The effect of leverage on financial performance: An analysis of European listed firms

Master Thesis

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Abstract

A crucial decision for business organizations is their capital structure choice. Capital structure is about how a firm finances its business operations, so that it will maximize the total firm value. This research aims to examine the impact of leverage on financial performance for European listed companies for a period of nine years (2009-2017), with the exclusion of financial, service and government-owned companies. The performed analysis is based on ordinary least squares regression analysis. The proxies of financial performance are Tobin's Q, ROA, ROE and RET (stock return) whereas the independent variables are book and market leverage. Previous studies determined; size, tangibility, current ratio and business risk as control variables for researching this topic. The results suggest that there is a negative impact of book and market leverage on all the proxies of financial performance. The impact is the strongest for ROE, thereafter ROA followed by Tobin's Q and the weakest for Stock Return. In line with other researches the results show that the impact of leverage on financial performance is significant negative for ROA, ROE, Tobin's Q and Stock Return. These results indicate that a company's financial performance improves when they operate based on a lower debt to equity ratio. Comparing post financial crisis years 2009-2010 with the years 2011-2017 the results show no severe difference between those samples.

Keywords: Capital structure, Leverage, Financial Performance, Tobin's Q, ROA, return on assets, ROE, return on equity, RET, Stock Return, European and Listed

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1. Introduction

A crucial decision for business organizations is their capital structure choice. Sheikh and Wang (2010) defined that capital structure is about how a firm finances its business operations at optimum cost (the optimal debt to equity ratio) that will maximize the total firm value. In this research capital structure is defined as leverage and can be seen as a ratio. The ratio is noted as debt to total assets ratio, in other words, debt divided by total assets (Margaritis & Psillaki, 2010). This capital structure choice is very important because of the need to maximize a firm's returns to their shareholders. But also because of the impact this choice has on a firm's ability to deal with its competitive environment (Amarjit, Nahum, & Neil, 2011). Schoubben and Van Hulle (2004) state that the decision of a firm's capital structure, is one of the firm's most important corporate finance decisions, because it will also determine whether a firm will survive less fortunate economic shocks. Therefore, a firm's capital structure choice is crucial for its survival and growth. But it also plays an important role in its financial performance in order to achieve it's objectives and long-term goals (Schoubben & Van Hulle, 2004).

A number of theories have been developed to explain a firm's capital structure. Despite the theoretical appeal, researchers in financial management have not been able to find a model that simply explains what a firm's optimal capital structure is. The corporate financing decision is a quite complex process and the existing theories can at best only explain certain facets of the diversity and complexity of these financing choices (Margaritis & Psillaki, 2010).

The first to research a firm's capital structure were Modigliani and Miller (1958). Their theory (hereafter M&M), is considered as the foundation theory for capital structure. They state that in a frictionless world where there are very restrictive assumptions of a perfect capital market, investors homogenous expectations, tax-free economy and no transaction costs, a firm's capital structure choice is irrelevant. This means a firm's value is independent on the way it chooses to finance its activities. But when taxes do exist, firm value can be increased through a change in capital structure, because of the tax advantage that the payment of interest on debt brings (Modigliani & Miller, 1958). In the real world, these assumptions do not hold, the capital structure does matter and will influence firm value.

Kraus and Litzenberger (1973) found evidence for their static trade-off theory. Their theory recognizes the benefits of debt financing because of its tax deductibility. They state that firms have to reach an optimal debt level in their capital structure, which is the trade-off between the costs and benefits of borrowing. The theory of Kraus and Litzenberger (1973) suggests a positive relation between debt and a firms financial performance. Another theory on capital structure is the pecking order theory developed by Meyers and Majluf (1984). This theory does not aim for a optimal capital structure but relates on the fact that firm should have a pecking order in their choice of financing. The theory is based upon the assumption that there

is asymmetry of information internal stakeholders and external providers of finance which causes different costs of financing among the providers of financing. Firms should first use internal financing (retained earnings), thereafter debt financing, and at last equity to finance their activities. The theory suggests a negative relation between leverage ratio and financial performance because more profitable firms have more retained earnings to finance their activities and therefore need less debt in their capital structure. The third theory on the capital structure choice is the market timing theory. The theory states that a firms capital structure is the cumulative outcome of its attempts to time the stock market through issuance and repurchases of stocks. The idea of the market timing theory is that the decision to issue equity depends on market performance, firms will issue equity if they are significantly overpriced. Because these market performance change over time the financing order is dynamic. This means that the market timing theory does not reach for a certain leverage level but that it depends on multiple factors which kind of financing is used. The last theory on capital structure is the agency theory of Jensen and Meckling (1976). The theory is based upon the fact that there exists conflict of interest between shareholders, managers and debt holders. The theory is based upon the assumption that there is a contractual relationship with two contracting parties, the director and the subordinate. The director gives the subordinate decision making authority and expects the subordinate to perform in best interest of the director. Jensen and Meckling (1976) stated that a firms optimal capital structure is the one that helps to minimise the agency costs, helps to let the subordinate act in best interest of the director. The theory states that a high leverage ratio will force the subordinate to invest in profitable projects to repay interest and therefore handle in best interest of the director. This suggests a positive impact of capital structure on financial performance. Contrary the theory also suggests a negative impact of leverage ratio of capital structure because a high amount of debt in the capital structure increases the risk of bankruptcy and causes shareholders to invest sub-optimal. Therefore, it increases the costs of financing which results in lower financial performance.

A lot of research has been done on the relation between capital structure and financial performance. Titman and Wessels (1988) found a negative relation in the United States and Japan. Abor (2005) who researched the impact leverage ratio on firm performance for Ghanaian listed firms between 1998 and 2002 again found a negative impact of leverage on financial performance. Arbabiyan and Safari (2009) found a negative relation between leverage and financial performance researching this relationship for 100 Iranian listed firms for the period 2001 till 2007. Salim and Yadav (2012) also found a negative relationship when researching this relation for a sample of 237 Malaysian listed companies on the Bursa Malaysia Stock exchange during 1995-2011. Tanveer, Aslam and Sajid (2012) researched the link between capital structure and firm performance for the top 100 firms on the Karachi Stock Exchange, for the period 2006-2009 and also found that leverage negatively influences financial performance. Fosu (2013) found in 2013 a positive relation for 257 South African

firms over the period 1998-2009, also Margaritis and Psillaki (2010) found a positive influence of leverage on financial performance for French manufacturing firms. Vătavu (2015) did his research using a sample of 196 Romanian companies listed on the Bucharest Stock Exchange and operating in the manufacturing sector, over a period of eight years 2003-2010 and found a negative impact of leverage on financial performance. Ilyukhin (2015) researched the relation between capital structure and financial performance of Russian joint-stock companies over the period 2004–2013 and found negative impact of leverage on financial performance. Detthamrong, Chancharat and Vithessonthi (2017) found a positive impact of leverage on financial performance researching a sample of 493 non-financial firms in Thailand during the period 2001–2014. At last, Le and Phan (2017) researched non-financial firms listed on the Vietnam stock market for the period 2007-2012 and found a negative impact of leverage on financial performance. Due to the above-mentioned mixed empirical results about the influence of leverage on financial performance, this research will add new knowledge to the relationship between leverage and financial performance, by giving insight in this relationship for European listed firms. For firms, the research will add knowledge to the impact increasing leverage and the consequences it has on the firms financial performance. Therefore, the research question is:

"Does the leverage of European listed firms influence their financial performance?"

This study will be separated into different chapters. Chapter two will examine the underlying theories developed on the capital structure firm value relationship. Chapter three will describe the research methodology for examining the impact of leverage on financial performance. Chapter four describes the data. Chapter five will give an overview of the descriptive statistics, regression results and robustness tests. Last, chapter six will give the conclusion and recommendations on this research followed by the research limitations.

2. Literature Review

This chapter will give an overview of the existing literature that is used to research the relation between leverage and financial performance. The underlying theories will be discussed with its empirical evidence upon which thereafter the hypothesis will be developed.

2.1 Modigliani and Miller theory

The underlying theory for the relation between leverage and financial performance rests on the research of Modigliani and Miller (1958). It was the first breakthrough paper to research the subject of the relation between capital structure and firm performance. They hypothesized that in a perfect capital market, it is irrelevant what capital structure a company chooses to finance its operations. A perfect capital market only exists under the strict assumptions that there are no taxes, no transaction costs (taxes and agency costs), no information asymmetry and that companies and investors can borrow at the same cost. They stated that under these assumptions the market value of a firm is based on the risk of it's underlying assets, its earning power and that its value is independent of how it chooses to distribute its dividends. This results in the following equation (1) for firms in the same financial risk class:

(1) $V_U = V_L$

V_U = Value of an unleveraged firm
V_L = Value of a leveraged firm

First, Modigliani and Miller (1958) thought of a world without taxes. This absence of tax is needed in their theory because when taxes are introduced, the tax deductibility of interest payments will increase the value of a leveraged company. Companies will use the interest payments on debt as a tax shield to lower their taxable income, which leaves the company with greater cash flows. The earnings after interest payments are taxable in the real world, which is one of the most important reasons for a company to use debt financing. Therefore, Modigliani and Miller made a correction to their work in 1963 (Modigliani & Miller, 1963). Because equation (1) only holds in a world without taxes and of course in the real world there are taxes. They now recognize the tax benefits of debt, that issuing bonds reduces a companies tax liability. When taxes exist the value of an levered firm is larger than that of an unleveraged firm in the same financial risk class. The value of the leveraged firm (V_L) is than equal to the value of the unleveraged (V_U) firm plus the tax gain to leverage which is T_C*D in equation (2). These equations shows that tax-deductible debt can increase a firm's value.

(2) $V_L = V_U + Tc * D$

V_U = Value of an unleveraged firm
V_L = Value of a leveraged firm
T_c = Corporate tax rate
D = Amount of Debt

To summarize, in 1958 Modigliani and Miller developed a theory without taxes, which says that a companies leverage doesn't influence a companies value, since it's based on the left-hand side of the balance sheet. In 1963 Modigliani and Miller made a correction on their work. They included taxes in their proposition and said that a company with a larger proportion of debt is more valuable, because of the interest tax shield debt provides (Modigliani & Miller, 1963). This explains why companies will add debt to their capital structure, so they can take advantage of the debt tax shield.

2.1.1 Empirical evidence

Modigliani and Miller (1958) developed the modern theory of capital structure. They pointed out that a firm's value was not influenced by its capital structure. In 1963 Modigliani and Miller discussed the impact tax has on a firm value. They indicated that leveraged firms had higher firm value than firms without debt, due to debt tax shields. Gordon and Chamberlin (1994) (Chang, 2015) found based on the corporate finance literature that market imperfections (such as: tax system, bankruptcy and agency costs) can violate the Modigliani and Miller theory. They showed that these imperfections have a significant impact of leverage on a firm's value. Further support was found by Chang (2015), he stated that in an environment where there is no financial market for lending and borrowing, and a market that does not demand that investors and companies can borrow at the same interest rate, the first theorem can be verified. Furthermore, Bailey (as cited in Mondher, 2011) showed in his research how the Modigliani and Miller theory can be demonstrated when the capital market is perfect. He showed that when an investor duplicates the effects of economic behaviour taken by the corporation, he must be able to lend or borrow at the same conditions as the firm. Bailey (as cited in Mondher, 2011) stated that what really matters isn't that taxes are neutral but that the rate of taxation is the same. Therefore, Bailey (as cited in Mondher, 2011) concluded that the Modigliani and Miller theory does not necessarily have to fail when taxes differ among income source and structure.

In addition to these findings, it is recognized that in a perfect market, financing decisions present an idealized picture of a firm's financing behaviour and that none of Modigliani and Miller's assumptions hold in the reals world (Mondher, 2011). But, the Modigliani and Miller theory contributes fundamentally to nowadays theory on corporate finance. Due relaxing Modigliani and Miller's assumptions this theory provides conditions under which the amount

of debt in a firm's capital structure affects it's market value. The analyses of the Modigliani and Miller hypothesis shows us which market imperfections explain the true relationship between market value and leverage.

2.2 Static trade-off Theory

In 1973 Kraus and Litzenberger developed the static trade-off theory, they described logical reasoning for how a firm's capital structure is formed. Kruas and Litzenberger (1973) agreed with Modigliani and Miller (1958) that in a perfect capital market a firm's market value is irrelevant of its capital structure. But, Kraus and Litzenberger (1973) also state the tax on corporate profits and bankruptcy penalties are market imperfections which are fundamental in the effect of leverage on a companies market value. For instance, the benefit from debt financing because of the tax deductibility of the interest payments on debt, as supported by Modigliani and Miller (1963). This interest payments can be subtracted from the gross profit, which lowers the net profit. This results in lower tax payables and in their turn increases firm value. In a theoretical perspective as can be seen in equation seven, a firm can lend endless amounts of money and increase firm value by doing so. The problem here is that the more debt a company has, the higher its debt obligations are. More debt obligations increases a firm's risk of bankruptcy and financial distress (Kraus & Litzenberger, 1973).

There are two kinds of bankruptcy costs; the direct costs like legal, administrative, liquidation or reorganization costs. Next to that the indirect costs, which are the loss of sales due to the doubt and fear of suppliers and customers (Haugen & Senbet, 1978). To understand, Modigliani and Miller (1958) permitted bankruptcy, but not bankruptcy costs. In other words, when a firm is unable to meet its debt obligations and therefore goes bankrupt, the control and ownership of the firm's assets will transfer costless from the firm's equity holders to its debt holders (Haugen & Senbet, 1978). Proposition two from Modigliani and Miller (1963) suggests that it is always a good thing when a company is attracting more debt, but it is only up to a certain point because of bankruptcy costs. These bankruptcy costs can affect a companies cost of capital significantly. When a company raises debt it also increases its debt obligations, which influences a companies cash flow and earnings. Each company has an optimal capital structure, but when a company increases its debt over the optimal level, the costs become higher because the debt has become riskier to the lender. The more debt a company attracts the higher the risk of bankruptcy is. (Hillier, Grinblatt, & Titman, 2012)

So, with attracting debt, a companies WACC (weighted average cost of capital) will fall, as a company profits from the benefits of tax. But when a company raises so much debt it surpasses its optimal capital structure, the risk of bankruptcy will cause a companies WACC to increase significantly. Therefore, a firm's optimal debt ratio is usually defined as a trade-off between the costs and benefits of borrowing after accounting for market imperfections, while the assets and investments kept constant to maximize firm value (Meyers & Majluf, 1984).

Baxter (1967) and Altman (2002) claim that in the perspective of this theory, issuing equity means moving away from the optimal debt level, which therefore must be considered as bad news. As stated by Myers (1984) firms that adopt this theory can be seen as firms that sett a certain debt-to-value ratio and will try to achieve it. Stated by Kim (1978) the cost of debt is derived from the direct and indirect costs of bankruptcy caused by the increase in financial risk and the financial distress costs. The theory aims to reach an optimal debt level where the marginal tax benefits of debt's tax deductibility are equal to the marginal costs associated with bankruptcy due to leverage (Stiglitz, 1969).

2.2.1 Empirical evidence

Based on the static trade-off theory, firms raise debt to benefit from its tax-deductibility as Modigliani and Miller (1963) found. This suggests a positive relationship between leverage and financial performance. The results of Abor (2005) who researched the relation between leverage ratio and firm performance, also indicate a significantly positive relastionship between short-term and total-debt in relation to return on equity. He carried out a regression analysis to research the impact leverage ratio on firm performance for Ghanaian listed firms between 1998 and 2002. Similar results where documented by Arbabiyan and Safari (2009). Over the period 2001 till 2007 they researched the relation of leverage on firm performance from 100 Iranian publicly listed firms. The results showed that short-term debt and total-debt are veively related to ROE which is used as the proxy variable for firm performance. Contrary to this they also found a negative relation between longterm-debt and ROE. Margaritis and Psillaki (2010) also found support for the positive relations between leverage and firm performance for French manufacturing firms for the period 2001-2005. Even as Fosu (2013) who found in 2013 a positive relation for 257 South African firms over the period 1998-2009. Further support for the positive relation is given by Detthamrong, Chancharat and Vithessonthi (2017). They researched the relation between leverage and firm performance, where firm performance is measured as ROE. Their sample existed out of 493 non-financial firms in Thailand during the period 2001-2014. Finally, Umar, Tanveer, Aslam and Sajid (2012) researched the link between capital structure and firm performance for the top 100 firms for the period 2006-2009 on the Karachi Stock Exchange. They documented a positive link between leverage and firm performance when using current liabilities to total assets as measurement for leverage and earnings per share as measurement for firm performance.

2.3 Pecking order theory

The pecking order theory is developed by Meyers and Majluf (1984). Unlike the trade-off theory, the pecking order theory does not aim to reach an optimal level of leverage. The theory states that firms will not use debt or equity if there are sufficient internal sources. The theory is based upon the assumption of asymmetry of information between internal

stakeholders (owners and managers) and external providers of finance (Berger & Bonaccorsi di Patti, 2005). Based on the fact that insiders posses more information than the outsiders, it allows insiders to take advantage of this by timing its debt and equity issuance. In other words, insiders will issue debt when the company is undervalued and equity if the company is overvalued (Ross, 1977).

The theory suggests that firms should follow the hierarchy of financing in order to reduce information asymmetry between stakeholders. Information asymmetry means that one party has more or better information than the other party. The existence of information asymmetries between finance providers and the firm results in different relative costs of finance, that vary between the different suppliers of finance. Beside information asymmetry, there exists another explanation for the pecking order theory, which is related to transaction costs.

The theory suggests that firms prefer internal financing (retained earnings)over external financing (debt and equity), because internal financing involves less transaction costs (commisions and taxes) and issuing costs (costs associated with the underwriting and issuance of equity or debt securities) than other sources which therefore, makes a firm more profitable (Le & Phan, 2017). When outside funds are needed, firms prefer to use debt over equity. This is caused by the lower information costs associated with debt issues (Meyers & Majluf, 1984). Lower information costs lowers the cost of debt compared to equity issuance and makes a firm more profitable than a firm financed with equity (Le & Phan, 2017). This will be explained using an example, where the provider of funds is an internal source. The firm itself, will have more knowledge about the firm than new equity holders. These new equity holders suppose a higher rate of return on their investments. Because of this, it will be cheaper to use internal funds for the firm's investments than issuing new equity shares. The same argument can be provided for the choice between new debt holders and internal finance (Amarjit, Nahum, & Neil, 2011). Therefore, the information asymmetry between the two types of external financing creates a hierarchy of the costs when using external financing (Tong & Green, 2005). Therefore, the pecking order theory states that companys should use these sources of finance in subsequent order and only move to the next source of finance when the previous is depleted (Murray & Vidhan, 2009).

