Capital structure and firm performance – Evidence from European listed firms

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<td><strong>Abstract:</strong></td>
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<td>A firm's performance is often linked to its capital structure. Many different theories try to explain how a firm chooses its optimal capital structure; however no dominant theory so far has been established. Most previous research on firm performance and capital structure do not account for the reverse causality between leverage and firm performance. In order to take the reverse causality into consideration this study uses a two-stage least squares regression with instrumental variables. Simultaneously, we will try to examine which capital structure theory best explains the results in our study.</td>
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<td>The main purpose of the study is to measure how capital structure affects firm performance. We examine six European countries: Finland, France, Germany, Italy, Sweden, and the United Kingdom. The results we found are consistent with previous research. Leverage shows a significant positive relationship with firm performance for most countries studied. Our independent variables size and growth likewise show a positive relationship with firm performance, which is consistent with previous research. However, our model diagnostics show that the results are not robust for every country. France &amp; Germany showed the most robust results, followed by the U.K, Sweden, Finland, and Italy with the least robust results. Reasons for the discrepancies in country results may lie in the smaller sample sizes for the countries showing insignificant results. Our results show support for the agency cost theory as well as the efficiency-risk hypothesis.</td>
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| **Nyckelord:** | Kapitalstruktur, företagsprestation, Skuldsättningsgrad, two-stage least squares, 2sls, instrumentvariabel, IV, agentkostnadsteorin, efficiency-risk hypotesen. |
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1 INTRODUCTION

One of the more important duties for a firm’s management is to optimize the amount of leverage used. A firm can utilize leverage in various ways, for instance maintaining day to day activities or by accelerating their growth by investing in otherwise out of reach projects. Today, most firms are levered to some degree. However, leverage does not come without its costs or risks. Concurrently, a firm’s goal is to maximize its value. The interplay between risk and value-maximizing is what constitutes the capital structure decision: How should a firm decide how much leverage is optimal to maximize firm value?

Ever since Modigliani & Miller in 1958 published their propositions about capital structure many other studies have emerged in hopes of understanding what drives a firm’s capital structure. In 1963 Modigliani & Miller realized their earlier theories are not infallible and acknowledged the role of taxes in the capital structure choice. Since then different theories have emerged, trying to explain in greater detail how firms determine their desired capital structure. Some notable theories are the trade-off theory proposed by Kraus & Litzenberger (1973) and the pecking order hypothesis proposed by Myers & Majluf (1984).

However, these theories generally do not offer sufficient information on specific factors that explain the capital structure decision. Some significant studies trying to pin down the determinants of capital structure are Frank & Goyal (2009) and Titman & Wessels (1988). These studies succeeded in finding specific factors that explain a firm’s leverage.

Studies regarding determinants of capital structure normally do not research the effect on firm profitability, rather the focus is to pinpoint a broad category of factors that affect leverage. On the other hand, firm performance studies tend to not study leverage as the principal variable. Furthermore, reverse causality has been established in some previous research between leverage and firm performance. Firm performance might affect the choice of capital structure, and concurrently the amount of leverage might affect firm performance as well. Berger & Di Patti (2006) suggest that failure to take this into account may result in simultaneous-equations bias. However, studies regarding reverse causality between firm performance and leverage are sparse. Consequently, this study will take this identified reverse causality into account when estimating how capital structure affects firm performance.
1.1 Purpose of the study

Measure how capital structure affects firm performance when accounting for reverse causality.

1.2 Contribution

Most of the previous research on capital structure tries to establish determinants that affect capital structure. Meanwhile, many studies on firm performance generally do not focus on leverage as the main determinant. However, firm performance has shown to have a large impact on capital structure. Wald (1999) found that profitability is the single largest determinant of a firm’s capital structure. A confounding result is that many previous research papers have found a negative correlation between profitability and leverage (Titman & Wessels, 1988; Rajan & Zingales, 1995; Wald (1999)). Some authors suggest that their results regarding firm performance may warrant further research. Wald (1999) expresses that the negative correlation between profitability and leverage found in his study, especially in the U.K, Germany, and France requires additional explanation.

The answer to why many previous studies may have found conflicting results regarding firm performance and capital structure may lie in the fact that they fail to account for reverse causality. When taking reverse causality into account the results may differ largely. So far, only a few studies examine reverse causality between firm performance and capital structure. Margaritis & Psillaki (2010) and Berger & Di Patti (2006) found that when accounting for reverse causality they find leverage to have a positive impact on firm performance, which is in stark contrast to previous studies. By not considering the reverse causality that exists the results may become skewed.

For our study to show more robust results, we will use two-stage least squares with instrumental variables. The usage of this method allows us to account for the reverse causality between firm performance and leverage. Few papers on the topic exist and even less so for the European countries. Most of the previous research on the topic are on the U.S and some larger countries in Europe. In order to broaden the scope of the study, we will use a dataset containing some of the lesser-studied countries, such as Sweden and Finland.
1.3 Scope of the study

We study six different countries in Europe: Finland, France, Germany, Italy, Sweden, and the United Kingdom. The time period of 2000-2018 is used in our study, which allows us to have a large enough sample. It is worth noting that only firms that are publicly listed are included in our study. Concerning our topic, especially Finland and Sweden have few previous studies that employ two-stage least squares methods. Our data is limited by available data from COMPUSTAT.

1.4 Structure of the thesis

The next chapter will outline the most relevant theories of capital structure as well as important determinants of capital structure. These theories form the basis for our research and establish the effect capital structure has on firm performance. Chapter three is dedicated to highlighting the reverse causality between firm performance and capital structure.

Chapter four will present relevant previous research regarding our topic. In particular focus is put on previous studies of determinants of capital structure as well as firm performance research. Chapter five presents the data for our study. The chapter also presents the variables used in this study and sets the research hypotheses for our thesis. Chapter six explains the methodology employed in this study. In particular, our motivation for why we use a two-stage least squares approach instead of traditional regression models is presented. The chapter also presents the instrumental variables used in our study. Chapter seven presents the results of our study as well as model diagnostics relevant for instrumental variables regressions. Chapter eight will discuss the results of our study and how they relate to previous research on the topic. Chapter nine will present the conclusions of our study as well as recommendations for further research on the topic.
2 THEORETICAL FRAMEWORK

2.1 Modigliani & Miller theorems

Most discussions regarding capital structure start with the Modigliani & Miller (1958) propositions regarding capital structure irrelevancy. The ground-breaking paper presents several propositions regarding capital structure which are debated even to this day. MM suggests that in a fully efficient market, i.e. no taxes, no bankruptcy costs, no transaction costs, no agency costs, and no information asymmetry the following propositions can be drawn:

MM Proposition I: The market value of a firm is independent of how it is financed

\[ V_L = V_U \]

\( V_L \) = Value of a levered firm

\( V_U \) = Value of an unlevered firm

Proposition 1, the irrelevance proposition, states that both sides of the equation are constant regardless of the amount of debt or equity. A firm’s value is the same regardless of whether it is levered or not. The cash flows of two identical firms with different capital structures must be identical, otherwise, arbitrage opportunities exist.

MM Proposition II: The expected return on equity for a firm rises in proportion to the amount of leverage.

\[ r_E = r_A + \frac{D}{E} \times (r_A - r_D) \]

\( r_E \) = Cost of equity

\( r_A \) = Cost of capital (WACC)

\( \frac{D}{E} \) = Debt to equity ratio

\( r_D \) = Cost of debt

The second proposition states that a firm’s capital structure does not affect its cost of capital. This occurs because when a firm’s debt to equity ratio increases, so does the
firm’s cost of equity. It is important to note that it is also assumed that the risk of equity rises in proportion to the leverage ratio.

The propositions drawn by the Modigliani & Miller (1958) paper do not consider taxes. However, in reality, taxes are usually assumed to have an implicit effect on a firm’s leverage. For instance, interest on debt is tax-deductible, which indicates that there are benefits in including debt in your capital structure choice.

In 1963 MM augmented their propositions to account for taxes:

Proposition I:

\[ V_L = V_U + T_C D \]

\[ T_C = \text{Tax rate} \]

\[ D = \text{Value of debt} \]

The addition of \( T_C D \) implies that there are tax benefits of having debt, in the form of a tax shield. The tax shield benefits a firm in the form of tax savings which are gained from interest expenses. Leveraged firms benefit from tax deductions which are taxed after interest expenses, while unlevered firms are taxed on their total earnings. Leveraged firms pay less tax because interest expenses are deductible.

Proposition II:

\[ r_E = r_A + \frac{D}{E} \times (r_A - r_D)(1 - T_C) \]

The addition of taxes to the formula indicates that a firm can include debt to its capital structure to eliminate tax liabilities. However, leverage still increases the firm’s risk and results in a higher cost of equity. A new addendum is the tax shield benefit to the equity, the tax shield benefit reduces a firm’s cost of capital. With taxes, the MM propositions seem to suggest that a firm should use 100% debt to fully take advantage of the tax shield benefits.

In theory, the propositions are very sound. However, the main issue with these propositions is that they depend on a “perfect market”, which in turn relies on several assumptions. Even with the presence of taxes, many of the assumptions are not realistic. Some of these perfect market conditions, such as no agency costs, no transaction costs,
no bankruptcy costs, and equal borrowing rates for firms are some of the assumptions found to not hold in the real world. Due to these MM assumptions not holding in the real world the capital structure choice can have an effect on firm value. (Hillier et al., 2012)

Since these “perfect market conditions” described by Modigliani & Miller are not realistic the question remains what truly explain the capital structure choice. The fallibility of the assumptions made by the MM theorem has since fuelled a desire for other theories that can explain the choice of capital structure. Even so, the Modigliani & Miller propositions remain an important steppingstone for further research.

2.2 Trade-off theory

Following the MM propositions with taxes, in theory, it will lead to a firm using 100% debt financing. However, few firms are levered to this degree because of the higher levels of risk involved.

This is identified by the trade-off theory, a static capital structure theory popularized by Kraus & Litzenberger (1973). The theory builds upon MM proposition I and agrees that it holds in a perfect market. However due to the existence of corporate taxes and bankruptcy risks the reality is different. There are advantages to debt, namely tax savings. However, debt is not free and comes with bankruptcy risks. This leads to a firm weighing the tax-benefits of debt against the bankruptcy costs to find an optimal capital structure. The optimal capital structure for a firm is found when the benefits of debt exceed or equal the bankruptcy costs. However, measuring this exactly may be difficult, if not impossible. (Kraus & Litzenberger, 1973)

The theory is not without its criticism. Myers (1984) points out that taxes are the fundamental basis for the theory and thus should have a large impact on capital structure. Some studies show that this may not be the case. Furthermore, if the theory holds, value-maximizing firms should never pass up interest tax shields when the probability of financial distress is low. Still, there are many profitable firms with good credit ratings that operate for years with low debt ratios, such as Microsoft and some pharmaceutical firms. (Myers, 2001)

2.3 Agency cost theory

Jensen & Meckling (1976) and Jensen (1986) presented agency costs as expenses occurring due to the separation between ownership and control, which leads to conflicts of interests. Owners of a firm want to maximize their benefit, while managers may have
an incentive to maximize their benefit. Ensuring that managers work in the owner’s interests may incur monitoring costs.

