



Determinants of Capital Structure:
A comparison between small and large firms

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Abstract

This paper investigates the impact and differences of several firm-level determinants on the capital structure of small and large firms in a cross-country context. The effect of asset tangibility, growth opportunities, firm size, profitability, non-debt tax shields and liquidity on leverage ratios will be explored. Furthermore, the effect of the institutional environment on corporate debt levels will be discussed. Analyses will be performed on small and large firms from 2008 till 2015 for France, Germany and the United Kingdom. The findings indicate that small firms are relatively lower levered vis-à-vis large firms. With respect to small firms, asset tangibility, growth opportunities, firm size and non-debt tax shields are positively related to gearing levels. Small firm profitability and –liquidity negatively affect leverage. However, the finding for asset tangibility is insignificant. In the case of large firms, asset tangibility and growth opportunities are positively related to leverage, whereas firm size, profitability, non-debt tax shields and liquidity have a negative impact on large firm gearing levels. All large firm results are significant with the exception of non-debt tax shields. On the one hand, the findings indicate similarities between small and large firms with respect to growth opportunities, profitability and liquidity. On the other hand, they suggest differences with regard to firm size and non-debt tax shields. Hence, the funding behaviour of small and large firms differs. Furthermore, German firms seem to be relatively lower levered vis-à-vis British and French firms. However, this difference is larger for British firms compared to French firms. Hence, the institutional environment plays a role in the financing behaviour of both small and large firms.

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1. Introduction

Modigliani and Miller (1958) were one of the first modern researchers investigating capital structure. Their proposition: the Irrelevance theory, stating that in a perfect market the financing decision of a firm is irrelevant. Because the value of a firm is not affected by its capital structure, the latter is not important. Thus, making the financing decision irrelevant. After Modigliani's and Miller's proposition, many more studies have been performed on the topic of capital structure. Nowadays four main theories can be distinguished, the static trade-off theory, the pecking order theory, the signalling theory and the agency theory. The static trade-off theory states that a firm's capital structure depends on the trade-off between the costs and benefits of debt (Myers, 1984). The pecking order theory argues that a hierarchy exists in financing preferences, which is caused by information asymmetry (Frank and Goyal, 2003). In this hierarchy internal financing is preferred over external financing and debt is preferred over equity (Myers, 2001). The signalling theory suggests that firm's financing decisions can be used to signal information to outsiders (Ross, 1977). The last one, the agency theory claims that conflicts arise due to the separation of management and ownership. Furthermore, it states that financing decisions can be used as a disciplinary tool for these conflicts (Jensen and Meckling, 1976; Morellec et al., 2010). These main theories all try to explain the reasons underlying corporate financing policies by looking at the benefits and costs associated with each source of financing. Since these theories, the phenomenon of capital structure has been cleared up, however no definite answer has been found.

The capital structure choice firms have to deal with is a widely studied topic and a large set of studies exist (Rajan and Zingales, 1995; Titman and Wessels, 1988; de Jong et al., 2006). These led to a couple of key variables determining the capital structure of firms. A grasp of these variables are tangibility of assets, firm profitability, firm size and growth opportunities, but many more determinants have an impact on corporate leverage (Titman and Wessels, 1988; Fama and French, 2002). Almost all of these studies focus on either small or large firms, where research, making explicit comparisons between the two groups, are scarce and make use of old data (Deesomsak et al., 2004; Jõeveer, 2013). Previous studies have shown that the determinants of capital structure affect both small and large firms. However, if differences exist in how these variables affect firms in both groups remains unclear. The contribution of this paper to the literature consists of empirical comparisons between the firm-level determinants of capital structure of small¹ and large² firms. It checks whether the stylized facts of capital structure for large firms also hold for small firms and examines whether the differences found are significant or not.

¹ Firms are considered small if they meet the following two criteria: The firm has less than 250 employees and its turnover is 50 million euros or less or its balance sheet total is 43 million euros or less (European Commission).

² Firms are considered large when they do not belong to the small group.

This study will investigate four different firm-level determinants, namely asset tangibility, growth opportunities, size and profitability. These factors are found to be consistently related to corporate leverage (Rajan and Zingales, 1995; Frank and Goyal, 2008). While these determinants have been investigated widely, differences of their impact on small and large firms remain unstudied. Other firm-level determinants such as liquidity and non-debt tax shields have been found to affect corporate debt levels as well (Fama and French, 2002; Deesomsak et al., 2004; Mazur, 2007). Therefore, these factors will be discussed in a robustness analysis, to see whether differences exist in their effect on the leverage ratios of both size groups.

Besides firm-level determinants, institutional factors play a role in corporate leverage as well (Rajan and Zingales, 1995). Differences between countries with respect to financial legislation and ownership concentration might influence corporate leverage too (Rajan and Zingales, 1995). This study covers three countries, France, Germany and the United Kingdom, which makes cross-country comparisons possible. There are two reasons why these countries are chosen. First, these countries differ in their legal systems. The French legal system has a French origin, Germany's system is defined by its German origin and the UK has an English origin (La Porta et al., 1998). Second, looking at the accessibility to the capital markets of these countries, they can be considered comparable. Therefore, this factor cannot bias the results of this study. Hence, these countries are a good setting for cross-country comparisons between institutional factors and corporate leverage.

This paper has two main objectives, first is to explain the differences in firm-level determinants of leverage between small and large firms. Second is to look whether country characteristics have the same effect on small and large firms, with respect to their capital structure. This leads to the following research question:

What are the differences in firm-level determinants of capital structure for small and large firms and does the institutional setting play a role in their capital structure?

The results of this paper indicate that small firms are significantly lower levered vis-à-vis large firms. With respect to the firm-level determinants, asset tangibility, growth opportunities, firm size and non-debt tax shields positively affect small firm leverage. Small firm profitability and liquidity appear to be negatively related to small firm debt levels. However, the result found for asset tangibility is insignificant. In the case of large firms, asset tangibility and growth opportunities are positively related to leverage, whereas firm size, profitability, non-debt tax shields and liquidity have a negative impact on large firm gearing levels. All large firm results are significant with the exception of non-debt tax shields. On the one hand, the findings suggest similarities between small and large firms with respect to growth opportunities, profitability and liquidity. On the other hand, they indicate differences with regard to firm size and non-debt tax shields.

Another important finding of this paper is the effect of institutional factors on leverage. German firms seem to be relatively lower levered vis-à-vis British and French firms. However, this difference is larger for British firms compared to French firms. Hence, firms in

the United Kingdom are higher levered relative to French firms. Besides, small German firms appear to be relatively higher levered vis-à-vis large German firms. The same result is found for the United Kingdom, whereas this is not the case for France. However, only the result found for Germany is significant. Furthermore, the findings indicate cross-country differences in the effects of firm-level determinants on capital structure, suggesting the influence of institutional factors on corporate debt levels. Differences with respect to creditor rights, shareholder rights, legal reservation and the efficiency of the judicial system are found to significantly affect corporate debt levels of both small and large firms. Relatively high creditor rights in the UK compared to Germany and France might indicate why corporate gearing levels are higher for British firms vis-à-vis German and French companies. French and German lenders may be less willing to lend at a low rate as they face more risk. Making debt in the United Kingdom relatively more attractive.

This paper is organized as follows: Section two reviews the existing literature on the topic of capital structure. Section three will cover the formulation of hypotheses. Section four will describe the data sample and the methodology. In the fifth section the empirical results will be discussed. The sixth and final section will cover the conclusion, limitations and suggestions for future research.

2. Theoretical framework

The irrelevance theory of Modigliani and Miller (1958) is the starting point of most contemporary literature on capital structure. Their discussion started the creation of many new theories. This section starts with a short summary of the irrelevance theory of Modigliani and Miller (1958). Second, four main theories will be discussed, namely the static trade-off theory, the pecking order theory, the signalling theory and the agency theory. This section will conclude with a description of several institutional factors affecting corporate leverage.

2.1 Irrelevance theory

Modigliani and Miller (1958) claim that the value of a firm is independent of its capital structure. The investment decision affects the firm value, therefore making it relevant, however the financing decision does not. Since the financing policy of a firm is not relevant, there is no optimal leverage ratio, any debt level would give the same cost of capital and would not affect a firm's value (Modigliani and Miller, 1958). Modigliani and Miller (1958) made some crucial assumptions for their propositions to hold. They assumed that we live in a perfect world, with no bankruptcy costs, the absence of taxes and no information asymmetries (Bradley et al., 1984). However, we do not live in a perfect world, suggesting that the irrelevance theory has some flaws, making the capital structure not completely irrelevant. Therefore, new theories were proposed to show the value and relevance of a firm's financing policy.

2.2 Static trade-off theory

A theory derived from the irrelevance theory is the static trade-off theory. It argues that there is a trade-off between the costs and benefits of debt, this trade-off determines the optimal leverage ratio of a firm (Myers, 1984). Thus, where an optimal debt ratio is absent according to the irrelevance theory, the static trade-off theory states that each firm has one and should

try to achieve it. The main benefit of using debt is the tax shield it creates (Brounen et al., 2006). Besides, Green and Tong (2005) state that using debt reduces the agency costs of free cash flows. The tax shield debt creates means that the interest payments on debt are tax deductible, leading to lower taxes payable than the firm would have without the use of debt (DeAngelo and Masulis, 1980). This suggests that firms should be almost completely financed with debt, because equity won't give them this tax advantage (Modigliani and Miller, 1963). Since firms, which are almost completely financed with debt, are unrealistic, the static trade-off theory includes some limits to the debt advantages, namely bankruptcy costs. Keep on adding debt leads to an increasing probability of going bankrupt, therefore costs incur to prevent this from happening. Thus, a trade-off exists between the benefits and costs of debt. Some examples of the costs firms experience from increasing levels of debt are: financial distress costs, the costs of contracting and costs of monitoring (Green and Tong, 2005; Myers, 1984). Financial distress costs incur when a firm tries to avoid bankruptcy. Because higher levels of debt lead to a higher probability of going bankrupt, these costs increase with a firm's debt level. Furthermore, when a firm has lots of debt, suppliers may be less willing to give credit and the firm may even have to lower its prices to remain competitive (Frank and Goyal, 2008).

2.3 Pecking order theory

The pecking order theory tries to explain capital structure decisions by a firm's preferences in financing options. The theory states that a hierarchy in financing preferences exist. Internal financing stands at the top of the hierarchy, but if the amount of internal financing is insufficient, external financing is used. If firms seek to use external financing, debt is preferred over equity. Equity is only used if all else lacks the availability or is not enough (Frank and Goyal, 2003; Myers, 1984). According to the pecking order theory, the hierarchy in financing is caused by adverse selection, which in turn is explained by information asymmetry costs and transaction costs (Fama and French, 2002). For example, transaction costs are costs which arise from equity or debt issues. These costs are found to be higher for equity than for debt and internal financing lacks these costs (Baskin, 1989). Therefore, transaction costs are one of the explanations for the hierarchy. Information asymmetry costs can be explained by people having different information about firms. For example, managers know more about the firm they work for than most outsiders do. They have more knowledge on the future risks and income of a firm and show less willingness to give this information to outsiders (Fama and French, 2002). Taking these costs into account, internal financing is preferred over external financing. Another reason for the preference of debt over equity has to do with the amount of information firms must give away. In case of a bankruptcy, debtholders are paid before equity holders, therefore asking less information than equity holders do. So, debtholders are more secure, leading again to equity being less preferred than debt (Myers, 2001). An optimal leverage ratio is not present, instead the need for external funding drives the leverage ratio of a firm (Myers and Sunder, 1999). Therefore, firms do not try to reach a target debt to equity ratio.