Because using retained earnings as financing method is easy to access and free of charge, this comes first in the pecking order. Last in the order is equity due its consequence of falling stock price and the large amount of issuance costs. This view is supported by Altinkiliç and Hansen (2000), they show in their research that the cost of issuing equity is five times higher than issuing debt.

All the above-mentioned mechanisms suggest that the pecking order theory claims a negative relationship between leverage and firm performance. This because according to the pecking order theory firms will first use retained earning than debt financing and last issuing equity due to information asymmetry, transaction and issuing costs. The theory assumes that this is the best way to behave. Since, if they issue equity to finance their operations, this will signal to outside investors that the company is lack of capital which results in a fall in stock price. Baker and Martin (2011) found empirical evidence for this relationship. Due to reasoning above firms that are more profitable have more retained earnings and favour internal financing over debt financing (Muritala, 2012). Because firms are more likely to be profitable and generate earnings during boom or normal market conditions the pecking order theory assumes that companys will have a lower debt level before a financial crisis take place. But, during a financial crisis companys become less profitable and will often face liquidity issues and therefore make a company seek to external financing (Cetorelli & Goldberg, 2011). To summarise, the theory assumes a higher level of debt during financial crisis, when the probability is larger that a firm's internal funds are not sufficient. Since more profitable firms need less debt, the pecking order theory suggests a negative relationship between leverage and firm performance.

2.3.1 Empirical evidence

Based on the pecking order theory, companies use the sources of finance in a subsequent order and only move to the next source of finance when the previous is depleted. They start with retained earnings, next debt and last equity issuance. This for the reason that through information asymmetry, transaction and issuance costs retained earnings is the cheapest source of finance, secondly debt issuance and the most expensive way is issuing equity. As stated by Muritala (2012) therefore there is a negative relation between leverage and firm performance, because more profitable companies have more retained earnings and favour internal over debt financing.

Consistent with the pecking order theory is the research of Shyam-Sunder and Myers (1999). They found evidence consistent with the pecking order theory from analysing data from 157 firms on the New York Stock Exchange, covering various industries between 1971 and 1989. But, in 2003 Murray and Goayal did also research to the link between capital structure and firm performance using the exact same method as Shyam-Sunder and Myers in 1999. They also researched companies from the New York Stock Exchange but extended the sample till 1998. Murray and Goyal (2009) found little support for the pecking order theory and argued that the leverage ratio is more closely correlated with financing deficit. Furthermore, they emphasize that the pecking order theory looks more applicable for data till 1990.

The research of Le and Phan (2017) indicated that all debt ratios have a negative relationship to firm performance. They researched non-financial firms listed on the Vietnam stock market

for the period 2007-2012. In their research they used three different kind of firm performance variables ROE, ROA and Tobin's Q. To measure capital structure they used long-term debt, short-term debt, total-debt to book value and market value of total assets as variables. More evidence for the negative relationship was found by Kester (1986) who found a negative association in the United States and Japan. But they were not the only researchers who found this negative relationship between leverage and firm performance. Also Friend and Lang (1988) even as (Titman & Wessels, 1988) found a negative relation in the United States and Japan.

Ilyukhin (2015) researched Russian joint-stock companies over the period 2004-2013. He concluded that the impact of leverage on their performance is negative for Russian joint-stock firms. The same results are for the research of Salim and Yadav (2012) researching 237 Malaysian listed firms for the period 1995-2011 using ROE, ROA and Tobin's Q as measurement for firm performance. Also Vătavu (2015) found a negative relationship researching 196 Romanian companies listed on the Bucharest Stock Exchange and operating in the manufacturing sector. The research period was from 2003 till 2010, using ROE and ROA as proxy variables for firm performance.

Finally, Fama and French (2002) found a negative relationship between a firm's level of leverage and its performance. They tested the trade- off and pecking order theory using a sample of over 3000 firms covering a period from 1965 till 1999. Their results supported the pecking order theory because they found a negative link between the leverage and financial performance of a firm.

2.4 Market timing theory

One theoretical challenge of the pecking order theory is the market timing theory (hereafter MTT), which argues that market timing has a lasting and significant effect on the capital structure of a firm. Hovakimian (2006) stated that the capital structure of a firm is the cumulative outcome of its previous attempts to time the stock market through both the issuance and repurchases or retirements.

The pecking order theory relies on the assumption of a semi-strong market efficiency, The MTT does not rely on such an assumption. MTT emerged from the fact that a firm's financial settings change over time and through the fact that market inefficiencies can have essential implications for corporate finance as stated by Rakha et al., (2018). The idea of the market timing theory is that the decision to issue equity depends on market performance (Lucas & McDonald, 1990). Lucas and McDonald (1990) found that companys that issue equity, on average have positive abnormal returns preceding the issue. This implies that all firms will try to time the equity market.

Choe, Masulis and Nanda (1993) found based on their analysis that firms sell seasoned equity offerings when they face lower adverse selection costs. This suggests that firms will try to time the equity market in the period with better opportunities and less uncertainty about a companies assets. This is further supported by Myers (1984) who also suggested that managers will be adverse of issuing equity if they think the equity is undervalued in the market. This results in the fact that investors perceive this as the fact that equity issues only occur if the equity is fairly priced or overvalued.

As stated by Rakha et al., (2018) these findings suggest that the adverse selection varies over time. Loughran and Ritter (1995) found evidence for the fact that a firm will face a decline in performance, in the long run, after stock issuance. This confirms the hypothesis that companies will exploit the temporary opportunity by issuing shares when they are significantly overpriced (Loughran & Ritter, 1995). Baker and Wurgler (2002) found evidence for this market timing behaviour and state that it has large and permanent effects on a firm's capital structure and argue that a firm's capital structure is just a cumulative outcome of attempts to time the stock market.

To summarise, the MTT hypothesizes that because of the fact that information asymmetry and adverse selection change over time, the financing order is dynamic, which is contrary to the pecking order theory. This means that the MTT does not reach for a certain level of leverage, but that it depends on multiple factors which kind of financing a firm will use, which makes a firms capital structure dynamic.

2.4.1 Empirical evidence

There is support of empirical evidence for the prediction that share price performance is important for equity issue decisions (Rajan & Zingales, 1995) and (Baker & Wurgler, 2002). There is mixed evidence regarding the fact investors are willing to overpay for shares or not. Baker and Wurgler (2002) argue that investors can be over optimistic during new issues, because the analysts forecast are inadequately high and because the fact that the firms managers will manipulate the firms earnings before going public. This will result in investors overpaying for the firms shares. Other research argues in favour of the efficient market version of the MTT. Schultz (2003) suggests that the market timing is not based on good market performance compared to a companys predicted performance, but it is based on market performance prior to securities issue.

Baker and Wurgler (2002) also found that low-leveraged firms are those that raised funds when their market to book value was high and that high-leveraged firms raised funds when their market to book value was low. Ati (2006) confirms that market timing behaviour exists. He shows in his research that hot-market IPOs firms issue substantially more equity and have compared to cold-market firms lower leverage ratios. Bie and Haan (2007) found further

support for the existence of market timing behaviour. They found in their research of Dutch firms that stock price run-ups results in lower leverage ratios and will increase the firms profitability due issuing equity over debt.

Kayhan and Titman (2007) state that a firm's history strongly affects its capital structure because financial deficits and stock price changes affect a firm's capital structure changes. The research of Gaud, Hoesli and Bender (2007) supports the equity market timing approach, they found evidence that firms will take advantage of favourable market conditions. Huang and Ritter (2009) found that when the relative cost of equity is low, firms will fund a larger portion of their financing deficit with equity.

The empirical evidence mostly supports the market timing theory in that managers will wait for favourable market conditions when issuing equity, they will sell equity when investors have attitude optimism and high enthusiasm. But also that managers will window-dress to improve their performance before stock issuance. Therefore, the market timing theory doesn't give a direction of capital structure and says there is no optimal capital structure (Baker & Wurgler, 2002). But therefore, says it depends on internal (i.e. financial deficits) and external (i.e. market valuations) market conditions, if a firm chooses to issue equity or debt to finance its activities.

2.5 Agency Theory

The agency theory is developed by (Jensen & Meckling, 1976) and is based upon the fact that there exist conflicts of interest between shareholders (principals) and managers (agents) and debt holders. The agency theory assumes hhere is a contractual relationship with two contracting parties. One party is the principal, supervisor, director and the other party is the agent thus subordinate. The principal will give the agents decision-making authority and expects the agents to perform actions in best interest of the principal as a reward.

As stated by Jensen and Meckling (1976) the optimal capital structure in view of the agency theory is the one that helps to minimise the total agency costs. Jensen and Meckling (1976) stated that there are two kinds of agency costs. The agency cost of equity, which is a result of the conflict of interest between shareholders and managers and the agency cost of debt which is the result of the conflict of interest between debt and shareholders. The conflict between managers and shareholders is caused by the fact that managers will place personal interests above maximising the shareholders and firms returns. With excess free cash flow managers have the opportunity to invest in projects for personal goals even if they are not profitable. Amihud and Lev (1981) state that managers have the incentive to use strategies that reduce their employment risk. But also will they try to increase firm size which results in greater compensation for the managers (Baker, Jensen, & Murphy, 1988). This can result in the fact

that managers will adopt non profitable investments, even though this is likely to result in losses for shareholders.

Jensen (1986) argued that when companys have high debt in their capital structures, this will force managers to invest in profitable projects to create a stream of cash flow to repay their interest. If they invest free cash flow in unprofitable projects the probability that the debt repayments will be met decreases, which can result in bankruptcy. When this happens the debt-holders will get claim over the firms assets. This results in managers losing their decision rights and probably their job. So, the increase of debt prevents managers from engagement in wasteful actions and aiming to utilize assets efficiently which increases firm value (Jensen, 1986). Therefore, debt can reduce the agency costs of the conflict between managers and shareholders, which has a positive effect on firm value (Myers, 1977).

Contrary to the positive effect of debt on the managers-shareholders conflict it increases the debt-shareholder conflict as stated by Myers (1977). Milton and Raviv (1991) state that this conflict arises because shareholders will not invest optimal due to the high amount of debt in the capital structure or it will cause the creditors and the firm to bear the costs of avoiding this suboptimal investment strategy (Myers, 1977). In addition Myers (1977) add to this that when there is a high amount of debt in the capital structure debt holders require a higher rate of return on their debt to compensate for underinvestment of the higher risk of bankruptcy. From this point of view a high amount of debt in the capital structure has a negative effect on firm value.

2.5.1 Empirical evidence

The agency theory has theoreticly two contradicting outcomes for the relation between leverage and firm performance. On one hand, it has a positive effect on firm value because a higher amount of debt in the capital structure mitigates the manager-shareholder agency problem because more debt reduces excess free cash flow. A lower amount of free cash flow will force managers to invest in profitable projects to create cash flow for repaying their interest, which increases firm value. On the other hand a higher amount of debt in the firms capital structure will cause that managers will not invest optimal. But also that debt holders will demand a higher rate of return on the debt because more debt increases the firms probability on bankruptcy, which causes a negative effect on a firm's value.

Empirical evidence will show which theory is right about the agency theory for the relation between capital structure and firm performance. Onaolapo and Kajola (2010) found in their research of 30 non-financial listed firms that a high amount of debt in a firm's capital structure has a significant negative effect on a firm's ROA and ROE. Simon-Oke and Afolabi (2011) also found a negative relation in between a high amount of debt in the capital structure and a firm's performance, where they used debt financing as proxy variable for leverage and profit

efficiency as proxy for financial performance. Pratheepkanth (2011) did research on Sri Lanka's listed firms for the relation between capital structure and firm performance. In their research debt was the proxy variable for capital structure and ROCE (return on capital employment) and ROA (return on assets) as proxy for financial performance. They found that an increase in debt weakens a firm's performance, so a negative relationship between capital structure and firm performance.

Contrary to the literature above (Berger & Bonaccorsi di Patti, 2005) found that firms with a higher debt ratio have a higher profit efficiency which is used as proxy for firm performance. They argue that using more debt reduces the agency conflict of shareholders and managers. This by encouraging managers to act more in favour of the firms shareholders, which increases the firms value. Abor (2005) adds to this by his research of firms listed on the Ghana Stock Exchange. He found a significant positive effect between short-term debt to total assets and total debt to total assets in relations to return on equity. At last Gill, Biger and Mathur (2011) found a significant positive relation between capital structure measured by short-term debt to total assets, total debt to total assets and longterm-debt to total assets in relation to firm performance.

The literature above showed evidence for a negative and positive relationship between a high amount of debt in a firm's capital structure and its financial performance. This suggests that the agency theory can give no clear direction for the relation between leverage and financial performance. It can be used for an argument for a negative relationship as well as positive relationship between a high level of debt in the capital structure and a firm's financial performance. Therefore, in perspective of the agency theory there is no clear relation between debt and financial performance.

2.6 Development of Hypotheses

This study investigates the relation between financial leverage and firm performance for European listed firms. The hypotheses will be developed based on the research question: *"Does the leverage of European listed firms influence their financial performance?"* and the underlying theory. There are four theories that are fundamental for this research, the trade-off theory which suggest a positive relation between leverage and firm performance. Contrary to the trade-off theory, the pecking order theory which suggest a negative relationship between leverage and financial performance. And last there are the agency theory and the market timing theory that both give no clear direction of the relation between leverage and financial performance.

The trade-off theory developed by Kuard and Litzenberger (1973) suggests that firms trade-off the benefits and costs of debt and equity to find an optimal debt level. Due to the tax benefit of debt, firms try to finance as much as possible with debt. But debt financing also has

a down side, bankruptcy costs. The more a company finances with debt, the greater the risk of bankruptcy and financial distress is. When a company surpasses its optimal debt level, this will cause a companies cost of debt to rise significantly. Therefore, the trade-off theory states that companies have to try to reach an optimal level, with as much debt as possible to maximize firm value. Various researches have supported this fact that a higher amount of debt in the capital structure, a higher leverage ratio, results in higher firm performance, as can be read in paragraph 2.3.

Contrary, there is the pecking order theory. This theory suggests that a lower amount of debt in the capital structure, a lower leverage ratio, results in higher firm performance. This theory is developed by Meyers and Majluf (1984) and states that firms use their sources of finance in a subsequent order and only move to the next source of finance when the previous is depleted. To finance their investments firms will first use retained earnings, thereafter debt and at last equity. The theory assumes that this is the best way to behave. Since, if a company issues equity to finance their operations, this will signal to outside investors that the company lacks capital, which results in a fall in stock price. Baker and Martin (2011) found empirical evidence for this relationship. Due to reasoning above firms that are more profitable have more retained earnings and favour internal financing over debt financing (Muritala, 2012). Because firms are more likely to be profitable and generate earnings during boom or normal market conditions the pecking order theory assumes that companys will have a lower debt level before a financial crisis take place. But, during a financial crisis companys become less profitable and will often face liquidity issues and therefore make a company seek to external financing (Cetorelli & Goldberg, 2011). To summit, the theory assumes a higher level of debt during financial crisis, when the probability is larger that a firm's internal funds are not sufficient. Since more profitable firms need less debt, the pecking order theory suggests a negative relationship between leverage and firm performance. Since a lot of researches have found support, this negative link between leverage and financial performance and because the good argumentation of Meyers and Majluf (1984) there is also a good reasoning to expect a negative relationship between leverage and financial performance.

The market timing theory emerged from the fact that a firm's financial settings change over time and through the fact that market inefficiencies can have essential implications for corporate finance. The idea of the market timing theory is that the decision to issue equity depends on market performance and that these market performance change over time. Firms will attract the cheapest kind of financing based on current market conditions. Therefore, the market timing theory hypothesizes that because information asymmetry and adverse selection change over time, the financing order is dynamic, which is contrary to the pecking order theory. This means that the market timing theory does not reach for a certain level of leverage, but that the leverage ratio depends on multiple factors like marketperformance, adverse selection costs and stock price.

The agency theory is based upon the fact that there exist a conflict of interest between shareholders and managers and between shareholders and debt holders. The conflict between managers and shareholders is caused by the fact that managers will place personal interests above maximising the shareholders and firms returns. The agency theory suggests that when companys have a higher amount of debt in the capital structure, this mitigates this problem. When a company has a high amount of debt in its capital structure, investing in unprofitable projects will increase the firms probability of bankruptcy. The debt-holders will get a claim over the firms assets, which results in managers losing their decision rights and their job. So a higher amount of debt in the capital structure will force to utilize assets efficiently which increases firm value. Contrary to this positive effect that a high amount of debt in the capital structure mitigates the conflict of interest between shareholders and managers and shareholder and debt holders, there is also a negative effect. A high amount of debt can cause managers to induce a suboptimal investment strategy which reduces the firms market value (Myers, 1977). It can also reduce a firm's market value by the fact that creditors and the firm have to bear the costs of avoiding such suboptimal investment strategy (Myers, 1977). Myers (1977) also state that a high amount of debt in the capital structure will cause debt holders to demand a higher rate of return on their investments to compensate for underinvestment and the higher risk of bankruptcy. So, the agency theory supports a positive impact of leverage on performance as well as a negative impact of leverage on performance.

The static trade-off theory, pecking order theory, market timing theory and agency theory gives support for an expected negative as well as a positive impact of leverage on financial performance. I expect the impact of leverage of financial performance to be negative based on the pecking order theory. Because, following the pecking order theory, more profitable firms have more retained earnings to finance their investments and therefore need less debt financing. As can be read in paragraph 2.6 this negative impact was found in a lot of previous studies from countries all over the world, for example Titman and Wessels (1988) and Margaritis and Psillaki (2010) . Therefore, I develop the following hypothesis:

Hypothesis 1: *"Leverage has a negative impact on financial performance"*

The worlds 2007-2008 global financial crisis brings important challenges for the managers of (listed) firms. Because profits decrease, investment outcomes are unclear and it is harder to obtain credits to fund attractive investment opportunities (Campello, Graham, & Harvey, 2010). This might have an effect on the capital structure of a firm. As argued by Cook and Tang (2010), through the global financial crisis a firm's ability to raise equity or debt to adjust their capital structure has been substantially hampered. And therefore, it was difficult or even impossible for European listed firms to change their capital structure significantly. According to the IMF (2014) lending conditions have been strongly tightened since 2007, i.e. a firm's access to the debt market decreased. Therefore, a firm depends more on its internal financing

sources. This results in a more stringent financing hierarchy during the crisis period. In line with the pecking order theory I expect that firms with a high leverage ratio, so rely more on debt, will face higher transaction and issuance costs due to higher risk of bankruptcy than the more profitable firms that rely more retained earnings. I expect that the negative effect of leverage ratio on financial performance is even stronger during the post crisis period due to fact that it is even harder to adjust leverage ratio in this period, to lower the risk of going bankrupt and increase financial performance. Therefore, I developed the following hypothesis:

Hypothesis 2: *"The negative relationship between leverage and financial performance is stronger during the post crisis period years 2009-2010"*

3. Methodology

3.1 Research method

The goal of this thesis is to gain knowledge about the relation between leverage and financial performance of European listed firms. In this part, the appropriate research method will be discussed for this research. Table 1 shows an overview of the variables.