As established, the managers of a firm may not always act in the best interests of the shareholders. However, the addition of debt adds another conflict, namely between shareholders and debtholders. In case of bankruptcy, the debtholders get their due first, even if the shareholders end up with nothing. Issuing debt can discipline the managers to act in the best interest of the shareholders. It is also in the manager’s best interest to avoid bankruptcy. A manager may receive a part of their compensation in firm shares and may lose out on benefits and compensations in case of bankruptcy. Debt can serve to decrease agency costs, which in turn can add advantages to a firm being more leveraged.

The agency costs and its possible mitigation by debt has a direct effect on firm performance; a firm that mitigates agency costs should in theory be more profitable. Meanwhile, conflicts between shareholders and managers regarding the choice of investment and the amount of risk to undertake are corporate governance issues that can have a negative effect on firm performance. Furthermore, conditions wherein the firm is liquidated, and dividend policy is relevant to firm performance.

However, a problem is that using more debt can lead to an increase in risk and bankruptcy costs. Stulz (1990) explains that debt can negatively influence shareholders due to high-interest payments which can lead to the firm’s projects not being as profitable. This can lead to an underinvestment problem. This indicates that a firm must also account for the trade-off between the cost of debt and the benefits. Myers (2001) explains that agency costs may explain why growth firms usually rely on equity. Growth firms have more to lose, a debt-overhang problem is less of a problem for firms that lack valuable investment opportunities.

The agency cost theory is often used in conjunction with the trade-off theory in order to explain why a firm may not always fully utilize the tax advantages of borrowing.

### 2.4 Pecking order theory

As opposed to the trade-off theory the pecking order theory is a dynamic capital structure theory. The basic principle behind Myers & Majluf (1984) theory is that managers are reluctant to issue equity when they believe that the firm’s shares are undervalued. Investors would interpret the equity issuance as a sign that the managers believe the
firm’s equity is overvalued. In turn, this will lead to the share price dropping when issuing new shares. This market reaction would lead to a firm not issuing equity. (Hillier et al., 2012)

This market reaction is based on the information asymmetry between the managers and the market. Managers are privy to more information about a firm’s true valuation and are expected to act in a certain way regarding financing. A manager would not issue equity if a firm’s stock is undervalued, however, when it is overvalued, they may be more inclined to issuing equity. The market reaction to a firm’s capital structure decision occurs due to their expectations on how they expect the managers to act.

The theory proposes that a firm would implement a sort of hierarchy in its financing decisions. First, the firm will choose internal financing if possible, e.g. retained earnings. A firm may also choose to change its dividend policy if they are aware of future investment needs. Secondly, debt financing. In this case, normal bonds are preferred over convertible bonds. Third, equity financing, and only if no other options are available. In the most extreme cases a firm may even pass up on positive NPV projects in case external financing is needed. The main theme behind the pecking order theory lies in the information asymmetry between the firms and the market, which leads to equity financing being the last resort. (Myers & Majluf, 1984)

The prediction by the theory that the announcement of stock issuance reduces firm value is confirmed by some previous research (Asquith and Mullins, 1986; D’Mello & Ferris, 2000). Myers (2001) argues that in equilibrium only debt will be issued. Even when managers believe their shares are undervalued, they will issue debt rather than equity. Equity issues would only occur when debt is costly. Costly debt can occur due to the firm already being levered to a high degree and investors expect costs of financial distress. This leads to the hierarchy of the pecking order.

The pecking order theory seems to explain why most of a firm’s external financing comes from debt. It can also explain why profitable firms would borrow less; profitable firms may have more internal financing available. Less profitable firms may require external financing, which can lead to the accumulation of debt. (Myers, 2001)

2.5 Market timing theory

The market timing theory proposed by Baker & Wurgler (2002) suggests that a firm’s capital structure is based on the market situation and the manager’s discretion. The
theory stipulates that there is no optimal capital structure, rather it describes capital structure as “the cumulative outcome of attempts to time the equity market”. If managers believe their firm’s equity is overvalued by the market, they issue equity. Consequently, a firm may also repurchase equity if the market value is low. If there are opportunities for cheap debt firms may issue debt instead. If both the equity and debt market present no suitable opportunities the firm may postpone the financing decision for later. If the conditions look good for both the equity and debt markets a firm may choose to raise funds from both options, even if they do not need funds currently. There is no pre-set capital structure, rather the choice depends on the market situation. (Baker & Wurgler, 2002)

Some previous studies criticize the market timing theory. Kayhan & Titman (2007) argue that even if market timing exists, it does not have a long-run impact on a firm. Their results indicate that a firm’s history can influence capital structure decisions, however over time, firms actively rebalance their leverage towards a target debt ratio. Another problem is that the theory lacks a theoretical model, as there is no optimal capital structure.

2.6 Summary of the capital structure theories

Most of the work surrounding capital structure is built upon the Modigliani and Miller theorems. The MM theorems state that the capital structure choice is irrelevant, though in 1963 MM acknowledged the importance of taxes. However due to unrealistic assumptions regarding “perfect markets,” many dismiss the feasibility of the MM theorems in practice. However, the MM theorems are still of importance to this day. As Miller (1988) himself describes “showing what doesn’t matter can also show, by implication, what does.”

The trade-off theory popularised by Kraus & Litzenberger (1973) builds upon the first MM proposition and stresses the importance of the tax-saving aspects of debt. The theory states a firm must weigh bankruptcy costs with the tax benefits of debt to find an optimal capital structure. The theory mostly rejects the MM assumptions regarding no taxes and no bankruptcy costs.

Jensen & Meckling (1976) agency cost theory state that debt can serve to decrease agency costs. Debt can be used as a disciplinary tool to decrease the probability of managers not acting in the best interests of shareholders. As evident from the name of the theory, the MM assumption regarding no agency costs is discarded.
The pecking order theory by Myers & Majluf (1984) presents a hierarchical order for a firm’s capital structure decision. A firm chooses internal financing first, debt financing second, and issues equity only if no other options are available. The MM assumption regarding no asymmetric information is rejected. The theory also assumes that investors are rational.

The Market timing theory proposed by Baker & Wurgler (2002) suggests that managers try to “time” the market. This indicates that managers evaluate whether issuing equity, repurchasing equity, or issuing debt is more optimal. In some cases, if the conditions for both the equity and debt market are good a firm may raise funds from both sources, even if there is no imminent need for funds. The market timing theory generally assumes that markets are imperfect, however, it is not implicitly explained how. The markets are not efficient due to any/all of the MM assumptions not holding as well as irrationality in investor behaviour.

Table 1 presents the key points of the different capital structure theories presented in this chapter.
### Table 1  Summary of the capital structure theories

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<th>Theory</th>
<th>Main points</th>
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<tr>
<td>Modigliani &amp; Miller</td>
<td>1958</td>
<td>MM 1 &amp; 2</td>
<td>(1) A firm’s value is irrelevant to its capital structure. (2) Expected return on equity for a firm rises in proportion to the amount of leverage.</td>
</tr>
<tr>
<td>Kraus &amp; Litzenberger</td>
<td>1973</td>
<td>Trade-off theory</td>
<td>There are tax benefits to debt, which a firm weighs against bankruptcy costs to determine an optimal capital structure.</td>
</tr>
<tr>
<td>Jensen &amp; Meckling</td>
<td>1976</td>
<td>Agency cost theory</td>
<td>Debt may serve as a tool in reducing the costs of shareholder and manager conflicts of interests</td>
</tr>
<tr>
<td>Myers &amp; Majluf</td>
<td>1984</td>
<td>Pecking order theory</td>
<td>Hierarchy to determine the capital structure. In order of preference: (1) Internal Financing (2) Debt financing (3) Issuing equity</td>
</tr>
<tr>
<td>Baker &amp; Wurgler</td>
<td>2002</td>
<td>Market timing theory</td>
<td>Managers evaluate the current market conditions to determine how to raise funds. Funds may be raised in any way, the most efficient alternative(s) are chosen.</td>
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2.7 Determinants of capital structure

Due to the copious amounts of theories trying to explain the capital structure choice with very different approaches an alternative method emerged. Determinants of capital structure refer to the specific factors at play when determining the capital structure for a firm. The earliest significant research on the topic is Titman & Wessel’s (1988) paper “The determinants of capital structure choice”. The paper most notably found that profitability and uniqueness of a firm have a negative effect on debt levels. Other significant papers on the topic are Rajan & Zingales (1995) and Frank & Goyal (2009), both of which will be presented in chapter 4.

Previous literature suggests many different factors significantly influence a firm’s capital structure. The remainder of this chapter will present some of the more influential factors on capital structure which have shown significant results in previous studies. The effect of the determinants used in our study and firm performance will be presented later in chapter 5.

2.7.1 Profitability

The trade-off theory suggests a linear relationship between firm profitability and leverage. More profitable firms should have a higher free cash flow they want to shield from tax. The agency cost theory also suggests that in order to protect these cash flows from managers more debt is required. More profitable firms should consequently have higher levels of debt.

According to the pecking order theory, more profitable firms should have lower amounts of debt. Firms would prefer internal financing over external funds. More profitable firms should become less levered over time if investments and dividends are fixed. (Frank & Goyal, 2009).

Some previous research has shown a negative relationship between profitability and leverage, as shown by Rajan & Zingales (1995), Titman & Wessels (1988), and Wald (1999). It is worth noting that most major studies on the determinants of capital structure do not consider the reverse causality between profitability and capital structure, which is presented in greater detail in chapter 3.

2.7.2 Size

Depending on the point of view the size factor may be interpreted differently. Viewed through the lens of the trade-off theory large diversified firms should accumulate more
debt. This viewpoint is supported by Rajan & Zingales (1995) study, where they found that large firms in G-7 countries generally tend to be more diversified, which lead to a lower risk of default. Large firms would also have easier access to capital markets, lower agency costs of debt, and lower bankruptcy costs. A positive relationship was also reported by Huang & Song (2002) and Frank & Goyal (2009).

However, the pecking order theory predicts the opposite effect. Information asymmetry between insiders in a firm and capital markets are lower in a large firm. Therefore, a negative relation between size and debt should exist. Due to lower information asymmetry, there may exist a better ability to issue equity, which may lead to lower debt ratios. (Sheikh et al. 2011)

Support for the pecking order theory has been found in some previous studies. A negative relationship was found by Ozkan (2001) and for some countries by Wald (1999).

2.7.3 Tangibility

Most theories agree that high tangibility is positively correlated with leverage. Firms holding assets can use them as collateral when acquiring debt. Consequently, the agency cost of debt is diminished when tangibility is high. A firm with low tangibility may shift to riskier investments after acquiring debt, transferring wealth from the debtors to the shareholders. Due to the collateral value of tangible assets, it reduces lender risk, which can lead to a firm acquiring more favourable debt. This supports the trade-off theory of capital structure. (Huang & Song, 2002)

The trade-off theory regarding tangibility is confirmed by most previous research. A positive correlation was found by Wald (1999) and Rajan & Zingales (1995).

