0.0107 (0.0458)		-0.0310 (0.0410)
Concentration					-0.0214 (0.0531)	-0.0268 (0.0539)					-0.0423 (0.0391)	-0.0530 (0.0395)
Profitability		-0.2850*** (0.0633)	-0.2837*** (0.0636)	-0.2833*** (0.0635)	-0.2813*** (0.0636)	-0.2805*** (0.0637)		-0.2862*** (0.0456)	-0.2779*** (0.0458)	-0.2761*** (0.0457)	-0.2775*** (0.0460)	-0.2868*** (0.0461)
Asset structure		-0.0304 (0.0337)	-0.0321 (0.0336)	-0.0320 (0.0336)	-0.0329 (0.0337)	-0.0312 (0.0337)		0.2675*** (0.0243)	0.2674*** (0.0242)	0.2667*** (0.0242)	0.2681*** (0.0241)	0.2692*** (0.2692)
Growth		0.1122*** (0.0296)	0.1176*** (0.0297)	0.1172*** (0.0297)	0.1168*** (0.0297)	0.1112*** (0.0296)		-0.0019 (0.02132)	0.0012 (0.0214)	0.0014 (0.0214)	0.0016 (0.0214)	-0.0017 (0.0214)
Age		-0.0009*** (0.0003)	-0.0009*** (0.0192)	-0.0009*** (0.0003)	-0.0008*** (0.00026)	-0.0009*** (0.0003)		-0.0013*** (0.0002)	-0.0013*** (0.0002)	-0.0013*** (0.0002)	-0.0013*** (0.0002)	-0.0013*** (0.0002)
Size		-0.0157 (0.0105)	-0.0145 (0.0105)	-0.0145 (0.0105)	-0.0129 (0.0105)	-0.0139 (0.0106)		0.0452*** (0.0076)	0.0460*** (0.0075)	0.0461*** (0.0076)	0.0456*** (0.0456)	0.0450*** (0.0076)
<i>Model-fit statistics</i>												
AICC	-666.291	-487.01	-479.229	-479.270	-477.208	-478.673	-1288.924	-1153.137	-1147.512	-1146.994	-1129.902	-1130.959
CAIC	-646.970	-439.740	-396.675	-396.717	-394.796	-413.854	-1269.604	-1105.867	-1064.958	-1064.440	-1047.491	-1066.140
BIC	-649.970	-447.740	-410.675	-410.717	-408.796	-424.854	-1272.604	-1113.867	-1078.958	-1078.440	-1061.491	-1077.140
N	1711	1019	1019	1019	1019	1019	1711	1019	1019	1019	1019	1019

Table 8. Random-intercept model with covariates continued

	Short-term debt					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.4009*** (0.0130)	0.4195*** (0.010)	0.4481*** (0.0129)	0.4474*** (0.0136)	0.4424*** (0.0129)	0.4126*** (0.0093)
Dynamism			1.1604** (0.5797)			0.2591 (0.5586)
Munificence				0.0178 (0.0461)		0.1070 (0.040)
Concentration					0.0859** (0.0359)	0.0885** (0.0372)
Profitability		-0.2965*** (0.0436)	-0.3054*** (0.0435)	-0.3101*** (0.0435)	-0.3164*** (0.0434)	-0.3067*** (0.0435)
Asset structure		-0.2571*** (0.0251)	-0.2582*** (0.0249)	-0.2557*** (0.0249)	-0.2634*** (0.0249)	-0.2630*** (0.0250)
Growth		0.1144*** (0.0213)	0.1068*** (0.0213)	0.1069*** (0.0214)	0.1061*** (0.0213)	0.1135*** (0.0212)
Age		-0.0004** (0.0002)	-0.0004** (0.0001)	-0.0004** (0.0002)	-0.0004** (0.0002)	-0.0004** (0.0002)
Size		-0.0889*** (0.0075)	-0.0899*** (0.0074)	-0.0904*** (0.0074)	-0.0889*** (0.0889)	-0.0884*** (0.0075)
<i>Model-fit statistics</i>						
AICC	-865.975	-1110.792	-1117.645	-1113.838	-1116.425	-1114.829
CAIC	-845.486	-1060.861	-1030.387	-1026.580	-1029.278	-1015.280
BIC	-848.486	-1068.861	-1044.387	-1040.580	-1043.278	-1031.280
N	2522	1414	1414	1414	1414	1414

This table shows the fixed-effect results from multi-level modelling with random intercepts. Table 1 provides the definitions of the variables. The year fixed effects are included in this table.