2.4 Signalling theory

According to Ross (1977), the signalling theory suggests that the financing decisions of firms can be used to signal information to outsiders. The author states that information about the firm and its value can be transferred by evaluating different financing options. Increasing a firm's debt level signals to outsiders that the firm is able to meet future debt obligations, therefore signalling better earnings quality, profitability and cash flows. All these factors signal higher firm value (Masulis, 1983). Thus, firms may use debt to signal their expectations about the company and the market.

2.5 Agency theory

The agency cost theory argues that conflicts arise due to the separation of ownership and management (Jensen and Meckling, 1976; Morellec et al., 2010). Managers and owners have different interests, therefore the separation of the two can lead to conflicts. There are all kinds of agency conflicts, such as conflicts between managers and owners, but also between bondholders and shareholders. Jensen (1986) elaborated on the free cash flow problem, stating that managers of firms with excess cash, might waste this on their own interests. Thus, destroying value instead of creating it. Increasing the debt level of a firm decreases the free cash flows, because more interests need to be paid. Hence, less cash can be wasted by the managers. Furthermore, increasing the use of debt leads to the commitment of managers to make profitable investments, otherwise the interest on debt can't be paid. Thus, leverage also acts as a disciplinary tool.

2.6 Institutional factors

Besides firm-level determinants, institutional factors affect corporate financing behaviour as well (Rajan and Zingales, 1995). Previous studies show countries with similar capital markets, having different levels of corporate leverage (De Jong et al., 2006; Rajan and Zingales, 1995). Hence, an explanation could be that institutional factors besides capital markets affect corporate leverage. Some examples of these factors are shareholder protection, debtholder protection and stock market development. When looking at the legal system of countries they can broadly be categorized into two groups, common law and civil law (La Porta et al., 1998). Where the origin of common law systems is mostly dominated by English origin, this is not the case for civil law systems. The origin of the civil law system can be found from different places, such as Germany, France and Scandinavia (Levine et al., 2003). The sample used in this study applies the differences between these legal systems, by using data from Germany, France and the United Kingdom. Germany belongs to the German civil law, whereas the French legal system finds its origin in the French civil law, the UK is characterized by English common law.

When looking at the legal environment of these countries it is important to take the investor protection into account. Distinctions with respect to investor protection laws can be found between each of the three countries used in this study. De Jong et al. (2006) found that these laws and the enforcements of them influence corporate debt levels. A study explicitly investigating the influence of legal systems on firm characteristics is the one of La Porta et al. (1998). Based on differences in bankruptcy laws, creditor rights and other factors, they come up with an index ranking countries according to their degree of shareholder and creditor

protection. The index for shareholder protection runs from zero to six, where the index for creditor protection is scaled from zero to four. Respectively a six and four indicate high investor protection, whereas a zero is associated with a low degree of investor protection.

When looking at shareholder rights, Germany is scoring a one, where France and the United Kingdom score a three and five respectively. Suggesting that UK common law protects equity holders to a higher extent than the legal systems in the other two countries do. With respect to creditor rights the UK finds itself at the top, with a rating of four. Germany has a rating of three and France scores a zero (La Porta et al., 1998). This might indicate that creditors in the United Kingdom are more favourable towards their debtors than in the other two countries, as lenders in the UK face less risk. This suggests that debt levels are higher in the UK. Furthermore, La Porta et al. (1998) suggest a high degree of law enforcement for all three countries due to their highly efficient judicial systems. Looking at both shareholder and creditor protection, investors have the most legal protection in the UK. The rankings of Germany, showing a low score on shareholder rights and a relatively higher score on creditor rights, suggest that debt could be the preferred source of finance, because the costs shareholders face for monitoring might be too high.

Furthermore, the degree of shareholder rights has influence on another characteristic, namely ownership concentration. The low level of shareholder rights in France and Germany can be seen as one of the reasons why corporate ownership in these countries is concentrated. Similarly, British firms are characterized by dispersed ownership, as their shareholders face better legal protection. The agency theory suggests that concentrated ownership would lead to firms preferring debt over equity, as shareholders are unwilling to give up their corporate control. This is in line with the results of Antoniou et al. (2008) which states that ownership concentration has a positive relation with corporate leverage. Therefore, the results of La Porta et al. (1998) suggest that equity holders in the UK are more willing to issue new equity than their peers in France and Germany, as the latter group may not want to lose control. Furthermore, Antoniou et al. (2008) report that higher levels of creditor rights reduce the costs of debt. Hence, it increases corporate debt levels, leading to a positive relation between creditor rights and leverage. Lastly, they find a positive relation between shareholder rights and debt. They claim that a higher degree of shareholder protection increases a firm's debt capacity by decreasing the level of information asymmetry. Overall, it should be noted that institutional factors play a significant role in explaining the cross-country differences in corporate debt levels.

3. Hypothesis development

In this section hypotheses will be formulated based on the main theories and previous studies. Four hypotheses will cover the firm-level determinants of capital structure and one hypothesis will test the difference in leverage between small and large firms.

3.1 Asset tangibility

The financing behaviour of a firm might be influenced by the assets it holds. The static trade-off theory argues that the bankruptcy costs of a firm decrease with the amount of tangible assets it holds (Chen, 2004; Hovakimian et al., 2004; Rajan and Zingales, 1995). Because

tangible assets can be easily used as collateral, holding more tangible assets should lead to a higher debt capacity. Chen (2004) supports this by stating that tangible assets are better for collateral purposes than intangible assets. Furthermore, Myers and Majluf (1984) claim that secured debt can be used to reduce information asymmetry. If investors have little information it can be costly to sell securities. In line with this argumentation, Galai and Masulis (1976) propose that debt financing can only be used for specific purposes when it is collateralized. For unsecured debt, this does not hold, making lenders less willing to give favourable terms. Thus, collateralized debt makes the use of debt preferred to equity. Lastly, agency costs between debt and equity holders could be reduced using collateral, because lenders are more secured (Rajan and Zingales, 1995). Hence, if a firm has lots of tangible assets, lenders should be more willing to give credit. This leads to the first hypothesis:

H1: Asset tangibility is positively related to the leverage ratio of a firm.

3.2 Growth opportunities

The static trade-off theory argues that growth opportunities, together with intangible assets increase bankruptcy costs in times of financial distress. Both variables tend to have a higher probability of decreasing value when a firm is in a state of financial distress (Myers, 1984). As the static trade-off theory states, bankruptcy costs have a negative impact on the leverage ratio of a firm, therefore growth opportunities decrease the benefits of having debt. Hence, growth opportunities would lead to firms having lower leverage ratios. The studies of Gul (1999) and Graham and Leary (2011) support this prediction by finding a negative relation between growth opportunities and corporate leverage. The negative relation predicted by the static trade-off theory is shared by the pecking order theory. Because the value of future growth opportunities is better known by inside managers than by outsiders, so information asymmetries tend to be higher for high growth firms (Frank and Goyal, 2008). Therefore, internal financing would be preferred over external financing. Besides, Myers (1977) argues that high growth firms should use more equity instead of debt, because it is more common for firms with large amounts of debt to pass up profitable investment opportunities. Lastly, Titman and Wessels (1988) state that costs arising from agency problems between share- and bondholders tend to be larger for growing firms. They also argue that growth opportunities do add value to firms, but cannot be used as collateral, nor lead to tax benefits. Therefore, they predict a negative relation between growth opportunities and leverage. From all in this section the second hypothesis can be formulated:

H2: Growth opportunities are negatively related to the leverage ratio of a firm.

3.3 Size

Many authors claim that size plays a role in the explanation of corporate leverage. The financial distress costs of a firm are affected by its size, because larger firms tend to be less sensitive to bankruptcy and are more diversified (Chen, 2004; Titman and Wessels, 1988). Furthermore, Ang et al. (1982) argue that direct bankruptcy costs seem to be inversely related to the value of a firm. This suggests that bankruptcy costs are lower for large firms than for small firms. In line with the static trade-off theory this indicates a positive relation between size and leverage. This relation is supported by Rajan and Zingales (1995), who found a

positive relation between size and leverage. Another argument for a positive relation can be found in the pecking order theory. Because bigger firms have more legal restrictions, such as annual financial statements, larger firms tend to have lower information asymmetries (Myers and Majluf, 1984). This means that the information gap between insiders and outsiders decreases as the size of a firm increases. Hence, large firms tend to be more transparent and have less information asymmetries vis-à-vis small firms. Sufi (2007) claims that information asymmetries restrict firms from using debt. Therefore, bigger firms have easier access to debt compared to smaller companies. This study investigates two groups, namely small enterprises versus large firms. Within each of the two classes, size is expected to have the following relation with leverage:

H3: Size is positively related to the leverage ratio of a firm.

3.4 Profitability

The pecking order theory states that internal financing is preferred over external financing. When firms become more profitable, they are able to generate more retained earnings which can be used to finance their projects. Therefore, more profitable firms are better capable of using internal funds as a source of financing. Because more internal funds can be used, external capital such as debt is less required (Fama and French, 2002). Thus, the pecking order theory suggests a negative relation between profitability and leverage. Supporting the pecking order theory, the signalling theory suggests a negative relation as well. Because high profits signal that the firm is doing well, there is less need to use debt to signal the same to outsiders (Schoubben and van Hulle, 2004).

Contradictory to the pecking order and the signalling theory, the agency and static trade-off theory suggest a positive relation. More profitable firms can have more agency problems related to the free cash flows. Managers can use these free cash flows to achieve personal goals instead of acting in the shareholders' interests (Jensen, 1986). To overcome this problem firms can increase their debt levels to discipline the managers. The agency theory suggests, as firms become more profitable, a larger fraction of pre-interest earnings should be devoted to debt (Fama and French, 2002). Therefore, profitability indicates higher leverage ratios. Due to asymmetric taxation, losses are less subsidized as profits are taxed, leading to the expectation that more profitable firms have a higher tax rate (DeAngelo and Masulis, 1980; Feld et al., 2013). This is especially the case for progressive tax rates, meaning that an increase in earnings leads to an above proportional increase in the corporate tax rate. This increasing tax rate results in an increasing tax shield. Hence, the benefit of debt increases when firms become more profitable (Hovakimian et al., 2011). Therefore, the static trade-off theory predicts a positive relation between profitability and leverage. Most of the authors investigating profitability and leverage find a negative relation between the two (Rajan and Zingales, 1995; Titman and Wessels, 1988; Frank and Goyal, 2003). In line with prior studies and the pecking order theory the fourth hypothesis is:

H4: Profitability is negatively related to the leverage ratio of a firm.

3.5 Small and Large firms

Small and large firms differ with respect to their access to the capital market, information asymmetry and ownership concentration. Large firms are usually characterized by diffused ownership, relatively easy access to the capital market and face some regulatory obligations with respect to their disclosure of information (Beck and Demircuc-Kunt, 2006; Beedles, 1992; Bergström and Rydqvist, 1990). On the other hand, small firms show the exact opposite characteristics.