The pecking order theory suggests a negative relationship between tangibility and leverage. Firms with more tangible assets should have less asymmetrical information. This can reduce the cost of equity issuance, which suggests that firms should make more use of equity financing. The maturity of debt is also relevant, tangibility should be positively associated with long-term debt but negatively to short-term debt. (Karadeniz et al, 2009)

This negative relationship is most notably shown in countries with less developed capital markets, such as Brazil, India, Poland, and the Czech Republic. Some studies showing a negative relationship are Bauer (2004) and Booth et al. (2001).
2.7.4 Leverage and taxes

If tax rates are high there should exist more benefits to debt. The trade-off theory suggests that a firm will issue more debt when tax rates are high in order to take advantage of higher interest tax shields. DeAngelo & Masulis (1980) showed that non-debt tax proxies should be negatively related to leverage. Firms with larger non-debt tax shields should have less debt. (Sheikh et al, 2011)

Previous research has shown mixed results. Titman & Wessels (1988) found no effect on debt ratios from non-debt tax shields, while Bradley et al. (1984) found a positive relationship, and Wald (1999) a negative one.

2.7.5 Earnings volatility

The trade-off theory suggests a negative relationship between earnings volatility and leverage. Higher volatility indicates a greater risk in the firm not being able to repay their debts. The amount of debt a firm may be able to acquire can also decrease when earnings volatility increases.

The pecking order theory suggests that firms with more volatile stocks have more debt. This is a result of these firms suffering from adverse selection due to public perception. Firms with more volatile cash flows may also have more need for external capital. (Frank & Goyal, 2009)

Most studies show a negative relationship between leverage and earnings volatility (Booth et al, 2009; Fama & French, 2002).

2.7.6 Liquidity

According to the trade-off theory liquidity is associated with larger debt ratios. Higher liquidity also displays that a firm has a better ability to meet contractual obligations on time. Therefore, the trade-off theory predicts a positive relationship between liquidity and leverage. Antoniou et al. (2002) findings support a positive relationship between liquidity and debt ratios.

The pecking order theory predicts a negative relationship. A firm with more liquidity should prefer internal funds over external ones. Higher liquidity can indicate that a firm has a better ability to use internal funds to finance investments. This inverse relation may also be a result of agency costs and conflicts of interest between shareholders and
debtholders. Some previous research that found a negative relationship is Mazur (2007) and Ozkan (2001).

### 2.7.7 Industry

Generally, between industries, there can exist large differences in median leverage ratios. Some suggest that managers use industry averages as a benchmark when adjusting their own firm's leverage. Hovakimian et al. (2001) provide evidence that firms adjust debt ratios toward the industry average. The trade-off theory suggests that a higher industry median growth is associated with less debt, while a higher industry median is associated with more debt.

### 2.7.8 Growth opportunities

The trade-off theory suggests that growth opportunities reduce leverage. Under this theory, growth should increase the cost of financial distress, reduce free cash flow problems, and increase debt-related agency problems. Growth opportunities are a form of an asset; however, they are intangible and thus unable to be collateralized. (Frank & Goyal, 2009)

A negative relationship is also expected by the agency theory. Firms with more growth opportunities can allow managers to invest sub optimally which may increase agency costs of debt. For a firm with no investment opportunities debt can serve as a great tool for mitigating agency costs. However, the opposite is true in this case, and firms would borrow less. (Sheikh et al., 2011)

The pecking order theory predicts that growth opportunities and leverage are positively related. Frank & Goyal (2009) suggests that firms with more investments should accumulate more debt over time. Michaelas et al. (1999) explain that growth may push firms into acquiring more debt due to the exhaustion of their internal funds.

Most previous research supports the trade-off & agency theory. Booth et al. (2001), Rajan & Zingales (1995), and Wald (1999) all show a negative relationship.

### 2.7.9 Uniqueness

Uniqueness is defined as a firm that produces “unique products or services”. Most previous studies suggest that uniqueness is negatively related to leverage. According to the trade-off theory, the liquidation decision would be causally related to its bankruptcy status. Since the liquidation costs are relevant to a firm’s capital structure, uniqueness
can consequently affect the capital structure. If a firm has high “uniqueness” its customers, workers, and suppliers may find it hard to find alternative products, jobs, or buyers if the firm liquidates. Bankruptcy costs are thus higher. This in turn would lead to firms having less debt. (Titman, 1984)

Still, previous studies show mixed results regarding firm uniqueness. Frank & Goyal (2009) found a significant negative relationship with leverage, while Mazur (2007) found a positive relationship.
3 FIRM PERFORMANCE AND CAPITAL STRUCTURE

The main theories of capital structure often interpret the relationship between capital structure and firm performance as a one-way street; how leverage affects firm performance. Most previous research has found a negative relationship between firm performance and capital structure. Major studies regarding determinants of capital structure (Wald, 1999; Rajan & Zingales, 1995; Frank & Goyal, 2009) all find profitability and capital structure to be negatively correlated. This seems to show support for the pecking order theory, as it argues that firms prefer internal financing over external financing. More profitable firms seem to become less leveraged over time.

However, the problem with many previous studies as well as established capital structure theories is that they do not consider the reverse causality effect between firm performance and capital structure. This may result in a simultaneous-equations bias. The one-way street approach may be flawed, which may explain why so many previous studies find a negative relationship between profitability and capital structure. (Berger & Di Patti, 2006)

3.1 Reverse causality between firm performance and capital structure

Berger & Di Patti (2006) present two hypotheses of reverse causation based on violations of the MM perfect market assumptions: the efficiency-risk hypothesis and franchise-value hypothesis. Various market imperfections such as taxes, bankruptcy costs, and asymmetric information are assumed to result in firms striking a balance between those who favour more versus less equity capital. Differences in profit efficiency would move the optimal equity capital ratio marginally either up or down.

The efficiency-risk hypothesis states that more efficient firms are more likely to acquire higher returns for their given capital structure. These higher returns would serve as a buffer against portfolio risks to reduce the probability of incurring costs of financial distress and bankruptcy. According to the theory, more efficient firms would thus become more heavily leveraged due to the above-mentioned reasons. This hypothesis is assumed as a joint hypothesis due to 1) Profit efficiency is strongly positively associated with expected returns and 2) the higher expected returns from high efficiency are substituted for equity capital to manage risks. The efficiency-risk hypothesis believes that a firm, depending on its efficiency level, can fine-tune its capital structure. (Berger & Di Patti, 2006)
Evidence for the first part of the joint hypothesis is found by Berger & Mester (1997), profit efficiency was found to be significantly positively correlated with returns on equity and return on assets. Furthermore, DeYoung (1997) suggests that profit efficiency is relatively stable over time, however high current profit efficiency tends to lead to high future expected returns.

The second part of the hypothesis is supported by Altman (1968) z-score analysis of firm insolvency. The study indicates that high expected returns and high equity capital ratios can be used to mitigate portfolio risks and reduce the probability of a firm experiencing financial distress or bankruptcy. Therefore, firms with high expected returns owing to high-profit efficiency can also hold lower equity ratios.

The other theory presented by Berger & Di Patti (2006) is the franchise-value hypothesis. The franchise-value hypothesis states that more efficient firms tend to hold extra equity capital and would consequently have lower leverage ratios to protect their future income from the possibility of liquidation. A high-profit efficiency could create economic rents if the higher efficiency is expected to continue in the future, and shareholders would choose to hold extra equity capital to protect these rents. This equity capital would be lost in the event of liquidation, even if the liquidation process does not involve any overt bankruptcy or distress costs. Furthermore, Titman & Wessels (1988) argue that firms with unique products are found to have higher equity ratios. Unique products serve to create market power rents and in turn lead to the firm holding extra equity capital to protect these rents.

Evidence supporting this hypothesis is found by Driffield et al. (2007) who examined the simultaneous relationship between a firm’s capital structure and its valuation. Their results are in line with the franchise-value hypothesis, a negative association between firm value and leverage.

These two hypotheses are in direct contrast: The efficiency-risk hypothesis predicts a higher leverage ratio in highly efficient firms, while the franchise-value hypothesis predicts that efficient firms have lower leverage ratios.

Margaritis and Psillaki (2010) found that firm performance is positively impacted when a firm has lower levels of leverage, while it becomes negative when a firm has high levels of leverage. The results are in line with both hypotheses. High performing firms use more debt; however, this debt may also increase bankruptcy costs and increase risk. The
negative relationship was found mostly in firms that already had high levels of leverage. According to the franchise-value hypothesis, this occurs due to high performing firms trying to minimize debt levels to avoid financial distress and bankruptcy.
4 PREVIOUS STUDIES

This chapter is devoted to presenting previous research that examines either capital structure determinants or the relationship between firm performance and capital structure. The previous research is used to justify the used variables in this study, as well as to highlight the reverse causality that exists between firm performance and leverage.

4.1 The determinants of capital structure choice

One of the earlier studies regarding determinants of capital structure choice is the paper published by Titman & Wessels (1988). The paper investigates different factors and their effect on capital structure. The paper was developed as a response to the many theories of capital structure lacking empirical evidence.

4.1.1 Data and Method

The data used in the paper consists of 469 US firms over the years 1974-1982. By analysing contemporary theories about capital structure they derive eight different factors believed to affect a firm’s capital structure. These factors are collateral value of assets, non-debt tax shields, growth, uniqueness, industry classification, size, volatility, and profitability. These factors serve as the independent variables in the study. The method used in the study was a factor-analytic model with different measures of leverage as dependent variables.

4.1.2 Results

The results indicate that firms with unique or specialized products exhibit lower debt ratios. Likewise, profitability shows a negative relationship with leverage. Growth, non-debt tax shields, and volatility show no relation at all. When considering a firms’ short-term debt, they find size to be negatively related, while the collateral value of assets is positively related. However, the authors state that their factors may not describe every feature of the factor. Hence it is important to put a focus on the way a chosen factor is calculated.
4.2 What do we know about Capital Structure? Some evidence from International data

While Titman & Wessels (1988) studied U.S firms, Rajan & Zingales (1995) aimed to fill the gap of no international studies regarding determinants of capital structure. Furthermore, their objective was to establish whether the same factors that showed relevancy in the U.S show similar results in different markets. This comparison would help them discern relevant information about capital structure theories, and whether they are universal.

4.2.1 Data and Method

Their data consists of the G-7 countries with differing amounts of firms per country during 1987-1991. The factors used in the study are tangible assets, MTB-ratio, sales, and return on assets. These factors were chosen due to their significance in previous studies. The method used in this study is an OLS model with leverage as the dependent variable, while the previously mentioned factors serve as independent variables.

4.2.2 Results

Tangibility as well as size show a positive relationship with leverage. Similar to Titman & Wessels (1988) they also found profitability and leverage to be negatively related. Some country-specific differences found are that size and leverage are negatively related in Germany whereas every other country showed a positive relationship. The results show that firm leverage is quite similar in the G-7 countries. Furthermore, they find that the other studied factors show similar results in the U.S and the G-7 countries.

Similar to Titman & Wessels (1988) the authors conclude by stressing the importance of how a variable is calculated.

4.3 How firm characteristics affect capital structure: An international comparison

The paper by Wald (1999) differs from the study by Rajan & Zingales (1995) in that it focuses on capital structure determinants that are not similarly correlated with leverage across countries. The study aims to obtain a greater understanding of the relationship between institutional differences and capital structure.

4.3.1 Data and Method

The data used consists of French, German, Japanese, U.K, and U.S firms during a one-year period, 1991-1992. The independent factors used are proxies of costs of financial
distress, moral hazard (creditors), nondebt tax shields, profitability, growth, and size. The main method used in the study is a Tobit model.