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

4.3.3 Random-slope model with covariates

Table 9 shows the results of the random-slope model with covariates of total debt, long-term debt, and short-term debt, respectively. Now, the slopes of firm-level variables are random. This affects the influence of isolated covariates at levels of industry and firm on firm leverage, but also add additional (interaction) relationships. The last model includes the interaction variables representing the indirect effects of industry-level covariates on leverage. In other words, the expectation that industry-level variable munificence affects certain firm-level covariates, namely, profitability and growth (Kayo & Kimura, 2011). As can be concluded from Table 9, munificence has only a moderate positive significant impact of firm growth on long-term debt. Thus, munificence increases the effect of growth in driving long-term debt. Both individual variables (munificence and growth) have no significant effect on long-term debt. So, the interaction effect shows that munificence influences growth in a way that it has a significant positive effect on long-term debt. A possible explanation for this could be that notice good results and growth industry-wide, can lead to less financial distress and that investors borrow money more easily in growing industries since they are surer of their payments.

There are also a few statistical changes when the random-intercept model is compared to the random-slope model. Industry concentration becomes negatively significant for long-term debt. This is an opposite relationship to industry concentration and short-term debt that shows a positive impact.

Age becomes statistically insignificant for long-term debt after including industry-specific determinants. Size becomes negatively statistically significant for the total debt at a 10% level.

Now the results of the two tests can be compared to conclude the hypotheses.

Hypothesis H1 is rejected, we failed to find statistical evidence to support our hypothesis. The expectation was that firms in dynamic environments that reflect the volatility of earnings will lead to financial distress and therefore keep their debt levels low. It only shows a positive impact on short-term debt when dynamism is measured as the only industry-specific variable which contradicts the expectation. Thus, dynamism shows weak evidence that it has a positive impact on the debt of Dutch SMEs. The first hypothesis of munificence which indicates a negative impact of munificence on debt is not accepted. The first hypothesis is rejected, which is about the high profitability in an industry and the preference of internal finance over external financing according to the pecking order theory. The second hypothesis of munificence is also not accepted. Munificence represents the abundance of resources in a given industry, high profitability, and plenty of growth opportunities. Since, growth opportunities are intangible assets and cannot be used as collateral, which is usually needed to get a long-term loan, it is, therefore, logical to do this by short-term loan capital, where the collateral is not necessarily needed. However, no statistical evidence is found between munificence and debt. We cannot accept the hypothesis regarding industry concentration because there are two conflicting signals between industry concentration and debt. A possible explanation could be, as mentioned earlier, that firms in concentrated industries prefer the use of short-term debt because they have to provide less competitive information to the investors.

Table 9. Random-slope model with covariates

	Total debt						Long-term debt					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.5935*** (0.0130)	0.6001*** (0.0064)	0.5954*** (0.0138)	0.6013*** (0.0143)	0.5969*** (0.0137)	0.5985*** (0.0065)	0.1940*** (0.0126)	0.1535*** (0.0093)	0.1419*** (0.0121)	0.1408 (0.0126)	0.1469*** (0.0120)	0.1583*** (0.0087)
Dynamism			-1.0588 (0.6806)			-0.7011 (0.7024)			-0.6416 (0.5560)			-0.2149 (0.5407)
Munificence				-0.0587 (0.0548)		-0.070 (0.0518)				0.0134 (0.0434)		-0.0386 (0.0387)
Concentration					-0.0522 (0.0401)	-0.0553 (0.0441)					-0.0855** (0.0380)	-0.0947** (0.0395)
Profitability		-0.2983*** (0.0636)	-0.3081*** (0.6413)	0.2975*** (0.0638)	-0.2940*** (0.0639)	-0.3079*** (0.0648)		-0.2821*** (0.0463)	-0.2775*** (0.0464)	-0.2747*** (0.0465)	-0.2805*** (0.0465)	-0.2892*** (0.0469)
Asset structure		0.0124 (0.0336)	0.0122 (0.0325)	0.0080 (0.0326)	0.0134 (0.0134)	0.0083 (0.0328)		0.2614*** (0.0262)	0.2632*** (0.0260)	0.2618*** (0.0261)	0.2640*** (0.0258)	0.2596*** (0.0258)
Growth		0.1246*** (0.0301)	0.1286*** (0.0302)	0.1267*** (0.0303)	0.1296*** (0.0301)	0.1219*** (0.0302)		-0.0037 (0.0213)	-0.0019 (0.0223)	-0.0014 (0.0224)	-0.0025 (0.0222)	-0.0113 (0.0221)
Age		-0.0009* (0.0004)	-0.0008* (0.0044)	0.0008* (0.0004)	-0.0008 (0.0004)	-0.0009* (0.0003)		-0.0004** (0.0223)	-0.0015 (0.0069)	-0.0014 (0.0071)	-0.0015 (0.0065)	-0.0017 (0.0063)
Size		-0.0221** (0.0107)	-0.0215** (0.0107)	-0.0206* (0.0106)	-0.0193* (0.0107)	-0.0197* (0.0107)		0.0371*** (0.0116)	0.0382*** (0.0113)	0.0377*** (0.0115)	0.0390*** (0.0110)	0.0398*** (0.0109)
Mun * Profit						0.6587 (0.5278)						0.1803 (0.3673)
Mun * Growth						0.0273 (0.2193)						0.4165*** (0.1536)
<i>Model-fit statistics</i>												
AICC	-666.291	-451.966	-445.762	-444.467	-443.885	-446.928	-1288.924	-1110.792	-1104.559	-1103.369	-1089.140	-1096.642
CAIC	-646.970	-404.695	-363.208	-361.913	-361.474	-370.376	-1269.604	-1060.861	-1022.005	-1020.815	-1006.729	-1020.090
BIC	-649.970	-412.695	-377.208	-375.913	-375.474	-383.376	-1272.604	-1068.861	-1036.005	-1034.815	-1020.729	-1033.090
N	1711	1019	1019	1019	1019	1019	1711	1019	1019	1019	1019	1019