3.5.1 Access to capital market

Titman and Wessels (1988) found that firm size plays a role in the costs of debt and equity issues. Firm size is inversely related to the costs of an external capital issue. An equity issue costs much less for a large firm vis-à-vis a small firm. Looking at long-term debt, an issue is more expensive for small firms compared to large firms, however this relative difference is smaller than for an equity issue (Beedles, 1992). An explanation for this is found by Chittenden et al. (1996), who argue that initial public offerings are subject to under-pricing, which appears to affect small firms more than large firms. Besides, the agency theory provides some explanation. Jensen and Meckling (1976) point out the fixed element of transaction costs, meaning that small firms face the same fixed component of transaction costs as large firms do. This is supported by Ang (1991) who states that small firms pay proportionally more in bankruptcy, transaction and negotiation costs. In other words, small firms have a disadvantage compared to large firms with respect to issuing debt and equity. Agency problems are more likely to occur when small firms get into a financing agreement with another party, compared to large firms. Therefore, the costs of solving these problems are also higher (Chittenden et al., 1996). This indicates that the overall costs for small firms to access the capital market are larger than for large firms. Hence, it is more difficult for small firms to access the capital market vis-à-vis large firms, but if they choose to raise external capital, issuing debt is relatively cheaper than equity. This indicates higher leverage for small firms compared to large firms.

3.5.2 Information asymmetry

Another difference can be found in information asymmetry. Market frictions, such as information asymmetry and transaction costs are more likely to harm small firms vis-à-vis large firms (Beck and Demircuc-Kunt, 2006). Myers and Majluf (1984) state that many legal systems require large firms to disclose some of their information by making financial statements. This indicates that large firms face less information asymmetries than small firms do. Meaning that it is more difficult for outsiders to judge the financial situation of small firms versus the situation of large firms. Because debtholders have priority over equity holders, with respect to claiming a part of the firm's cash flow, equity is more affected by information asymmetries (Myers and Majluf, 1984). This results in equity holders demanding a higher return to compensate for the transparency risk. Hence, equity becomes relatively unattractive compared to debt for firms facing information asymmetries, suggesting that small firm would prefer to issue debt instead of equity.

3.5.3 Ownership concentration

Besides access to the capital market and information asymmetry, ownership concentration can influence the corporate financing decision as well. As mentioned before, small firms tend to have concentrated ownership, whereas large firms are subject to dispersed ownership (Bergström and Rydqvist, 1990). Margaritis and Psillaki (2010) found that more diffused ownership is related to lower levels of leverage. Meaning that small firms, having a more concentrated ownership structure, should have higher debt levels compared to large firms.

A second implication of ownership concentration is the fact that shareholders of small firms are less protected than their equivalents in large firms. The cause can be found in disclosure regulations, suggesting that equity in small firms is riskier than equity in large firms (Myers and Majluf, 1984). For large shareholders facing less protection is not necessarily a problem, because they are able to monitor the firm themselves. However, minority shareholders are not always able to monitor the firm, making their equity riskier than their equivalents in large firms. Thus, minority investors demand a higher return for small firm's equity in order to buy the stock, increasing the barrier for small firms to issue equity.

Lastly, concentrated ownership indicates the presence of majority shareholders, meaning that they have a significant part of control in the firm. In case of a new equity issue, a majority shareholder would potentially lose a part of his share in the firm and with it a part of his control (Stulz, 1990). Thus, making it undesirable for a majority shareholder to restore to equity financing. As a result, the cost of equity is higher when ownership is concentrated, because majority shareholders demand a larger return in order for them to transfer a part of their control. Making equity less attractive relatively to debt. From all of this section, the fifth and final hypothesis can be formulated:

H5: Small firms are likely to have relatively higher leverage than large firms.

4. Methodology

This section will start with the description of the data source and data sample. It continues with the discussion of the research methodology. After which the variable measurements used for the dependent and independent variables will be described. Lastly an overview of the descriptive statistics will be discussed.

4.1 Data source

The database used for gathering the financial statement information is Orbis, managed by Bureau van Dijk. Very often it is hard to find comparable and large amounts of information for small firms, but Orbis provides access to extensive datasets for over 200 million small and large firms. Hence, it is a suitable database for the purpose of this study. Another advantage of Orbis is its data format. It generates a standard data format, which makes comparisons and data handling relatively easy.

In order to generate proxies for the variables tested in this study, information is used from income statements, cash flow statements and balance sheets. Orbis only provides consolidated firm information for the previous ten years, implying data availability from 2006-2015. Therefore, an active firm has a maximum information availability until 2006, whereas

information of inactive firms can be available for a longer period. To avoid any selection bias, this study will only cover data from the period 2006-2015. As mentioned before, the countries used in this study are France, Germany and the United Kingdom. These countries are chosen because of their different legal systems and their comparability with respect to capital market accessibility.

4.2 Data sample

This study focusses on the corporate debt levels of firms in France, Germany and the United Kingdom. Therefore, it covers all available corporate entities of those countries. However, to improve the comparability of this study, firms need to meet some criteria before they are included in the sample.

First, the data sample used contains two groups, one consisting of small firms, the other containing large firms. As aforementioned a firm is considered small if it meets two criteria. First the firm must have less than 250 employees. Second, its turnover is 50 million euros or less or its balance sheet total is 43 million euros or less (European Commission). Firms are considered large if they do not belong to the small group. The data period runs from 2006-2015, to assign firms to a size group, they have to meet the conditions in every single year. This improves the comparability of the results and makes the sample size equal for all years.

Second, to be eligible, firms also need to provide data for all of the years. If a firm has missing data on one or multiple variables, all the observations of that firm are excluded from the dataset. This makes it easier to do cross-year comparisons, because the sample has the same size every year. Besides, if some of the independent variables are missing, it is impossible to perform a complete analysis in order to explain leverage. The same goes for missing values of leverage. If a leverage value is missing, the independent variables explaining leverage do not serve their purpose. Furthermore, since it is not possible for leverage to be negative, all firms showing negative leverage are deleted from the dataset.

Third, firms active in certain sectors are removed from the dataset. Following the study on capital structure by Brav (2009) firms in the public utilities sector, financial industry and public sector are deleted. Firms active in these industries have an entirely different nature of operations and face heavy regulations with respect to corporate debt levels (Brav, 2009; Gauthier et al., 2012; Rajan and Zingales, 1995). Hence, companies operating in these industries are excluded from the dataset.

After controlling the dataset for these criteria, the data sample consists of 7,641 firms. As can be observed in table 1, the group of small firms contains 6,051 unique firms and the group of large firms contains 1,590 unique companies.

Table 1: Data sample

	France	Germany	United Kingdom	All Countries
Small Firms	4,324	130	1,597	6,051
Large Firms	270	313	1,007	1,590
All Firms	4,594	443	2,604	7,641

4.3 Research methodology

The research methodology used in this paper follows the study of Brav (2009) on capital structure differences between private and public firms in the United Kingdom. A panel ordinary least square regression, with the inclusion of fixed effects, will be performed in order to test whether asset tangibility, growth opportunities, size and profitability explain the debt levels of small and large firms. Fixed effects are included, since many authors found that corporate debt levels are affected by factors other than firm-specific ones. Factors depending on country, industry or time may affect leverage as well. Hence, fixed effects will be included to control for these effects. A panel fixed effect model is a very common way to investigate the effect of firm-level determinants on capital structure, therefore making the results easier to compare to other studies (Brav, 2009; de Jong et al., 2009; Deesomsak et al., 2004). The advantage of using panel data is the provision of precise results for a relatively short time series, looking at multiple different observations in a cross-section (Hsiao, 1985). Besides, Hsiao (1985) argues that panel data provides a large amount of data points, with less collinearity and more variability among the variables compared to time-series or cross-section. Baltagi (1998) states that the additional and more informative data can provide more reliable estimates, as less restrictions are required. Furthermore, the independent variables are interacted with the size of the firm. Where “Small” takes the value of one if a firm meets the criteria of a small firm and zero if it does not and “Large” takes the value of one if a firm does not meet the criteria of a small firm and zero if it does meet the criteria.

As aforementioned, the panel OLS model will be elaborated with industry, country and year fixed effects. Titman and Wessels (1988) state that leverage differs across industries. This is supported by Bradley et al. (1984) who found that a firm’s average leverage has a strong relation with the industry in which it operates. Thus, industry fixed effects are included to control for this. This study tries to explain the differences in leverage between small and large firms across three different countries. Fan et al. (2002) argue that large variations in corporate debt levels exist between countries and that these variations can be attributed to differences in their institutional environment. They state that differences in market participation, taxation, public governance and legal systems can cause varieties in corporate financing behaviour. For example, France, Germany and the UK show differences in their corporate governance scores (Renders et al., 2010). Thus, it is worthy to control for these institutional factors. Hence, country fixed effects are included in this study. Similar goes for year fixed effects. Leary and Roberts (2005) state that firms tend to achieve a mean optimal leverage ratio in the long run. Thus, this will be controlled for by year fixed effects. Furthermore, it is a possibility that leverage explains the firm-level determinants instead of the other way around. To avoid endogeneity problems, the independent variables will be lagged one year. Besides, to operationalize some variables, data is needed from two consecutive years. Hence, the data period runs from 2006-2015, whereas the analysis period will run from 2008 till 2015. Lastly, outliers may cause variables to become correlated, even if they are not (Rajan and Zingales, 1995). To overcome this problem, all variables are winsorized at a 0.5% level at both tails. However, the results without the alteration of the outliers are checked for in the robustness section. From all of the above the following regression model can be formulated:

$$LEV_{i,t} = \alpha + \beta_1 TANG_{i,t-1} + \beta_2 GROWTH_{i,t-1} + \beta_3 SIZE_{i,t-1} + \beta_4 PROF_{i,t-1} + \text{Industry Fixed Effects} + \text{Country Fixed Effects} + \text{Year Fixed Effects} + \varepsilon_{i,t}$$

Where:

$LEV_{i,t}$ = The leverage ratio of firm i at time t,

α = The constant in the model,

$TANG_{i,t-1}$ = The asset tangibility of firm i at time t-1,

$GROWTH_{i,t-1}$ = The growth opportunities of firm i at time t-1,

$SIZE_{i,t-1}$ = The firm size of firm i at time t-1,

$PROF_{i,t-1}$ = The profitability of firm i at time t-1,

$\varepsilon_{i,t}$ = The error term of firm i at time t.

4.4 Variable measurements

In order to capture the effect of the different firm-level determinants on leverage, both the firm's capital structure as the variables affecting it have to be operationalized. First, two different proxies for leverage will be discussed. Second, the measures for the firm-level determinants will be elaborated.

4.4.1 Leverage

The capital structure of firms is widely measured by a firm's leverage ratio. Literature provides multiple measures for leverage, all coming with their own benefits and flaws. Therefore, two widely used measures will be discussed, namely total liabilities divided by total assets and total debt divided by total assets (Brav, 2009; de Bie en de Haan, 2007; Huang and Song, 2006). Since the sample used does not only consist of firms which have publicly traded equity, but also contains small firms with privately traded equity, market leverage cannot be calculated for the entire sample. Hence, to improve the comparability book leverage is used instead of market leverage. Leary and Roberts (2005) state that this does not need to be a problem, since the results are robust for both leverage measures. Huang and Song (2006) point out some advantages of measuring leverage by dividing total liabilities by total asset. First, creditors do not only look at long- and short-term debt when a firm wants to issue new debt, they consider other liabilities as well. Therefore, a firm's debt capacity is affected by its liability level. Second, Rajan and Zingales (1995) state that this proxy measures the residual interest of shareholders. On the other hand, they show some disadvantages of the total liabilities proxy as well. Rajan and Zingales (1995) argue that this proxy does not tell anything about the default risk in the near future. Furthermore, leverage might be overestimated, because this proxy includes balance sheet items such as accounts payable, which are more likely to be used for transaction purposes rather than for financing activities. The total debt is measured by summing the total short-term debt and total long-term debt (de Bie en de Haan, 2007). This proxy does not seem to have the problem of overstating the leverage of a firm (Rajan and Zingales, 1995). But it has a different flaw coming with it.