4.3.2 Results

The study aims to explain the differences between the studied countries’ determinants of capital structure. Most results show consistency with Rajan & Zingales (1995) study. However, variables associated with risk, growth, firm size, and inventories show differing signs across countries. This seems to indicate that institutions may be significant determinants of capital structure. Furthermore, agency and monitoring problems may affect countries differently. The authors conclude by stating that further work is needed to determine the cause of these differences.

4.4 Capital Structure Decisions: Which Factors Are Reliably Important?

More recently Frank & Goyal (2009) conducted a comprehensive study on the U.S market. From existing literature, they extract a long list of factors that could influence capital structure. In contrast to earlier studies, Frank & Goyal (2009) include substantially larger amounts of factors as well as a very long sample period.

4.4.1 Data & Method

Data used in the paper consists of U.S firms on COMPUSTAT during the period 1950-2003. The study uses four different leverage measures as dependent variables and many different proxies for different independent variables, 25 in total. The method used in the study is OLS with leverage measures as dependent variables.

4.4.2 Results

Six factors account for 27% of the variation in leverage, while the remaining factors add only 2% more. These six factors are industry median leverage, tangibility, profitability, firm size, MTB-ratio, and inflation. They describe these six factors as “core factors”. When these six factors are used in a “core model” they show consistent signs and statistical significance across many different variations on the data used. In addition, they state that an indicator variable of whether the firm pays a dividend is also reliably associated with leverage.

The study also states that no single theory about capital structure is enough to explain a firm’s capital structure. The market timing, pecking order, and trade-off theory all have their flaws. However, they believe that if a unified theory of leverage emerges it will have
most elements in common with the trade-off theory. The authors conclude by hoping that the robust six core factors could provide a useful base for further studies regarding capital structure.

4.5 Capital Structure and Firm Performance: A New Approach to Testing Agency Theory and an Application to the Banking Industry

A notable study regarding capital structure and firm performance is the paper by Berger & Di Patti (2006). The paper proposes new theories regarding firm performance and capital structure and highlights the reverse causality that exists between them. Furthermore, they were among the first to employ a simultaneous-equation model to account for this reverse causality. They aimed to test the agency cost hypothesis as well as the efficiency-risk and franchise-value hypotheses.

4.5.1 Data & Method

Berger & Di Patti (2006) used data on U.S. commercial banks during 1990-1995. They used a two-stage least squares model with firm performance as the dependent variable. Furthermore, they include leverage as an endogenous variable to account for reverse causality.

4.5.2 Results

The paper finds results consistent with the agency cost hypothesis. Higher leverage or lower equity capital is associated with a higher profit efficiency among many different measures of performance. Though they did not find consistent enough results to conclude that the relationship between performance and leverage may be reversed when leverage is high enough. When debt levels are very high agency costs may outweigh the benefits of debt. They also find that profit efficiency is responsive to the ownership structure of the firm, which is also consistent with the agency theory. Furthermore, institutional holders have favourable monitoring effects that reduce agency costs, but large individual investors do not.

Considering reverse causality from efficiency and capital structure they find evidence for both the efficiency-risk hypothesis and the franchise-value hypothesis. However, they find a substitution effect of the efficiency-risk hypothesis in the full sample, indicating differences in behaviour depending on the size of the firm.
4.6 Capital Structure, equity ownership and firm performance

A major study focusing on firm performance and capital structure is the paper by Margaritis & Psillaki (2010). The paper investigates the relationship between capital structure, ownership structure, and firm performance. The paper aims to examine if more efficient firms use more debt in their capital structure. This study is one of the more major studies that account for the reverse causality between firm performance and leverage.

4.6.1 Data & Method

The observations in the paper consist of firms in French manufacturing during 2002-2005. Three categories were chosen, chemicals, computers and R&D, and lastly textiles. The paper investigates two models, a firm performance model and a leverage model. The method used in the study is instrumental variables regressions, with the aim of accounting for reverse causality. The firm performance dependent variable is highlighted in the paper, which is estimated through data envelopment analysis (DEA). This leads to the variable measuring productive efficiency as opposed to financial performance.

4.6.2 Results

The results show a significant positive relationship between leverage and firm performance. Furthermore, profitability has a positive and significant effect on efficiency in all industries. The study finds that depending on the industry the factors can show differing results. Size is significant in chemicals, a positive effect for smaller firms, and negative for larger firms. Tangibility also shows differing results related to firm performance, negative at low tangibility, and positive at high tangibility. Ownership concentration shows very different results depending on the industry. For instance, low ownership concentration in the computer industry shows a negative effect on firm performance, while the chemicals industry shows mainly positive effects. Family ownership also shows a significant positive effect on firm performance.

The paper shows some support for the agency cost hypothesis, higher leverage is associated with improved efficiency.
<table>
<thead>
<tr>
<th>Author</th>
<th>Title</th>
<th>Data</th>
<th>Method</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titman &amp; Wessels (1988)</td>
<td>The determinants of capital structure choice</td>
<td>U.S. Firms 1974-1982</td>
<td>Factor Analysis</td>
<td>Uniqueness related with a lower debt ratio, as is profitability. Size is negatively related to debt in small firms. Choosing good proxies is recommended for future research.</td>
</tr>
<tr>
<td>Rajan &amp; Zingales (1995)</td>
<td>What do we know about capital structure? Some evidence from international data</td>
<td>G-7 countries 1987-1991</td>
<td>OLS</td>
<td>Tangibility and size positively related to debt, while profitability is negatively related to debt. Factors show similar results in the G-7 and the U.S.</td>
</tr>
<tr>
<td>Frank &amp; Goyal (2009)</td>
<td>Capital structure decisions: which factors are reliably important?</td>
<td>U.S. Firms 1950-2003</td>
<td>OLS</td>
<td>Median leverage, tangibility, profitability, firm size, MTB and inflation are major determinants of capital structure. No single capital structure theory show an ability to explain how a firm chooses its capital structure.</td>
</tr>
</tbody>
</table>
5 DATA

The data used is collected from the COMPUSTAT database. The full data collected consists of an unbalanced panel of 44,379 observations over the period of 2000-2018. We include six different countries in our sample. The bulk of the observations are from the United Kingdom with 17,377 observations, France with 8,146 observations, and Germany with 8,370 observations. Sweden, Italy, and Finland have 5,315, 3,388, and 1,783 observations, respectively. The variables obtained are winsorized on a 1% level to avoid outliers and reduce extreme values.

Financials are excluded from the sample due to large differences in their capital structure and assets. Previous research including financials either includes it as a dummy variable or solely has them as a focus. For instance, Berger & Di Patti (2006) focused on banking firms in their research paper with a similar topic. A paper that aims to focus on researching differences between industries (e.g. addition of industry dummies) could include financials as a dummy. However, in this study since this is not the case financials are excluded.

Observations with missing data points are removed, which limits the number of observations available. Some previous research suggests imputation procedures to “fill” missed data. For example, Frank & Goyal (2009) used “ICE”, a form of multiple imputation to fill in missing values in their sample. However, this also creates its problems due to the prediction of unavailable data, which may not always be accurate.

This leads us to use unbalanced panel data. There are differing opinions on whether balanced data or unbalanced data is superior. Evaluating previous research, we find support for both. For example, Titman & Wessels (1988) examined balanced panels, while Frank & Goyal (2009) used unbalanced panels. The usage of balanced panels can be criticised for creating survivorship bias. Furthermore, balanced panels drastically reduce the number of observations in the data sample. On the contrary, by using unbalanced panel data we increase the number of observations available for this study.

5.1 Determinants of capital structure and firm performance

From the variables presented in section 2.7, not all are used. The variables chosen for this paper is limited by data available from COMPUSTAT. Some of the more relevant variables that affect both leverage and firm performance are size and growth. We add uniqueness as an independent variable to account for firms producing unique products.
Not every variable associated with capital structure or firm performance can be used in this study. Since we run two-stage least squares regressions the variables we choose have to affect both firm performance and leverage. Furthermore, we add two variables as instrumental variables which are tangibility and non-debt tax shields. Previous research suggests that these variables are correlated with leverage but not as much with firm performance. Next, we will present the variables used in this study in more detail and their suggested signs regarding firm performance. The determinants suggested signs regarding capital structure were explained earlier in section 2.7, which is relevant for the first-stage regression. The suggested signs regarding firm performance are constructed in accordance with previous research on the topic.

Our dependent variable is a proxy for firm profitability. In this study, we measure firm profitability by dividing operating income before depreciation with total assets. This is but one way of measuring firm performance. Previous research has used many different ways of measuring firm performance, e.g. ROA and Market-to-book. We model our PROF variable similarly to Frank & Goyal (2009) profitability ratio. Our used proxy also benefits us in that it does not impede with the usage of non-debt tax shield as an instrument, due to our firm profitability measure not taking depreciation into account.

Our endogenous variable LEV is measured by total debt/total assets, also sometimes abbreviated as TDA (total debt to book assets). Some previous research has used only long-term debt or market value of assets or some combination of all the above. Berger & Di Patti (2006) use ECAP, which measures equity to gross total assets. We decide to use the TDA measure as presented by Frank & Goyal (2009), total debt/total assets. Predicting the sign for LEV is not straightforward due to the possibility of non-linearity as shown by previous research, most notably Margaritis & Psillaki (2010). Their results showed that leverage was significantly positively related to high-efficiency firms, while lower leverage is associated with a negative relationship with efficiency. Li et al. (2019) found that low credit risk SME’s debt ratio is negatively related to firm performance.

However, this relationship may be reversed when leverage is very high due to agency costs. Still, no conclusive evidence is found in previous research. Margaritis & Psillaki (2010) suggest that the relationship can be positive in high-efficiency firms, and negative in low-efficiency firms.

SIZE in this study is measured by taking the natural logarithm of sales. Margaritis & Psillaki (2010) use the same proxy for size. However, some studies also use the natural
logarithm of total assets to measure size. In order to keep the study consequent and comparable with previous research we will use the natural logarithm of sales. To predict a certain sign for SIZE is also not straightforward due to previous research showing non-linearity with firm performance. Berger & Di Patti (2006) and Margaritis & Psillaki (2010) both show significant results regarding non-linearity. The effect of size on high-efficiency firms is negative, while smaller firms show a positive relationship. We predict a similar effect in our study. We include a squared variable of size to measure for non-linearity.

GROWTH in this study is measured by \((Sales - Sales_{t-1})/Sales_{t-1}\). Most previous studies show consistent results with growth having a positive effect on firm performance (Maury, 2006; Margaritis & Psillaki, 2010). This occurs due to firms with more growth opportunities usually exhibiting higher rates of returns, and consequently generate larger profits. Growth can be measured by average sales growth, as shown by Margaritis & Psillaki (2010) or by the change in log assets (Frank & Goyal, 2009). Usually, studies show significant results regardless of which growth proxy is used. We calculate the variable similarly to the method employed by Margaritis & Psillaki (2010). For the most part, there is little reason to expect this variable to not have a positive influence on firm performance. However, Margaritis & Psillaki (2010) found a negative relationship in some industries.