Hair, Black, Babin and Anderson (2010) showed that regression analysis is the most used method to measure dependency. A regression analysis uses independent variables to measure a dependent variable. A simple regression analysis of causes consists out of one independent variable and one dependent variable. Whereas a multiple regression of causes consists out of two or more independent variables to measure the dependent variable. There are three different often used regression analyse methods; linear, logistic and probit regression. A linear regression is used when the dependent variable is continuous, what means that the number of values is infinite. A logistic regression is used when there is a categorical dependent variable, what means that the number of possible values or categoreis is fixed. For example, you can choose out of five answers like: very bad, bad, moderate, good and very good. The probit regression is used when there is a dicthomous dependent variable, what means the dependent variable can only take two values like “yes” or “no”. The use of probit and logistic regression can be distinguished by the fact that the dependent variable is dichotomous (two answers possible), which means a probit regression, or multichomous (more answers possible) which means a logistic regression. A probit regression has the form of y = f (α+βx) and is used to estimate the chance that an observation will meet the requirements of one of the two categories. The linear regression model is appropriate when there is a metric dependent variable which can have infinite values and takes the form of y = α+β*x+ε.

Looking across different studies who researched the impact of capital structure on financial performance, they all used the same research method. All comparable studies used a ordinary least squares multiple regression to examine the impact of capital structure on financial performance . Margaritis and Psillaki (2010) researched the impact of leverage on financial performance. They measured financial performance as firm efficiency and leverage as the book value of the total debt divided by the book value of the total assets. To research this subject they used an ordinary least squares (OLS) multiple regression model. Berger and Bouwman (2013) researched the impact of capital structure on bank performance. They measure bank performance as the percentage change in market share and leverage as equity to gross total assets. To research this impact they used an OLS multiple linear regression. Detthamrong, Chancharat and Vithessonthi (2017) researched the impact of leverage on ROE using a OLS multiple regression model. A OLS multiple regression model takes the form of:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k + \epsilon$$

This regression model has more than one predictor variable which allows to examine the impact of more than one predictor variable on the dependent variable. This model works by the principles of least squares, it minimizes the sum of the squared differerences between the observed and predicted values of the dependent variable (Hair, Anderson, Tatham, Black, & W., 2010). This method will closely fit a function with the data, also called "the best line of fit" (Hair et al., 2010). Hair et al., (2010) also mentioned that this is an appropriate research method when there is a metric dependent variable. In this research there are four different metric dependent variables; ROA, ROE, Tobin's Q and Stock Return. Therefore, an OLS regression will be an appropriate research method. The advantage of an OLS multiple regression model is its ability to determine the influence of one or more predictor variables on the dependent variable. Another advantage is that it a simple and straightforward dependence technique and provides both prediction and explanation. (Hair & Black, 2013)

Fosu (2013) researched the impact of leverage on ROA using a OLS multiple regression model with fixed effects. A fixed effects model is a statistical model in which the model parameters are fixed or non-random quantities, the variables do not change over time or at a constant rate. A fixed effects model is appropriate when you are only interested in analysing the impact of variables that change over time. In a fixed effects model, radom variables are treated as though they are fixed, or non-random. Fixed effects in a regression will hold a variable constant when you expect this to influence the outcome of your analysis. The disadvantage of fixed effects models is that they can't control for variables that change over time. Shehata, Salhin and El-Helaly (2017) mentioned that a fixed effects (FE) model is not suitable to estimate time-invariant variables. This is because a FE model does not deal with between variance for the estimation (Hsiao, 2003). Also, is possible to condition a large number of constants out of a model (Greene, 2004).

An ordinary least squares (OLS) regression will be used in this research, as it is the most pronounced method in existing literature on the influence of leverage on firm's financial performance. As stated by Hair et al., (2010) OLS is an appropriate research method when there is a metric dependent variable, in this research ROA, ROE, Tobin's Q and Stock Return are the metric dependent variables. To remain consistent with previous studies the regression model that will be used in this research will be similar to that of the previous researches. Therefore, the following OLS multiple linear regression model is developed:

$$FP_{i,t} = \alpha_0 + \alpha_1 LEV_{i,t-1} + \alpha_2 Z_{1i,t} + u_{i,t}$$

$FP_{i,t}$ = *Financial performance for firm i in year t;*
$LEV_{i,t-1}$ = *Leverage for firm I in year t;*
$Z_{1i,t}$ = *Control variables*
$U_{i,t}$ = *Firm-specific errors.*

Where FP represents financial performance, LEV leverage ratio, Z_1 are the control variables and u is the stochastic error term. Beneath the regression will be explained, where i stands for a firm and t for a certain time. In short you can read this as for firm i in year t.

Endogeneity Problem

When researching the effect of leverage on financial performance its important to address the endogeneity problem. Endogeneity refers to the situation where the explanatory variable is correlated with the error term (Wooldridge, Introductory Econometrics: A Modern Approach, 2009). The possibility exists that firms that perform good have higher leverage, because firms with good financial performance are less risky and are able to attract debt at lower cost than firms that perform bad. This problem is called reverse causality. As stated by Berger and Bonaccorsi di Patti (2005) a firm's financial performance may od affect a firm's capital structure choice. Firms with higher returns, so better financial performance on a given capital structure, can use their returns as a buffer against portfolio risk and are therefore in a better position to substitute equity for debt in their capital structure (Berger & Bonaccorsi di Patti, 2005). As explained by Margaritis and Psillaki (2010), firms with better financial performance choose higher leverage ratio's, because better financial performance are expected to lower the costs of financial distress and bankruptcy.

Barnett and Salomon (2012) dealt with this endogeneity problem using their independent variable "leverage" as a lagged. Berger and Bouwman (2013) also wanted to mitigate their endogeneity problem for the capital structure firm performance relationship. They also used their independent variable "capital structure" as a lagged variable to deal with their endogeneity problem. Also Aebi, Sabato and Schmid (2012) used a lagged independent variable to mitigate their endogeneitye problem. Another way to control for endogeneity is by using a two stage least squares regression (2SLS). Low et al. (2015) uses instrumental variables (variables used to account for unexpected behaviour between variables) in a 2SLS regression to control for endogeneity. In the first stage a new variable is created using an instrumental variable, in the second stage the model-estimated values from stage one is used in place of the actual values of the problematic predictor variables.

Because of this endogeneity issues, a simple OLS regression of the impact of leverage on financial performance results in biased estimates. To control for this endogeneity problem leverage will be one year lagged in the regression model, since this is the most pronounced way to deal with the endogeneity problem.

3.2 Variables

3.2.1 Dependent variable

Financial Performance (FP) is measured in four different ways. The first two are accounting-based measurement methods, Return on Assets (ROA) and Return on Equity (ROE). ROA is measured as operating income divided by the firms total assets (Benouri et al., 2018; Liu, Miletkov, Wei, and Yang, 2015; King and Santor, 2008; Barnett and Salomon, 2012) . ROE is measured as net income to shareholders equity (Benouri et al., 2018; Aebi et al., 2012; Peng and Yang, 2014). As stated by Ahamed (2014) these are the two most commonly used measurement methods for financial performance. Both ROE and ROA are ways to measure a firm's profitability as stated by Berger and Bouwman (2013). Vātavu (2015) mentioned that ROA and ROE refer to how much profit a firm earns based on their asset investments and how effectively managers use investors funds. But, Ahamed (2014) also mentioned some disadvantages of accounting-based measurement methods. He states that these methods are sensitive for manipulation for short-term earnings activities and are based on historical information. Ahamed (2014) calls this backward looking measurement methods.

Therefore, a hybrid measurement will be included, which uses a capital market-based measurement, the market value of the common shares and an accounting based measurement, the book value of total assets (Duffhues & Kabir, 2008). This measurement is developed by James Tobin hypothesized that the market value of a physical asset on the stock market should be about equal to its replacement value (Tobin & Brainard, 1977). The advantage of Tobin's Q is that it reflects not only a firm's tangible assets but also its intangible assets like; brand image, trust, loyalty, reputation and intellectual capital (Jiao, 2010). Tobin's Q will be used as by Bennouri et al., (2018) and Huang, Li, Meschke & Guthrie (2015), which is measured as the stock market capitalization as ratio of the total assets. A hybrid measurement method like Tobin's Q is more forward looking and also reflects the firms market value as stated by Ahamed (2014). According to Inoue and Lee (2011) who call Tobin's Q a market-based measurement, Tobin's Q is the most commonly used market-based measurement method. It is used by King and Santor, (2008), Bennouri et al., (2018) and Hauser, (2018) to measure financial performance. Hillier et al., (2012) states that when Tobin's Q is lower than 1 a company is overvalued. This means the replacement costs of the assets of the firm are lower than the market value of the firms stocks. When the Tobin's Q of a firm is higher than 1 it means that the replacement value of a firm's recorded assets is higher than the market value of it's stocks. A high Tobin's Q (greater than 1) propose that the firms market value represents some unrecorded assets of the firm.

The last way, a less common way, to measure a firm's financial performance will be through a firm's stock returns (RET). There are two main ways to ways to measure a firm's stock return, stock return volatility and stock return. Stock return volatility was used by Hertzel and Officer (2012) and de Haan and Poghosyan (2012) they measured stock return volatility as standard

deviation of the raw returns to the firm's common stock. Nelling and Webb (2009) and Harjoto, Laksmana and Lee (2015) stock return to measure a firm's profitability. Stock return will be measured following Nelling and Webb (2009) and Harjoto, Laksmana and Lee (2015) as ((the stock price of the end of the year – the stock price at the start + dividend)/ by the stock price at the beginning of the year). This research will calculate stock return following Nelling and Webb (2009), Harjoto, Laksmana and Lee (2015) and Duchin, Matsusaka and Ozbas (2010).

3.2.2 Independent variable

Leverage (LEV) as stated by Hillier et al., (2008), relates to long-term solvency ratios which addresses the firms ability to meet its obligations in the long run. Leverage is basically a ratio that shows the proportion of debt in the capital structure. Margaritis and Psillaki (2010) and King and Santor (2008) measured leverage as the book value of the total debt divided by the book value of the total assets, which is a book leverage ratio. Some researchers used other ways to measure a firm's leverage ratio. For instance, de Jong, Kabir and Nguyen (2008) calculated leverage as the book value of the long-term debt over the market value of the firms total assets (measured as the book value of the total assets minus the book value of the total equity plus the market value of the equity), which is market leverage ratio. de Jong et al., (2008) stated that short-term debt consists largely out of trade credit which is under the influence of completely different determinants compared to long-term debt and that the examination of short-term debt is likely to generate results which are difficult to interpret. Therefore, no leverage ratio with short-term debt will be used. Baker and Wurgler (2002) have a different approach, they measure leverage as the book value of the assets – book value of the equity / book value of the total assets. Welck (2011) used a market-based value of leverage which is calculated as (short-term debt + long-term debt) / (short-term debt + long-term debt + (stock price × common shares outstanding)). Welck (2011) also included a leverage ratio based on book value, which is in line with Margaritis and Psillaki (2010) and King and Santor (2008) and measured as the book value of the total debt divided by the book value of the total assets.

Leverage will be measured in two ways, a book and a market-based leverage ratio. Because book leverage is the most way pronounced in the literature. And market leverage as stated by Santos, Moreira and Vieira (2014) gives a more realistic measure of leverage, because it is closer to the firm's intrinsic value. The book leverage will be calculated in this research in line with the research of Margaritis and Psillaki (2010) and King and Santor (2008) and Welck (2011) and will be defined as the book value of the total debt divided by the book value of the total assets. The market leverage will be calculated in line with de Jong et al., (2008) as the book value of the long-term debt over the market value of the firms total assets (measured as the book value of the total assets minus the book value of the total equity plus the market value of the equity).

3.2.3 Control variables

Control variables can have a systematic impact on the independent and dependent variable. By including them as control variables, the influence of these variables on financial performance can become visible (Barnett & Salomon, 2012; Bennouri, Chtioui, Nagati, & Nekhili, 2018; Berger & Bonaccorsi di Patti, 2005).

1. Firm Size (SIZE) will be measured by the natural logarithm of the firms sales as in the regression model of Margaritis and Psillaki (2010). Also de Jong et al., (2008) and Ramli et al., (2018) measured firm size as the natural logarithm of total sales. This way will be used because it is the most pronounced way to measure firm size in the existing literature. Another way to measure firm size could be the natural logarithm of total assets as used by Bennouri et al., (2018) and Fosu (2013). The third way to measure firm size is the natural logarithm of the firms market value of equity as used by Duchin, Matsusaka and Ozbas (2010). The last way found was used by Hauser (2018) he measures firm size as the book value of the total assets. But this research will use the natural logarithm of the firms total sales. Chung et al., (2018) state that the trade-off theory implies that larger firms are less risky because of their greater diversification. Harris and Raviv (1991) stated that large firms attract more debt because they tend to be more diversified but also because large firms have greater access to the debt market. Amit and Livnat (1988) provided evidence for the fact that diversified firms, due to reduced operating risk, can support increased financial leverage, the opposite holds for smaller firms (Titman & Wessels, 1988). The positive relationship between size and leverage is supported by the literature of Titman and Wessels (1988) and Rajan & Zingales (1995). But Rajan & Zingales (1995) also recognize a negative relationship and that this is caused by the fact that large firms suffer less from information asymmetry which lowers the cost of capital. Therefore, these firms are able to issue more information sensitive securities like equity which lowers the leverage ratio. Previous literature state that firm size has a significant influence on leverage, but it is not clear if it has a positive or negative effect due to the mixed results.

2. Tangibility (TANG) is measured according to (Devereux, Giorgia and Xing, 2018; Margaritis and Psillaki, 2010; Hertzel and Officer, 2012; Deesomsak, Paudyal and Pescetto, 2004; Nga Cao 2015) as fixed assets divided by total assets. This method is used since it's the most pronounced way found in the existing literature. Two other ways to measure tangibility where found. De Jong et al., (2008) measured tangibility as the ratio of net fixed tangible assets divided by the book value of the total assets of the firm. The third way to measure tangibility is used by Fosu (2013), he measured tangibility as the ratio of tangible assets to total assets. As stated by Mackie-Mason (1990) who also used tangibility in their research, firms with a high fraction of tangible assets in their total asset structure are more likely to choose debt financing which eventually influences firm performance. This because more tangible assets correlates with lower distress costs as stated by Chung, Liu and Wang (2018). According to

Ramli et al., 2018 this will eventually result in higher firm financial performance. Finally Akintoye (2008) also states that companys with a high level of investments in tangible assets, results in lower costs of financial distress compared to firms have a high level of investments in intangible assets. Following the static trade-off theory from Kuard and Litzenberger (1973)(paragraph 2.2), lower costs of financial distress will grant a company with the capability of attracting more debt. As stated by Mackie-Mason (1990) more debt eventually increases financial performance.

3. Current Ratio (CURR) is calculated as the ratio of current assets divided by the current liabilities (Detthamrong, Chancharat and Vithessonthi, 2017; Ramli et al., 2018; Wang and Sarkis, 2017). The purpose of this ratio is to measure to which extent a firm has sufficient liquid assets to pay their short-term debt obligations. Firms with sufficient cash, and therefore a higher current ratio are better prepared to absorb liquidity shocks (Detthamrong et al., 2017). As stated by Ramli, Latan and Solovida (2018) a higher current ratio indicates better performance and therefore it will be better able to face any short and long-term financial problems and that the opposite holds for weak firms with a lower current ratio. Therefore, Ramli et al., (2018) mention that firms with greater liquidity, so higher current ratio, will increase firm leverage.

4. Business Risk (BRISK) is defined accordant to Ramli et al., (2018), they defined business risk as the absolute difference between the annual percentage difference in earnings before interest and tax (EBIT) and the average of this change in EBIT over the sample period. The same way to measure business risk is used by Deesomsak, Paudyal and Pescetto (2004), they defined business risk as earnings volatility which is calculated similar to the research of Ramli et al., (2018). However, de Jong et al., (2008) used a different method to calculate business risk. They calculated business risk as the standard deviation of operating income over the book value of total assets. Another measurement was used Wald (1999), he measures business risk as the variance in earnings to total assets. Since the two studies used the same measurement method, the method of Ramli et al., (2018) and Paudyal and Pescetto (2004) will be used to calculate business risk. As stated by Ramli et al., (2018) business risk is negatively related to debt, which means that higher business risk results in lower debt levels. This negative relationship is in line with the trade off theory, because of the fact that a risky firm will attract less debt (Wald, 1999). The theory assumes that a firm with higher bankruptcy and financial distress risk will not be able to fulfill its debt commitments. Ramli et al., (2018) also suggests that based on the asymmetric information theory, which states that one party has better information than the other party, that a less profitable firm with lower growth which is therefore is more risky, will suffer more from information asymmetry than a more profitable firm. As stated by Ramli et al., (2018), therefore there is a negative relationship between earnings volatility (business risk) and leverage, so higher business risk means lower leverage.

Deesomsak et al., (2004) also expected a negative impact of business risk on financial performance but they found no significant results.

5. Industry (INDUS) There will be controlled for industry differences. Tong, Alessandri, Reuer and Chintakananda (2008) show in their research that the variation in the value of growth options is driven by industry effects. Also Islam and Khandaker (2015) state that industry does matter for firms making leverage decisions. To control for industry differences the firms are grouped following the standard industrial classification code (SIC CODE). The first two digits of the code will be used to divide the companies into different industries, the first 2-digits of the SIC code ranges from 01 till 99 where 01 to 09 is classified as "Agriculture, Forestry and Fishing", 10 to 14 as "Mining", 15 to 17 as "Construction", 20 to 39 as "Manufacturing", 40 to 49 as "Transportation and Public Utilities", 50 to 51 as "Wholesale Trade", 52 to 59 as "Retail Trade", 60 to 67 as "Finance, Insurance, And Real Estate", 70 to 89 as "Services" and 91 to 99 as "Public administration. The distribution of the firms among the industries can be seen in figure 1.