Table 9. Random-slope model with covariates continued

	Short-term debt					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.4009*** (0.0128)	0.4108*** (0.0046)	0.4442*** (0.0101)	0.4408*** (0.0105)	0.4425*** (0.0100)	0.4113*** (0.0046)
Dynamism			1.0444** (0.4882)			0.1932 (0.5010)
Munificence				0.0184 (0.0391)		0.0978 (0.0359)
Concentration					0.0620** (0.0272)	0.0741* (0.0302)
Profitability		-0.2929*** (0.0438)	-0.3017*** (0.0432)	-0.3073*** (0.043)	-0.3159*** (0.0431)	-0.3001*** (0.0433)
Asset structure		-0.2718*** (0.0262)	-0.2721*** (0.0237)	-0.2690*** (0.0239)	-0.2796*** (0.0238)	-0.2746*** (0.0240)
Growth		-0.0037 (0.0240)	0.0995*** (0.0212)	0.0990*** (0.0213)	0.0982*** (0.0212)	0.1085*** (0.0213)
Age		-0.0008 (0.0005)	-0.0006 (0.0004)	-0.0007 (0.0005)	-0.0006 (0.0005)	-0.0006 (0.0002)
Size		-0.0086*** (0.0074)	-0.0875*** (0.0073)	-0.0880*** (0.0073)	-0.0866*** (0.0074)	-0.0865*** (0.0074)
Mun * Profit						-0.2693 (0.3429)
Mun * Growth						-0.0555 (0.1457)
<i>Model-fit statistics</i>						
AICC	-865.975	-1111.972	-1120.927	-1116.601	-1119.327	-1112.094
CAIC	-845.486	-1062.041	-1033.668	-1029.342	-1032.180	-1031.154
BIC	-848.486	-1070.041	-1047.668	-1043.342	-1046.180	-1044.154
N	2522	1414	1414	1414	1414	1414

This table shows the fixed-effect results from multi-level modelling with random slopes. Table 1 provides the definitions of the variables. The year fixed effects are included in this table.

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

Table 10. Overview results random-intercept and random-slope model

Variable	Predicted impact	Outcome random-intercept	Outcome random-slope
Dynamism	-	Positive for STD in model 3	Positive for STD in model 3
Munificence	+/-	No impact	No impact
Concentration	+	Positive for STD	Same
Profitability	-	Negative	Same
Asset structure	+	Positive for LTD and negative for STD	Same
Growth	+	Positive for TD and LTD	Same
Age	-	Negative	Become insignificant for LTD
Size	+	Positive for LTD and negative for STD	Also negative for TD
Mun * Profit	+	No impact	
Mun * Growth	+	No impact	Moderate positive effect on LTD

4.4. Robustness test

As a robustness check, an OLS analysis is performed. OLS have been used by multiple studies to measure industry effects (Simerly & Li, 2000; Mackay & Philips, 2005; Chen et al., 2015). This examines whether results based on the model of Kayo and Kimura, (2011) that I have applied does not deviate from the other studies who used OLS regression. The results are presented in appendix B. No changes

occur except the interaction term Mun * growth becomes insignificant for long-term debt. This shows that the model used is robust and does not differ much from the standard OLS. The adjusted R square increases significantly if total debt is compared with long-term debt and short-term debt in the OLS regression analysis. The adjusted R-square goes from 3.9% for total debt to 27.6% for long-term debt and 24.3% for short-term debt. This may be because more independent variables are significant in these models.

