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The Impact of Tangible Assets on Capital Structure

An analysis of Swedish listed companies

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Abstract

This thesis examines if tangible assets is a significant explanatory variable to explain the debt to total assets ratio. In addition, further analysis regarding the importance of the composition of the tangible assets is assessed. This is done in order to test if some specific tangible assets can give additional explanatory power to the model trying to explain the capital structure decision within firms. The sample for the analysis consists of listed companies in Sweden with data between 2005 and 2014. The analysis is made with two separate OLS regression models. The first model aim to find the relationship between the overall tangibility and the debt ratio and the second model is designed to capture the effect of the decomposed tangible assets. The results from running the regression shows that the overall tangibility is a significant explanatory variable that is positively related to the debt level. Furthermore, the second regression model shows that the least firm specific assets have the largest impact on capital structure, which is in accordance with previous evidence. Conclusively the results show that tangible assets explain the capital structure decision. The theoretical framework for this thesis is the pecking order and trade-off theory and these theories provide no uniformly explanation to the findings of this paper. Even though the trade-off theory does not explicity discusses the composition of tangible assets, this theory predicts a positve relationship in contrary with pecking order theory. We received postive coefficents on all of our variables for tangible assets and therefore the best theory of these two is the trade-off theory.

Key words: Tangible Assets, Capital Structure, Leverage, Pecking Order Theory, Trade-off Theory

Table of content

1 Introduction

Tangible assets are one of the key drivers for explaining the capital structure within firms (Charalambakis & Psychoyios, 2012). The impact of a firm's composition of assets and how they explain its capital structure is an ongoing debate. Tangible assets are generally more liquid than intangible assets. Therefore, tangible assets have a higher second market value, and in case of bankruptcy these could be quickly and easily sold. Furthermore, ownership of tangible assets should give companies with such assets an increased debt capacity. As Siblikov (2009) argues the question if tangible assets are negatively or positively associated with debt is not clear. The current divergence between existing studies and theories concerning the relationship triggered this thesis concerning if tangible assets is a significant variable in order to explain companies debt levels.

The composition of tangible assets is of importance to explain the level of debt within firms (Giambona, Golec, & Schwienbacher, 2014). Tangible assets are divided into smaller and more specific assets groups, which are presented in the notes of the annual reports. Consequently, this division reveals in some extent the redeployability and liquidity of the assets. Tangible assets that could be used within different industries should suggest higher debt capacity for the firm. The impact of the composition of the tangible assets on the debt level will be analysed in this thesis.

Modigliani and Millers proposition from 1958 laid the foundation for modern corporate finance (Hillier, 2013). Since then, several theories have developed from their thesis, two of these are the trade-off- and pecking order theory. The trade-off- and pecking order theory are contradicting each other concerning if tangible assets have a positive or negative effect on debt level. The first mentioned theory predicts a positive relationship, while the second predicts a negative.

The source of inspiration for this paper is "What do we know about capital structure? Revisiting the impact of debt ratios on some firm-specific factors" written by Charalambakis and Psychoyios (2012). Their paper concludes that tangible assets have a positive effect on the debt ratio. In this thesis inspiration is taken from their regression model to explain the debt ratio, in which tangible assets is one of the explaining variables.

From a sample of the thirty largest listed companies of each country in Scandinavia, Sweden stands out as the country that has the lowest average ratio of tangible assets to total assets on its balance sheet (see Appendix 1). Even though Sweden on average has the lowest ratio of tangible assets it is the country with the highest debt to total assets ratio. Tangible assets are assumed to be a variable of impact for leverage and due to the occasion of Sweden's low proportion of tangible assets and high debt ratio the question arises. Do tangible assets have a significant positive impact on debt level on firms listed in Sweden? as it has on American and British firms according to the results of Charalambakis and Psychoyios (2012). This is the motivation for the choice to specifically focus our research on Swedish firms.