6. Year Effects (YEAR) At last, a dummy variable will be created to control for year effects. As stated by Lee, Lee, Zeng, and Hsu (2017) the leverage decision of financial institutions can be positively or negatively influenced by long-term / short-term economic policy uncertainty. This will cause a company to reserve more or less funds to deal with this uncertainties, which influences a firm's capital structure (Lee et al., 2017). Leary and Roberts (2014) found similar results for non-financial companies. Because these economic conditions change over time which can influence a firm's capital structure there will be controlled for year effects.

7. Country effects (COUNT) As stated by Tong et al., (2008) country differences is also responsible for the variation in the value of growth options which therefore can influence leverage. As stated by Graham and Harvey (2001) when firms issue debt or equity they will take their target leverage into consideration. But, due to market frictions like intermediation costs, issuance costs or uncertainty, firms may deviate from their target leverage (Hovakimian, Opler, & Titman, 2001). These unpredictable political and economical factors can create uncertainty which disrupts a companys planned activities which causes slower adjustment speed for leverage. These political and economical conditions vary between countries and therefore there will be controlled for country differences. For instance the average GDP is eight times higher in west European countries, the inflation rate is four times higher in east European countries and unemployment rate is three times higher in eastern europe[1]. Country effects will be used to test for robustness and see if there is difference among the countries in the sample.

[1] http://www.nationmaster.com/country-info/compare/Eastern-Europe/Western-Europe/Economy

Table 1: Definitions of variables

Dependent variables	Definition	Source
Return on Assets	Operating income / total assets	(Benouri et al., 2018; Liu, Miletkov, Wei, and Yang, 2015; King and Santor, 2008; Barnett and Salomon, 2012)
Return on Equity	Net income / shareholder equity	(Benouri et al., 2018; Aebi et al., 2012; Peng and Yang, 2014)
Tobin's Q	(Stock market capitalization + book value of liabilities) / total assets	(Bennouri, Chtioui, Nagati, & Nekhili, 2018)
Stock Return	((Stock price of the end of the year – the stock price at the start + dividend) / (by the stock price at the beginning of the year)) - industry average stock return	(Nelling and Webb, 2009; Harjoto, Laksmana and Lee, 2015; Duchin, Matsusaka and Ozbas, 2010)
Independent variable	Definition	Source
Book Leverage	(Book value of the total debt / book value of the total assets)	(Margaritis and Psillaki, 2010; King and Santor, 2008)
Market Leverage	Book value of the long-term debt / (book value of the total assets - the book value of the total equity + the market value of the equity)	(de Jong, Kabir and Nguyen, 2008)
Control variables	Definition	Source
Firm Size	Natural logarithm of the firm's sales	(Margaritis and Psillaki, 2010; de Jong, Kabir and Nguyen, 2008; Ramli, Latan and Solovida, 2018)
Tangibility	Fixed assets divided by total assets	(Devereux, Giorgia and Xing, 2018; Margaritis and Psillaki, 2010; Hertzel and Officer, 2012; Deesomsak, Paudyal and Pescetto, 2004; Nga Cao 2015)

Current Ratio	Current assets divided by the current liabilities	(Detthamrong, Chancharat and Vithessonthi, 2017; Ramli, Latan and Solovida, 2018; Wang and Sarkis, 2017)
Business Risk	The absolute difference between the annual percentage difference in earnings before interest and tax (EBIT) and the average of this change in EBIT over the sample period	(Ramli, Latan and Solovida, 2018; Paudyal and Pescetto, 2004)
Industry Dummy	Industry Dummies	(Chintakananda, 2008; Islam and Khandaker, 2015)
Year Dummy	Year Dummies	(Lee, Lee, Zeng, and Hsu, 2017; Roberts, 2014)
Country Dummy	Country Dummies	(King and Santor, 2008; (Detthamrong, Chancharat and Vithessonthi, 2017)

4. Data and sample selection

In this chapter I discuss how the data will be collected and which data will be used for the research. This study uses panel data, panel data is data combined out of cross-sectional data and time series data. Using panel data permits the researcher to examine the change of a parameter within a certain period of time among different entities.

Since the research is about European listed firms and their relation between capital structure and financial performance, financial data is needed. Therefore, data is needed from listed European firms with the requirement that they are currently listed. This financial data of the firm will be gathered from the ORBIS database.

Another important aspect are the sample criteria, as stated by Graham, Leary and Roberts (2013) financial firms, utilities and railroad companies should be excluded from research because their capital structure differs in nature from non-financial companies. Salim and Yadav (2012) also excluded financial services institution like banks and insurance firms from their sample because of the nature of their capital structure. Even as Detthamron et al., (2017) who only included non-financial firms in their sample. The above-mentioned papers all did research to the relations between capital structure and financial performance. According to Rudolph and Schwetzler (2013) you can exclude firms from the financial service sector by filter out companies with an SIC (Standard Industrial Classification) code between 6000 and 6999 and SIC 8000 to 9999 for service and government-owned companies.

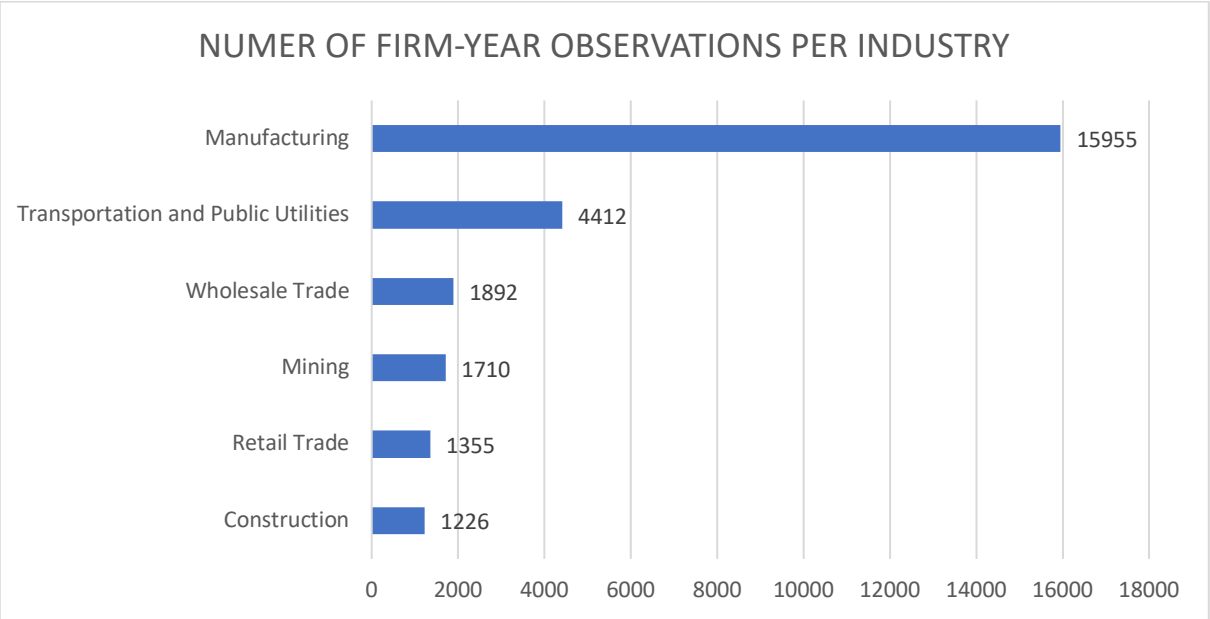

Figure 1: *Number of firm-year observations per industry*

Figure 1 shows how the different industries within the sample are represented. The 26550 firm-year observations are divided into industry groups using the standard industrial

classification (SIC) code as explained in paragraph 3.2.3 under industry dummy. The manufacturing industry is by far the largest industry, this industry covers with 60,09% (15.955 firm-year observations) more than half of the sample. Second largest is transportation and public utilities with 16,62% (4412 firm-year observations) of the firm-year observations and the smallest industry is construction with only 4,62% (1226 firm-year observations) of the firm-year observations.

The time spread of the sample is from 2009 till 2017, which is the largest spread that could be generated from Orbis. When there is missing data for a certain firm-year observation, this certain firm-year observation will be removed from the sample.

Table 2 shows the sampling strategy, to get to the final sample. The initial dataset from ORBIS consists of 125.704 firm-year observations, of currently active and currently listed European firms. The European firms will be filtered in ORBIS since you can select a continent like "Europe" from which you want to gather data. This means that the firms that are included in the sample are firms that are registered in Europe. After excluding financial firms like banks and pension funds and service and government-owned (non-profit) companies the sample is reduced with 60.432 firm-year observations to 65.272. In the next step firm-years with missing data are excluded from the sample, this means firm-years where one or more data points are missing. This reduces the sample further with 38.722 firm-year observations, which lead to a final balanced sample of 26550 firm-year observations for the years 2009-2017. For the variables ROA, ROE, Tobin's Q, Stock return, leverage, size, tangibility, current ratio and business risk 26550 firm-year observations are available as can be seen in table 2.

Table 2. Data sampling strategy

Data reduction steps	Number of firm-year observations
European listed firms	125.704
Excluding firms with SIC code 6000 and 6999 and between 8000 and 9999	65.272
Excluding firm-year observations with missing data	38.722
Final number of firm-year observations	26.550

This table displays the data sampling strategy

Figure 2 shows the distributions of the firm-year observations among the countries and shows us that there are three countries representing almost 46% of all observations. These countries are United Kingdom (15,53%), France (10,32%) and Germany (10,01%).

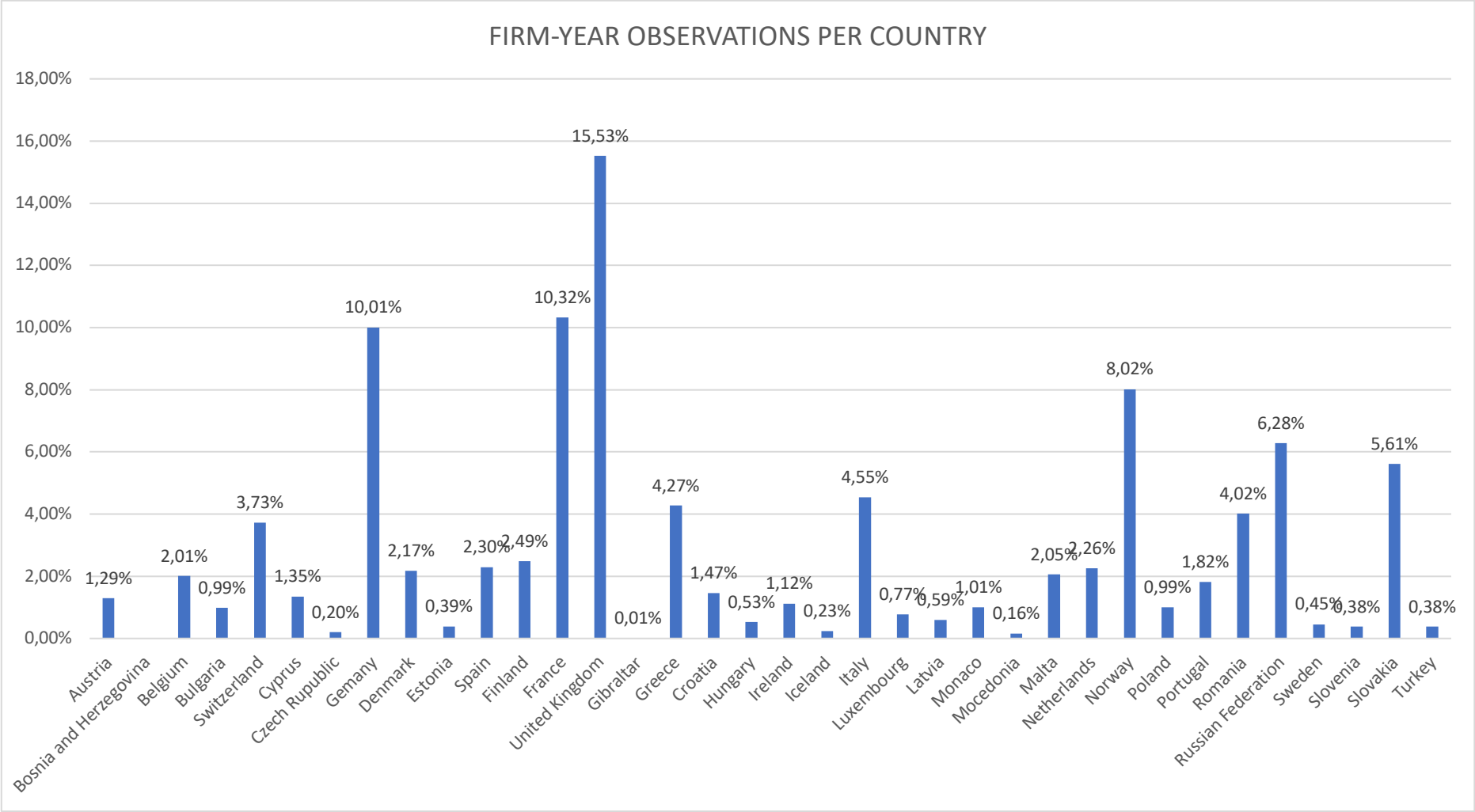

Figure 2: *Number of firm-year observations per country*

5. Empirical Results

In this chapter the results of the descriptive statistics of the sample will be shown. These descriptives will be compared to the descriptives of similar research. Secondly, a Pearson correlation matrix will be made to check if there exists multicollinearity between the variables. Thereafter, the regression results will be presented followed by the robustness checks.

5.1 Univariate Analysis

Table 4 shows the summary statistics from the sample of active, European listed firms with the exclusion of financial, service and government-owned companies, for the period 2009-2017. The table includes the desctriptives of the dependent, independent and control variables. To reduce the impact of outliers the data is winsorized at a 95 percentile on advice of Shehata et al. (2017) and Liu, Wei and Xie (2014). The purpose of that, is to mitigate the effect of outliers that can be present in the data. Winsorization has been performed on the top and bottom 2.5% of the sample to keep 95% of the original values. Following Villalonga and Amit (2006) observations of firms with Tobin's q ratios above 10 should be removed from the sample because they are considered as outliers.

These statistics show that Tobin's Q has a mean of 0.860, which is lower than 1, this means that the book value of the average non-financial European listed company is greater than their market value and therefore is undervalued. La Rosa, Liberatore, Mazzi and Terzani (2017) found a Tobin's Q of 1.083 for their sample of non-financial European listed firms. This is a bit higher than the Tobin's Q of 0.875 in this sample. Bennouri et al., (2018) found a standard deviation for Tobin's Q of 0.830 which is comparable to the 0.902 in this research, but they found a slightly higher mean of 1.040 and a higher median of 0.800.

ROA has a mean score of 4.317% with a median of 5.150%. Zemsem, Guesmi and Ftouhi (2017) reported much lower results for their sample of non-financialEuropean listed firms. They found a mean ROA of 2.35% which is around half the ROA of 4.32% found in this sample. Bennouri et al., also found slightly lower results, they reported an average ROA of 2.73% with a median of 3.55% for their sample of 394 French firms. Their study reported higher results for ROE. Their sample had an average ROE of 5.05%, with a median of 9.41%. These are higher compared to the average 2.76% of this sample with a median of 6.25%, this can be caused due to the much smaller sample size. Buchuk, Larrain, Muñoz and Urzúa (2014) reported much higher results on ROE for their sample of non-financial firms, they found a mean of 10,96% and a median of 10,32%. This are much higher results than the mean of 2.76% and median of 6,25% in this research. Duchin, Matsusaka and Ozbas (2010) reported similar results concerning stock return, they found a mean of 14.52% and a standard deviation of 47.97% which is comparable to the mean of 0.132 (13.2%) and standard deviation of 0.482 (48.2%) in

this research. Goto, Xiao and Xu (2015) also found similar results on stock return for their sample of non-financial US firms a mean of 11,0% and a higher standard deviation of 76,5%.

Table 4 reports an average book leverage of 53.5% with a median of 54.0%. The research of Zemsem, Guesmi and Ftouhi (2017) reports a higher leverage ratio for European non-financial firms. They report an average leverage ratio of 77.9%, this is probably caused by the fact that they included only companies listed in the Euronext 100 index. This means it includes only the largest and most liquid stocks traded on Euronext. Duchin et al., (2010) found an average leverage ratio of 39.1% for their sample, which is slightly lower than the average of this sample which is 52.1% and is probably caused by the different sample period. Their sample was from 2005 till 2012 and therefore includes relatively a lot of bad years from the crisis period which can cause this difference. Market leverage reports an average of 15.6%. de Jong et al., (2008) found slightly lower results for European countries, which differ among countries, for Austria 10,3%, Belgium 11.2%, Croatia 12,8%, Denmark 13,4%, Finaland 12,1%, France, 9,7%, Germany 7,2%, Greece 5,5%, Hungary 9,4%, Ireland 14,4%, Italy 8,0%, Netherlands 9,1%, Norway 19,8%, Poland 5,2%, Portugal 13,5%, Spain 10,3%, Sweden 10,3%, Switzerland 14,8%, and Uk 8,4%.

The average size of a company, measured in total sales, is in this sample €1.781 million with a median of €160 million. The table shows an average tangibility of 0.528 with a standard deviation of 0.219, which means that the average firms assets exists for more than half out of fixed assets. Fosu et al., (2016) found an average tangibility of 0.301 which is much lower than the mean in this research and a standard deviation of 0.250 which is comparable to this research for a sample of 1446 UK firms. Tangibility is comparable to the research Devereux, Giorgia and Xing (2018) who report an slightly higher average of 0.430 with a median of 0.320 for European firms. Current Ratio shows an average of 1.912 which means that the average firm in this sample has almost two times as much current assets as current liabilities and shows an median of 1.470. These findings are comparable to the research of Robert, Graham and Jones (2018) who reported an average current ratio of 2.245 and a median of 1.488 and also comparable to the research of Detthamrong et al. (2017), who reported an average of 2.160 and an median of 1.510. Business risk shows an average of 6.717, this means that on average the EBIT of a company differs 6.717% from the average of the sample period.