We also include a uniqueness variable in this study. We calculate the variable by a dummy that takes the value of one or zero. Similar to Frank & Goyal (2009) we calculate the variable by the firm’s SIC code. Values 3400-4000 are assigned to firms that produce “unique” products. These are firms that produce specialised products such as computers, chemicals, electronics, aircraft, etc. Most previous research regarding capital structure uses some sort of proxy for uniqueness. However, the uniqueness of a firm is a variable that can also have an effect on firm profitability, which leads to its usage in this study.

Our first instrumental variable is tangibility, which is one of the more important factors that affect leverage. The variable is calculated by dividing fixed assets with total assets. Most previous research agrees that a positive effect on leverage is more likely than a negative one. The main reason is that tangible assets can be used as collateral and thus makes it easier to acquire cheap debt. We expect the sign to be positive in relation to leverage. Wald (1999) and Frank & Goyal (2009) both show a positive relationship.
Non-debt tax shield is our second instrumental variable. The variable is calculated by depreciation divided by total assets. The variable is related to leverage but not as much with firm performance. Non-debt tax shields effect on firm profitability is hard to quantify, and mostly affects debt ratios. Most previous research agrees that firms that have higher non-debt tax shields in relation to their expected cash flows should include less debt in their capital structure. This leads to a negative relationship between non-debt tax shields and leverage. Predicting the sign for non-debt tax shields is tricky. Previous research has found results on the whole spectrum, either no effect at all, a negative effect, or a positive effect. Most of the background theory supports a negative relationship as does the majority of previous research (Sheikh et al, 2011; Bauer (2004); Wald (1999). As such, we also expect non-debt tax shields to have a negative relationship with leverage.

5.2 Research Hypotheses

Following previous research, we construct the following research hypotheses:

H1: Firm performance is positively impacted by capital structure

This research hypothesis mainly follows the efficiency-risk hypothesis as outlined in chapter 3. More profitable firms would choose higher leverage ratios mainly due to reduced costs of bankruptcy and financial distress. The efficiency risk hypothesis mostly resembles the trade-off theory of capital structure. However, in essence, it is hard to measure whether the trade-off theory is the prevailing capital structure theory with our estimations. The agency cost theory also suggests that increased leverage leads to higher firm performance. Increased leverage puts pressure on managers to perform, which in turn is expected to reduce the costs of bankruptcy and financial distress, similarly to the efficiency-risk hypothesis. The hypothesis is set up as the following due to most previous research that accounts for reverse causality showing a positive effect between firm performance and leverage (Margaritis & Psillaki 2010; Berger & Di Patti, 2006).

If our hypothesis holds, we can surmise that our results also show support for the efficiency-risk and agency cost theories. Next, we set up hypotheses regarding the predicted signs of our independent variables used in this study. Table 3 outlines our predicted signs for the firm performance model.
Table 3 Predicted signs of the variables used in the firm performance model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predicted sign of the variable</th>
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<tbody>
<tr>
<td>Leverage</td>
<td>Positive effect on firm performance (+)</td>
</tr>
<tr>
<td>Size</td>
<td>Positive for low performance (+), Negative for high performance (−)</td>
</tr>
<tr>
<td>Growth</td>
<td>Positive effect on firm performance (+)</td>
</tr>
<tr>
<td>Uniqueness</td>
<td>Negative effect on firm performance (−)</td>
</tr>
</tbody>
</table>

Leverage is expected to show a positive effect on firm performance as per the efficiency risk and agency cost hypothesis. As alluded to previously, previous research highlights a positive relationship between firm performance and leverage, and our prediction is no different.

Our variable for size is also likely to show a positive relationship with firm performance. Larger firms usually have better technology available, are more diversified, and are most of the time managed more efficiently. Larger firms may also benefit from economies of scale when monitoring top management. (Himmelberg et al. 1999)

However, larger firms may suffer from a high degree of moral hazard and increased need for monitoring, which in turn may lead to a negative relationship between firm performance and size. Some studies have shown nonlinearity in size, and we control this by our squared size variable. This leads us to the prediction that larger firms may show a negative effect on firm performance, while the opposite is true for smaller firms.

H2: Firm performance in nonlinearly correlated with size, positively in smaller firms, and negatively in larger firms.

Growth likewise is expected to have a positive relationship with firm performance. Firms that exhibit higher growth are more likely to be more profitable. Furthermore, most previous research on the topic has shown a positive relationship between firm
performance and growth. The predicted relationship in this study between growth and firm performance is therefore positive.

H3: Firm performance has a positive relationship with growth.

Uniqueness is usually a variable associated with capital structure. Product uniqueness can create market power rents, and in turn the firm may want to hold extra equity capital in order to protect these rents. This can in turn lead to higher performance in a firm. Considering firm performance, firms with unique products may be expected to advertise more and spend more on promoting their product. (Titman & Wessels, 1988)

These costs are less relevant to firms without unique products. These costs lead us to believe the relationship will be negative. Hence, the predicted relationship between uniqueness and firm performance in this study is negative.

H4: Uniqueness is negatively correlated with firm performance.

5.3 Country differences

Due to our sample covering six different countries it is important to discern country-specific differences. We can categorize our countries into bank-oriented countries and market-oriented countries. According to Demirgüç-Kunt et al. (1999) Finland, Italy, France, and Germany fall into the former category, while the U.K and Sweden fall into the latter category. Bank-oriented countries generally show a higher degree of creditor rights which in turn can lead to premature liquidation. This means managers should emphasize the importance of financial distress as a factor when considering financing. Some previous research has found no difference between bank and market-oriented countries. Rajan & Zingales (1995) did not find any systematic difference in the level of leverage between bank and market-oriented countries.

However, what Rajan & Zingales (1995) do suggest is that bankruptcy laws can have an effect on capital structure. The countries in our sample have different bankruptcy procedures. If creditors are better protected it has an effect on the amount of leverage in a firm. For instance, Germany has laws that are very creditor friendly. In a similar vein, Franks & Torous (1993) argue that the U.K has bankruptcy laws that may in some cases lead to premature liquidation. Our other civil law countries have less strict bankruptcy laws. Rajan & Zingales (1995) point out that very strict bankruptcy laws may lead to a firm maintaining a lower amount of leverage due to managers’ fear of liquidation.
Another way of categorizing countries is by the legal system they employ. Our bank-oriented countries all fall into the civil law category, while the U.K is seen as a common-law country. Our countries can also be further subcategorized into Scandinavian law (Sweden, Finland), Germanic law (Germany), and Napoleonic law (France, Italy). La Porta et al. (1998) argue that common law countries have the best investor and creditor protection, Napoleonic law the worst while Scandinavian and German civil law countries are in the middle.

Beck et al. (2003) find that firm size is positively related to the development of a country’s banking system. However, firm size was found to have a negative relationship with creditor’s rights. Furthermore, they also find a significant positive relationship between firm size and a country’s legal system. Large firms may be prone to a higher degree of agency problems which may be more difficult to monitor and control. Investors in these large firms may need strong financial institutions and an effective legal system that mitigates these agency problems.

Furthermore, some idiosyncrasies in how some countries use financing tools may have an effect. For instance, France uses leasing more often than overdrafts, and factoring is prevalent. The usage of trade credit is also more widespread in France and Italy than in the rest of our sample. These factors can influence the amount of debt in a firm’s balance sheet. (Psillaki & Daskalakis, 2009)

Antoniou et al. (2008) argue that firms with strong main bank relationships usually have higher leverage ratios. American and British firms on the other hand emphasize managerial preference for equity capital. This preference may be explained due to dispersed share ownership and firms in general having poorer relations with lenders. This means financial traditions in a country can affect the leverage ratio of the firm. Meanwhile, in countries where lenders and borrowers have closer ties as well as a lower threat of bankruptcy borrow more. Their study confirms this view, continental European firms are on average more leveraged than British firms.

The effect of asset tangibility on corporate debt is also assumed to be more prominent in bank-oriented countries. This relationship is likely caused by institutional differences, such as restrictions on a bank’s ability to grant unsecured loans and banking practices that require collateral. The importance of tangibility depends upon the source of debt financing: banks, or capital markets. (Antoniou et al., 2008)
Still, previous research is not unanimous on the country-specific differences. There are too many factors in play that each contributes to the country-specific differences. That said, based on the information presented in this section we can make the following assumptions:

Civil law countries should be more leveraged than common law countries, mostly due to less strict bankruptcy laws and in general worse creditor protection. Most of the civil law countries are bank-based countries and thus have closer ties with the banks. This is correlated with higher leverage ratios. Due to most of our sample countries being civil law and bank based in general we should not expect all too much country variation in the factors used in this study.

5.4 Descriptive statistics

Table 4 presents descriptive statistics for the data collected. The descriptive statistics show similar results to Wald (1999) and Rajan & Zingales (1995), U.K. and German firms seem to use less debt than firms in other countries. However, Sweden appears to use even less debt than the U.K. and Germany. Compared to previous research it seems that during the 21st century firms appear to have become more indebted. France, Finland, and Italy all use debt more heavily than the other countries on the list, with Italy topping the list. Finland seems to show the highest mean ratio for profitability while Italy scores second. Wald (1999) with a similar profitability ratio found that the U.K showed on average higher values, with France and Germany as 2nd and 3rd. In our sample, Finnish firms have the highest means for profitability while Sweden scores the lowest.

U.K. firms on average seem to have more tangibles than most countries, with Sweden showing the lowest mean for tangibles. Higher tangibility ratios are usually associated with more debt due to their collateral value. Sweden having lower debt ratios as well as a lower tangibility ratio may support this theory. The usage of non-debt tax shields appears to be similar across countries, with Germany showing slightly higher means and Italy the lowest. Non-debt tax shields tend to be negatively related to leverage.

In the sample, Sweden showed to have the highest mean in the size of firms, with U.K. the lowest. However, it is worth noting that the sample for U.K. is the largest and may include more small-cap firms. Similar results were shown in Wald (1999) with U.K. having a lower mean when compared to other European countries. The variable for growth showed the highest values in Sweden, while France scored the lowest. Growth is
traditionally positively associated with leverage as well as firm profitability; firms with more investments accumulate more debt and are more profitable.