Namely, it does not consider the fact that specific assets can be offset by certain non-debt liabilities (Rajan and Zingales, 1995). For example, industry considerations affect both accounts receivable and accounts payable. While both measures have their shortcomings, the total debt proxy will be used. This has two reasons, first this measure is more common in capital structure studies than the other one. Second, this study tries to explain the effect of firm-level determinants on the total debt level of a firm, therefore the total debt measure suits the essence of this study better. However, to test the robustness of the results, the total liabilities proxy will be used as a second opinion.

4.4.2 Firm-level determinants

The proxies used for the firm-level determinants are selected from prior studies on corporate leverage. One of the most commonly used measure for asset tangibility is to divide a firm's total fixed assets by its total assets (Deesomsak et al., 2004; Rajan and Zingales, 1995). Following Degryse et al. (2009) growth opportunities will be defined as the percentage change in total assets. Firm size will be measured by taking the natural logarithm of the total assets (Deesomsak et al., 2004). Finally, ebit over total assets will be used as a proxy for profitability (Deesomsak et al., 2004; Fama and French, 2002).

4.5 Descriptive statistics

A summary of the descriptive statistics for the entire sample and per country can be observed from table 2 and table 3 respectively. Both the mean, median and standard deviation are reported for both the small firm and large firm sample. Furthermore, the tables show whether the differences in mean values of respectively the small and large firm sample are significant or not.

Table 2 shows that the mean leverage ratio for small firms is higher than for large companies. On average, small firms consist of 52.3% debt when measured by total debt divided by total assets. Whereas large companies show a lower leverage ratio, namely 50.6%. As can be observed from the table, the difference of 1.7% is statistically significant at the 1% level. Looking at table 3, the same holds for the United Kingdom. However, France and Germany show a result inconsistent with this hypothesis. On average, large firms in these countries report a relatively higher debt level than small companies do. The results of La Porta et al. (1998), showing low scores on creditor protection for France and Germany, might provide an answer to this difference. As mentioned before, a possible factor explaining the difference in capital structure of small and large firms is their cost of equity relatively to their cost of debt. This relative difference might be higher for small firms than for large companies, making small firms prefer debt over equity (Chittenden et al., 1996; Titman and Wessels; 1988). Keeping in mind that France and Germany score poorly on creditor protection, lenders face more risk in these countries. Hence, they demand a higher interest rate, increasing the cost of debt for firms. As a result, the relative difference between the cost of equity and the cost of debt decreases.

Table 2: Descriptive statistics total sample

Descriptive statistics for the small firm and large firm sample. The difference statistic shows the difference in means between the small and large firm sample respectively. *, **, *** shows significance at the 10%, 5% and 1% level respectively.							
		Mean	Median	SD	Min	Max	N
Leverage	Small	0.523	0.479	0.329	0.004	1.394 ³	6,051
	Large	0.506	0.483	0.279	0.010	1.216 ³	1,590
	Difference	0.017***					
Asset tangibility	Small	0.304	0.232	0.251	0.003	0.967	6,051
	Large	0.461	0.450	0.244	0.010	0.978	1,590
	Difference	-0.157***					
Growth opportunities	Small	0.052	0.021	0.230	-0.467	1.421	6,051
	Large	0.054	0.038	0.187	-0.441	1.099	1,590
	Difference	-0.002					
Size	Small	7.488	7.501	1.750	3.522	11.651	6,051
	Large	12.564	12.227	1.897	8.571	18.483	1,590
	Difference	-5.076***					
Profitability	Small	0.078	0.063	0.130	-0.483	0.605	6,051
	Large	0.077	0.066	0.949	-0.295	0.516	1,590
	Difference	0.001					

Looking at the other firm characteristics, large firms appear to hold more tangible assets compared to small firms. Suggesting that small firms hold relatively more intangible assets than large firms. The results per country are consistent with the overall sample. All showing a significant difference in mean asset tangibility at the 1% level. The mean value for large firm growth opportunities is 5.4% whereas it is 5.2% for the small firm sample. The results per country for growth opportunities hold broadly, both the German and the British sample show a significant negative difference in mean growth opportunities between small and large firms at the 5% level. Higher growth rates might be one of the reasons for firms to issue equity, as lenders might be unable to fully fulfil their financing needs in order to seize these opportunities. As suggested by the sample names, the small firm sample shows a mean firm size which is significantly lower than the mean firm size in the large firm sample. This is supported by the statistics per country, all showing significant negative differences in mean firm size at the 1% level.

³ Since total assets needs to be equal to total debt plus total equity, leverage may be larger than 1 if equity is negative (Song; 2005; Degreyse et al., 2009). For example, if total assets equals to €100 and total equity has a value of -€20, total debt needs to be €120. Hence, the leverage ratio will be €120/€100=1.2.

Table 3: Descriptive statistics per country

Descriptive statistics for the small firm and large firm sample per country. The difference statistic shows the difference in means between the small and large firm sample respectively. *, **, *** shows significance at the 10%, 5% and 1% level respectively.

		France				Germany				United Kingdom			
		Mean	Median	SD	N	Mean	Median	SD	N	Mean	Median	SD	N
Leverage	Small	0.503	0.459	0.313	4,324	0.319	0.238	0.286	130	0.594	0.570	0.361	1,597
	Large	0.558	0.536	0.260	270	0.413	0.407	0.246	313	0.521	0.494	0.288	1,007
	Difference	-0.055***				-0.094***				0.073***			
Asset tangibility	Small	0.281	0.210	0.237	4,324	0.363	0.309	0.263	130	0.362	0.302	0.278	1,597
	Large	0.424	0.418	0.227	270	0.474	0.461	0.203	313	0.467	0.460	0.259	1,007
	Difference	-0.143***				-0.111***				-0.105***			
Growth opportunities	Small	0.054	0.019	0.230	4,324	0.040	0.005	0.271	130	0.047	0.029	0.228	1,597
	Large	0.052	0.036	0.158	270	0.055	0.035	0.182	313	0.053	0.040	0.196	1,007
	Difference	0.002				-0.015**				-0.006**			
Size	Small	6.826	6.716	1.528	4,324	9.411	9.449	1.008	130	9.123	9.160	1.023	1,597
	Large	12.953	12.533	2.146	270	12.964	12.596	1.870	313	12.336	12.013	1.794	1,007
	Difference	-6.127***				-3.553***				-3.213***			
Profitability	Small	0.081	0.067	0.130	4,324	0.032	0.044	0.192	130	0.073	0.057	0.120	1,597
	Large	0.061	0.060	0.076	270	0.070	0.065	0.096	313	0.083	0.069	0.099	1,007
	Difference	0.020***				-0.038***				-0.010***			

Lastly, small firms seem to be slightly more profitable than large companies are. On average small firms report a return on assets of 7.8% whereas it is 7.7% for large firms. Taking a look at the individual countries, there are deviating results. On the one hand, small French firms appear to be relatively more profitable than large French firms. On the other hand, in Germany and the United Kingdom, the results are the other way around. A possible explanation might be the value small firms add relatively to large firms. Schiemann (2008) reports that the amount of value added by small and medium enterprises (SME) compared to the national total is larger for French SME's than for both German and British SME's.

As stated earlier, table 2 shows a higher mean leverage for small firms than for large firms. But no conclusions can be made from a univariate analysis, it can only provide a first insight into the sample characteristics. The mean value for asset tangibility is higher for large firms in both table 2 and 3. It might be possible that this leads small firms to have higher debt levels instead of firm size. Therefore, the next section will provide results from a multivariate regression, in order to make conclusions about the hypotheses.

5. Results

This section starts with the results of the panel OLS regression for the entire sample. Second, the results per country will be discussed. Hereafter, the impact of some institutional factors will be analysed. Lastly, some additional regressions will be performed, in order to test the robustness of the results.

5.1 Overall sample

The results of the panel OLS regression for the entire sample can be found in table 4. All specifications from panel A include both year and industry fixed effects, but the first regression shows results without country fixed effects, whereas the second regression reports the results with the inclusion of country dummies. This makes it possible to see whether the country dummies affect the other coefficients or not. Panel B shows whether the coefficients found for each size group differ significantly from each other or not.

The first observation which can be made is that the size dummy is both negatively and significantly related to the leverage ratio of a firm. Furthermore, it holds for both the regression with and without country fixed effects. When excluding country dummies, small firms are 19.8% less levered than large firms, whereas this difference is 13% when controlling for countries. However, a positive relation is expected between the size dummy and leverage. As the hypothesis states that small firms are more likely to have higher leverage than large firms do. A possible explanation might lie in the barriers small firms face and their control. Titman and Wessels (1988) found that small firms face more restrictions when entering the external capital market, making debt and equity issues costly. Hence, small firms prefer to fund their projects with internal capital if possible. Furthermore, Stockmans et al. (2010) found a close relation between familial wealth and firm wealth within SME's. Meaning that the private wealth of SME owners is closely depending on firm wealth. As debtholders are paid before the owner of a SME, the owner might choose to only execute those projects which can be funded internally, or with just a little external capital. Suggesting that small firms are relatively less levered than large firms.

When comparing the results for asset tangibility, it can be seen that for the small firm sample a firm's asset tangibility is positively related to its leverage ratio. An increase of 1% in a small firm's asset tangibility increases its leverage ratio with 2.2%. However, the result found for this sample is not significant. This result is supported by Jõeveer (2013) and Van der Wijst and Thurik (1993) reporting an insignificant result for small firms as well. On the other hand, the large firm sample shows a positive coefficient which is significant at a 5% level. For large firms this means that an increase of 1% in its asset tangibility would lead to an 8.1% increase in its leverage ratio. The result is in line with Fan et al. (2012) and Jõeveer (2013), both predicting and finding a positive relation between asset tangibility and leverage for large firms. Thus, as large firms own more tangible assets, they have more collateral which enables them to issue more debt. Both signs are consistent with the hypothesis stating that asset tangibility is positively related to the leverage ratio of a firm. Panel B shows the differences in coefficients between the small and large firm sample respectively. For asset tangibility, the difference found is -5.9% and is not significant, meaning that the coefficients of both samples do not significantly deviate from each other.

Across the small firm and large firm sample, the variable growth opportunities shows similar significant results. An increase of 1% in growth opportunities increases leverage with 2.7% and 3.3% for small and large firms respectively. The coefficients indicate that both small and large firms tend to go to the debt market in order to fund their growth opportunities, because other funds might not meet their demand. The finding for the small firm sample is supported by evidence found by Degreyse et al. (2009) in their study on capital structure of SME's. The large firm sample result is in line with both Song (2005) and Deloof and Verschueren (1998), finding a positive relation between growth opportunities and leverage. However, these findings are in contrast with the hypothesis stating that growth opportunities have a negative impact on a firm's leverage ratio. Titman and Wessels (1988) provide a possible explanation, stating that valuable growth opportunities tend to increase a firm's value and therefore its debt capacity. Hence, growth opportunities can lead to potential higher debt levels. Panel B shows an insignificant difference of -0.6%. Therefore, the small firm coefficient does not significantly deviate from the one found for large companies.