Summary Statistics

Variables	Mean	Median	Std. Deviation	Minimum	Maximum
Dependent					
Tobin's Q	0.860	0.564	0.902	0.045	4.242
ROA %	4.317	5.150	9.951	-28.499	25.266
ROE %	2.765	6.251	22.647	-85.818	42.291
RET	0.132	0.060	0.482	-0.668	1.641
Independent					
Book Leverage	0.535	0.540	0.226	0.095	1.054
Market Leverage	0.156	0.117	0.144	0.001	0.587
Control					
Size (in millions)	1781.574	160.750	4563.390	1.022	23258.200
Tangibility	0.528	0.535	0.219	0.080	0.920
Current Ratio	1.912	1.470	1.502	0.350	7.790
Business Risk	6.717	2.661	9.607	0.001	37.470

Table 4: this table reports the; means, medians, standard deviations, minimums and maximums of the variables from 26550 firm-year observations of European listed firms over the period 2009-2017

5.2 Pearson correlation matrix

To control for multicollinearity a Pearson correlations test has been conducted at the variables within the research. Wooldridge (2012) defines multicollinearity as "high (but not perfect) correlation between two or more independent variables" (p. 95). Therefore, this test checks if there is correlation between the variables. When there is a high correlation between certain variables within the same regression, this can distort the results of the regression analysis. The values of the correlation between two variables lie between -1 and 1, where 1 is a total positive linear correlation, 0 is no linear correlation and -1 represents a total negative linear correlation. As a general rule of thumb Anderson, Sweeney, Williams, Camm and Cochran (2013) stated that a correlation coefficient of > 0.7 or < -0.7 between two independent variables indicates a potential multicollinearity problem. (Anderson, Sweeney, Williams, Camm, & Cochran).

Table 5 shows the Pearson correlation matrix for the variables from this research. There exists a very high correlation between ROA and ROE, the correlation between these variables is .725, significant at the 0.01 level. This high correlation is expected because both variables attempt to measure financial performance and both use a form of income to calculate. ROA uses operating income and ROE uses net income, which is operating income – operating expenses, taxes, interest and preferred stock. But, this high correlation is of low interest because the variables will not be used in the same regression. Similar results of high collinearity between these variables are found by Detthamrong et al., (2017), they found a correlation of 0.790, significant at the 0.01 level between ROA and ROE. Le and Phan (2017) also found a high correlation between ROA and ROE but not as high and significant as this research, or the research of Detthamrong et al., (2017). Le and Phan (2017) found a correlation of 0.485* significant at the 0.1 level. There exists no high collinearity between Tobin's Q and ROE (.163**) and Tobin's Q and ROA (.200**). Similar results were found by Le and Phan (2017), they found a correlation of 0.345* between Tobin's Q and ROA which is similar to this research. But, they found a lower correlation of 0.091* between Tobin's Q and ROE. Stock Return has no high correlation with any of the other variables.

There is also no high collinearity between the independent variable book leverage, and the dependent variables Tobin's Q (-.227**), ROA (-.058**), ROE (-.049**) and Stock Return (-.015**) and the independent variable market leverage, and the dependent variables Tobin's Q (-.362**), ROA (-.094**), ROE (-.106**) and Stock Return (-.054**). Detthamrong et al., (2017) found similar results for the relation between ROA and leverage, they found a correlation of -0.270*** between these variables. But, Detthamrong et al., (2017) did not found a significant relation between leverage and ROE. Le and Phan (2017) found a lower correlation between leverage and Tobin's Q, a correlation of -0.168*. But, they found comparable results for the relation between ROE and leverage, a correlation of 0.129*. Concerning the relation between ROA and leverage Detthamrong et al., (2017) found a much higher correlation of -0.431*.

Leverage and Stock Return have a very low correlation of -0.020**, which will give no problem in the regression. The correlations between market and book leverage is 0.340** but this is of no concern because the variables will not be added in the same regression.

Concerning the control variables there is high collinearity between book leverage and current ratio (-.502**) and between ROA and business risk (-.418**). The correlation between book leverage and current ratio is suspicious. Multicollinearity can make the estimates very sensitive to small changes in the model. The coefficients estimates can swing widely based on which other independent variables are included and even can cause coefficients to switch sign[1]. To control for this multicollinearity, you can simply drop one of the variables (Tomaschek, Hendrix, & Baayen, 2018). Therefore, the full regression model with book leverage will also be performed without current ratio and the full model for market leverage will also be performed without tangibility. To check if the collinearity between these variables influences the regression results.

Pearson correlation matrix

	Tobin's Q	ROA	ROE	Stock Return	Book Leverage	Market Leverage	Size	Tangibility	Current Ratio	Business Risk
Tobin's Q	1									
ROA	,264**	1								
ROE	,207**	,715**	1							
Stock Return	,225**	,251**	,241**	1						
Book Leverage	-,227**	-,058**	-,049**	-,015*	1					
Market Leverage	-,362**	-,094**	-,106**	-,054**	,340**	1				
Size	0,003	,324**	,277**	,077**	,195**	,068**	1			
Tangibility	-,130**	-,036**	-,041**	-,062**	-,049**	,402**	,081**	1		
Current Ratio	,230**	,095**	,087**	,056**	-,502**	-,130**	-,159**	-,303**	1	
Business Risk	,027**	-,418**	-,333**	-,075**	-,045**	,077**	-,313**	,127**	,086**	1

**. Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 4: *This table presents the correlation between the variables of this research*

5.3 Regression analysis

The tables show the results of the linear regressions with ROA, ROE, Tobin's Q and Stock Return as the dependent variables. The models represents the results of 6 different regressions. Model 1 shows the effect of the independent variable (leverage) on the dependent variable (a proxy of financial performance) alone. Model 2 till 5 all add a different control variable to the regression, model 6 contains all variables, model 7 drops one specific variable to check if collinearity between book leverage and current ratio and market leverage and tangibility influences the regression results and model 8 will do an alternative regression to control for the so called "confounding phenomeon". Model 2 adds size to the regression, model 3 adds tangibility, model 4 adds current ratio and model 5 adds business risk. All models control for both year and industry effects.

5.3.1 Tobin's Q as dependent variable

Table 5 shows the results of the linear regressions with Tobin's Q as the dependent variable and book leverage as independent variable. The model represents the results of eight different regressions and shows that in all the models leverage has a significant negative impact on Tobin's Q at the 0.01 significance level. Model 6, with all control variables included, reports as significant negative impact of leverage on Tobin's Q at the 0.01 significance level. Table 5 shows that a one standard deviation increase in book leverage is associated with a -0.190 point decrease in Tobin's Q. Model 7 shows that the exclusion of current ratio bearly influences the regression results and therefore, the correlation between current ratio and book leverage has no impact on the regression results. Table 6 shows the regression results of Tobin's Q with market leverge as dependent variable. Here also, all regressions show a significant negative impact of leverage on Tobin's Q. The results show that a one standard deviation increase in market leverage is associated with a -0.290 point decrease in Tobin's Q (model 6). This negative impact is in line with the research of Bae, Kim, and Oh (2017) for their sample of 1481 firms traded on the US stock market for the period 1970-2011. King and Santor (2008) also found a negative impact of leverage on Tobin's Q for Canadain firms. Therefore, when a firm increases their leverage, so adding more debt to their capital structure, this lowers their financial performance in terms of Tobin's Q.

Concerning the control variables, size has no significant impact on Tobin's Q in model 2 in table 5, but has a significant positive impact at the 0.01 level in model 6. This is the result of; 'omitted variable bias'. The omitted variable bias can occur when in a statistical model one or more relevant variables are left out. This variable is known as the confounding variable and forces the model to attribute the effect of the omitted variable to the other variables in the model, which biases the coefficient estimates[2]. This bias results in the fact that the model attributes the effect of the missing variable to the estimated effects of the variables that are included. It can have the following effects:

- Overestimate the strength of an effect.
- Underestimate the strength of an effect.
- Change the sign of an effect.
- Mask an effect that actually exists

There are two conditions that must hold for omitted variable bias to exist[3]:

- The omitted variable must be correlated with the dependent variable
- The omitted variable must be correlated with one or more other explanatory/ independent variables

To explain the phenomeon see figure 3, where Y is the dependent variable and A and B are two independent variables. Area 1 is the impact of variable A on Y, area 3 is the impact of variable B on Y. When you include variable A and omitted variable B in the regression, the impact of variable A is explained by areas 1 and 2, not alone by area 1. When you only add variable A in the regression (figure 4) you explain the impact of variable A on Y by areas 1 and 2 while area 2 actually belongs to both variables A and B. This means the impact is biased because area two actually belongs to both variables A and B and not only to variable A.

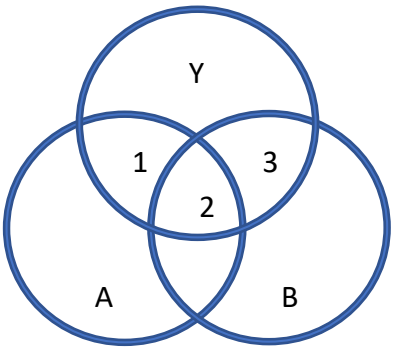

Figure 3: *Omitted variable bias*

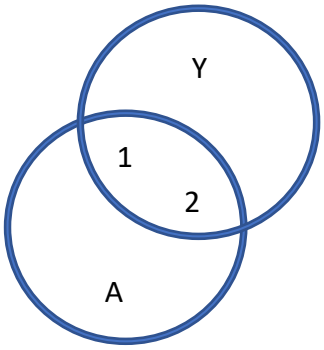

Figure 4: *Omitted variable bias*

The insignificance of size in model 2 and its significant impact in model 6 is a result of omitted variable bias. There is a confounding variable in model 6 that affects both Tobin's Q and size. This basically occurs because of correlation, when you only include one of two strongly correlated variables, this one variable will show 'absorb' the effect of the variable that is left out. It will display its own effect and that of the other variable. These two effects might cancel each other out, which results in a seemingly insignificant prediction. Therefore, both correlated variables should be included together and both variables will display their own effect. Because size has the highest correlation (-0.313**) with business risk among the variables these variables are included together in model 8. The results of this regression show that when these variables are included together both variables are statistically significant at

the 0.01 level and display their real effect. When using market leverage as independent variable size is positive significant on Tobin's Q in model 2 and 6. Tangibility has a significant negative impact on Tobin's Q in model 3 and model 6 at the 0.01 level. In table 6 this omitted variable bias problem also occurs, where tangibility is significant in the full model but not in model 3. Therefore, in model 8 tangibility and current ratio are added together because they have the highest collinearity. When adding these variables together, they both show their real effect and tangibility and current ratio are both significant at the 0.01. The negative impact of tangibility on Tobin's Q suggests that the more tangible assets a firm has, the lower it's Tobin's Q is. The other two control variables, business risk and current ratio both have a significant positive impact on Tobin's Q in all the models at the 0.01 significance level. The positive impact of current ratio, in table 5 and 6, on Tobin's Q suggests that firms that have a higher ratio of current assets to current liabilities, and therefore are better able to meet their short term debt obligations have better financial performance in terms of Tobin's Q. The positive impact of business risk on Tobin's Q suggests that firms that are more risky have a higher Tobin's Q, this results are significant at the 0.01 level when using book leverage as well as market leverage.

5.3.2 ROA as dependent variable

Table 7 shows the results of the linear regressions with ROA as the dependent variable using book leverage as independent variable, table 8 shows the same regressions using makret leverage. The model represents the results of eight different regressions and shows that for both, book and market leverage, all the models have a significant negative impact on ROA at the 0.01 level except for model 4 table7. Model 4 shows an significance of 0.05 of book leverage on ROA. Model 6, with all variables included reports a significant negative impact of leverage on ROA at the 0.01 level for book and market leverage. Model 4 shows that when current ratio is included the impact of book leverage on ROA is influenced, it changes from -2.341*** to -0.674**. Also model 7 shows that the impact changes from -2.414*** (in model 6) to -6.045*** when current ratio is excluded. This means that the correlation between current ratio and book leverage influences the regression results of book leverage on ROA. Table 8 model 7 shows no difference when tangibility is excluded from the full model and which means that the correlation between market leverage and tangibility doesn't influence the regression results. Therefore, current ratio and book leverage should not be taken in the same regression when ROA is the dependent variable. So, when a firm increases their leverage, so adding more debt to their capital structure, this lowers their financial performance in terms of ROA. Looking to model 7 a one standard deviation increase in book leverage is associated with a decrease in ROA of -1.367% and -0.793% decrease when using market leverage looking to the full model(6). This is caused by the fact that higher leverage firms have lower profitability and lower leverage firms have higher profitability (Wald, 1999), lower profitability means a lower return on assets. This is in line with the findings from the

research of Kind and Santor (2008), the found a negative impact of leverage on ROA for Canadian firms. Le and Phan (2017) found for their sample of non-financial firms listed on the Vietnam stock market for the period 2007-2012. Further support for this negative impact is given by Detthamrong et al., (2017) who researched 493 non-financial listed firms in Thailand for the period 2001-2014. At last Ilyukhin (2015) also found a negative impact of leverage on ROA in his research for Russian joint-stock companies.

Concerning the control variables, tangibility and business risk have a significant negative impact on ROA for book leverage. Tangibility is negative significant at the 0.01 level for model 2 and 7 in table 7. Table 8 shows the same problem for tangiblity but when adding tangibility and current ratio together they both show their real effect, a significant positive effect on ROA, the same as the full model. The other two control variables, size and current ratio both have a significant positive impact on ROA in both models at the 0.01 level in table 7 and 8. The positive impact of size on ROA suggests that larger firms in terms of sales have a higher ROA. Rajan and Zingales (1995) found explanation for this relationship, they found that large firms suffer less from information asymmetry which lowers the cost of capital. Because of that, firms are able to issue more information sensitve securities like equity, which therefore lowers the firms leverage ratio. Thus, size lowers the leverage ratios which therefore has a positive influence on a firm's ROA. Also current ratio has a positive impact on ROA, which suggests that firms that are better able to meet their short term debt obligations have better financial performance in terms of ROA.

5.3.3 ROE as dependent variable

Table 9 and 10 show the results of the linear regressions with ROE as the dependent variable and book and market leverage as the independent variable respectively. The model represents the results of eight different regressions and shows that in all the models leverage has a significant negative impact on ROE at the 0.01 level except for model 4 table 9. Model 6, with all control variables included reports a significant negative impact of leverage on ROE at the 0.01 level. Model 4 shows that when current ratio is included the impact of book leverage on ROE is influenced, it changes from -4.600*** to -0.264. Also model 7 shows that the impact changes from -4.018*** (in model 6) to -11.771*** when current ratio is excluded. This means that the correlation between current ratio and book leverage influences the regression results of book leverage on ROA. Table 8 model 7 shows no difference when tangibility is excluded from the full model, which means that the correlation between market leverage and tangibility doesn't influence the regression results. Therefore, current ratio and book leverage should not be taken in the same regression when ROE is the dependent variable. So, when a firm increases their leverage, so adding more debt to their capital structure, this lowers their financial performance in terms of ROE. The regression results show that a one standard deviation increase in leverage is associated with a -2.660% decrease in ROE for book leverage and -2.410% for market leverage. This is caused by the fact that higher leverage firms have

lower profitability and lower leverage firms have higher profitability (Wald, 1999), lower profitability means a lower return on equity. Le and Phan (2017) found similar results for their sample of non-financial firms listed on the Vietnam stock market for the period 2007-2012. Also Ilyukhin (2015) also found a negative impact of leverage on ROE in his research for Russian joint-stock companies. Model 7 in table 9 shows that the exclusion of current ratio, , results in a change of impact of tangibility on ROE compared to model 6. This means that the correlation between current ratio and book leverage influences the regression results, but the impact of book leverage on ROE stays significant at the 0.01 level. Looking to table 10 model 7 excluding tangibilty from the model, which is correlated with market leverage, has no significant impact on the regression results. Therefore, the correlation between current ratio and book leverage and tangibility and market leverage are of no concern.

Concerning the control variables, size and current ratio have a significant positive impact on ROE in table 9 and 10. The control variable's are significant in both models at the 0.01 level. The positive impact of size on financial performance indicates that larger firms in terms of sales have a higher ROE. This follows the same explanation as the positive impact of size on ROA. There is also a positive impact of current ratio on ROE, which indicates that firms that are better able to meet their short term debt obligations have a higher ROE. In line with ROA is the control variable business risk. Business risk again shows a significant negative impact on financial performance at the 0.01 level in table 9 and 10. This means that the more uncertainty there is about a firm's earnings before intterest and tax (EBIT) the lower a firm's financial performance is in terms of ROE. Also tangibility shows a significant negative impact in model 2 and model 7 in table 9. In table 10 tangibility shows a significant negative impact in model 6 but not in model 3. Tangibility probably suffers from omitted variable bias. Therefore model 10 is included in both tables, which combines current ratio and tangibility in one model because of their correlation (-0.303**). Including current ratio and tangibility results in a positive significant impact of both variables on market leverage, which is in line with the full model. The negative impact on ROE was also found by Vătavu (2015) who researched 196 Romanian listed firms. This negative impact of tangibility on ROE indicates that firms with more tangible assets have a lower ROE. This can be explained by the same explanation that is given for the negative impact of tangibility on ROA.

5.3.4 Stock Return as dependent variable

Table 8 shows the results of the linear regressions with Stock Return as the dependent variable. The model represents the results of eight different regressions and shows that in all the models leverage has a significant negative impact on Stock Return at the 0.01 level except for model 4. Model 6, with all control variables included reports as significant negative impact of leverage on Tobin's Q at the 0.01 level at the 0.01 significance level. The regression results show that a one standard deviation increase in book leverage results in a -0.014 (-1.4%) point decrease in Stock Return and a -0.028 (-2.8%) point decrease for market leverage. This is in

line with the research of Hauser (2018) who also found a negative impact of leverage on stock return. Therefore, when a firm increases their leverage, so adding more debt to their capital structure, this lowers their financial performance in terms of Stock Return. Model 7 in both models show that the correlation of between current ratio and book leverage and tangibility and market leverage are of no concern in these regressions.

Concerning the control variables, size and current ratio have a significant positive impact on stock return. Both variables are significant at the 0.01 significance level in all the models in table 11 and 12. Contrary to the findings in this research Hauser (2018) found a negative impact of size on Stock Return. The positive impact of size on stock return suggests that larger firms have better stock returns. Current ratio also has a positive impact on a firm's Stock Return. Which suggests that firms that are better able to meet their short term debt obligations have higher stock returns. Tangibility shows a significant negative impact on stock return in both models even as business risk in table 11 and 12. The negative impact of tangibility on stock return suggests that firms with a higher fixed to total assets ratio have lower financial performance in terms of stock return. The negative impact of business risk on stock return means that firms that have higher volatility in their earnings before interest and taxes have lower stock returns.