1.1 Purpose and Question Formulation

The purpose of this paper can be concluded with two questions. Firstly, do tangible assets have a positive or negative relationship on debt ratios of the largest listed firms in Sweden? Secondly, can the composition of tangible assets in a larger extent explain the capital structure decision?

1.2 Hypothesis

Our research is premised on the following two hypotheses:

H1: Tangible assets have a positive effect on the debt to total assets ratio.
H2: Non-firm specific tangible assets have a positive effect on the debt to total assets ratio, which is stronger than the overall effect of tangibility.

Tangible assets should have a positive effect on the debt level because they are easier to value and resell. Furthermore, these advantages should lead to lower financing costs since these assets can be used as collateral in a potential bankruptcy. The relatively lower costs for debt should in extent lead to higher debt ratios. In addition, the compositions of tangible assets are of importance and specifically it is the least firm specific assets that should have the highest secondary value on the market and the strongest impact on the debt level.

1.3 Outline of thesis

This thesis is organised into eight chapters. The first chapter gives an informative introduction to the subject of the paper and in addition the purpose, question formulation and hypotheses are presented. In the second section the relevant theory is presented, followed by the third section, which presents previous studies within the subject. Section four presents the methodology of the study, in this chapter the two regression models used are presented along with descriptions about additional data tests that will be performed. Section five gives a detailed presentation about the data gathering and the data sample. The results of the study is presented in chapter six, which is followed by section seven where the results are analysed and compared with previous studies and the hypotheses of this thesis. Section eight ends the thesis with a conclusion of the main results of this study.

2 Theory

The following section presents the relevant theories underlying the thesis. Firstly, the Modigliani & Millers proposition I is presented which forms the foundation of the following two theories, the trade-off theory and the pecking order theory, which more precisely relates to the questions of this paper.

2.1 Modigliani & Millers proposition

A paper of fundamental impact published by Modigliani and Miller in 1958 is "The Cost of Capital, Corporation Finance and the Theory of Investment" and is one of the most important foundations in corporate finance. Their capital structure irrelevance proposition claims that a firm cannot change its value by changing its capital structure. Their initial proposition is built on the assumption of a perfect market with no taxes, transaction costs or financial distress costs. According to Modigliani and Miller (1958) the capital structure has no impact on firm value and an unlevered firm should have the same value as an identical levered firm. (Hillier, 2013)

This result is known as the *MM Proposition I without corporate taxes*, and is generally considered as the starting point of modern corporate finance (Hillier, 2013). Modigliani and Millers argument for this result is based on what is called homemade leverage. The implication of homemade leverage is that investors do not need the company to borrow for them, instead they can just as well borrow the money themselves. Consider an investor who wants to invest in a levered firm, but the only investment prospect available is of an unlevered firm. What he can do is to invest the amount of cash he would have done in the levered firm and take a levered position on a margin account, which allows him to buy additional stocks for borrowed funds. In extent, it can be shown that the cost and pay-off from this strategy is the same as the cost and pay-off from investing in an identical levered firm. Thus Modigliani and Miller claim that the investor receives nothing from corporate leverage that the individual cannot get on its own.

One underlying assumption concerning homemade leverage that must hold is that individuals and corporates have the same borrowing rate. If individuals do not have the same beneficial borrowing terms, individuals would actually benefit from corporate leverage and thus a levered

firm would have a higher value than an unlevered firm. However, as argued by Hillier (2013) this assumption is not that extreme as it first might sound. He argue that because of the requirements of additional cash contributions on margin accounts in case of sudden price drops and the fact that the broker can easily sell stocks from the account, the brokers face very little default risk. This in turn leads to interest rates on margin accounts only slightly above the risk-free rate. On the other hand, corporations often borrow against illiquid assets, thus it is not necessarily the case that investors borrow on worse terms than corporations.