Some interesting findings have been found for the firm-level determinant size. On the one hand, the small firm sample reports a positive and significant effect of firm size on corporate leverage. On the other hand, for the large firm sample a negative significant result has been found. An increase of 1% in firm size increases leverage by 1.2% and -1.2% respectively for small and large firms. The coefficient found for small firms is in line with Degreyse et al. (2009) and López-García et al. (2008) who both found significant positive coefficients for SME's as well. Besides, the result found for the small firms supports the hypothesis that firm size is positively related to corporate leverage. This indicates when small firms become bigger they increase their debt capacity by becoming more diversified and less sensitive to bankruptcy. Hence, their debt levels increase. For large firms this goes the other way around, the negative coefficient suggests when large firms become even larger their debt to equity ratio decreases. Even though this is not in line with the hypothesis, evidence in favour of this coefficient is provided by Jõeveer (2013) and Titman and Wessels (1988). This might suggest

that the positive effect size has on debt capacity decreases or even becomes negative when a firm reaches a certain size. In other words, if a firm is already very large and diversified, becoming even larger does not necessarily mean that it will become more diversified. Hence, its debt capacity does not increase. Another explanation might be caused by agency costs. Agency costs seem to harm small firms more than large firms (Beck and Demircug-Kunt, 2006). Hence, going to the external capital market is less attractive for small firms. But when going to the external capital market, equity is relatively more expensive for small firms vis-a-vis large firms, compared to debt. Thus, when small firms become bigger, but still remain relatively small they want more debt. But if large firms become even larger they might want to issue equity. When taking a look at panel B it can be seen that the difference of 2.4% is significant, indicating that both coefficients differ significantly from each other.

Comparing the two size groups with respect to the effect of profitability on leverage, table 4 reports similar results for both groups. Profitability has a negative and significant impact on corporate debt levels in both size classes. An 1% increase in profitability indicates a decrease of 20.7% and 26.1% in corporate leverage for small and large firms respectively. Both results find broad support by other authors, reporting similar results (López-García et al., 2008; Degreyse et al., 2009; Jõeveer 2013). These findings support the pecking order theory, arguing as firms become more profitable they enable themselves to fund more of their projects with internal capital and therefore decreasing the need for external capital such as debt. Hence, corporate debt levels will fall. Both coefficients found are in line with the hypothesis stating that profitability has a negative effect on leverage. It is noteworthy to say that the effect of profitability on leverage seems to be bigger for large firms vis-à-vis small firms. Furthermore, this difference is found to be significant, as reported in panel B. A possible reason for this lies in information asymmetry and agency costs. Large firms have lower information asymmetries and agency costs compared to small companies (Myers and Majluf, 1984). When firms become more profitable the ability of managers to use the profits as they wish is higher for managers in small firms vis-à-vis large firms. Suggesting that small firm profits are more likely to be subject to mismanagement. Hence, profitability has less impact on corporate leverage if a firm is small relative to large firms.

Similar results hold with the inclusion of country dummies, as can be observed from the second specification. It is noteworthy to say that Germany is not included in the specification, because not all dummies can be included in a regression. Hence, the French and British dummies show the relative differences in leverage ratio of these countries compared to Germany. Both panel A and panel B report comparable results with the first specification. Only the effect of firm size on small firm leverage becomes insignificant when country dummies are included. Although the results for the firm-level determinants do not differ a lot from the first specification, some interesting results have been found for the country dummies. Both French and British firms have a significantly higher leverage ratio compared to German companies. Respectively for French and British firms, gearing levels lie 12.6% and 17.3% higher when compared to German firms. This suggests that factors other than the firm-level determinants play a significant role in explaining the capital structure of firms.

Table 4: Results overall sample

The results of the panel OLS regression for the entire sample are shown in Panel A. P-values are mentioned in parentheses. All the independent variables used are interacted with their firm size dummy. All specifications include industry and year fixed effects. Column 1 reports the results excluding country fixed effects. Column 2 shows the results including country fixed effects. Panel B reports the results of the test of differences between the coefficients of respectively the small and large sample.

The results are checked for heteroskedasticity by the White test.

White robust standard errors are used to correct for heteroskedasticity.

Leverage is defined as total debt divided by total assets.

The definitions of the variables can be found in the appendix.

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

Panel A

	Leverage	Leverage
Small	-0.198*** (0.000)	-0.130*** (0.039)
Small asset tangibility	0.022 (0.241)	0.020 (0.294)
Large asset tangibility	0.081** (0.024)	0.077** (0.028)
Small growth opportunities	0.027*** (0.000)	0.028*** (0.000)
Large growth opportunities	0.033*** (0.000)	0.032*** (0.000)
Small size	0.012** (0.016)	0.008 (0.203)
Large size	-0.012*** (0.005)	-0.008** (0.015)
Small profitability	-0.207*** (0.000)	-0.209*** (0.000)
Large profitability	-0.261*** (0.000)	-0.265*** (0.000)
France		0.126*** (0.000)
United Kingdom		0.173*** (0.000)
Constant	0.641*** (0.000)	0.463*** (0.000)
Year Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Country Fixed Effects	No	Yes
Adjusted R-squared	0.028	0.040
Number of observations	61,128	61,128

Panel B

Asset tangibility	-0.059 (0.128)	-0.058 (0.139)
Growth opportunities	-0.006 (0.477)	-0.003 (0.724)
Size	0.024*** (0.000)	0.017** (0.020)
Profitability	0.054* (0.067)	0.056* (0.056)

The firm-level determinants, asset tangibility, growth opportunities, firm size and firm profitability seem to significantly affect corporate debt levels of both small and large firms. Only small firm asset tangibility is found to have an insignificant effect on small firm leverage. Differences between the two subsamples are found to be significant for both size and profitability. These findings suggest a larger effect of profitability on large firm leverage vis-à-vis small firm leverage. Furthermore, it means that firm size has a positive impact on small firm debt levels whereas the effect on large firms is negative. Lastly, there are significant differences between the countries with respect to corporate leverage. Hence, country specific factors play a role in explaining corporate debt levels. To see whether these results hold for the individual countries as well, the next paragraph will discuss country specific results.

5.2 Cross-country analysis

Similar to table 4, the results per country are listed in table 5. Where the regressions in panel A include industry and year fixed effects. Panel B provides the results of the difference tests, to check whether the coefficients of both size groups differ significantly from each other. The specifications show the results of France, Germany and the United Kingdom respectively.

For France, the size dummy seems to have a negative impact on leverage. Being a small firm would result in 13.1% less leverage vis-à-vis large firms. Although, the coefficient is consistent with table 4, it is insignificant, indicating that small firm leverage in France does not statistically differ from large firm leverage. In contrast to France, Germany and the United Kingdom report a positive coefficient. Corporate debt levels are 43.5% and 8.2% higher for small firms vis-à-vis large firms in Germany and the United Kingdom respectively. However, only the result for Germany is found to be significant. Leading to the interpretation that British gearing levels do not significantly differ across different size groups. The signs are in line with the hypothesis. Hence, a possible explanation might lie in the differences in access to the capital market. Small firms find it harder to get access to the capital market and are subject to higher issuance costs than large firms are. Besides, the relative difference in issuance costs is higher for equity vis-à-vis debt. Thus, when needing funds, small German firms prefer to go to the debt market instead of the equity market (Ang, 1991).

Regarding asset tangibility, the findings are similar to the ones listed in table 4. The coefficients found for the small firm samples are in line with Hall et al. (2004). In their international study on SME capital structure they found a positive relation as well. However, the coefficients found in this study are insignificant, whereas Hall et al. (2004) found a significant relationship. The large firm results for Germany and the United Kingdom are supported by de Jong et al. (2006) in their international comparison of capital structure. However, large French firms report a coefficient contradictory to the hypothesis and the results for the overall sample. A possible explanation is provided by Daskalakis and Psillaki (2008) who argue that holding a large amount of tangible assets can indicate that firms already found a stable source of return. Therefore, generating stable internal funds, discouraging them from using debt. Panel B shows us that the coefficients of both size groups differ significantly from each other in the case of France and the United Kingdom. This is not the case for the German sample.

For the firm-level determinant growth opportunities the results are comparable with the ones shown in table 4. All signs for small firm growth opportunities are found to be positively related to leverage. However, Germany reports an insignificant coefficient, whereas the results for France and the United Kingdom are significant. This means that the growth opportunities of small firms seem to have a positive impact on their gearing level in case of France and the UK. Debt levels of small German firms do not appear to be depending on their growth opportunities. These findings are in line with Hall et al. (2004) and Daskalakis and Psillaki (2008) who found similar results in their studies. For the large firm samples, the findings are in line with the results of the entire sample. Only France shows an insignificant coefficient. However, the sign is in line with the overall results. These findings are supported by Wald (1999) reporting positive significant relations as well. Just as the results found for the entire sample, these results are inconsistent with the hypothesis. However, as stated before, Titman and Wessels (1988) provide an explanation for the deviation. As growth opportunities can increase a firm's value, it increases its debt capacity. Thus, increasing the potential use of debt. Hence, debt levels may increase as growth opportunities become bigger. Panel B shows that the coefficients found for the German firms are significantly different from each other, where this is not the case for French and British firms.

Across the small firm sample, mixed results have been found for the variable firm size. A significant positive and negative coefficient have been found for France and the United Kingdom respectively. For Germany, an insignificant negative result has been reported. Daskalakis and Psillaki (2008) and Hall et al. (2004) found similar results for these countries. When comparing the results to the ones provided in table 4, it can be observed that only the coefficients of the small French firm sample and the large British firm sample are similar to the results reported for the overall sample. On the one hand, the findings suggest as small French firms become bigger, but still remain relatively small, they are able to hold more debt. Hence, gearing levels will increase. As stated in the hypothesis, this might be due to the inverse relation between firm size and bankruptcy costs (Chen, 2004). On the other hand, when increasing in size, but still remain a relatively small firm, small British firms become less levered. This might be due to creditor protection in the United Kingdom. As creditors in the UK are better protected than their French and German colleagues, British lenders are more willing to provide credit and loans to a firm, even when it is very small and young. Hence, small British firms have early access to debt, whereas this is more difficult for French and German firms. Therefore, when small firms increase in size, French and German lenders will be more reluctant to provide loans. However, as British small firms already have access to credit, they might go to the equity market. Hence, the leverage ratios will decrease. The large firm sample only reports a negative significant coefficient for the UK. France and Germany show insignificant positive signs. All these findings are supported by de Jong et al. (2006). The findings indicate when large firms in the United Kingdom become even larger, their leverage ratios will decrease, which is similar to the results found in table 4. Furthermore, firm size does not seem to affect corporate debt levels of large firms in France and Germany. It can be seen from panel B that the size coefficients for Germany are the only ones significantly different from each other.

Table 5: Results per country

The results of the panel OLS regression per country are shown in Panel A. P-values are mentioned in parentheses. All the independent variables used are interacted with their firm size dummy. All specifications include industry and year fixed effects. Panel B reports the results of the test of differences between the coefficients of respectively the small and large sample. The results are checked for heteroskedasticity by the White test. White robust standard errors are used to correct for heteroskedasticity. Leverage is defined as total debt divided by total assets. The definitions of the variables can be found in the appendix. *, **, *** shows significance at the 10%, 5% and 1% level respectively.