Leverage shows a significant negative impact on the proxy variables of financial performance; Tobin's Q, ROA and ROE. The impact of leverage is the strongest on ROE thereafter ROA thereafter Tobin's Q and the weakest on stock return. The significance is the highest for Tobin's Q (t=-28.659) thereafter ROA (t=-8.016) thereafter ROE (t=-5.558) and the lowest on Stock Return (t=-3.792). But all impacts are significant in all the models at the 0.01 significance level, also when the control variables are included. Therefore, the hypothesis *"Leverage has a negative impact on financial performance""* is supported based on the findings in table's 5-12.

5.3.5 Post crisis years compared with other years

Comparing the years 2009 and 2010, which are the two years following the 2007-2008 global financial crisis, from the other years as can be seen in table 13 and 14 (Mathonnata & Minea, 2018). Concerning Tobin's Q, the impact of book and market leverage is much stronger for the years 2011-2017. The impact of book leverage on Tobin's Q is -2.274*** for the years 2001-2017 and -0.801*** for the years 2009-2010 the same hold for market leverage where the impact is -2.194*** and -1.391*** respectively. For ROA the negative impact of book leverage is much stronger during the post crisis period -3.320*** compared to -0.851*** and comparable when using market leverage. When looking to ROE, book leverage shows a much stronger negative impact in the post crisis period (-5.648***) compared to the years 2011-2017 (-2.274**). For market leverage the impact in stronger during the years 2011-2017, -17.604*** compared to -12.372***. At last, for RET the impact is much stronger during the years 2011-2017 compared to the post crisis years. For book leverage the impact was -

0.111** in the years 2009-2010 and 0.851*** for the period 2011-2017. For market leverage the impact was twice as strong for the years 2011-2017 (-0.223***) compared to the years 2009-2010 (-0.131**).

The above-mentioned finding about the difference in impact between the post crisis period (2009-2010) and the other years (2011-2017) shows only little support for the second hypothesis: *"The negative relationship between leverage and financial performance is stronger during the post crisis period years 2009-2010".* Only the impact of book leverage on ROA an ROE shows results in favour of the hypothesis. Therefore the hypothesis is not supported based on the findings in table 13 and 14.

Table 5: Regression results Tobin's Q and Book leverage

	Model 1 Tobin's Q	Model 2 Tobin's Q	Model 3 Tobin's Q	Model 4 Tobin's Q	Model 5 Tobin's Q	Model 6 Tobin's Q	Model 7 Tobin's Q	Model 8 Tobin's Q
Book Leverage	-0.988***	-0.994***	-0.999***	-0.621***	-0.974***	-0.842***	-1.042***	-1.007***
	(-41.672)	(-40.545)	(-42.817)	(-21.865)	(-41.095)	(-28.659)	(-43.293)	(-41.009)
Size		0.002				0.025***	0.024***	0.013***
		(1.023)				(10.216)	(9.615)	(5.231)
Tangibility			-0.743***			-0.671***	-0.795***	
			(-29.716)			(-24.687)	(-31.540)	
Current Ratio				0.098***		0.055***		
				(22.943)		(11.875)		
Business Risk					0.006***	0.008***	0.009***	0.007***
					(9.783)	(13.464)	(14.652)	(11.051)
Constant	1.589***	1.565***	1.964***	1.197***	1.544***	1.388***	1.678***	1.402***
	(82.973)	(51.951)	(86.611)	(46.899)	(78.575)	(33.232)	(49.360)	(41.909)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	26550	26550	26550	26550	26550	26550	26550	26550
Adjusted *R*-Sq	0.088	0.088	0.118	0.106	0.092	0.130	0.125	0.125

Info: Dependent variable: Tobin's Q, using market leverage as independent variable, the t-values are in parentheses. *, ** and *** denote significance levels at the 10%, 5% and 1%, respectively

Table 6: Regression results Tobin's Q and Market leverage

	Model 1 Tobin's Q	Model 2 Tobin's Q	Model 3 Tobin's Q	Model 4 Tobin's Q	Model 5 Tobin's Q	Model 6 Tobin's Q	Model 7 Tobin's Q	Model 8 Tobin's Q
Market Leverage	-1.997***	-2.005***	-1.999***	-1.882***	-2.015***	-2.019***	-1.920***	-1.997***
	(-55.406)	(-55.610)	(-51.634)	(-52.923)	(-55.906)	(-53.448)	(-54.031)	(-52.694)
Size		0.011***				0.028***	0.029***	
		(5.173)				(12.093)	(12.348)	
Tangibility			0.005			0.222***		0.250***
			(0.171)			(7.656)		(8.662)
Current Ratio				0.128***		0.142***	0.132***	0.139***
				(28.914)		(30.717)	(29.728)	(30.232)
Business Risk					0.005***	0.006***	0.006***	
					(8.379)	(8.903)	(9.831)	
Constant	1.247***	1.109***	1.244***	0.999***	1.221***	0.505***	0.616***	0.863***
	(83.718)	(36.465)	(63.013)	(58.999)	(80.487)	(13.560)	(17.926)	(37.357)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	26550	26550	26550	26550	26550	26550	26550	26550
Adjusted *R*-Sq	0.157	0.158	0.157	0.190	0.160	0.199	0.197	0.193

Info: Dependent variable: Tobin's Q, using market leverage as independent variable, the t-values are in parentheses. ∗, ∗∗ and ∗∗∗ denote significance levels at the 10%, 5% and 1%, respectively

Table 7: Regression results ROA and Book leverage

	Model 1 ROA	Model 2 ROA	Model 3 ROA	Model 4 ROA	Model 5 ROA	Model 6 ROA	Model 7 ROA	Model 8 ROA
Book Leverage	-2.341***	-6.620***	-2.364***	-0.674**	-3.468***	-2.414***	-6.045***	-0.707
	(-8.575)	(-25.158)	(-8.661)	(-2.044)	(-14.031)	(-8.016)	(-24.342)	(-0.914)
Size		1.566***				1.051***	1.024***	
		(63.499)				(41.596)	(40.279)	
Tangibility			-1.559***			0.472*	-6.768***	-1.720**
			(-5.326)			(1.694)	(-56.744)	(-2.389)
Current Ratio				0.444***		0.987***		1.045***
				(8.977)		(20.939)		(8.569)
Business Risk					-0.453***	-0.366***	-0.353***	
					(-77.139)	(-58.978)	(-56.744)	
Constant	5.188***	-10.656***	5.975***	3.408***	8.860**	-6.670***	-1.429***	1.942***
	(23.529)	(-32.968)	(22.523)	(11.499)	(43.240)	(-15.567)	(-4.076)	(2.232)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	26550	26550	26550	26550	26550	26550	26550	26550
Adjusted *R*-Sq	0.007	0.138	0.08	0.010	0.189	0.248	0.236	0.010

Info: Dependent variable: ROA, using book leverage as independent variable, the t-values are in parentheses. ∗, ∗∗ and ∗∗∗ denote significance levels at the 10%, 5% and 1%, respectively

Table 8: Regression results ROA and Market leverage

	Model 1 ROA	Model 2 ROA	Model 3 ROA	Model 4 ROA	Model 5 ROA	Model 6 ROA	Model 7 ROA	Model 8 ROA
Market Leverage	-6.052***	-6.922***	-5.812***	-5.430***	-4.443***	-5.510***	-4.225***	-5.799***
	(-13.997)	(-16.940)	(-12.513)	(-12.530)	(-11.317)	(-13.626)	(-11.101)	(-12.535)
Size		1.260***				0.874***	0.882***	
		(50.204)				(35.271)	(35.540)	
Tangibility			-0.480			2.869***		0.803**
			(-1.413)			(9.260)		(2.278)
Current Ratio				0.691***		1.324***	1.193***	0.727***
				(12.828)		(13.464)	(25.025)	(12.952)
Business Risk					-0.435***	-0.375***	-0.368***	
					(-67.151)	(-56.398)	(-55.590)	
Constant	5.507***	-9.593***	5.727***	4.167***	7.726***	-6.931***	-5.494***	3.730***
	(30.828)	(-27.818)	(24.174)	(20.196)	(46.759)	(-17.377)	(-14.922)	(13.231)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	26550	26550	26550	26550	26550	26550	26550	26550
Adjusted *R*-Sq	0.150	0.121	0.150	0.022	0.191	0.255	0.252	0.023

Info: Dependent variable: ROA, using market leverage as independent variable, the t-values are in parentheses. *, ** and *** denote significance levels at the 10%, 5% and 1%, respectively

Table 9: Regression results ROE and Book leverage

	Model 1 ROE	Model 2 ROE	Model 3 ROE	Model 4 ROE	Model 5 ROE	Model 6 ROE	Model 7 ROE	Model 8 ROE
Book Leverage	-4.600***	-12.682***	-4.659***	-0.264	-6.600***	-4.018***	-11.771***	-0.707
	(-7.399)	(-20.680)	(-7.449)	(-0.352)	(-11.241)	(-5.558)	(-19.785)	(-0.914)
Size		2.957***				2.106***	2.051***	
		(51.463)				(34.754)	(33.655)	
Tangibility			-4.077***			0.001	-4.764***	-1.720**
			(-6.119)			(0.001)	(-7.653)	(-2.389)
Current Ratio				1.156***		2.107***		1.045***
				(10.259)		(18.634)		(8.569)
Business Risk					-0.803***	-0.629***	-0.602***	
					(-57.619)	(-42.265)	(-40.381)	
Constant	5.260***	-24.665***	7.316***	0.629	11.773**	-19.403***	-8.209***	1.942**
	(10.475)	(-32.746)	(12.114)	(0.932)	(24.190)	(-18.868)	(-9.772)	(2.232)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	26550	26550	26550	26550	26550	26550	26550	26550
Adjusted *R*-Sq	0.006	0.096	0.07	0.010	0.117	0.164	0.153	0.010

Info: Dependent variable: ROA, using book leverage as independent variable, the t-values are in parentheses. ∗, ∗∗ and ∗∗∗ denote significance levels at the 10%, 5% and 1%, respectively

Table 10: Regression results ROE and Market leverage

	Model 1 ROE	Model 2 ROE	Model 3 ROE	Model 4 ROE	Model 5 ROE	Model 6 ROE	Model 7 ROE	Model 8 ROE
Market Leverage	-17.453***	-19.285***	-17.155***	-16.087***	-14.362***	-16.733***	-16.760***	-17.126***
	(-16.523)	(-19.002)	(-15.117)	(-15.182)	(-14.390)	(-16.103)	(-15.942)	(-15.142)
Size		2.652***				1.956***	1.801***	
		(42.600)				(30.725)	(28.135)	
Tangibility			-0.597			6.132***		2.262***
			(-0.719)			(7.702)		(2.625)
Current Ratio				1.519***		2.830***	1.109***	1.620***
				(11.532)		(22.198)	(1.436)	(11.806)
Business Risk					-0.836***	-0.700***	-0.674***	
					(-50.735)	(-40.937)	(-39.016)	
Constant	6.553***	-25.237***	6.826***	3.608***	10.816***	-21.614***	-12.106***	2.375***
	(15.014)	(-29.497)	(11.793)	(7.151)	(25.745)	(-21.089)	(-12.850)	(3.446)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	26550	26550	26550	26550	26550	26550	26550	26550
Adjusted *R*-Sq	0.018	0.097	0.018	0.024	0.117	0.178	0.159	0.024

Info: Dependent variable: ROA, using market leverage as independent variable, the t-values are in parentheses. ∗, ∗∗ and ∗∗∗ denote significance levels at the 10%, 5% and 1%, respectively

Table 11: Regression results RET (stock return) and Book leverage

	Model 1 RET	Model 2 RET	Model 3 RET	Model 4 RET	Model 5 RET	Model 6 RET	Model 7 RET
Book Leverage	-0.056***	-0.107***	-0.058***	-0.004	-0.067***	-0.061***	-0.108***
	(-4.378)	(-8.088)	(-4.527)	(-0.274)	(-5.216)	(-3.792)	(-8.154)
Size		0.019***				0.016***	0.016***
		(14.988)				(11.890)	(11.651)
Tangibility			-0.126***			-0.108***	-0.137***
			(-9.177)			(-7.255)	(-9.914)
Current Ratio				0.014***		0.013***	
				(5.945)		(5.001)	
Business Risk					-0.004***	-0.003***	-0.003***
					(-14.036)	(-8.270)	(-7.816)
Constant	0.184***	-0.003	0.248***	0.129***	0.219***	0.048**	0.115***
	(17.791)	(0.214)	(19.912)	(9.248)	(20.629)	(2.088)	(6.196)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	26550	26550	26550	26550	26550	26550	26550
Adjusted *R*-Sq	0.063	0.071	0.066	0.065	0.070	0.078	0.077

Info: Dependent variable: RET (stock return), using book leverage as independent variable, the t-values are in parentheses. ∗, ∗∗ and ∗∗∗ denote significance levels at the 10%, 5% and 1%, respectively

Table 12: Regression results RET (stock return) and Market leverage

	Model 1 Stock Return	Model 2 Stock Return	Model 3 Stock Return	Model 4 Stock Return	Model 5 Stock Return	Model 6 Stock Return	Model 7 Stock Return
Market Leverage	-0.238***	-0.250***	-0.200***	-0.222	-0.222***	-0.201***	-0.214***
	(-10.692)	(-11.247)	(-8.359)	(-9.910)	(-9.994)	(-8.427)	(-9.585)
Size		0.017***				0.015***	0.015***
		(12.381)				(10.051)	(9.998)
Tangibility			-0.077***			-0.031**	
			(-4.371)			(-1.679)	
Current Ratio				0.018***		0.023***	0.025***
				(6.489)		(7.917)	(8.754)
Business Risk					-0.004***	-0.003***	-0.003***
					(-11.692)	(-8.094)	(-8.341)
Constant	0.198***	-0.004	0.233***	0.163***	0.220***	0.008	-0.008
	(21.511)	(-0.250)	(19.098)	(15.284)	(23.484)	(0.333)	(-0.348)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	26550	26550	26550	26550	26550	26550	26550
Adjusted *R*-Sq	0.081	0.087	0.081	0.082	0.086	0.093	0.093

Info: Dependent variable: RET (stock return), using market leverage as independent variable, the t-values are in parentheses. *, ** and *** denote significance levels at the 10%, 5% and 1%, respectively

Table 13: Regression results for years 2009-2010

	Model 1 Tobin's Q	Model 2 Tobin's Q	Model 3 ROA	Model 4 ROA	Model 5 ROE	Model 6 ROE	Model 7 RET	Model 8 RET
Book Leverage	-0.801***		-3.320***		-5.648***		-0.111**	
	(-11.765)		(-4.309)		(-3.868)		(-2.225)	
Market Leverage		-1.391***		-5.347***		-12.372***		-0.131**
		(-18.487)		(-6.050)		(-7.079)		(-2.098)
Size	0.025***	0.033***	1.106***	0.993***	2.129***	2.022***	0.046***	0.044***
	(4.418)	(6.287)	(17.171)	(16.033)	(17.442)	(16.509)	(11.096)	(10.012)
Tangibility	-0.528***	0.302***	-1.206*	2.910***	-3.319**	4.324***	-0.247***	-0.121**
	(-8.597)	(4.672)	(-1.733)	(3.827)	(-2.518)	(2.876)	(-5.488)	(-2.257)
Current Ratio	0.087***	0.208***	0.893***	1.686***	1.516***	2.727***	0.024***	0.046***
	(8.054)	(18.855)	(7.332)	(12.991)	(6.568)	(10.625)	(2.987)	(5.027)
Business Risk	0.004***	-0.001	-0.377***	-0.397***	-0.519***	-0.575***	0.001	0.001
	(3.357)	(-0.680)	(-24.850)	(-25.071)	(-18.048)	(-18.368)	(0.933)	(0.505)
Constant	0.980***	0.059	-6.485***	-9.416***	-17.295***	-22.614***	-0.015	-0.115*
	(10.726)	(0.721)	(-6.268)	(-9.838)	(-8.823)	(-11.948)	(-0.226)	(-1.708)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	4455	4455	4455	4455	4455	4455	4455	4455
Adjusted *R*-Sq	0.153	0.188	0.243	0.269	0.183	0.203	0.060	0.070

Info: Regression results including only the years 2009-2010, the t-values are in parentheses. *, ** and *** denote significance levels at the 10%, 5% and 1%, respectively

Table 14: Regression results for years 2011-2017

	Model 1 Tobin's Q	Model 2 Tobin's Q	Model 3 ROA	Model 4 ROA	Model 5 ROE	Model 6 ROE	Model 7 RET	Model 8 RET
Book Leverage	-2.274**		-0.851***		-2.274**		-0.851***	
	(-6.937)		(-26.236)		(-6.937)		(-26.236)	
Market Leverage		-2.194***		-5.651***		-17.604***		-0.223***
		(-50.866)		(-12.397)		(-14.445)		(-8.732)
Size	1.045***	0.026***	0.025***	0.854***	1.045***	1.993***	0.025***	0.009***
	(38.008)	(10.326)	(9.322)	(31.554)	(38.008)	(26.711)	(9.322)	(6.168)
Tangibility	0.754**	0.218***	-0.698***	2.914***	0.754**	6.451***	-0.698***	-0.010
	(2.473)	(6.777)	(-23.118)	(8.575)	(2.473)	(7.101)	(-23.118)	(-0.509)
Current Ratio	1.001***	0.131***	0.049***	1.263***	1.001***	2.825***	0.049***	0.019***
	(19.565)	(25.646)	(9.752)	(23.473)	(19.565)	(19.642)	(9.752)	(6.152)
Business Risk	-0.364***	0.007***	0.009***	-0.372***	-0.364***	-0.724***	0.009***	-0.004***
	(-53.539)	(10.054)	(9.752)	(-50.591)	(-53.539)	(-36.888)	(9.752)	(-9.814)
Constant	-6.827***	0.569***	1.419***	-6.571***	-6.827***	-21.194***	1.419***	0.076***
	(-14.655)	(13.913)	(30.777)	(-15.202)	(-14.655)	(-18.343)	(30.777)	(3.139)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	22095	22095	22095	22095	22095	22095	22095	22095
Adjusted *R*-Sq	0.129	0.209	0.219	0.253	0.161	0.175	0.051	0.068

Info: Regression results including only the years 2011 till 2017, the t-values are in parentheses. ∗, ∗∗ and ∗∗∗ denote significance levels at the 10%, 5% and 1%, respectively

5.4 Robustness Check

In this section additional regression analysis will be performed, in order to test the robustness of the main findings. First, because of the large amount of manufacturing firms in the sample there will be a regression with only manufacturing firm's vs all other firms. Secondly, there will be a regression that compares the global post financial crisis years 2009 and 2010 with the years 2011 till 2017. The third test will compare small and big firms and the last test compares firms with low and high business risk.