Modigliani and Miller developed their initial model and took into account the fact taxes exists in the real world. The inclusion of taxes in the model gives firms taking on debt a tax advantages due to the tax shield and therefore should a company taking on debt be worth more than an identical unlevered firm. The tax shield arises because interest payments are considered a cost in a tax legal perspective, which is in contrast to dividend payments which are made after taxes have been paid. This means that a company with higher proportion of debt compared to an identical unlevered firm, have to pay less of its cash flow in taxes and can pay more to its debtholders and shareholders. Thus the levered firm should be worth more than an unlevered firm. The value of a levered firm is the value of an identical unlevered firm plus the present value of the tax shield. This is known as *MM Proposition I with corporate taxes*. Ultimately, this development of the proposition concludes that in order to maximize firm value firms should be 100 percent debt financed. (Hillier, 2013)

2.2 Trade-Off Theory

The trade-off theory is a development of the MM proposition. In addition to MM, this theory considers the extra risk that debt implies. In comparison with the MM proposition, which claims that companies should maximize their leverage in order to take full advantage of the beneficial tax shield, the trade-off theory says that there is an optimal amount of debt where the extra benefit from increased debt is equal to the extra cost of financial distress. According to the trade-off theory, the value of a levered firm is calculated as the value of an identical unlevered firm plus the present value of the tax shield, subtracted with the present value of the financial distress costs. At the point where the equation is maximised, we find the firm's optimal debt level. (Berk

& DeMarzo, 2014)

Like the name of the theory suggests it exist a trade-off to find a balance between taking full advantage of the tax shield and at the same time reduce the financial distress costs. Calculation of financial distress costs for a firm is the most challenging task in order to determine the optimal debt level. Mainly, the financial distress cost is based on three aspects. Firstly, the probability for the firm to face financial distress is considered, for example a company with very consistent cash flows and with a low beta is less reluctant to face financial distress. Secondly, the size of the costs that a company have to pay in a potential financial distress situation is of importance and is suggested to vary by industry. For example real estate firms are assumed to have lower financial distress cost in comparison with technology firms, whose value comes mostly from their human capital. Thus the real estate firms have a larger proportion of their firm value that could easily be sold. Thirdly, finding a suitable discount rate for the distress cost is crucial for calculating the financial distress costs, the discount rate chosen depends on the market risk of the firm. (Berk & DeMarzo, 2014)

An extension of the original definition of the trade-off theory exists and this includes both agency- benefits and costs. The inclusion of the agency benefits in the firm valuation calculation was suggested partly by the free cash flow hypothesis. This specific hypothesis implies that managers decrease their wasteful spending due to leverage and the limited amount of free cash flow and therefore this theory suggest a positive relationship between leverage and market value. Another idea that is strongly connected with this assumption is that management entrenchment reduces with debt and therefore the value of the company increases. Mainly it is because of two reasons, firstly managers are more vulnerable to lose their job if the company suffers from financial distress and secondly, highly indebted companies are also more closely monitored. Both of these arguments is claimed to reduce management entrenchment. Concerning the agency costs of debt, these expenses occur when it exist disagreements between the stakeholders. Examples of such situations are when firms have high proportion of debt in relation to assets and the shareholders want to invest in risky projects, are unwilling to take on positively NPV-projects or when they take advantage of liquid assets and sell them underprized in order to receive dividends. All of these actions decreases firm value and are only short-term actions. (Berk & DeMarzo,

2014)

Conclusively, the trade-off theory claims there should be a positive relationship between leverage and tangible assets and that the type of industry has an impact. Generally, companies whose core business are related mainly with research and development costs and have great prospects to grow will have lower debt financing than mature firms with low growth forecasts. The reason is because in case of financial distress the stakeholders have a better position in a firm with a high tangible- to total asset ratio, because of the possibility to sell to the secondary market. In addition non-firm specific tangible assets should lower the cost of financial distress and therefore increase the optimal debt capacity. (Berk & DeMarzo, 2014)