As a second robust check, I have merged the industries with NACE codes 10-17, 18-25 and 26-33. In this way, industries that could potentially lead to a biased results are reduced. The results are reported in Appendix B. There are no deviated results compared to the multilevel analysis.

Despite that industry-specific determinants do not vary much annually, a robustness analysis with lagged independent variables is used to check the robustness of the control variables (firm variables). Since this robustness test shows statistical different results the table is presented below in table 11. The robustness analysis with lagged independent variables for total debt makes profitability, growth, and size insignificant, with size only being significant in the random-slope model. However, the interaction Munificence x Profitability becomes significant in the lagged variables analysis. The model fit statistics have decreased compared to the random-intercept and random-slope model regressions.

For long-term debt, industry concentration no longer becomes significant. Growth does become significant at a 10% level. The significant value of the interaction Munificence x Growth decreased from 1% to 10% significant level. The model fits a higher value, which is unfavourable in this case since a lower value indicates a better model fit.

For short-term debt, industry concentration is no longer statistically significant. Profitability decreased to 10% significance level. Age only remains significant in the lagged random-intercept model and becomes insignificant for short-term debt in the lagged random slope-model. The model fits have also increased here (less favourable).

Table 11. Results Lagged independent variables total debt, long-term debt, and short-term debt

	Total debt		Long-term debt		Short-term debt	
	Random-intercept	Random-slope	Random-intercept	Random-slope	Random-intercept	Random-slope
Intercept	0.6017*** (0.0160)	0.6039*** (0.0067)	0.171*** (0.0113)	0.1660*** (0.0090)	0.4076*** (0.0100)	0.4044*** (0.0051)
Dynamism	-0.0059 (0.8269)	-0.9242 (0.7402)	0.0524 (0.6347)	-0.0461 (0.5983)	-0.0927 (0.6094)	-0.1059 (0.5539)
Munificence	0.0088 (0.0599)	-0.0843 (0.0548)	-0.0071 (0.0460)	-0.0294 (0.0433)	0.0656 (0.0446)	0.0649 (0.0403)
Industry concentration	-0.0603 (0.0543)	-0.0721 (0.0456)	-0.0306 (0.0415)	-0.0652 (0.0401)	0.0574 (0.0403)	0.0508 (0.0332)
Profitability	-0.0785 (0.0653)	-0.1036 (0.0659)	-0.1164** (0.0505)	-0.1246** (0.0505)	-0.0910* (0.0479)	-0.0814* (0.0477)
Asset structure	-0.0481 (0.0349)	0.0039 (0.0337)	0.2240*** (0.0270)	0.2314*** (0.0284)	-0.2451*** (0.0275)	-0.2618*** (0.0265)
Growth	-0.0226 (0.0332)	-0.0200 (0.0344)	-0.0438* (0.0257)	-0.0439* (0.0261)	-0.0498** (0.0237)	-0.0547** (0.0236)
Age	-0.0008*** (0.0002)	-0.001*** (0.0002)	-0.0012*** (0.0002)	-0.0014 (0.0064)	-0.0005** (0.0002)	-0.0008 (0.0005)
Size	0.0009 (0.0111)	-0.0034 (0.0114)	0.0407*** (0.0086)	0.0354*** (0.0118)	-0.0751*** (0.0083)	-0.0727*** (0.0082)
Mun * Profit		1.2509** (0.5419)		0.3345 (0.3894)		0.01758 (0.3788)
Mun * Growth		-0.0779 (0.2436)		0.3304* (0.1791)		-0.1905 (0.1905)
<i>Model-fit statistics</i>						
AICC	-440.766	-392.960	-911.353	-862.899	-872.831	-865.812
CAIC	-377.038	-317.703	-847.625	-787.642	-805.304	-786.048
BIC	-388.038	-330.703	-858.625	-800.642	-816.304	-799.048
N	916	916	916	916	1284	1284

This table shows the fixed-effect results from multi-level modelling with random intercepts. Table 1 provides the definitions of the variables. The year fixed effects are included in this table. This model only used Eq. (6) for random-intercept and Eq. (7f) for random-slope model.

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

5. Conclusion

In this chapter, the conclusion of this thesis is described. First, the main findings of this thesis are summarized. The second part provides the limitations of this thesis and recommendations for future research regarding this topic.