Panel A			
	France	Germany	United Kingdom
	Leverage	Leverage	Leverage
Small	-0.131 (0.353)	0.435** (0.034)	0.082 (0.482)
Small asset tangibility	0.025 (0.264)	0.049 (0.559)	0.006 (0.813)
Large asset tangibility	-0.129*** (0.003)	0.157*** (0.000)	0.105** (0.021)
Small growth opportunities	0.031*** (0.000)	0.002 (0.933)	0.035** (0.010)
Large growth opportunities	0.016 (0.240)	0.046*** (0.000)	0.033*** (0.006)
Small size	0.015** (0.023)	-0.038 (0.246)	-0.025* (0.083)
Large size	0.007 (0.412)	0.009 (0.356)	-0.022*** (0.000)
Small profitability	-0.193*** (0.000)	-0.146** (0.026)	-0.285*** (0.000)
Large profitability	-0.339*** (0.005)	-0.182*** (0.000)	-0.273*** (0.000)
Constant	0.405*** (0.000)	0.664** (0.029)	0.842*** (0.000)
Year Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Adjusted R-squared	0.040	0.077	0.019
Number of observations	36,752	3,544	20,832

Panel B			
Asset tangibility	0.155*** (0.004)	-0.108 (0.136)	-0.099* (0.056)
Growth opportunities	0.015 (0.260)	-0.044* (0.080)	0.001 (0.956)
Size	0.008 (0.529)	-0.047* (0.056)	-0.004 (0.768)
Profitability	0.145 (0.230)	0.037 (0.718)	-0.011 (0.837)

Looking at profitability, the results per country are comparable with the results found for the entire sample. An 1% increase in small firm profitability decreases leverage with 19.3%, 14.6% and 28.5% for France, Germany and the United Kingdom respectively. These results are comparable with those found by Hall et al. (2004) and Daskalakis and Psillaki (2008). The same goes for the large firm samples, reporting negative significant coefficients as well. Wald (1999) and de Jong et al. (2006) found similar results with respect to the relation between profitability and large firm leverage. Furthermore, all results are in line with the hypothesis stating that profitability negatively affects corporate debt levels. Thus, these findings indicate that both small and large firms will use an increase in profits to repay debt or to finance their projects with. Hence, their gearing level will decrease. As can be observed from panel B, none of the differences in small and large firm coefficients for profitability is found to be significant.

When looking at the firm-level determinants, most of the relationships found for the overall sample hold when zoomed in on each country. However, some cross-country differences have been found, among others for the firm size dummy. This indicates that institutional factors play a role in explaining the leverage ratios of small and large firms. The next paragraph will describe the impact of some institutional factors on the leverage ratio of small and large firms.

5.3 Institutional factors

As indicated in the previous sections, institutional factors appear to play a role in explaining the capital structure of firms. Therefore, four additional country-specific determinants, that describe the institutional environment, are included in the regression to test whether their impact is similar in both size groups. These four additional determinants are creditor rights, shareholder rights, legal reservation and efficiency of the judicial system, they come directly from the paper of La Porta et al. (1998). The values for each specific country can be found in the appendix. The results of the OLS regression with the inclusion of the institutional factors are reported in table 6. It can be observed that for the small firm sample, all of the firm-level determinants remain significantly related to leverage. Furthermore, all relations are similar to the ones found in table 4. The only difference found, lies in the significance of asset tangibility. When controlling for industry and year, asset tangibility is insignificantly related to small firm leverage. However, it becomes significant when these effects are excluded from the regression. Considering the impact of the firm-level determinants on large firm leverage, all signs are in line with table 4. However, the traditional determinants show two deviations from the results shown in table 4. When industry and year fixed effects are not considered, large firm growth opportunities and large firm size are insignificantly related to large firm debt levels. When taking a look at the country-specific factors, all four determinants are significantly related to a firm's gearing level. Creditor rights have a positive relation with corporate debt levels vis-à-vis the negative relation of shareholder rights, legal reservation and the efficiency of the judicial system. Similar results hold for both size groups. However, the impact of country-specific factors seems to be larger for small firms than for large firms, indicating that small firms are more sensitive to institutional factors. Especially legal reservation shows a big difference in coefficients. This might have to do with the fact that large firms are more likely to already meet the legal reservation requirements. As equity is

relatively cheaper for large firms vis-à-vis small firms, it is more likely that large firms already issued some equity. As equity is relatively more expensive for small firms, they might not meet the requirements and have to alter their capital structure. Hence, the effect of legal reservation is larger for small firms relatively to large firms.

The positive significant relation between creditor rights and leverage, found in both groups, is consistent with the literature. Deesomsak et al. (2004) propose, as creditor rights increase, lenders are better protected. Indicating that they become more willing to lend against better terms. Hence, debt becomes more attractive vis-à-vis equity and leverage will increase. The other way around, if creditor rights are low, lenders will demand a higher return in order to incorporate the extra risk they face. The coefficients indicate that a 1 unit increase in creditor rights would lead to an increase of 8.5% and 4.6% in leverage for respectively small and large firms.

Table 6: Results Institutional factors

The results of the OLS regression are shown in the table. P-values are mentioned in parentheses. Column 1 and 2 report the results of the small firm sample, whereas column 3 and 4 report the results of the large firm sample. The results are checked for heteroskedasticity by the White test. White robust standard errors are used to correct for heteroskedasticity. Leverage is defined as total debt divided by total assets. The definitions of the independent variables and the scores on the institutional factors can be found in the appendix. *, **, *** shows significance at the 10%, 5% and 1% level respectively.

	Small	Small	Large	Large
	Leverage	Leverage	Leverage	Leverage
Asset tangibility	0.114*** (0.000)	0.114*** (0.000)	0.029*** (0.006)	0.029*** (0.006)
Growth opportunities	0.043*** (0.000)	0.043*** (0.000)	0.009 (0.505)	0.009 (0.505)
Size	0.024*** (0.000)	0.024*** (0.000)	-0.001 (0.464)	-0.001 (0.464)
Profitability	-0.394*** (0.000)	-0.394*** (0.000)	-0.440*** (0.000)	-0.440*** (0.000)
Creditor rights	0.085*** (0.000)		0.046*** (0.000)	
Legal reservation	-3.818*** (0.000)		-1.586*** (0.000)	
Shareholder rights		-0.092*** (0.000)		-0.042*** (0.000)
Efficiency judicial system		-0.070*** (0.000)		-0.055*** (0.000)
Constant	-1.033*** (0.000)	0.691*** (0.000)	0.013 (0.723)	0.927*** (0.000)
Adjusted R-squared	0.063	0.063	0.051	0.051
Number of observations	48,408	48,408	12,720	12,720

On the other hand, legal reservation is negatively related to the leverage ratio of firms. When looking at the definition of legal reservation, this is quite logical. Since legal reservation means the fraction of share capital to total capital a firm is obligated to have, it directly affects leverage. As the legal reservation increases, mandatory equity increases. Hence, debt to equity ratios will decrease. It is noteworthy to mention that the effect of legal reservation is quite large compared to the other factors. This might have to do with the fact that legal reservation directly impacts the leverage ratio of firms.

Similar to legal reservation, shareholder rights are negatively and significantly related to corporate gearing ratios. A 1 unit increase in shareholder rights decreases leverage with 9.2% and 4.2% for small and large firms respectively. The reasoning is rather intuitive, as shareholders are better protected, they face less risk. Therefore, demanding a lower return. Hence, all else being equal, equity becomes relatively more favourable than debt. Indicating that debt to equity ratios will decrease.

Lastly, the efficiency of the judicial system is negatively and significantly related to leverage of both small and large firms. The efficiency of the judicial system measures the degree to which laws are used efficiently and integrally (La Porta et al., 1998). As the efficiency of the judicial system applies to all laws, it goes for bankruptcy laws as well. This indicates that if a country has a more efficient judicial system, it is more likely that a firm is forced into bankruptcy when having above rational levels of debt. Hence, firms incorporated in countries with a highly efficient legal system might be unwilling to have large proportions of debt, suggesting a negative relation between the efficiency of the judicial system and corporate leverage.

5.4 Robustness tests

To test whether the results found are robust or not, some additional regressions will be performed. First, a different definition of the dependent variable will be used. Second, two additional firm-level determinants will be included in the regression. Third, short-term regressions within the sample period will be conducted. Lastly, a panel OLS regression will be performed without changing the outliers.

5.4.1 Total liabilities

As discussed in paragraph 4.4.1, both the total debt and total liabilities proxy for leverage have some benefits and shortcomings. Therefore, it is wisely to compare the results of the tests using both definitions. The results, when using the total liabilities measure can be found in table 7. Results are reported for the entire sample as well as for each country. Comparing both leverage measures it can be seen that the results hold broadly. The small dummy still remains significantly and negatively related to the leverage ratio of firms. In the case of France and the UK, the signs for the size dummy do not change, however, they do become significant. Furthermore, the results for the firm-level determinants growth opportunities, profitability and large size do not change. These findings support the ones reported in table 4. However, some results loose or gain significance due to the change in proxy. Small firm asset tangibility becomes significant in the overall sample, France and the UK. Using the total debt measure, it is insignificantly related to corporate debt levels.

Table 7: Results leverage regression

The results of the panel OLS regression for the entire sample and per country are shown in Panel A. P-values are mentioned in parentheses. All the independent variables used are interacted with their firm size dummy. All specifications include industry and year fixed effects. Column 1 reports the results for the entire sample excluding country fixed effects. Column 2 shows the results for the entire sample including country fixed effects. Column 3, 4 and 5 report the results for France, Germany and the United Kingdom respectively.

Panel B reports the results of the test of differences between the coefficients of respectively the small and large sample.

The results are checked for heteroskedasticity by the White test.

White robust standard errors are used to correct for heteroskedasticity.

Leverage is defined as total liabilities divided by total assets. The definitions of the independent variables can be found in the appendix.

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

Panel A

	Overall	Overall	France	Germany	United Kingdom
	Leverage	Leverage	Leverage	Leverage	Leverage
Small	-0.040*	-0.057*	-0.152**	0.490*	0.284***
	(0.084)	(0.088)	(0.014)	(0.064)	(0.001)
Small asset tangibility	0.072***	0.072***	0.085***	-0.004	0.049**
	(0.000)	(0.000)	(0.000)	(0.930)	(0.027)
Large asset tangibility	0.036	0.036	-0.078**	0.097***	0.047
	(0.203)	(0.212)	(0.017)	(0.001)	(0.196)
Small growth opportunities	0.038***	0.038***	0.047***	0.005	0.026***
	(0.000)	(0.000)	(0.000)	(0.793)	(0.001)
Large growth opportunities	0.007*	0.007*	0.023	0.043***	-0.005
	(0.068)	(0.070)	(0.139)	(0.001)	(0.593)
Small size	-0.020***	-0.022***	-0.016***	-0.055**	-0.043***
	(0.000)	(0.000)	(0.000)	(0.025)	(0.000)
Large size	-0.005***	-0.005***	-0.009**	-0.003	-0.005**
	(0.001)	(0.002)	(0.019)	(0.645)	(0.037)
Small profitability	-0.218***	-0.218***	-0.233***	-0.218***	-0.173***
	(0.000)	(0.000)	(0.000)	(0.008)	(0.000)
Large profitability	-0.225***	-0.225***	-0.440***	-0.180***	-0.207***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
France		0.009*			
		(0.051)			
United Kingdom		0.012*			
		(0.082)			
Constant	0.666***	0.664***	0.667***	0.597***	0.935***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	No	Yes	No	No	No
Adjusted R-squared	0.044	0.045	0.043	0.023	0.033
Number of observations	61,128	61,128	36,752	3,544	20,832

Panel B

Asset tangibility	0.036	0.037	0.163***	-0.101	0.002
	(0.171)	(0.169)	(0.000)	(0.107)	(0.955)
Growth opportunities	0.031***	0.032***	0.024	-0.037	0.031**
	(0.000)	(0.000)	(0.185)	(0.178)	(0.021)
Size	-0.015***	-0.016***	-0.007	-0.052**	-0.038***
	(0.000)	(0.000)	(0.154)	(0.041)	(0.000)
Profitability	0.007	0.007	0.207**	-0.037	0.034*
	(0.817)	(0.809)	(0.012)	(0.742)	(0.078)

On the other hand, large firm asset tangibility becomes insignificantly related to leverage in the overall sample. Only one determinant changes from sign and remains significant when the total liabilities proxy for leverage is used. Small firm size becomes negatively and significantly related to small firm gearing levels in both the overall sample as the French sample. The small size results found for Germany and the United Kingdom remain robust. This suggest that as small firms become bigger, but still remain relatively small, their leverage will decrease. This is rather puzzling, as the hypothesis and the results in table 4 say the opposite. Since the definition of leverage is the only thing changed compared to table 4, an explanation needs to be sought in the leverage measure. One of the differences between the total debt and total liabilities measure is the inclusion of trade credit in the latter. Garcia-Teruel and Martinez-Solano (2007) found that SME's are more depending on short-term debt than large firms do, especially on trade credit. This suggests that in the small firm sample, when firms increase in size their trade credit decreases at a faster rate than their debt levels increase. Hence, their total liabilities will decrease, but their total debt will increase.