5.4.1 Robustness testing by industries

Because of the fact that manufacturing firms cover more than half of the sample, a regression is performed with only manufacturing firms and with all other firms as can be seen in table 15 and 16. Comparing the impact of book leverage and market leverage of the manufacturing firms with the non-manufacturing firms, the significant impact of leverage on ROA, ROE, Tobin's' Q and Stock Return is stronger for the manufacturing company's sub-sample. For the manufacturing firms in table 15, leverage has a significant negative impact on ROA, ROE, Tobin's' Q and Stock return all at the 0.01 level. The impact of ROA is much stronger for manufacturing firms (-3.188***) compared to non-manufacturing firms (-1.110**) the impact of book leverage on ROA loses significance and drops from the 0.01 level to the 0.05 level. For manufacturing firms ROE has a significant impact on leverage of (-5.732***) where it loses all its significance for non-manufacturing firms. The impact on Tobin's Q is weaker for non-manufacturing firms but remains significant at the 0.01 level. The significance of stock return drops from the 0.01 level to the 0.05 level for non-manufacturing firms. Size loses its significance on Tobin's Q for non-manufacturing firms. For manufacturing firm's tangibility loses its significant impact on a firm's ROA, where it has a significant impact on ROA for non-manufacturing firms. The significance of current ratio on stock return drops from 0.01 to 0.05 for non-manufacturing firms. Looking to table 16 when market leverage is used as independent variable, there are comparing results for manufacturing firms and non-manufacturing firms. The impact of leverage is slightly higher on ROA and ROE and RET for non-manufacturing firms and slightly lower for Tobin's Q compared to manufacturing firms. Looking to the control variables the only difference is that tangibility has no significant impact on stock return for non-manufacturing firms where it does at the 0.1 level for manufacturing firms. This robustness test shows that the significant negative impact of leverage on ROE does not hold for non-manufacturing firms and that the impact of leverage on ROA and Stock Return is more significant and stronger for manufacturing firms.

5.4.2 Robustness test by comparing small and big firms

The results of the robustness test for comparing small and big firms are given in table 17. The first remarkable thing is that the impact of leverage only stays the same for Tobin's Q, but is much stronger for larger firms. The impact of leverage on ROA loses its significance for small firms, but becomes much stronger for big firms compared to the full model, it raises from

-2.341*** till -4.077***. The impact of leverage on ROE is also much stronger and more significant for large firms, the impact raises from -2.478** till -5.089***. Table 11 also shows that leverage has no significant impact on stock return for large firms but it is significant at the 0.01 level for small firms. A remarkable thing is that tangibility has a significant positive impact on ROE (4.058***) for small firms and a significant negative impact on ROE for big firms (-4.430***). In table 18 when market leverage is used as independent variable there are comparable results for the impact of market leverage on RET and Tobin's Q. But for big firms the impact of market leverage on ROA and ROE is much bigger. For small firms the impact of leverage on ROA is -1.371** and for big firms -11.658***, the for small firms of leverage on ROE is -8.570*** where it is much stronger for big firms -26.833***. This test shows that there is difference between small and big firms concerning the impact on financial performance. Most important differences are the fact that leverage has no significant impact on ROA for small firms and no significant impact on stock return for big firms and the big difference in impact on ROA and ROE when using market leverage as dependent variable.

5.4.3 Robustness test by low and high-risk firms

The third robustness test compares high-risk firms to low-risk firms, in terms of volatility in earnings before interest and taxes. The results (table19) shows that the impact of book leverage on financial performance is much stronger for low-risk firms compared to high-risk firms. For high-risk firms, leverage loses its significance on all proxies of financial performance except for Tobin's Q. The impact of leverage on low-risk firms becomes much stronger compared to the full model. The impact on ROA raises from -2.414*** to -6.416*** on ROE from -4.018*** to -11.101*** on Tobin's Q from -0.974*** to -1.172*** and on Stock Return from -0.061*** till -0.113***. For high-risk firms leverage has only a significant negative impact on Tobin's Q (-0.641***). The significant positive impact of size on Tobin's Q drops from the 0.01 level to the 0.05 level for high-risk firms. Looking to tangibility the strange thing is that tangibility has a significant positive impact on ROA and ROE for high-risk firms but a significant negative impact on ROA and ROE for low-risk firms and a significant negative impact on Tobin's Q and Stock Return for low and high-risk firms. Current ratio loses its significant power at Stock Return for low-risk firms and becomes higher to for high-risk firms (0.021***) compared to the full model (0.014***). Looking to table 20 when market leverage is used as independent variable the impact of leverage on the proxies of financial performance is negative at the 0.01 level for all proxies. Comparable results are found for Tobin's Q and RET but not for ROA and ROE. For ROA the impact is much stronger on low-risk firms (-10.050***) compared to high-risk firms (-2.581***). Market leverage shows also a bigger impact on ROE for low-risk firms, -22.608*** for low-risk firms and -12.002*** for high-risk firms. Concerning the control variables Tangibility shows no significant impact on ROE for low-risk firms (-0.952) but shows a very large impact on high-risk firms (12.994***). There is a significant impact of business risk on Tobin's Q and RET for high-risk firms but not for low-risk firms.

5.4.4 Robustness test by comparing large country groups

The last robustness test compares the three countries with the most firm-year observations with the other countries. In total there will be four different sub-samples; United-Kingdom, Germany, France and Other firms. This test will be done to check if these countries with high representation influence the regression and if the results also hold for this sub-samples. First, we will look to table 21 and 22 where book leverage is used as dependent variable. Looking to Tobin's Q the negative impact is the strongest in France (-0.917***), closely followed by Germany (-0.863***) and the other firms (-0.807***) and the impact is much less strong in the United Kingdom (-0.297***) but significant at the 0.01 level for all sub-samples. For ROA the strongest negative impact of leverage is found in France (-4.553***) followed by the other firms (-0.807***). For Germany there is no significant impact and for The UK there is a positive impact of leverage on ROA. So, the negative impact of leverage on ROA doesn't hold for firms from Germany and the United Kingdom. ROE shows a very strong negative impact among the other firms (-8.963***) but no significant impact for France firms and a very strong positive impact for firms from the UK and is also significant at the 0.1 level for German firms (0.775*). RET loses its significance in almost all sub-samples, but stays negative at the 0.1 level for France (-0.097*) and other firms (-0.045*). In table 23 and 24 market leverage is used as dependent variable. These tables report a significant negative impact at the 0.01 level of market leverage on all proxies of financial performance. The impact on Tobin's Q is the strongest in the UK (-2.220***) and the weakest in Germany (-0.160***). The impact of market leverage on ROA is comparable among all sub-samples, where the impact varies between -5.157*** and -7.480***. For ROE there are more divergent results, there the impact is the strongest for in the UK (-22.081***) thereafter in the sub sample of other countries (-17.335***) followed by France (-11.056***) and the weakest in (-5.645***). RET shows comparable results among all sub-samples where it shows the strongest negative effect in the UK (-0.270***) and the weakest in (-0.160***).

Table 15: Robustness test comparing manufacturing firms with other firms using Book leverage

	Manufacturing Firms				***Non-manufacturing firms***			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Dependent variable	ROA	ROE	Tobin's Q	RET	ROA	ROE	Tobin's Q	RET
Book leverage	-3.188***	-5.732***	-0.986***	-0.057***	-1.110**	-1.381	-0.618***	-0.060**
	(-8.026)	(-6.179)	(-24.083)	(-2.720)	(-2.408)	(-1.196)	(-15.233)	(-2.372)
Size	1.194***	2.366***	0.046***	0.021***	0.862***	1.754***	-0.005	0.010***
	(35.852)	(30.414)	(13.448)	(11.692)	(22.331)	(18.157)	(-1.487)	(4.714)
Tangibility	-0.281	1.081	-0.762***	-0.107***	1.111***	-1.418	-0.547***	-0.110***
	(-0.735)	(1.212)	(-19.367)	(-5.250)	(2.728)	(-1.391)	(-15.268)	(-4.956)
Current Ratio	0.907***	1.995***	0.063***	0.015***	1.094***	2.275***	0.040***	0.010**
	(14.470)	(13.624)	(9.750)	(4.544)	(15.371)	(12.770)	(6.321)	(2.450)
Business Risk	-0.397***	-0.665***	0.012***	-0.002***	-0.325***	-0.591***	0.003***	-0.003***
	(-48.401)	(-34.197)	(14.391)	(-5.607)	(-34.492)	(-25.028)	(3.335)	(-6.266)
Constant	-6.888***	-21.380***	1.250***	-0.015	-6.169*	-15.723***	1.498***	0.109***
	(-12.059)	(-16.028)	(21.232)	(-0.494)	(-9.088)	(-9.252)	(24.926)	(2.943)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N.	15955	15955	15955	15995	10555	10555	10555	10555
Adjusted *R*-Sq	0.272	0.180	0.133	0.082	0.219	0.145	0.118	0.070

Info: *Splitting the sample in manufacturing firms and all other industries, the t-values are in parentheses, *, ** and *** denote significance levels at the 10%, 5% and 1%, respectively*

Table 16: Robustness test comparing manufacturing firms with other firms using Market leverage

	Manufacturing Firms				***Non-manufacturing firms***			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Dependent variable	ROA	ROE	Tobin's Q	RET	ROA	ROE	Tobin's Q	RET
Market Leverage	-4.859***	-15.163***	-2.292***	-0.157***	-5.921***	-17.734***	-1.706***	-0.240***
	(-8.683)	(-10.853)	(-41.498)	(-4.818)	(-10.140)	(-11.272)	(-35.017)	(-6.825)
Size	0.983***	2.142***	0.041***	0.019***	0.731***	1.706***	0.007**	0.009***
	(29.885)	(26.073)	(12.776)	(9.781)	(19.500)	(16.889)	(2.296)	(4.087)
Tangibility	2.390***	6.762***	0.203***	-0.040*	3.129***	4.880***	0.232***	-0.022
	(5.759)	(6.526)	(4.964)	(-1.651)	(6.725)	(3.893)	(5.966)	(-0.773)
Current Ratio	1.419***	2.978***	0.181***	0.026***	1.153***	2.610***	0.083***	0.019***
	(21.565)	(18.127)	(27.818)	(6.727)	(15.301)	(12.856)	13.247)	(4.253)
Business Risk	-0.413***	-0.736***	0.009***	-0.003***	-0.328***	-0.656***	0.002**	-0.003***
	(-46.456)	(-33.171)	(9.916)	(-5.839)	(-32.868)	(-24.359)	(1.973)	(-5.806)
Constant	-7.814***	-24.167***	0.333***	-0.043	-5.285***	-16.242***	0.720***	0.055
	(-14.929)	(-18.496)	(6.439)	(-1.398)	(-8.147)	(-9.292)	(13.293)	(1.409)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N.	15955	15955	15955	15995	10555	10555	10555	10555
Adjusted *R*-Sq	0.278	0.192	0.206	0.096	0.225	0.162	0.186	0.087

Info: *Splitting the sample in manufacturing firms and all other industries, the t-values are in parentheses, *, ** and *** denote significance levels at the 10%, 5% and 1%, respectively*

Table 17: Robustness test comparing small and big firms using Book leverage

	Small Firms				***Big Firms***			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Dependent variable	ROA	ROE	Tobin's Q	RET	ROA	ROE	Tobin's Q	RET
Book Leverage	-0.538	-2.478**	-0.619***	-0.082***	-4.077***	-5.089***	-1.213***	-0.019
	(-1.220)	(-2.392)	(-15.603)	(-3.689)	(-10.383)	(-5.045)	(-27.794)	(-0.798)
Size	1.698***	2.576***	-0.067***	0.020***	0.439***	1.699***	0.040***	0.004
	(25.128)	(16.244)	(-11.120)	(5.759)	(9.727)	(14.668)	(8.070)	(0.192)
Tangibility	-2.515***	4.058***	-0.915***	-0.092***	-0.880**	-4.430***	-0.352***	-0.108***
	(5.967)	(4.102)	(-24.157)	(-4.366)	(-2.458)	(-4.817)	(-8.858)	(-4.901)
Current Ratio	1.063***	2.220***	0.043***	0.011***	1.480***	2.554***	0.096***	0.023***
	(16.889)	(15.021)	(7.639)	(3.390)	(18.449)	(12.392)	(10.816)	(4.660)
Business Risk	-0.352***	-0.571***	0.010***	-0.002***	-0.329***	-0.762***	0.096***	-0.004***
	(-41.750)	(-28.874)	(13.078)	(-5.065)	(-32.974)	(-29.758)	(10.816)	(-6.351)
Constant	-15.845***	-28.554***	2.268***	0.024	3.053***	-10.033***	1.264***	0.172***
	(-18.344)	(-14.084)	(29.227)	(0.544)	(4.328)	(-5.537)	(16.123)	(3.964)
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N.	13277	13277	13277	13277	13278	13278	13278	13278
Adjusted *R*-Sq	0.236	0.138	0.190	0.056	0.179	0.141	0.277	0.146

Info: *Running the regression with small and big firms, the t-values are in parentheses, *, ** and *** denote significance levels at the 10%, 5% and 1%, respectively*

Table 18: Robustness test comparing small and big firms using Market leverage

	Small Firms				***Big Firms***			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Dependent variable	ROA	ROE	Tobin's Q	RET	ROA	ROE	Tobin's Q	RET
Market Leverage	-1.371**	-8.570***	-1.616***	-0.179***	-11.658***	-26.833***	-2.615***	-0.250***
	(-2.260)	(-5.498)	(-31.705)	(-5.261)	(-22.991)	(-20.019)	(-47.939)	(-7.501)
Size	1.325***	2.284***	-0.048***	0.021***	0.202***	1.268***	-0.002	-0.001
	(19.811)	(13.290)	(-8.474)	(5.599)	(4.195)	(9.959)	(-0.314)	(0.331)
Tangibility	2.550***	6.523***	-0.235***	-0.006	4.630***	6.751***	0.889***	-0.045*
	(5.967)	(5.514)	(-6.074)	(-0.223)	(11.443)	(2.901)	(20.417)	(-1.692)
Current Ratio	1.128***	2.851***	0.099***	0.024***	1.856***	2.901***	0.243***	0.022***
	(16.974)	(16.698)	(17.805)	(6.386)	(24.097)	(14.247)	(29.320)	(4.265)
Business Risk	-0.381***	-0.671***	0.009***	-0.003***	-0.301***	-0.738***	-0.007***	-0.003***
	(-42.307)	(-29.032)	(11.562)	(-5.634)	(-28.861)	(-26.738)	(6.539)	(-4.410)
Constant	-12.077***	-27.429***	1.489***	-0.062	1.804**	-9.886***	0.572***	0.230***
	(-14.404)	(-12.732)	(21.128)	(-1.318)	(2.429)	(-5.034)	(7.152)	(4.701)
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N.	13277	13277	13277	13277	13278	13278	13278	13278
Adjusted *R*-Sq	0.227	0.129	0.153	0.045	0.152	0.113	0.168	0.121

Info: *Running the regression with small and big firms, the t-values are in parentheses, *, ** and *** denote significance levels at the 10%, 5% and 1%, respectively*

Table 19: Robustness test comparing low and high-risk firms using Book leverage

	Low-risk Firms				***High-risk Firms***			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Dependent variable	ROA	ROE	Tobin's Q	RET	ROA	ROE	Tobin's Q	RET
Book Leverage	-6.416***	-11.101***	-1.172***	-0.113***	0.305	0.469	-0.641***	-0.035
	(-18.060)	(-12.655)	(-26.376)	(-4.971)	(0.663)	(0.426)	(-16.271)	(-1.518)
Size	0.923***	2.139***	0.063***	0.016***	1.162***	1.915***	0.008**	0.016
	(34.225)	(32.120)	(18.795)	(9.123)	(27.658)	(19.139)	(-2.220)	(7.473)
Tangibility	-3.662***	-9.611***	-0.443***	-0.157***	3.620***	8.211***	-0.859***	-0.076***
	(-12.072)	(-12.832)	(-11.688)	(-8.068)	(7.987)	(7.609)	(-22.130)	(-3.365)
Current Ratio	0.575***	0.569***	0.073***	-0.003	1.262***	2.989***	0.046***	0.021***
	(9.578)	(3.839)	(9.685)	(-0.900)	(18.283)	(18.181)	(7.707)	(6.029)
Business Risk	-0.420***	-1.296***	-0.006	-0.004	-0.342***	-0.563***	0.008***	-0.003***
	(-5.656)	(-7.073)	(0.692)	(-0.910)	(-37.804)	(-26.134)	(10.586)	(-5.674)
Constant	0.348***	-6.692***	2.268***	0.135***	-12.326***	-27.709***	1.728***	0.001
	(0.719)	(-5.606)	(29.227)	(4.262)	(-17.823)	(-16.829)	(29.181)	(0.039)
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N.	13276	13276	13276	13276	13279	13279	13279	13279
Adjusted *R*-Sq	0.147	0.095	0.156	0.084	0.223	0.133	0.136	0.077

Info: *Running the regression with low-risk and high-risk firms, the t-values are in parentheses, *, ** and *** denote significance levels at the 10%, 5% and 1%, respectively*

Table 20: Robustness test comparing low and high-risk firms using Market leverage

	Low-risk Firms				***High-risk Firms***			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Dependent variable	ROA	ROE	Tobin's Q	RET	ROA	ROE	Tobin's Q	RET
Market Leverage	-10.050***	-22.608***	-2.513***	-0.248***	-2.581***	-12.002***	-1.678***	-0.160***
	(-22.027)	(-18.621)	(-44.228)	(-7.622)	(-4.090)	(-7.468)	(-33.239)	(-4.647)
Size	0.673***	1.811***	0.052***	0.013***	1.043***	1.931***	0.006*	0.015***
	(26.039)	(26.333)	(16.004)	(6.951)	(25.113)	(18.257)	(1.736)	(6.805)
Tangibility	1.234***	-0.952	0.632***	-0.052**	4.525***	12.994***	-0.097**	-0.019
	(3.763)	(-1.091)	(15.474)	(-2.212)	(8.858)	(9.985)	(-2.381)	(-0.676)
Current Ratio	1.391***	1.985***	0.191***	0.012***	1.312***	3.366***	0.118***	0.029***
	(22.935)	(12.299)	(25.263)	(2.787)	(17.758)	(17.885)	(20.008)	(7.134)
Business Risk	-0.233***	-1.138***	0.008	-0.005	-0.352***	-0.635***	0.007***	-0.003***
	(-2.928)	(-5.376)	(0.853)	(-0.894)	(-36.666)	(-25.940)	(8.545)	(-5.710)
Constant	-2.855***	-12.612***	0.004	0.068**	-10.906***	-28.542***	0.877***	-0.026
	(-6.610)	(-10.973)	(0.069)	(2.193)	(-16.568)	(-17.023)	(16.656)	(-0.711)
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N.	13276	13276	13276	13276	13279	13279	13279	13279
Adjusted *R*-Sq	0.147	0.115	0.242	0.102	0.234	0.149	0.186	0.092