Table 4 Descriptive Statistics for all countries

<table>
<thead>
<tr>
<th></th>
<th>FIN</th>
<th>FRA</th>
<th>GER</th>
<th>ITA</th>
<th>SWE</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profitability</td>
<td>0.093</td>
<td>0.071</td>
<td>0.071</td>
<td>0.079</td>
<td>0.023</td>
<td>0.038</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.145</td>
<td>0.141</td>
<td>0.163</td>
<td>0.097</td>
<td>0.237</td>
<td>0.239</td>
</tr>
<tr>
<td>Leverage</td>
<td>0.251</td>
<td>0.217</td>
<td>0.202</td>
<td>0.267</td>
<td>0.182</td>
<td>0.194</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.178</td>
<td>0.173</td>
<td>0.192</td>
<td>0.164</td>
<td>0.185</td>
<td>0.216</td>
</tr>
<tr>
<td>Size</td>
<td>5.5</td>
<td>5.23</td>
<td>5.17</td>
<td>5.81</td>
<td>6.05</td>
<td>4.04</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>2.04</td>
<td>2.42</td>
<td>2.32</td>
<td>2.26</td>
<td>2.65</td>
<td>2.62</td>
</tr>
<tr>
<td>Growth</td>
<td>0.099</td>
<td>0.098</td>
<td>0.113</td>
<td>0.079</td>
<td>0.274</td>
<td>0.261</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.489</td>
<td>0.532</td>
<td>0.544</td>
<td>0.517</td>
<td>0.83</td>
<td>0.817</td>
</tr>
<tr>
<td>Tangibility</td>
<td>0.231</td>
<td>0.172</td>
<td>0.222</td>
<td>0.233</td>
<td>0.164</td>
<td>0.238</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.192</td>
<td>0.174</td>
<td>0.19</td>
<td>0.194</td>
<td>0.194</td>
<td>0.242</td>
</tr>
<tr>
<td>Ndtax</td>
<td>0.051</td>
<td>0.045</td>
<td>0.055</td>
<td>0.043</td>
<td>0.048</td>
<td>0.049</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.032</td>
<td>0.044</td>
<td>0.049</td>
<td>0.033</td>
<td>0.044</td>
<td>0.046</td>
</tr>
<tr>
<td>Observations</td>
<td>1,783</td>
<td>8,146</td>
<td>8,370</td>
<td>3,388</td>
<td>5,315</td>
<td>17,377</td>
</tr>
</tbody>
</table>

It is worth noting that the descriptive statistics can vary a lot from one study to another, mainly due to the different methods of how a variable can be calculated. Leverage and
profitability in particular can be measured in many ways. The full sample statistics stand out by the fact that the sample mean values drift towards the values shown in U.K, Germany, and France. The three countries combined account for 75% of our observations, which explains this phenomenon. Table 5 summarizes the results for our whole sample.

**Table 5 Full sample statistics**

<table>
<thead>
<tr>
<th></th>
<th>Observations</th>
<th>Mean</th>
<th>Std. Dev</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profitability</td>
<td>44379</td>
<td>0.054</td>
<td>0.200</td>
<td>-1.06</td>
<td>0.4</td>
</tr>
<tr>
<td>Leverage</td>
<td>44379</td>
<td>0.206</td>
<td>0.196</td>
<td>0</td>
<td>1.02</td>
</tr>
<tr>
<td>Size</td>
<td>44379</td>
<td>4.91</td>
<td>2.59</td>
<td>-2.31</td>
<td>11.1</td>
</tr>
<tr>
<td>Growth</td>
<td>44379</td>
<td>0.184</td>
<td>0.699</td>
<td>-0.847</td>
<td>5.17</td>
</tr>
<tr>
<td>Tangibility</td>
<td>44379</td>
<td>0.213</td>
<td>0.212</td>
<td>-0.002</td>
<td>0.887</td>
</tr>
<tr>
<td>Ndtax</td>
<td>44379</td>
<td>0.049</td>
<td>0.045</td>
<td>0.0008</td>
<td>0.302</td>
</tr>
</tbody>
</table>

A Pagan-Hall test was conducted to test for heteroskedasticity. The test results show that our dataset show heteroskedasticity on a 1% level. Furthermore, Stock & Watson (2015) suggest always using robust standard errors on economic data. “At a general level, economic theory rarely gives any reason to believe that the errors are homoscedastic. It is therefore prudent to assume that the errors might be heteroskedastic unless you have compelling reasons to believe otherwise” (Stock & Watson, 2015).

To account for heteroskedasticity we will adjust our regression to run with robust standard errors. Due to our version of Stata not allowing for a robust option we will instead use bootstrapping, which serves an identical purpose of dealing with heteroskedasticity as well as autocorrelation.

In order to identify whether our data suffer from correlation issues we construct a correlation matrix. The correlation matrix for our data shows no alarming rates of multicollinearity. The highest value shown was size and profitability, 43%. Table 6 presents the correlation results.
### Table 6 Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>Profitability</th>
<th>Leverage</th>
<th>Size</th>
<th>Growth</th>
<th>Tangibility</th>
<th>Ndtax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profitability</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leverage</td>
<td>0.0216</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>0.4345</td>
<td>0.1746</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth</td>
<td>-0.0500</td>
<td>-0.0511</td>
<td>-0.2425</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tangibility</td>
<td>0.1490</td>
<td>0.2843</td>
<td>0.1536</td>
<td>-0.0428</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>Ndtax</td>
<td>-0.0417</td>
<td>0.1089</td>
<td>-0.1004</td>
<td>-0.0126</td>
<td>0.1276</td>
<td>1.0000</td>
</tr>
</tbody>
</table>
6 METHODOLOGY

6.1 Motivation for two-stage least squares

As mentioned earlier in chapter 3 reverse causality between leverage and firm performance has been established by previous research. This can render typical regressions such as OLS moot. For proof, let us consider the following linear regression

\[ y = \beta_0 + B_1x_1 + B_2x_2 + \ldots + B_Kx_K + u, \]

\[ E(u) = 0, \quad Cov(x_j, u) = 0, \quad j = 1, 2, \ldots, K - 1 \]

But where \( x_K \) might be correlated with \( u \). This indicates that the explanatory variables \( x_1, x_2, \ldots, x_{K-1} \) are exogenous, however, \( x_K \) may be endogenous. Since we have established the leverage-firm performance endogeneity in chapter 3 it applies for this example. In other words, our \( u \) contains an omitted variable that is uncorrelated with all other explanatory variables except \( x_K \). An instrumental variables approach is one solution to the problem of an endogenous explanatory variable. For us to be able to use instrumental variables we need to have an observable variable, \( z_1 \), which satisfies the following conditions: It has to be uncorrelated with \( u \) and the coefficient \( z_1 \) has to be nonzero. If these conditions are met the variable can be said to be an instrumental variable candidate for \( x_K \). (Woolridge, 2010)

6.2 Two-stage least squares

Due to previous research highlighting the reverse causality between leverage and firm performance it is crucial to use a model that takes this into account. Without factoring for these endogeneity issues the results might be biased. In order to rectify this issue our firm performance model employs a two-stage least squares regression, which is an extension of the traditional OLS method.

The two-stage least square regression equation for the firm performance model is:

\[ PROF_{i,t} = \beta_0 + \beta_1LEV_{i,t-1} + \beta_2Z_{1i,t-1} + \mu_{i,t} \]

Where \( i \) stands for a specific firm and \( t \) stands for the time period. The variables in the equation are PROF as dependent variable and LEV as an endogenous variable. Similarly, to Margaritis and Psillaki (2010) we include variables that are squared. These variables are included due to the possible effect of non-linearity. The relationship between two variables may switch from a positive to a negative relationship at higher ratios. In our
case, SIZE will have a negative effect when $\text{SIZE} > -\beta_1/2\beta_2$. An inverse U-shaped relationship occurs when the condition $\beta_2 < 0$ holds. The variables in $Z_1$ stand for the exogenous variables Growth, SIZE, and $\text{SIZE}^2$ as well as Uniqueness (dummy variable).

Similar to previous research on the topic we lag our explanatory variables by one period to reduce problems of endogeneity. $\mu$ stands for the stochastic error term. However, since we treat leverage as endogenous, we further use the instrumental variables tangibility and non-debt tax shield with two lags to get more accurate results of the impact of leverage on firm profitability.

Instrumental variables used in this research are the lagged (t-2) variables of tangibility and non-debt tax shields. When using instrumental variables regressions lagging instruments is fairly common in order to avoid simultaneity bias. Several previous studies use tangibility as an instrument when dealing with leverage as an endogenous variable, most notably Fosu (2013) and Aivazian et al. (2005). Tangibility has shown to have an influence on a firms’ access to capital and its effect on profitability is mostly through financing. This makes it exogenous in relation to performance and a valid instrument.

Tangibility is measured in almost the same way in all previous research, fixed assets divided by total assets. As alluded to in chapter 2 most previous studies agree that tangibility is positively correlated with leverage. Himmelberg et al. (1999) argue that tangible assets provide good collateral, are easily monitored, and help mitigate agency conflicts between shareholders and creditors.

DeAngelo & Masulis (1980) and Sheikh et al. (2011) show support for the relationship between leverage and non-debt tax shields. Larger non-debt tax shields are usually correlated with lower leverage. Non-debt tax shields should not have an effect on profitability before depreciation and amortisation. The method for calculating profitability in this study uses operating income before depreciation, which allows us to use non-debt tax shields as an instrument.

$\text{NDTAX}$ in this study is measured by depreciation divided by total assets. According to DeAngelo and Masulis (1980) firms with larger non-debt tax shields should have less debt. Most studies that focus solely on firm performance often do not use non-debt tax shields as a variable. This may be due to it being quite hard to quantify exactly the effect of non-debt tax shields on profitability due to it mostly having debt benefits. This supports the usage of non-debt tax shields as an instrument.
Some previous studies suggest using lagged leverage as an instrument. However, as noted by Fosu (2013) lagged values of leverage are very likely to show persistence. Furthermore, Lemmon et al. (2008) suggest that leverage ratios from COMPUSTAT generally show little variation over time. This leads us to skip lagged leverage as an instrument.

Our first stage equation in our study is the following:

\[
LEV_{i,t} = \beta_0 + \beta_1 \text{Size}_{i,t-1} + \beta_2 \text{Size}_{i,t-1}^2 + \beta_3 \text{Growth}_{i,t-1} + \beta_4 \text{Tangibility}_{i,t-2} + \\
\beta_5 \text{Ndta}x_{i,t-2} + \beta_6 \text{Uniqueness}_{i,t} + \mu_{i,t}
\]

The first stage regression is briefly presented in this study in order to get a broader picture of how our leverage variable is constructed and to identify which determinants show significance for capital structure.

The data used is panel data and thus different estimation models can be used. The most frequent models used are fixed effects and random effects. The choice of model is not straightforward. In most cases, some sort of statistical test is run to determine the suitable model. Most previous research defers to the Hausman test. The Hausman test pits the fixed effects model against the random-effects model and tests whether there is a statistically significant difference between the estimators. The null hypothesis states that when the error term \( \mu \) is uncorrelated with the regressors random effects should be used. When the null is rejected the model is inconsistent and fixed effects should be used instead. (Hausman, 1978)

Previous studies with similar data to ours have used both methods. Margaritis & Psillaki (2010) used random effects, while Berger & Di Patti (2006) used fixed effects and a distribution-free method. However, Berger & Di Patti (2006) found that differences in scale have shown to be a problem in previous research as well as their own, which can lead to inefficiencies when using the fixed effects model.