5.4.2 Non-debt tax shields and liquidity

The second robustness test will investigate the impact of two additional firm-level determinants on leverage, namely non-debt tax shields and liquidity. According to the literature, non-debt tax shields and liquidity are both negatively related to a firm's leverage ratio. As stated before, one of the main benefits of using debt is the tax shield it creates. But there are other sources which can be tax deductible, therefore lowering a firm's corporate tax burden (Fama and French, 2002; Kolay et al., 2013). DeAngelo and Masulis (1980) argue that depreciation, R&D costs and investments tax credits lead to tax deductions, thus shield income against taxes. Hence these non-debt tax shields can act as a substitute for the tax benefits of debt (Titman and Wessels, 1988). As a result, firms having large non-debt tax shields would be less triggered to be debt financed to a large extent. According to the pecking order theory, internal financing is preferred over external financing. In other words, firms are more eager to use existing cash rather than to use debt or equity. Because liquid assets can be easily converted into cash, they can be used as a form of internal financing, therefore being preferred over debt and equity (Butt et al., 2013; de Jong et al., 2008). Thus, the presence of large amounts of liquid assets indicate a firm's ability to fund its projects with internal capital. Hence, liquid firms require less debt compared to illiquid firms.

Table 8: Results leverage regression

The results of the panel OLS regression for the entire sample and per country are shown in Panel A. P-values are mentioned in parentheses. All the independent variables used are interacted with their firm size dummy. All specifications include industry and year fixed effects. Column 1 reports the results for the entire sample excluding country fixed effects. Column 2 shows the results for the entire sample including country fixed effects. Column 3, 4 and 5 report the results for France, Germany and the United Kingdom respectively.

Panel B reports the results of the test of differences between the coefficients of respectively the small and large sample.

The results are checked for heteroskedasticity by the White test.

White robust standard errors are used to correct for heteroskedasticity.

Leverage is defined as total debt divided by total assets. The definitions of the independent variables can be found in the appendix.

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

Panel A					
	Overall	Overall	France	Germany	United Kingdom
	Leverage	Leverage	Leverage	Leverage	Leverage
Small	-0.253*** (0.000)	-0.175*** (0.009)	-0.164 (0.256)	0.308* (0.086)	-0.000 (1.000)
Small asset tangibility	-0.065*** (0.001)	-0.067*** (0.000)	-0.059** (0.019)	0.009 (0.916)	-0.105*** (0.000)
Large asset tangibility	-0.015 (0.718)	-0.017 (0.683)	-0.308*** (0.000)	0.070* (0.097)	0.009 (0.877)
Small growth opportunities	0.023*** (0.000)	0.025*** (0.000)	0.029*** (0.000)	0.003 (0.883)	0.022** (0.032)
Large growth opportunities	0.023*** (0.006)	0.022** (0.010)	0.012 (0.363)	0.039*** (0.001)	0.022* (0.082)
Small size	0.021*** (0.000)	0.017*** (0.007)	0.022*** (0.001)	-0.028 (0.376)	-0.011 (0.408)
Large size	-0.008* (0.078)	-0.004 (0.256)	0.018** (0.030)	0.011 (0.332)	-0.016*** (0.000)
Small profitability	-0.203*** (0.000)	-0.205*** (0.000)	-0.185*** (0.000)	-0.144** (0.032)	-0.296*** (0.000)
Large profitability	-0.283*** (0.000)	-0.284*** (0.000)	-0.269** (0.019)	-0.210*** (0.000)	-0.295*** (0.000)
Small Non-debt tax shields	0.265*** (0.001)	0.267*** (0.001)	0.325*** (0.001)	0.088 (0.571)	0.083 (0.436)
Large Non-debt tax shields	-0.155 (0.133)	-0.120 (0.237)	0.323 (0.335)	-0.091 (0.403)	-0.202* (0.075)
Small liquidity	-0.023*** (0.000)	-0.023*** (0.000)	-0.026*** (0.000)	-0.006* (0.091)	-0.026*** (0.000)
Large liquidity	-0.031*** (0.000)	-0.030*** (0.000)	-0.093*** (0.000)	-0.017*** (0.000)	-0.033*** (0.000)
France		0.104*** (0.001)			
United Kingdom		0.152*** (0.000)			
Constant	0.692*** (0.000)	0.531*** (0.000)	0.581*** (0.000)	0.293* (0.051)	0.805*** (0.000)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	No	Yes	No	No	No
Adjusted R-squared	0.167	0.159	0.163	0.156	0.157
Number of observations	61,128	61,128 Panel B	36,752	3,544	20,832
Asset tangibility	-0.050 (0.287)	-0.050 (0.290)	0.249*** (0.000)	-0.061 (0.296)	-0.114* (0.066)
Growth opportunities	0.000 (0.967)	0.003 (0.805)	0.016 (0.233)	-0.036 (0.135)	0.000 (0.987)
Size	0.028*** (0.000)	0.021*** (0.005)	0.004 (0.758)	-0.039* (0.086)	0.005 (0.641)
Profitability	0.079** (0.014)	0.080** (0.014)	0.084 (0.470)	0.066 (0.502)	-0.000 (0.992)
Non-debt tax shields	0.420*** (0.002)	0.387*** (0.005)	0.001 (0.997)	0.178 (0.197)	0.285** (0.034)
Liquidity	0.008* (0.059)	0.007 (0.100)	0.068*** (0.000)	0.012*** (0.002)	0.007 (0.214)

The results of the panel OLS regression can be found in table 8. It can be observed that the results found for the small dummy still remain negatively and significantly related to leverage at the 1% level. The results for growth opportunities, firm size, profitability and the country dummies remain robust against the ones found in table 4. Only small and large firm size become respectively significant and insignificant in the specification including country dummies. However, the signs remain the same compared to table 4. It should be noted that the inclusion of the two additional determinants change both the sign and significance of small and large firm asset tangibility. Where table 4 reports a positive relation between asset tangibility and leverage, table 8 shows the opposite. Besides, the original regression results on small and large firm asset tangibility are respectively insignificantly and significantly related to leverage. This has changed the other way around with the inclusion of non-debt tax shields and liquidity. A possible explanation can be found in the broadly used proxies for non-debt tax shields and liquidity (Titman and Wessels, 1988; Deesomsak et al., 2004; de Jong et al., 2008). Some authors argue that using depreciation over total assets measures more than solely non-debt tax shields (Ozkan, 2001; Bradley et al., 1984). As a result of holding large amounts of fixed assets, a firm's depreciation level increases (Bradley et al., 1984). Hence, the proxy for non-debt tax shields may measure a firm's asset tangibility. Intuitively, as liquidity is measured by current assets over current liabilities, it should be negatively correlated to asset tangibility. As a firm has relatively more fixed assets, its liquidity decreases. Hence, the proxies for asset tangibility and liquidity are correlated. Both suggestions are supported by the correlation matrix found in appendix C. Therefore, the inclusion of non-debt tax shields and liquidity can lead to different findings for asset tangibility.

As a negative relation between non-debt tax shields and leverage is expected, the findings for small firm non-debt tax shields are in contrast with the literature. As aforementioned the proxy for non-debt tax shields may also measure asset tangibility. Hence, a positive relation is expected. Although the results for large firm non-debt tax shields are as expected, they are insignificant. Only in the United Kingdom non-debt tax shields appear to significantly affect large firm leverage. On the other hand, the findings for liquidity are all as expected. All coefficients found are negatively and significantly related to the corporate debt levels of both small and large firms. Lastly, panel B shows that the small and large firm coefficients for non-debt tax shields and liquidity differ significantly from each other.

5.4.3 Time periods

Table 9: Results per period

The results of the panel OLS regression for the entire sample are shown in Panel A. P-values are mentioned in parentheses. All the independent variables used are interacted with their firm size dummy. All specifications include industry and year fixed effects.

Column 1 reports the results for the period 2008-2011. Column 2 shows the findings for the period 2012-2015.

All specifications are controlled for year, industry and country fixed effects.

Panel B reports the results of the test of differences between the coefficients of respectively the small and large sample.

The results are checked for heteroskedasticity by the White test.

White robust standard errors are used to correct for heteroskedasticity.

Leverage is defined as total debt divided by total assets.

The definitions of the independent variables can be found in the appendix.

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

Panel A

	Leverage	Leverage
Small	-0.112** (0.054)	-0.135* (0.075)
Small asset tangibility	-0.048* (0.081)	-0.043 (0.123)
Large asset tangibility	0.020 (0.589)	0.005 (0.865)
Small growth opportunities	0.018*** (0.001)	0.013** (0.014)
Large growth opportunities	0.022** (0.010)	0.037*** (0.000)
Small size	0.018*** (0.003)	0.020*** (0.001)
Large size	-0.000 (0.970)	-0.000 (0.946)
Small profitability	-0.157*** (0.000)	-0.183*** (0.000)
Large profitability	-0.215*** (0.000)	-0.202*** (0.000)
France	0.144*** (0.000)	0.141*** (0.000)
United Kingdom	0.187*** (0.000)	0.161*** (0.000)
Constant	0.386*** (0.000)	0.379*** (0.000)
Year Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Country Fixed Effects	Yes	Yes
Adjusted-R squared	0.056	0.046
Number of observations	30,564	30,564

Panel B

Asset tangibility	-0.068** (0.045)	-0.049 (0.286)
Growth opportunities	-0.004 (0.637)	-0.023** (0.029)
Firm size	0.019*** (0.008)	0.020** (0.013)
Profitability	0.057 (0.120)	0.019 (0.738)

The third robustness test will make a distinction between the first and second half of the analysis period. Hence, period one will include data from 2008-2011, whereas period two refers to 2012-2015. The results of the panel OLS regression for the two separate periods can be found in table 9. When taking a look at the different time periods, the effect of the size dummy remains robust against the results found in table 4. Furthermore, the full time period results found for growth opportunities, profitability, the country dummies and small firm size hold, compared to the findings per period. Although, the signs of large firm asset tangibility and large firm size remain similar to the ones found for the full time period, their significance changes. For both time periods, the coefficients for these two variables lose their significance. A possible explanation might lie in the number of observations. As the full time period is broken down into two separate periods, the amount of observations is reduced by half, compared to the full time period. As the likelihood of finding significant results increases with the number of observations, the reduction of N might be the cause of the changing significance. Furthermore, one firm-level determinant shows contrasting results compared to table 4, namely small firm asset tangibility. In the original specification, the coefficient found for this variable is positively related to small firm leverage, however it is not significant. When decomposing the full time span into two separate periods, small firm asset tangibility becomes negatively related to small firm debt levels in both periods. Besides, the result found for period one is significant at the 10% level. This suggests, as small firms hold more tangible assets, their leverage will decrease. In case of the two time periods, an increase in small firm asset tangibility leads to a decrease in leverage. However, over the full time period, an increase in small firm asset tangibility has a positive effect on leverage. This indicates that asset tangibility might have a negative impact on small firm debt levels on the short run, but on the long-term, it would lead to increases in leverage. A possible explanation can be found in the effect of asset tangibility on short-term and long-term debt. Degreyse et al. (2009) found that small firm asset tangibility has a negative impact on short-term debt, but a positive relation with long-term debt. Hence, on the short run, SME's might decrease their short-term debt levels as a result of increases in tangible assets. But, as their tangible assets remain on a high level, their long-term debt levels increase more than their short-term debt decreases. Hence, the effect of asset tangibility on SME leverage is positive on the long run.