5.1 Main findings

This thesis aims to assess the impact of industry-specific determinants on the debt of Dutch SMEs by analysing the direct and indirect influences of industry-specific and firm-specific determinants. To take the hierarchical relations between the different levels into account, multilevel analysis is performed. A sample of 499 Dutch SMEs operating in the manufacturing industry was analysed over the period 2007-2012. The goal of this thesis was to find an answer to the following research question: "What is the impact of industry-specific determinants on the capital structure of Dutch SMEs?" Based on different theories and empirical evidence hypotheses were formed to answer the research question.

The regression results provide no evidence of a relationship between dynamism and total debt and long-term debt. It only shows a positive impact on short-term debt when dynamism is measured as the only industry-specific variable. This becomes insignificant in the robustness test. So, the volatility of the industry environment does not seem to influence the level of debt of Dutch SMEs. So, there is no evidence to support the dynamism hypothesis. The results show no impact of munificence on the debt of Dutch SMEs. So, there is no evidence to support the munificence hypothesis. For industry concentration, there are opposite relations. Industry concentration has a positive impact on short-term debt, but a negative impact on long-term debt. The negative impact on long-term debt is only significant in the random-slope model. This is the opposite of the positive impact of industry concentration and short-term. Therefore, the industry concentration hypothesis is rejected by the analysis.

The interaction term of munificence and profitability is not significant for total debt, long-term debt, and short-term debt. It becomes only significant in the robustness results for total debt. The interaction variable munificence and growth is only significant for long-term debt. Thus, munificence positively moderates the effect of growth on long-term debt. This effect remains significant at a significance level of 10% when it is tested by lagged variables.

However, reported results are statistically weak and only significant in a few of the models and that is not enough to make generalizable conclusions.

5.2 Limitations and future research

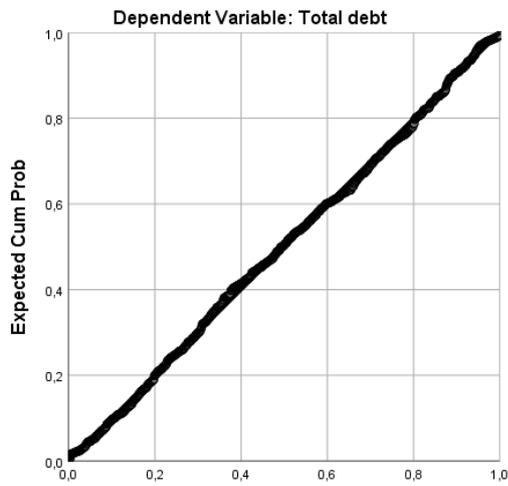
This chapter discusses the limitations of this thesis and forms recommendations for future research. Although this thesis shows some relevant results in the context of the impact of industry characteristics on the capital structure of Dutch SMEs, these are not generalizable. Most studies are aimed at firm-

specific variables or at analysing the different levels separately. Therefore, future research can be done into the impact of the different levels and determinants (country, industry, and firm) on the debt of SMEs. This thesis is based on six years and could have benefited from a longer period since industry-specific determinants do not vary much year-on-year. However, given the database, this was not possible. This study is based on book values, while other studies using industry-specific characteristics often applied market leverage, leading to different results compared to book values. Because this thesis concerns SMEs, the market leverage is often not available because SMEs often do not have to disclose financial figures by law. So, it can be interesting to do the research on industry-specific variables on leverage but with market leverage values instead of book leverage if this data is available. Further, this thesis only researched Dutch SMEs. It can therefore be interesting to conduct research into SMEs in other countries and compare them with each other.