A Hausman test was conducted on the data; the results rejected the null hypothesis. The rejection of the null seems to indicate that fixed effects should be used. However, there are some exceptions to this rule. When the time variable is short in comparison to the number of observations random effects may be warranted instead, which is the case for our data. Furthermore, due to the uniqueness variable being time-invariant the fixed effects method would not be applicable. This leads us to estimate using random effects for both regressions.
7 RESULTS

7.1 Two-stage least squares regression

Table 7 Two-stage least squares regression results

<table>
<thead>
<tr>
<th></th>
<th>Finland</th>
<th>France</th>
<th>Germany</th>
<th>Italy</th>
<th>Sweden</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leverage</td>
<td>-0.079</td>
<td>0.177***</td>
<td>0.387***</td>
<td>0.606</td>
<td>0.211*</td>
<td>0.106*</td>
</tr>
<tr>
<td></td>
<td>(0.174)</td>
<td>(0.067)</td>
<td>(0.074)</td>
<td>(1.014)</td>
<td>(0.124)</td>
<td>(0.063)</td>
</tr>
<tr>
<td>Size</td>
<td>0.126***</td>
<td>0.093***</td>
<td>0.082***</td>
<td>0.056***</td>
<td>0.130***</td>
<td>0.116***</td>
</tr>
<tr>
<td></td>
<td>(0.025)</td>
<td>(0.009)</td>
<td>(0.010)</td>
<td>(0.015)</td>
<td>(0.012)</td>
<td>(0.006)</td>
</tr>
<tr>
<td>Size_SQ</td>
<td>-0.009***</td>
<td>-0.007***</td>
<td>-0.006***</td>
<td>-0.004***</td>
<td>-0.007***</td>
<td>-0.009***</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Growth</td>
<td>0.075***</td>
<td>0.059***</td>
<td>0.068***</td>
<td>0.047***</td>
<td>0.071***</td>
<td>0.061***</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.006)</td>
<td>(0.006)</td>
<td>(0.018)</td>
<td>(0.006)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>Uniqueness</td>
<td>-0.044**</td>
<td>-0.042***</td>
<td>0.010</td>
<td>0.007</td>
<td>-0.039***</td>
<td>-0.023**</td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td>(0.011)</td>
<td>(0.009)</td>
<td>(0.023)</td>
<td>(0.015)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.262***</td>
<td>-0.246***</td>
<td>-0.268***</td>
<td>-0.278</td>
<td>-0.534***</td>
<td>-0.279***</td>
</tr>
<tr>
<td></td>
<td>(0.100)</td>
<td>(0.028)</td>
<td>(0.035)</td>
<td>(0.262)</td>
<td>(0.037)</td>
<td>(0.016)</td>
</tr>
</tbody>
</table>

Observations | 1,783 | 8,146 | 8,370 | 3,388 | 5,315 | 17,377 |
R-Squared     | 0.339 | 0.2556 | 0.09 | 0.01 | 0.324 | 0.377 |
Sargan-Hansen Statistic | 1.835 | 1.642 | 0.000 | 2.887 | 2.117 | 4.745 |
Sargan-Hansen P-value | 0.176 | 0.200 | 0.9946 | 0.0893 | 0.146 | 0.029 |
F-stat test value | 8.47 | 45.13 | 47.08 | 3.41 | 14.34 | 72.79 |

Table 7 presents the results for the two-stage least squares regression model. Our endogenous regressor leverage shows a significant positive effect on firm profitability in France, Germany, Sweden, and the UK, albeit only on a 10% level for the latter two. This would indicate that profitable firms in these four countries use more debt in their capital structure. The results suggest that the effect of leverage on firm performance is much stronger in Germany and the lowest in the U.K.

These results are similar to previous research on the topic. Fosu (2013) and Margaritis & Psillaki (2010) both show positive values for leverage. Finland showed a slightly negative value for leverage while Italy scored the highest positive value. However, for both Finland and Italy leverage does not show any statistical significance. The countries with significant positive values show support for the agency cost hypothesis, higher leverage is associated with higher firm performance. Our results show significant support for
research hypothesis H1: “Firm performance is positively impacted by capital structure” for every country except Finland and Italy.

Size shows a significant positive effect for all countries on a 1% level. The effect of size on firm performance is strongest in Sweden, Finland, and the U.K. However, the squared variable shows significant negative values. This indicates that firm size is nonlinearly significantly related to profitability. Similar results were shown in Ghosh (2008) and Fosu (2013). The benefit of size is most apparent in larger firms, where diversification and economies of scale have a larger effect on firm profitability. As highlighted by Himmelberg et al. (1999) excessive expansion may lead to moral hazard, which in turn can reduce profitability. This may be the cause of the negative squared value for size. Our results regarding size support our research hypothesis H2: “Firm performance is nonlinearly correlated with size, positively for smaller firms and negatively for larger firms”.

Similar to size growth also exhibits significant results for every country. Growth showed relatively similar values across countries However, Italy stands out with a weaker correlation between firm performance and growth.

The results are in line with most previous studies, growth is positively associated with profitability. Some previous studies show a positive but insignificant result for growth. In our study, growth show significance. The positive value for growth indicates, as expected, that more profitable firms show a larger growth. The results regarding growth also confirm our research hypothesis H3: “Firm performance has a positive relationship with growth”.

Our dummy variable uniqueness shows significance for Finland, France, Sweden, and the UK. These countries display a negative relationship with firm performance, while the insignificant countries Germany and Italy show positive values. The significant countries show similar values across countries, except for the U.K, where uniqueness is less negatively related with firm performance.

The results seem to indicate that firms that produce “unique” products are less profitable. The reasons behind this may be costs that are associated with unique products. These may be higher R&D, manufacturing, advertising, or promoting costs. Our research hypothesis H4: “Uniqueness is negatively correlated with firm performance” is supported by our results, except for Germany and Italy.
7.2 First-stage regression results

Table 8 First-stage regression results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Finland</th>
<th>France</th>
<th>Germany</th>
<th>Italy</th>
<th>Sweden</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tangibility</td>
<td>0.140** (0.056)</td>
<td>0.277*** (0.033)</td>
<td>0.280*** (0.031)</td>
<td>0.107** (0.043)</td>
<td>0.210*** (0.040)</td>
<td>0.157*** (0.015)</td>
</tr>
<tr>
<td>NDTAX</td>
<td>0.416* (0.227)</td>
<td>0.228*** (0.080)</td>
<td>0.152*** (0.067)</td>
<td>0.076 (0.168)</td>
<td>0.073 (0.085)</td>
<td>0.381*** (0.064)</td>
</tr>
<tr>
<td>Growth</td>
<td>-0.041*** (0.015)</td>
<td>-0.013*** (0.004)</td>
<td>-0.005* (0.004)</td>
<td>-0.016** (0.007)</td>
<td>0.004 (0.003)</td>
<td>-0.003 (0.002)</td>
</tr>
<tr>
<td>Size</td>
<td>-0.082*** (0.031)</td>
<td>-0.007 (0.008)</td>
<td>-0.004 (0.009)</td>
<td>0.004 (0.011)</td>
<td>0.011 (0.008)</td>
<td>0.0002 (0.004)</td>
</tr>
<tr>
<td>Size_SQ</td>
<td>0.006** (0.003)</td>
<td>0.001** (0.001)</td>
<td>0.001** (0.001)</td>
<td>0.00002 (0.001)</td>
<td>0.0004 (0.007)</td>
<td>0.001*** (0.004)</td>
</tr>
<tr>
<td>Uniqueness</td>
<td>0.031 (0.024)</td>
<td>0.016 (0.011)</td>
<td>-0.0002*** (0.011)</td>
<td>0.018 (0.016)</td>
<td>0.018 (0.011)</td>
<td>-0.017 (0.010)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.430*** (0.090)</td>
<td>0.161*** (0.022)</td>
<td>0.124*** (0.027)</td>
<td>0.218*** (0.036)</td>
<td>0.064*** (0.022)</td>
<td>0.119*** (0.009)</td>
</tr>
</tbody>
</table>

Observations | 1,783 | 8,146 | 8,370 | 3,388 | 5,315 | 17,377 |

R-Squared | 0.217 | 0.197 | 0.130 | 0.056 | 0.197 | 0.119 |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Although the focus of our study is on the two-stage least squares regression, we will also briefly present the first-stage regression in order to get a broader picture of how our variables interact with leverage. By examining the results of the first-stage regression it allows us to easier comprehend the results of our two-stage least squares regression. Furthermore, for further research it may allow one to identify why a certain result is achieved for the two-stage least squares regression.

Table 8 presents the results of the first-stage regression with leverage as the dependent variable. Our findings show consistency with previous research. Tangibility shows a positive relationship with leverage for every country. It would seem that firms with more tangibles have easier access to secure more beneficial loans, most likely due to the collateral value of tangibles. Most previous research shows a positive relationship (Frank & Goyal, 2009; Rajan & Zingales, 1995). NDTAX shows positive significance for every country save for Italy and Sweden. Interestingly enough the variable shows a positive
relationship with leverage. Bradley et al. (1984) found a positive relationship, while Wald (1999) and Sheikh et al. (2001) find a negative relationship. Bradley et al. (1984) suggest that firms with higher amounts of depreciation may also have higher values of tangible assets which in turn may increase leverage. Our results for Tangibility and NDTAX show support for the trade-off theory of capital structure.

Growth showed significance in every country except Sweden and the UK, a negative relationship in Finland, France, Italy, and positive in Germany. Support for both signs has been found in previous research; Frank & Goyal (2009) found a positive relationship while Wald (1999) a negative one. Due to most of our countries showing a negative relationship we find more support for the trade-off theory as well as the agency cost theory.

Size only shows significance for Finland, a negative relationship with leverage. Sheikh et al. (2011) also found a negative relationship between size and leverage. The variable in this study shows insignificance for most countries. A negative relationship supports the pecking order theory, information asymmetry may lead to an inverse relationship.

Our variable for uniqueness only shows significance for Germany, a negative relationship with leverage. German firms producing unique products have less debt, albeit only slightly. An explanation may be that unique industries have more specialized labour, which may result in higher financial distress costs that lead to a firm having less debt. A negative relationship was also found for the U.S by Frank & Goyal (2009) which used the same proxy for uniqueness.

7.3 Model diagnostics

When using instrumental variables regressions it is important to test the validity of the instruments. For this purpose, we use three different methods to test the robustness of our instruments. First, we observe the Hansen J statistic and its p-value. The null hypothesis is that our instruments are valid, e.g. uncorrelated with the residuals. As explained earlier in section 6.1 this is one of the requirements for an instrumental variable. For our results, the null hypothesis holds only for Finland, France, Germany, and Sweden. The null hypothesis is rejected on a 10% level for Italy and the U.K. For these countries it indicates that there exists a correlation between the instruments and the residuals of the IV regression. The instruments are not exogenous for these two countries. This means our estimates for Italy and the UK may not be valid.
Next, we test whether our instruments are weak with two tests. Testing for weak instruments is important for robust results. Weak instruments may cause instrumental-variables estimators to be biased. Furthermore, weak instruments can cause the hypothesis tests of parameters estimated by instrumental-variables estimators to suffer from severe size distortions.

The first test is a Sanderson-Windmeijer multivariate F test of our excluded instruments. Stock, Wright & Yogo (2002) suggest a F statistic that exceeds 10 in order for a two-stage least squares estimator to be reliable with one endogenous regressor. This condition is satisfied for every country except Finland and Italy.

The other test for weak instruments compares a F-stat to critical values. Due to the presence of heteroskedasticity we use the Kleibergen-Paap rk Wald F stat instead of the Cragg-Donald F stat to identify whether we have weak instruments. Heteroskedasticity in our model indicates that we cannot use Stock-Yogo critical values, which are normally used when testing for weak instruments. Instead, we will use the values presented by Olea & Pflueger (2013), which adjust for heteroskedasticity. Due to our regression only containing one endogenous variable the F-stat shows identical values to the Sanderson-Windmeijer F-stat. Table 9 in the appendices show the results of our critical value test.