5.4.4 Outliers

Table 10: Results leverage regression

The results of the panel OLS regression for the entire sample and per country are shown in Panel A. P-values are mentioned in parentheses. All the independent variables used are interacted with their firm size dummy. All specifications include industry and year fixed effects. Column 1 reports the results for the entire sample excluding country fixed effects. Column 2 shows the results for the entire sample including country fixed effects. Column 3, 4 and 5 report the results for France, Germany and the United Kingdom respectively.

Panel B reports the results of the test of differences between the coefficients of respectively the small and large sample.

The results are checked for heteroskedasticity by the White test.

White robust standard errors are used to correct for heteroskedasticity.

Leverage is defined as total debt divided by total assets. The definitions of the independent variables can be found in the appendix.

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

Panel A					
	Overall	Overall	France	Germany	United Kingdom
	Leverage	Leverage	Leverage	Leverage	Leverage
Small	-0.201*** (0.000)	-0.145** (0.021)	-0.147 (0.295)	0.336** (0.046)	0.037 (0.675)
Small asset tangibility	0.026 (0.153)	0.023 (0.189)	0.030 (0.155)	0.031 (0.709)	0.008 (0.734)
Large asset tangibility	0.083** (0.020)	0.079** (0.022)	-0.134*** (0.002)	0.167*** (0.000)	0.103** (0.023)
Small growth opportunities	0.002*** (0.000)	0.002*** (0.000)	0.008 (0.114)	0.004*** (0.002)	0.002*** (0.000)
Large growth opportunities	0.020*** (0.001)	0.019*** (0.003)	0.005 (0.741)	0.033*** (0.000)	0.020** (0.021)
Small size	0.014*** (0.002)	0.012* (0.060)	0.018*** (0.006)	-0.024 (0.386)	-0.019 (0.105)
Large size	-0.011** (0.014)	-0.007** (0.041)	0.008 (0.359)	0.010 (0.291)	-0.020*** (0.000)
Small profitability	-0.144*** (0.000)	-0.145*** (0.000)	-0.133*** (0.000)	-0.174*** (0.000)	-0.185*** (0.004)
Large profitability	-0.199*** (0.000)	-0.203*** (0.000)	-0.343*** (0.008)	-0.077*** (0.000)	-0.241*** (0.000)
France		0.133** (0.000)			
United Kingdom		0.174** (0.000)			
Constant	0.621*** (0.000)	0.444*** (0.000)	0.530*** (0.000)	0.201 (0.108)	0.740*** (0.000)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	No	Yes	No	No	No
Adjusted R-squared	0.024	0.037	0.040	0.082	0.018
Number of observations	61,128	61,128	36,752	3,544	20,832

Panel B					
Asset tangibility	-0.057 (0.118)	-0.056 (0.125)	0.164*** (0.002)	-0.136** (0.046)	-0.095* (0.058)
Growth opportunities	-0.018*** (0.003)	-0.017*** (0.007)	0.003 (0.864)	-0.029*** (0.000)	-0.018** (0.035)
Size	0.025*** (0.000)	0.019*** (0.006)	0.010 (0.423)	-0.034* (0.088)	0.001 (0.887)
Profitability	0.055** (0.030)	0.058** (0.021)	0.210 (0.114)	-0.097*** (0.000)	0.055 (0.372)

Lastly, a panel OLS regression will be performed without winsorizing the outliers. This shows whether the alteration of outliers has any impact on the outcomes or not. The results for the overall sample and per country are shown in table 10. The results are robust against the winsorized data. The only difference is related to small firm growth opportunities. If nothing happens to the outliers, small firm growth opportunities becomes insignificantly and significantly related to leverage in respectively France and Germany. It is noteworthy to mention that no signs change with respect to table 4. Panel B shows us that the small firm coefficients for growth opportunities, size and profitability are significantly different from the ones found for the large firm sample. Comparing the results from panel B with table 4, it can be seen that the significance for growth opportunities changes. In the initial regression, the small firm and large firm coefficient did not significantly differ from each other. However, without winsorizing the outliers, this difference becomes significant. With respect to the individual countries it can be seen from panel B that all coefficients differ significantly from each other in the German sample.

5.5 Limitations

Inevitably to every study, this research comes with some limitations as well. First, since this study has a lot of small firms in its sample, calculating the market leverage for the entire sample becomes difficult. Therefore, book leverage has been used. Although Leary and Roberts (2005) argue that this does not need to be a problem, it would be interesting to see whether the results hold when using market leverage. Second, the German sample is relatively small compared to the French and British sample, which might lead to a selection bias. This study tries to resolve problem by making a cross-country analysis and controlling for country fixed effects. Lastly, Titman and Wessels (1988) state that the use of proxies come with some limitations. They argue that variables can be related to each other, resulting in proxies measuring multiple variables. However, this study includes broadly used proxies for all variables and uses different proxies to measure leverage. Besides, as can be seen in the appendix, the correlation between all variables used in this study are checked for in the correlation matrix.

6. Conclusion

Many studies have been performed to test the impact of several firm-level determinants on capital structure. However, most of them focus on a single firm size and individual countries. This study tries to resolve this gap by investigating the differences in firm-level determinants between small and large firms. As several authors found that institutional differences affect corporate debt levels as well, this research is expanded to three different countries, namely France, Germany and the United Kingdom. Analyses on small and large firms from these countries have been performed for the period 2008-2015. Four commonly investigated firm-level determinants are initially tested for both sizes, namely, asset tangibility, growth opportunities, firm size and profitability. Later on, two additional firm-specific characteristics will be included, namely non-debt tax shields and liquidity. Analyses have been performed for the both overall sample and the individual countries, through conducting a panel OLS regression. Furthermore, the impact of several country-specific factors has been investigated.

The findings indicate that large firms are significantly higher levered compared to small firms. Moreover, the results suggest that the leverage of small firms is positively affected by asset tangibility, growth opportunities, firm size and non-debt tax shields. Profitability and liquidity have a negative impact on small firm leverage. All small firm results are significant, except for asset tangibility. With respect to large firms, asset tangibility and growth opportunities are positively and significantly related to leverage. Firm size, profitability, non-debt tax shields and liquidity negatively affect large firm gearing levels. However, the result found for non-debt tax shields is insignificant, whereas the other results are significant. On the one hand, these findings suggest similarities between small and large firms with respect to growth opportunities, profitability and liquidity. On the other hand, they indicate differences with regard to firm size and non-debt tax shields.

Looking at the individual countries, German firms seem to be relatively lower levered vis-à-vis British and French firms. However, this difference is larger for British firms compared to French firms. Hence, firms in the United Kingdom are higher levered relative to French firms. Cross-country analyses show that the leverage ratios of small German firms are relatively higher compared to large German companies. The same goes for the UK, whereas France shows the opposite sign. However, the French and British coefficients were found to be insignificant. The effect of the firm-level determinants appears to differ across the three countries. Asset tangibility has a positive impact on large firm leverage in all three countries, whereas this effect is negative for small firms. However, the results found for small firm asset tangibility are insignificant, whereas the ones reported for large firm asset tangibility are significant. Growth opportunities of both small and large firms in all three countries seem to be positively related to leverage ratios. The results found for small German firms and large French firms are insignificant. Looking at firm size it can be concluded that it positively affects small and large firm leverage in France and large firm leverage in Germany. Firm size has a negative effect on both small firm leverage in Germany and the United Kingdom. Leverage of large British firms is negatively affected by firm size as well. The results for firm size in Germany and for large French firms are insignificant. Lastly, profitability is negatively and significantly related to both size classes in all three countries.

These findings can be explained by the cross-country differences in institutional factors. Differences with respect to creditor rights, shareholder rights, legal reservation and the efficiency of the judicial system are found to significantly affect corporate debt levels of both small and large firms. Relatively high creditor rights in the UK compared to Germany and France might indicate why corporate gearing levels are higher for British firms vis-à-vis German and French companies. French and German lenders may be less willing to lend at a low rate as they face more risk. Making debt in the United Kingdom relatively more attractive.

Further research on the capital structure differences between small and large firms in an international context can be done by including other factors than the ones used in this study. For example, firm risk and firm age. Furthermore, the effect of the determinants can be separated into the effect on long-term debt and short-term debt.

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Appendix

Appendix 1:

Table A: Variable definitions

Variable	Definition
Leverage	$(\text{Long-term debt} + \text{Short-term debt}) / \text{Total Assets}$
Asset tangibility	$\text{Fixed Assets} / \text{Total Assets}$
Growth opportunities	$((\text{Total Assets}(t) - \text{Total Assets}(t-1)) / \text{Total Assets}(t-1))$
Firm size	$\text{Ln}(\text{Total Assets})$
Profitability	$\text{Ebit} / \text{Total Assets}$
Non-debt tax shields	$\text{Depreciation} / \text{Total Assets}$
Liquidity	$\text{Current Assets} / \text{Current Liabilities}$

Appendix 2:

Table B: Institutional Factors

The scores on creditor rights, shareholder rights, corruption level and efficiency of the judicial system are reported for France, Germany and the United Kingdom respectively.

The scores on creditor rights and shareholder rights lie on a scale from 0-4 and 0-6 respectively. The legal reservation of a firm lies between 0-100 percent.

Efficiency of the judicial system ranges from 0-10.

Higher values indicate better rights, standards and efficiency.

For an elaboration on these different institutional factors, refer to La Porta et al (1998).

	France	Germany	United Kingdom
Creditor rights	0	3	4
Shareholder rights	3	1	5
Legal reservation	10%	10%	0%
Efficiency judicial system	8	9	10

Appendix 3:

Table C: Correlation Matrix

The correlations between all the variables used in this study are reported in the table. It can be seen that the total debt and total liabilities measure show a high correlation. Furthermore, asset tangibility, profitability and liquidity are negatively correlated with total debt. Whereas growth opportunities, firm size and non-debt tax shields are positively related to total debt.

	Total debt	Total Liabilities	Asset tangibility	Growth opportunities	Firm size	Profitability	Non-debt tax shields	Liquidity
Total debt	1.000							
Total Liabilities	0.5708	1.000						
Asset tangibility	-0.0522	0.0030	1.000					
Growth opportunities	0.0069	0.0112	-0.0413	1.000				
Firm size	0.0559	0.0461	0.2621	0.0310	1.000			
Profitability	-0.1405	-0.1870	-0.1284	0.1756	-0.0367	1.000		
Non-debt tax shields	0.0375	0.1267	0.3205	-0.1297	-0.0815	-0.1172	1.000	
Liquidity	-0.3406	-0.4662	-0.2425	-0.0199	0.0114	0.0677	-0.1569	1.000