Appendix

Appendix A

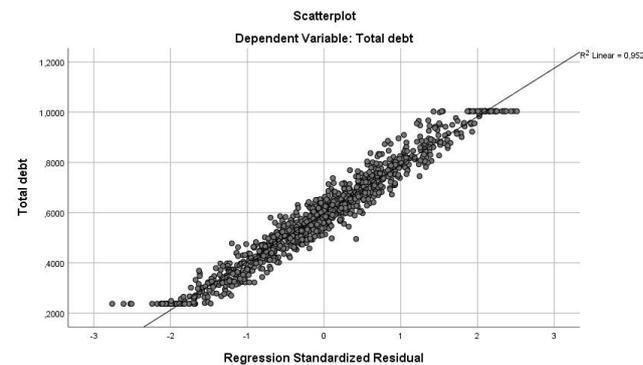
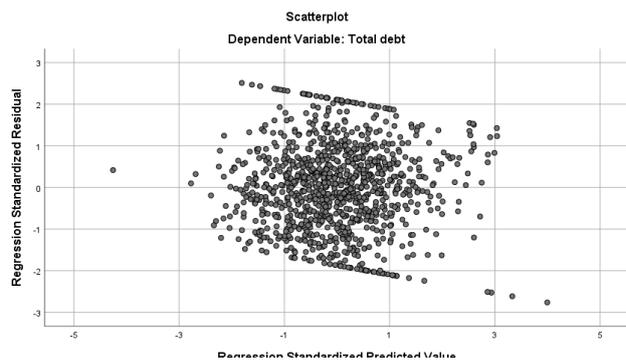
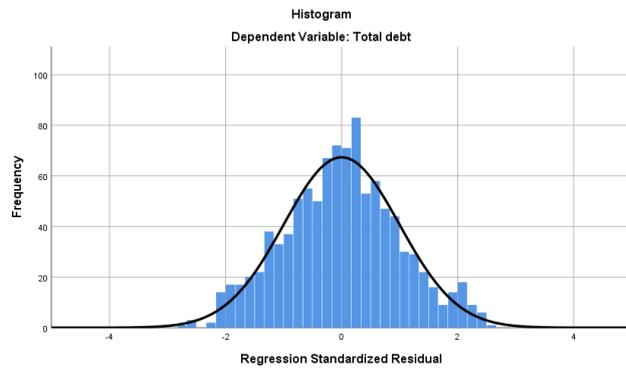
Normal P-P Plot of Regression Standardized Residual



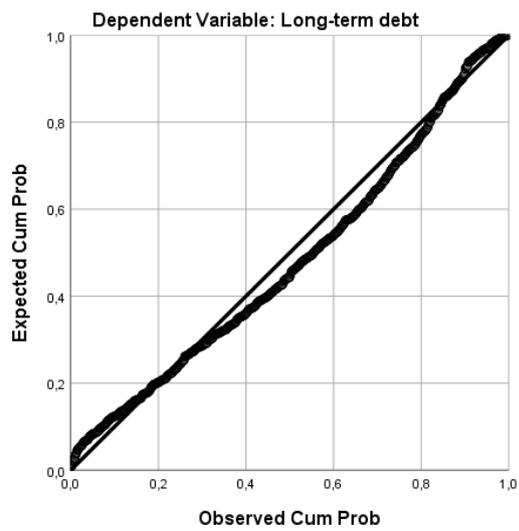
Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Dynamism	,831	1,203
	Munificence	,847	1,181
	Concentration	,736	1,358
	Profitability	,938	1,066
	Asset structure	,910	1,099
	Growth	,950	1,053
	Age	,976	1,024
	Size	,903	1,107

a. Dependent Variable: Total debt



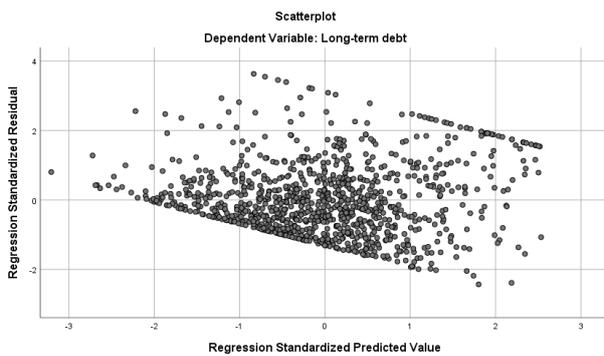
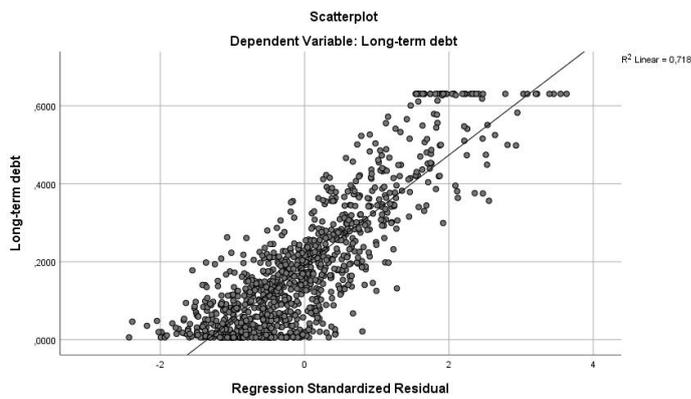
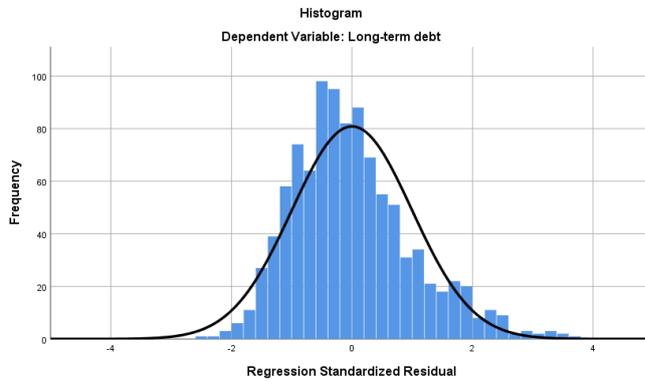
Normal P-P Plot of Regression Standardized Residual