Previous research suggests a cut off critical value of 10%, which we will employ in this study. After adjusting for heteroskedasticity the Olea & Pflueger (2013) critical value for 10% is 15.62. It is assumed that the instruments are weak if the critical values are larger than the Kleibergen-Paap rk Wald F statistic. The results are outlined in table 9. We find that France, Germany, and the U.K. all exceed the critical values. However, the same cannot be said for Finland, Italy, and Sweden. Our test indicates that the instruments used are weak for these countries, with the caveat that Sweden passed the first test for weak instruments.

### 7.3.1 Summary of model diagnostics

The model diagnostics seem to indicate that only the instruments for France and Germany satisfy the conditions for 1) Non-correlation with the residuals 2) No problems with weak identification. The instruments for the U.K. do not satisfy the first condition; however, they pass the weak identification tests. This indicates that tangibility and non-debt tax shield variables are correlated with the residuals of the U.K. regression. The instruments for Finland passed the test of non-correlation but failed the weak instruments test. Sweden also passed the test for non-correlation, however only passed
the simple F-test for weak instruments, and marginally failed the critical value test. The results for Italy show both correlation with the residuals and weak instruments.

When interpreting results, we have to keep the failures of the tests in mind. The only regression results that are fully robust in terms of our model testing are the ones for France and Germany. The results for the U.K. are only robust in terms of not having weak instruments, while Sweden might exhibit weak instruments. Finland failed both weak instrument tests and can be said to exhibit weak instruments. The instrumental variables regression used in this study showed poor results for Italy, which failed both conditions for an instrumental variable regression.
8 DISCUSSION

8.1 Two-stage least squares regression

In our firm performance model, the countries exhibit similar characteristics. The countries with significant leverage variables all show a positive relationship with firm performance. These results show support for our first research hypothesis. Concurrently, the results also show support for the efficiency-risk and agency cost hypotheses. Higher leverage reduces agency costs of outside equity and in turn increases firm value by limiting managers to act in the interest of shareholders. The agency costs of equity seem to be larger than for debt. Our results confirm the results of previous research on the topic (Margaritis & Psillaki, 2010; Berger & Di Patti, 2006; Fosu, 2013). The support for the agency cost theory entails support for the efficiency-risk hypothesis as well. Higher returns protect against portfolio risks and in turn reduces the probability of a firm incurring costs of financial distress and bankruptcy.

Our results show that for there are no significant differences in the sign of any independent variable; all significant results show the same signs. Furthermore, the predicted signs for our variables in table 3 modelled after previous research show the expected results.

Firms with more growth opportunities exhibit higher firm performance, which was to be expected. Although the underlying theory usually expects growth to be positive, some previous research has shown insignificant results regarding growth. Margaritis & Psillaki (2010) found growth to be insignificant, as did Fosu (2013). In our study, the variable showed a positive significance for all countries.

The results regarding non-linearity in firm size also showed consistency with previous research (Margaritis & Psillaki, 2010; Fosu, 2013). Firm size is positively associated with firm profitability, perhaps due to increased diversification and economies of scale. However, as explained by Himmelberg et al. (1999) size may also increase moral hazard. It would seem that the costs of a large firm outweigh some of the benefits at higher levels of size, leading to a decline in firm performance.

The variable for uniqueness has not been used in too many previous studies. What exactly counts as a firm producing an “unique” product is often up to the researcher’s discretion. In our study, the SIC code method similar to Frank & Goyal (2009) was used. The results seem to indicate that firms producing unique products are less profitable.
than other firms. Costs associated with having unique products seem to outweigh the benefits. Industry dummies may be useful for future research to further pinpoint which types of firms producing unique products show lower profitability.

8.2 First-stage regression

Our results regarding the first-stage regression with leverage as dependent variable show consistency with previous research. Tangibility, as expected, show a positive relationship with leverage. Germany, France, and Sweden in particular show a larger relationship between leverage and tangibility. As highlighted by Antoniou et al. (2008) this is likely caused by institutional differences and banking practices which may require collateral. It seems that Italy, Finland, and the U.K. have a lesser emphasis on tangibles when securing debt. It may be that these three countries are more effective than other countries at reducing moral hazard. For the U.K, the result is in line with the assumptions regarding a market-based economy. Wald (1999) also found a significantly lower ratio for U.K. firms in tangibility, which is also the case in our study.

For the countries that showed significance in non-debt tax shields, all showed a positive relationship with leverage. Previous research is divided on the expected sign. Barclay et al. (1995) and Grier & Zychowicz (1994) find a positive relationship, while Wald (1999) and Fama & French (2002) find a negative relationship. For our bank-oriented countries the explanation may lie in higher collateral requirements.

Countries with a significant ratio on growth show a negative relationship with leverage. Myers (1977) argues that highly levered firms are more likely to pass on profitable investment opportunities. Firms that expect high future growth should use greater amounts of equity financing. Growth may increase the cost of financial distress and increase debt-related agency problems. Germany on the other hand showed a slight positive relationship between leverage and growth.

Michaelas et al. (1999) argue that growth may in some cases push firms into seeking external financing due to the exhaustion of internal funds. In bank-based countries, this is more likely, due to a closer relationship between firms and lenders. Lenders in Germany may also be more willing to lend based on growth prospects than other countries. Rajan & Zingales (1995) similarly found a negative relationship between growth and leverage. However, Wald (1999) found a positive relationship for Germany and France, the latter of which showed a negative relationship in our sample.
Size only shows significance for Finland, a negative relationship with leverage. An insignificant size variable is not too rare in studies regarding capital structure. The size variable used by Rajan & Zingales (1995) also shows insignificance for France and Italy. Most previous studies expect the variable to be positive. Large firms should be able to reduce transaction costs associated with debt. According to Rajan & Zingales (1995), larger firms are often more diversified and fail less often.

However, size can sometimes be interpreted as a proxy for information that outside investors have, which leads to a preference for equity instead of debt. Wald (1999) explains that larger firms have more diluted ownership and less control over managers. This may lead to managers issuing less debt to decrease the risks of bankruptcy. Rajan & Zingales (1995) found a positive relationship in the U.K. and a negative one in Germany. Wald (1999) similarly found a positive relationship in the U.K. and France and a negative one in Germany.

Uniqueness only showed significance in Germany, a negative relationship with leverage. Titman (1984) argues that according to the stakeholder co-investment theory firms with unique products should have less debt. Specialized labour may result in higher financial distress costs which in turn leads to less debt. Frank & Goyal (2009) found a negative relationship for firms in the U.S.

Our first-stage regression results show the most support for the trade-off theory of capital structure. This is in line with most previous research, most notably Frank & Goyal (2009), who also found their results to show the most consistency with the trade-off theory.

### 8.3 Robustness

As mentioned previously the two-stage least squares regression is not robust for every country. France and Germany showed the most robustness, followed by Sweden and the UK. Finland and Italy show the weakest results in our model diagnostics tests. For Italy and the UK, our instrumental variables are not exogenous. One explanation for this could be that the instruments have an effect on firm profitability in these countries. This is more relevant for the U.K. due to showing significance in the endogenous variable. Due to Italy showing insignificance in our endogenous variable leverage the results of the model diagnostics may be skewed. Meanwhile, the instruments for Sweden and Finland show moderate and high weakness, respectively. This indicates that our instruments show less correlation with the endogenous variable being studied, in our case leverage.
By examining the first-stage regression results we find that for Sweden the non-debt tax shields show insignificance, while tangibility shows significance. This may explain why the instruments are moderately weak. As in Italy’s case, Finland also showed an insignificant endogenous variable, which may have an effect on the model diagnostics.

Why Finland and Italy show insignificance in the endogenous variable leverage is worth exploring. Multicollinearity is often the reason; however not in our case, as presented by table 6. One of the more plausible reasons is that the number of observations which are the lowest and second lowest, respectively, have an effect. The number of predictors may not be suitable for a lower sample size. Due to other countries showing significance this is one of the more likely explanations. Another explanation could be that the countries have major country-specific differences in relation to the other countries studied. However, this is most likely not the case, due to both countries having relatively similar characteristics to the other countries studied. We may have a good model fit but too much noise due to fewer observations. It is worth noting that the $R^2$ in an instrumental variable regression has no meaning and cannot be used as an explaining factor.
9 CONCLUSIONS

This study aimed to research the effect of capital structure determinants on firm performance. Data was sampled from six different countries and we employed a two-stage least squares model to avoid endogeneity issues and to account for reverse causality. The results show that leverage has a significant positive relationship with firm performance for France, Germany, Sweden, and the U.K. Our results show some support for the efficiency-risk hypothesis, a firm with debt is on average more profitable than a firm with no debt. Furthermore, size and growth show a significant positive relationship on firm performance for all countries sampled. Size also showed significant non-linearity for all countries. The results for uniqueness of a firm show a significant negative relationship for firms in Finland, France, Sweden, and the U.K. Firms with unique products seem to be less profitable. Regarding the first-stage regression results, our results show support for the trade-off theory of capital structure.

However, our instrumental variables regression results warrant closer scrutiny. Our model diagnostics show that only the instruments for Germany and France are robust. Sweden and Finland show non-correlation with the residuals but possibly weak instruments and weak instruments, respectively. The regressions result regarding the U.K. show correlation with the residuals but pass the tests of weak instruments. The IV regression for Italy in general shows insignificant results. Further research is required for the countries that showed less robust results.

9.1 Suggestions for future research

For future research, an industry dummy is recommended. Due to our uniqueness variable showing statistical significance further research into the specific industries that produce unique products may be warranted.

A different proxy for profitability could be constructed, similar to Margaritis & Psillaki (2010). For our endogenous variable leverage, a consideration is using different measures, such as only considering short- or long-term debt to see which is more significant for firm performance.

One of the larger problems of our research were the countries with smaller sample sizes. For instance, the number of observations for Finland, Italy, and Sweden was 1,783, 3,388, and 5,315, respectively. The results that showed insignificance were found mostly in these countries. One suggestion is running some sort of multiple imputation to fill in
for missing data. A method similar to Frank & Goyal (2009) could be used to fill in for the missing data points. This may drastically increase the number of observations, depending on which database is used. Increasing the time period to increase the number of observations is also a possibility.

Another suggestion is finding different instrumental variables. Tangibility and non-debt tax shields are traditionally associated with leverage, but for the U.K. and Italy, they showed correlation with the error term. Furthermore, the instruments showed weakness for Finland, Sweden, and Italy. Finding other variables suitable as instruments for leverage is an option. The main problem is finding suitable variables that fulfil both the conditions of being 1) non-correlated with the error term and 2) Non-weak (they have a significant effect on the endogenous variable). However, for the countries with larger samples our instruments generally showed robust results, which could indicate that the instruments are usable for future studies.
REFERENCES


## APPENDIX

### Table 9 Critical Value testing for the IV regression

<table>
<thead>
<tr>
<th></th>
<th>Finland</th>
<th>France</th>
<th>Germany</th>
<th>Italy</th>
<th>Sweden</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kleibergen-Paap rk Wald F-stat</td>
<td>8.465</td>
<td>45.126</td>
<td>47.082</td>
<td>3.410</td>
<td>14.338</td>
<td>72.785</td>
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<tr>
<td>Critical value (TSLS Bias) 10%</td>
<td>15.62</td>
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<td></td>
<td></td>
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</tbody>
</table>