Info: *Running the regression with low-risk and high-risk firms, the t-values are in parentheses, *, ** and *** denote significance levels at the 10%, 5% and 1%, respectively*

Table 21: Robustness test country separation using Book leverage

	Model 1 Germany Tobin's Q	Model 2 Germany ROA	Model 3 Germany ROE	Model 4 Germany RET	Model 5 France Tobin's Q	Model 6 France ROA	Model 7 France ROE	Model 8 France RET
Book Leverage	-0.863***	-0.867	0.775*	0.003	-0.917***	-4.553***	-0.278	-0.097*
	(-8.133)	(-0.825)	(0.295)	(0.055)	(-10.478)	(-4.282)	(-0.108)	(-1.755)
Size	-0.015*	0.467	1.197***	-0.002	0.011*	0.565***	1.000***	0.017***
	(-1.917)	(6.067)***	(6.390)	(-0.371)	(1.742)	(7.525)	(5.502)	(4.464)
Tangibility	-0.753***	1.438	3.071	-0.091*	-0.343***	1.976**	5.908**	-0.138***
	(-7.680)	(1.480)	(1.299)	(-1.768)	(-4.557)	(2.163)	(2.670)	(-2.910)
Current Ratio	0.006	1.336***	2.460***	-0.001	0.100***	1.171***	2.776***	0.010
	(0.384)	(7.960)	(6.024)	(-0.144)	(5.992)	(5.692)	(5.567)	(0.917)
Business Risk	0.004*	-0.524***	-0.686***	-0.004***	0.012***	-0.423***	-0.760***	-0.003***
	(1.703)	(-22.058)	(-11.868)	(-2.953)	(7.296)	(-21.937)	(-16.265)	(-3.207)
Constant	2.166***	-1.068	-12.441	0.405	1.348	-2.283	-14.896	0.106
	(14.009)	(-0.697)	(-3.338)	(4.998)	(11.697)	(-1.630)	(-4.389)	(1.456)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2635	2635	2635	2635	2718	2718	2718	2718
Adjusted *R*-Sq	0.132	0.279	0.130	0.112	0.196	0.272	0.178	0.090

Info: Robustness check, running regressions for the three biggest firms in the sample and all other firms, the t-values are in parentheses, ∗, ∗∗ and ∗∗∗ denote significance levels at the 10%, 5% and 1%, respectively

Table 22: Robustness test country separation using Book leverage

	Model 1 United Kingdom Tobin's Q	Model 2 United Kingdom ROA	Model 3 United Kingdom ROE	Model 4 United Kingdom RET	Model 5 Other Tobin's Q	Model 6 Other ROA	Model 7 Other ROE	Model 8 Other RET
Book Leverage	-0.297***	4.198***	12.368***	0.033	-0.807***	-2.802***	-8.963***	-0.045*
	(-3.159)	(4.457)	(5.295)	(0.616)	(-21.515)	(-7.361)	(-8.866)	(-1.926)
Size	-0.003	1.005***	2.098***	0.001	0.048***	0.997***	2.202***	0.020***
	(-0.397)	(13.234)	(11.140)	(0.115)	(15.705)	(32.223)	(26.816)	(10.511)
Tangibility	-0.490***	4.941***	11.421***	-0.132**	-0.528***	-0.806**	-3.793***	-0.095***
	(-5.115)	(5.185)	(4.834)	(-2.460)	(-14.557)	(-2.187)	(-3.875)	(-4.148)
Current Ratio	0.140***	1.303***	2.686***	0.020**	0.053***	1.069***	2.205***	0.022***
	(8.386)	(7.772)	(6.463)	(2.124)	(7.560)	(14.905)	(11.573)	(4.978)
Business Risk	0.002	-0.491***	-0.896***	-0.005	0.005***	-0.310***	-0.619***	-0.003***
	(0.950)	(-26.916)	(-19.801)	(-4.676)	(6.749)	(-37.760)	(-28.363)	(-4.970)
Constant	1.496***	-12.455***	-32.913***	0.164**	0.957	-5.019	-15.263***	-0.035
	(11.140)	(-9.254)	(-9.861)	(2.163)	(17.530)	(-9.061)	(-10.375)	(-1.023)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4089	4089	4089	4089	17108	17108	17108	17108
Adjusted *R*-Sq	0.135	0.350	0.259	0.089	0.121	0.237	0.169	0.102

Info: Robustness check, running regressions for the three biggest firms in the sample and all other firms, the t-values are in parentheses, *, ** and *** denote significance levels at the 10%, 5% and 1%, respectively

Table 23: Robustness test country separation using Market leverage

	Model 1 Germany Tobin's Q	Model 2 Germany ROA	Model 3 Germany ROE	Model 4 Germany RET	Model 5 France Tobin's Q	Model 6 France ROA	Model 7 France ROE	Model 8 France RET
Market Leverage	-0.160***	-5.645***	-6.747**	-0.160***	-2.011***	-7.480***	-11.056***	-0.205***
	(-4.647)	(-4.018)	(-1.969)	(-4.647)	(-18.630)	(-5.463)	(-3.333)	(-2.871)
Size	0.015***	0.455***	1.195***	0.015***	-0.002	0.502***	0.989***	0.016***
	(6.805)	(5.956)	(6.413)	(6.805)	(0.380)	(6.816)	(5.541)	(4.185)
Tangibility	-0.019	2.985***	4.636*	-0.019	0.396***	5.024***	8.714***	-0.062
	(-0.676)	(2.938)	(1.871)	(-0.676)	(5.398)	(5.397)	(3.863)	(-1.280)
Current Ratio	0.029***	1.411***	2.408***	0.029***	0.194***	1.642***	2.783***	0.020**
	(7.134)	(9.699)	(6.786)	(7.134)	(14.386)	(9.593)	(6.708)	(2.217)
Business Risk	-0.003***	-0.526***	-0.687***	-0.003***	0.011***	-0.428***	-0.762***	-0.003***
	(-5.710)	(-22.215)	(-11.900)	(-5.710)	(6.953)	(-22.251)	(-16.363)	(-3.321)
Constant	-0.026	-1.738	-11.967***	-0.026	0.718***	-5.450***	-14.928***	0.039
	(-0.711)	(-1.305)	(-3.683)	(-0.711)	(7.786)	(-4.659)	(-5.267)	(0.644)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2635	2635	2635	2635	2718	2718	2718	2718
Adjusted *R*-Sq	0.188	0.285	0.132	0.112	0.266	0.276	0.182	0.092

Info: Robustness check, running regressions for the three biggest firms in the sample and all other firms, the t-values are in parentheses, ∗, ∗∗ and ∗∗∗ denote significance levels at the 10%, 5% and 1%, respectively

Table 24: Robustness test country separation using Market leverage

	Model 1 United Kingdom Tobin's Q	Model 2 United Kingdom ROA	Model 3 United Kingdom ROE	Model 4 United Kingdom RET	Model 5 Other Tobin's Q	Model 6 Other ROA	Model 7 Other ROE	Model 8 Other RET
Market Leverage	-2.266***	-6.855***	-22.081***	-0.270***	-1.921***	-5.157***	-17.335***	-0.179***
	(-17.546)	(-5.037)	(-6.555)	(-3.534	(-43.662)	(-11.021)	(-13.974)	(-6.177)
Size	0.012*	1.168***	2.597***	0.004	0.043***	0.975***	2.136***	0.020***
	(1.749)	(15.801)	(14.189)	(0.974)	(14.860)	(31.921)	(26.376)	(10.553)
Tangibility	0.137	5.381***	13.171***	-0.077	0.205***	1.315***	3.336***	-0.033
	(1.489)	(5.551)	(5.448)	(-1.405)	(5.740)	(3.464)	(3.206)	(-1.422)
Current Ratio	0.174***	0.986***	1.760***	0.018**	0.136***	1.356***	3.112***	0.027***
	(12.324)	(6.632)	(4.784)	(2.209)	(24.104)	(22.579)	(19.613)	(7.187)
Business Risk	0.004**	-0.483***	-0.871***	-0.005***	0.005***	-0.314***	-0.630***	-0.003***
	(2.089)	(-26.447)	(-19.250)	(-4.427)	(6.215)	(-38.635)	(-29.243)	(-4.975)
Constant	0.973***	-11.121***	-29.277***	0.140**	0.300***	-7.231***	-22.378***	-0.075**
	(8.202)	(-8.895)	(-9.459)	(1.998)	(6.588)	(-14.946)	(-17.448)	(-2.511)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4089	4089	4089	4089	17108	17108	17108	17108
Adjusted *R*-Sq	0.219	0.351	0.258	0.093	0.204	0.241	0.176	0.105

Info: Robustness check, running regressions for the three biggest firms in the sample and all other firms, the t-values are in parentheses, ∗, ∗∗ and ∗∗∗ denote significance levels at the 10%, 5% and 1%, respectively

6. Conclusion, Recommendations & Limitations

6.1 Conclusion, Recommendations

Capital structure has been a popular topic in financial research since the publication of the proposition of Modigliani & Miller in 1958. Over the years different capital structure theories have been developed, such as the pecking order theory, trade-off theory, market timing theory and the agency theory. These theories emerged into the finance research field and many have tried to analyse the implications for firms. The pecking order theory of Meyers and Majluf (1984) suggests a negative impact of leverage on financial performance. Whereas the trade-off theory from Kraus and Litzenberger (1973) suggests a positive impact of leverage on financial performance. The market timing theory suggests that a firm does not reach for a certain level of leverage, but that it depends on multiple factors which kind of financing a firm will use and therefore gives no clear direction of the relationship between leverage and financial performance. The agency theory of Jensen and Meckling (1976) also gives no clear direction about the impact of leverage on financial performance. On one hand it suggests higher leverage mitigates the agency problem which increases financial performance, but on the other hand it says higher leverage causes the underinvestment problem which lowers a financial performance.

The research on the impact capital structure on financial performance for European listed firms has been minimum, by my best knowledge it is not even done before. This raises the question which capital structure theory is most suitable for European listed firms. Therefore, this study contributes to the existing literature by analysing European listed firm over the period 2009-2017 with the exclusion of financial, service and government-owned companies.

The research starts by defining the proxy variables for financial performance, the independent variable. Return on assets, return on equity, Tobin's Q and stock return are used as the proxy for financial performance. There are two independent variables, book leverage is defined as a firm's debt to total assets ratio and market leverage as book value of the long-term debt divided by the book value of the total assets minus the book value of the total equity plus the market value of the equity. Thereafter, analyzing factors that are determinants of a firm's capital structure. These are size, tangibility, current ratio and business risk, which are used as control variables.

The regression is performed using the variables above. Next to these variables, dummy variables were added to the regression to control for, industry differences and year differences. The regression analysis had been performed eight times, each time with a different proxy for financial performance as dependent variable for both, book leverage and market leverage.

All the proxies suggest a negative impact of book and market leverage on financial performance. When using RET as the dependent variable, a one standard deviation change in leverage has a negative impact of -0.0138 (-1,38%) for book leverage and – 0.029 (-2.9%) when using market leverage. When ROA is used as the dependent variable, book leverage shows a similar negative impact on ROA -1.37% and a smaller impact using market leverage -0.739% when leverage is increased one standard deviation. With ROE as the dependent variable leverage reports a bigger impact. When leverage is increased one standard deviation, ROE decreases -2.66% for book leverage and -2.41% for market leverage. At last when we look to Tobin's Q and increase leverage with one standard deviation, Tobin's Q decreases with -0.190 point when using book leverage and -0.290 point when using market leverage. These results are all in favour of the Pecking order theory, because more profitable firms have more retained earnings to finance their investments. But is also in favour of the agency theory for the part that states that high leverage causes the underinvestment problem. Looking the second hypothesis no severe difference was found for the post crisis years 2009-2010 compared to the years 2011-2017.

To test if the results hold under different circumstances four different robustness tests are performed. The first robustness tests show that the manufacturing industry, which covers more than half of the sample, has different results compared to non-manufacturing firms. For manufacturing firms book leverage has a significant negative impact on all proxies of financial performance at the 0.01 level. For the non-manufacturing firms the impact of book leverage on Tobin's Q stays negative significant at the 0.01 level, but drops from the 0.01 level to the 0.05 level when using ROA or Stock Return as the dependent variable. When using ROE as dependent variable leverage loses all its significance. For market leverage the results are comparable between manufacturing firms and non-manufacturing firms. The second robustness test compares small and big firms in terms of total sales. The test shows that the significant negative impact of book leverage on Tobin's Q and ROA is much stronger for big firms. The impact of book leverage on ROA is negative significant at the 0.01 level for large firms but has no significant impact on small firms and that the impact of book leverage on Stock Return is negative significant at the 0.01 for small firms but has no significance for big firms. When using market leverage as dependent variable comparable results were found for Tobin's Q and RET between big and small firms. But for ROA and ROE market leverage shows a much bigger impact on big firms. The third robustness check compares low and high-risk firms. Using book leverage shows that the results are much stronger and more significant for low-risk firms. For low-risk firms the impact of leverage on the proxies is significant at the 0.01 level for all proxies of financial performance. Looking to the high-risk firms there is only a significant impact of leverage on Tobin's Q, significant at the 0.01 level. When market leverage is used as independent variable there is no severe difference on the impact of leverage on Tobin's Q and RET between low and high-risk firms. But when we compare the impact of market leverage on ROA and ROE, the impact is much bigger on low-risk firms. The last

robustness test separates the sample into four different groups. The test separates the sample based on country representativeness, and compares the groups; UK firms, German firms, France firms and other firms. The regression results show that Tobin's Q stays significant among all sub-samples at the 0.01 level. ROA loses its significance in Germany but stays significant at the 0.01 level for the other sub-samples. ROE loses its significance for and France firms but stays significant at the 0.01 level for the other firms and firms from the UK and significant at the 0.1 level for German firms. RET loses its significant explaining power for German firms and firms from the UK. The significance for the other sub-samples drops from 0.01 to 0.1. The impact of market leverage is significant negative at the 0.01 level on all the proxies of financial performance. The impact of market leverage on Tobin's' Q varies between -0.160*** and -2.220***, which is a large difference. While ROA and RET report comparable results among the sub-samples. The impact on ROE is four times stronger in the UK compared to firms from Germany.

Overall this thesis contributes to the literature by finding a significant negative impact of leverage on Tobin's Q, ROA, ROE and RET for European listed firms with the exclusion of financial, service and government-owned firms, all at the 0.01 significance level. Which is in favour of the pecking order theory and partly of the agency theory. The relationship doesn't hold for the impact of leverage on ROE for non-manufacturing firms. When splitting the sample based on size and business risk there is no significant negative impact of leverage on ROA for small firms and no impact on Stock Return for big firms when using book leverage. Splitting the sample based on low and high-risk firms show that there is no significant negative impact of book leverage on ROA, ROE and RET for high-risk firms. For firms from the UK book leverage has no significant impact on RET. For German firms there is no significant impact of book leverage on ROA and RET and for France firms there is no significant impact on ROE. For the firms from the other countries the impact of book leverage stays significant on all proxies of financial performance. When using market leverage, the significant negative impact of market leverage on financial performance holds up in all robustness tests.

6.2 Limitations

Although this research tried to test the above-mentioned relationship between leverage and financial performance as thoroughly as possible, there are some limitations of this research. These limitations can be used as a basis for further future research for the relation between leverage and financial performance.

First, there exists no benchmark researching the impact of leverage on financial performance for European listed firms. Because the literature researching the impact of capital structure on financial performance for European listed firms is extremely limited, not even mentioned with the exclusion of financial, service and government-owned companies. Therefore, it was not possible to compare our findings with that of a similar sample.

Secondly, only active listed firms were used in this sample. We used only active firms because including firms that have gone bankrupt will disturb the analyses. Firms that have gone bankrupt often face high leverage as stated by Laitinen (1991). This will result in more outliers in terms of leverage ratio. But, excluding this firms will leave us with survival bias. This bias is caused by the fact that we include only the active firms and exclude the firms that doesn't exist anymore. Carpenter and Lynch (1999) state that this survival bias creates a reversel effect which dominates the presistence effect. This means that it can make the results look better than they acualty are, because the firms that have gone bankrupt (the firms whith high leverage and low financial performance) during this period are excluded from the sample.

Third, many could argue that due to the use of panel data a random effect or fixed effect model could be used. But to chose between a fixed effects or random effects model a Hausman specification test must be performed[2], but this is not possible with the statistic program used, called SPSS. The Hausman test detects endogenous regressors (predictor variables) in a regression model. Endogenous variables have values that are determined by other variables. The problem with these endogenous variables is that it will cause an OLS regression to fail, because for an OLS regression there may exist no correlation between the error term and the predictor variable[4]. The Hausman test starts with a null hypothesis that the preferred model is random effects and a alternative hypothesis that the preferred hypothesis is fixed effects. The essence of the test is to check if there is correlation between the unique errors and the regressors in the model. The null hypothesis states that there is no correlation between the regressors and the error term[2]. So when there is no correlation a random effects model is preferred and when there is correlation a fixed effects model is preferred. Another option is the Breusch-Pangan Lagrange multiplier test, this test help to determine if you have to use a random effects regression or simple ordinary least squares regression. Breusch and Pagan (1979) developed this test to check for heteroskedasticity in a linear regression. It tests

[2] http://www.statisticshowto.com/hausman-test/

if the variance of the error terms is dependent on the independent variables of a regression, if this is the case, there exists heteroskedasticity (Cook & Weisberg, 1983). Here the null hypothesis is that the error variances are all equal and the alternative hypothesis is that they are not equal[3]. If the null hypothesis hold you can use an OLS regression and If the null hypothesis is rejected a random effects model should be used[3]. But since this test is also not available in SPSS it was not possible to use such test therefore a multiple linear regression was used.

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