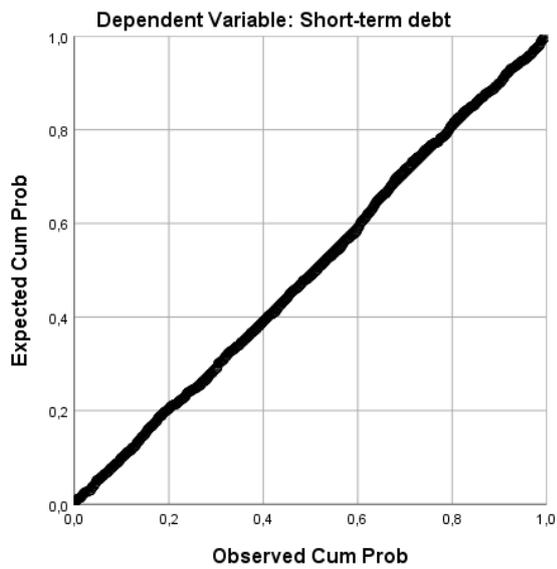
Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Dynamism	,831	1,203
	Munificence	,847	1,181
	Concentration	,736	1,358
	Profitability	,938	1,066
	Asset structure	,910	1,099
	Growth	,950	1,053
	Age	,976	1,024
	Size	,903	1,107

a. Dependent Variable: Long-term debt



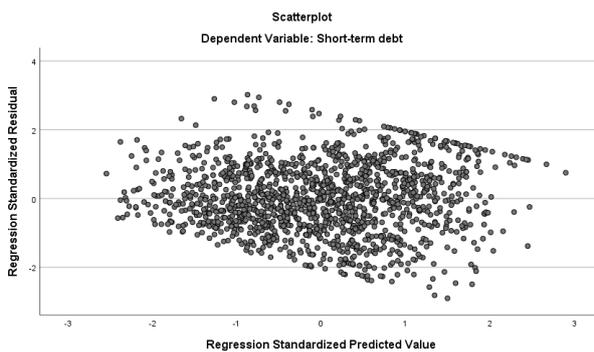
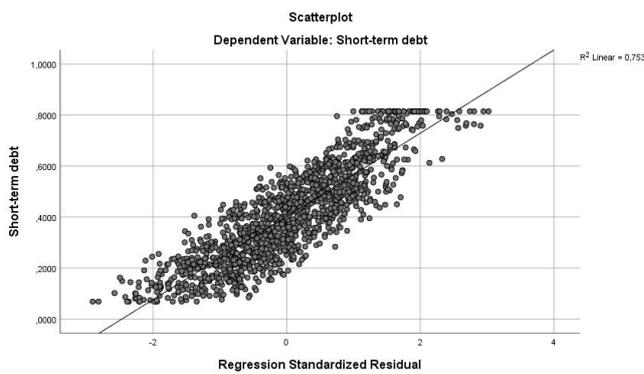
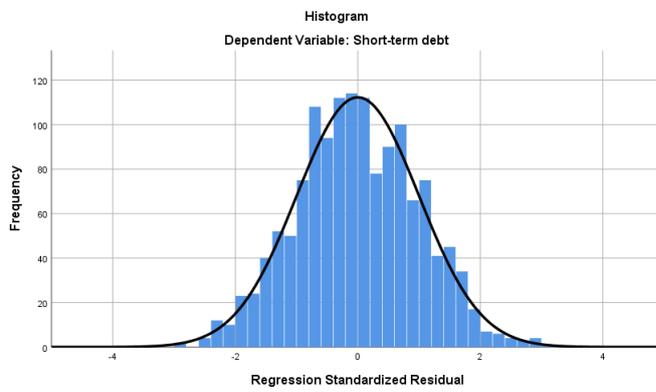
Normal P-P Plot of Regression Standardized Residual



Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Dynamism	,474	2,110
	Munificence	,786	1,273
	Concentration	,542	1,846
	Profitability	,973	1,028
	Asset structure	,914	1,094
	Growth	,963	1,038
	Age	,973	1,028
	Size	,915	1,093

a. Dependent Variable: Short-term debt



Appendix B

Table 12. Results OLS regression

	Total debt	Long-term debt	Short-term debt
Intercept	0.603*** (0.015)	0.160*** (0.011)	0.442*** (0.011)
Dynamism	0.6849 (0.750)	0.151 (0.547)	0.787 (0.540)
Munificence	0.088 (0.059)	-0.115 (0.043)	0.040 (0.042)
Concentration	-0.044 (0.046)	-0.085** (0.043)	0.059* (0.030)
Profitability	-0.307*** (0.064)	-0.325*** (0.047)	-0.291*** (0.044)
Asset structure	0.011 (0.032)	0.309*** (0.024)	-0.289*** (0.024)
Growth	0.126*** (0.031)	0.007 (0.022)	0.106*** (0.022)
Age	-0.001*** (0.000)	-0.001*** (0.000)	0.000* (0.000)
Size	-0.019 (0.011)	0.044*** (0.008)	-0.087*** (0.007)
Mun * Profit	0.612 (0.532)	0.369 (0.388)	-0.116 (0.347)
Mun * Growth	0.037 (0.223)	0.298 (0.163)	-0.031 (0.148)
Adjusted R Square	0.039	0.276	0.243
N	1019	1019	1414

This table shows the OLS regression results. The industries with NACE codes 10-17, 18-25 and 26-33 are grouped. Table 1 provides the definitions of the variables. The year fixed effects are included in this table. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level

Table 13. Results grouped industries total debt, long-term debt, and short-term debt

	Total debt		Long-term debt		Short-term debt	
	Random-intercept	Random-slope	Random-intercept	Random-slope	Random-intercept	Random-slope
Intercept	0.5913*** (0.019)	0.6018*** (0.0067)	0.1454*** (0.0143)	0.1465*** (0.0124)	0.4476*** (0.0130)	0.4411*** (0.0051)
Dynamism	0.1492 (0.8495)	-0.6842 (0.7452)	-0.3524 (0.4347)	-0.3533 (0.5763)	-0.7927 (0.6394)	-0.1059 (0.5539)
Munificence	0.0210 (0.0652)	-0.0755 (0.0548)	0.0010 (0.0590)	-0.0174 (0.0433)	0.0346 (0.0446)	0.0368 (0.0412)
Concentration	-0.0401 (0.0401)	-0.0749 (0.0655)	-0.0526 (0.0725)	-0.1182** (0.0577)	0.1114** (0.0503)	0.0799* (0.0443)
Profitability	-0.2821*** (0.0636)	-0.3026*** (0.0649)	-0.2764** (0.0505)	-0.2816** (0.0465)	-0.3051* (0.0439)	-0.0814* (0.0477)
Asset structure	-0.0319 (0.0331)	0.0104 (0.0327)	0.2630*** (0.0240)	0.2596*** (0.0256)	-0.2588*** (0.0247)	-0.2722*** (0.0239)
Growth	0.1168*** (0.0297)	0.1256*** (0.0303)	-0.0010 (0.0216)	-0.0100 (0.0222)	0.1075*** (0.0217)	0.1017*** (0.0216)
Age	-0.0008*** (0.0002)	-0.0009* (0.0004)	-0.0012*** (0.0002)	-0.0016*** (0.0064)	-0.0003** (0.0002)	-0.0006 (0.0007)
Size	-0.0142 (0.0105)	-0.0205 (0.0106)	0.0467*** (0.0036)	0.0407*** (0.0118)	-0.0902*** (0.0074)	-0.0884*** (0.0072)
Mun * Profit		0.6082 (0.5419)		0.3345 (0.3894)		-0.1676 (0.3411)
Mun * Growth		0.0249 (0.2201)		0.4141** (0.1535)		-0.0544 (0.1457)
<i>Model-fit statistics</i>						
AICC	-475.766	-443.894	-1144.218	-1108.101	-1117.637	-1116.407
CAIC	-377.038	-349.612	-1049.935	-1002.107	-1017.960	-1004.322
BIC	-388.038	-365.612	-1065.935	-1020.107	-1033.960	-1022.322
N	1019	1019	1019	1019	1414	1414

This table shows the fixed-effect results from multi-level modelling with random intercepts. Table 1 provides the definitions of the variables. The year fixed effects are included in this table. This model only used Eq. (6) for random-intercept and Eq. (7f) for random-slope model.

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

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