2.3 Pecking Order Theory

The pecking order theory assumes that a company have three sources of financing, which are internally generated cash flow, debt issue and equity issue. The theory suggests that a company should firstly finance their projects with internally generated cash flow, secondly they should issue debt and thirdly they should issue equity. The idea behind this order of financing comes from the concept of asymmetric information and signalling value. (Hillier, 2013)

Asymmetric information means that the typical investor and the manager of a company are not likely to have the same information to value the company. Obviously, since the manager works at the company every day, the manager should have more information about prospects and ongoing projects and thus know more about the true value of the company. However, the typical investor is aware that the manger has access to more information, which leads to actions undertaken by the manger to have a signalling effect on the market. (Hillier, 2013)

To illustrate the signalling value of the managers actions, assume that the manager know the true value of the equity is 10$, but the stock is undervalued and trades at 9$. No rational manager would issue equity in this situation, instead he should issue debt. The debt issue might be taken as a signal on the market that the equity is undervalued and thus the stock will be bided up. On the other hand, if the manager knows the true value of the equity is 10$, but the stock is currently

overvalued and trades at 11$, a rational manager should issue equity. If the manager can sell stocks for 11$ when it is actually worth 10$, he is giving his old stockholders 1$ per newly issued share for free. However, this equity issue might not be possible, because when the manger announces that the firm is going to issue equity for 11$, the market takes this as a signal that the equity is overvalued and thus the stock is bided down on the market. (Hillier, 2013)

The theory suggests that if a company need outside financing, it should always prefer to issue debt in order to avoid sending signals to the market that the company is overvalued. This seem like bit of extreme results, just like the MM result that in a world of corporate taxes but no financial distress costs, a firm should be 100 per cent debt-financed. However, in reality agency costs and financial distress costs are considered under this theory as well, which implies that the company might issue debt just to a certain upper limit. (Hillier, 2013)

The pecking order theory suggests, in contrary to the trade-off theory, that there is no optimal amount of debt. Instead, it suggests that profitable companies should finance themselves through retained earnings. This means the percentage of debt in the capital structure should be lower, since internally financed projects raise the value of the equity. Further, since tangible assets are easier to value than intangible assets, tangible assets should lead to less asymmetric information. Consequently, companies that possess high levels of tangible assets should be able in a larger extent to issue equity without sending negative signals. Conclusively this theory implies that there exist a negative relationship between tangible assets and debt. (Hillier, 2013)

3 Previous studies

First and foremost, the source of inspiration for this thesis is ”What do we know about capital structure? Revisiting the impact of debt ratios on some firm-specific factors” written by Charalambakis and Psychoyios (2012). In their paper they discuss and investigate which factors that are the most explanatory in order to determine capital structure for American and British companies. Specifically, they examine the relationship between four firm-specific factors that were assumed to affect leverage. Tangibility was one of these factors and was concluded to have a positive effect on firms' debt ratios. Beside tangible assets, size, profitability and growth opportunities were the variables used in their study for explaining the debt level. In addition, inspiration is taken from the paper "Asset Tangibility and Capital Structure" by Campello and Giambona (2010), which more specifically investigates how the composition of tangible assets affects debt ratios.

A great amount of previous studies shows that tangible assets affects capital structure, but the question concerning if tangible assets are negatively or positively associated with debt is not clear (Siblikov, 2009). One of the proponents of a positive association is the paper of Shleifer and Vishny (1992), which claim that liquid assets are easier to redeploy and should thus lower the costs of financial distress. Ultimately, this should result in lower costs of debt, which in turn should imply higher debt financing. In addition, Sibilkov (2009) also argue that capital structure decisions within firms are influenced by the expected financial distress costs and that the ability to be efficient in a possible liquidation is important to lower the cost of financial distress. In contrary, Morellec (2001) argues that there exists a negative association to leverage from having tangible assets due to the possibility for managers to use the tangible assets and sell them underprized for short term funding which in turn penalizes the debt and shareholders. Instead Morellec (2001) argues that it is just collateralized liquid assets that lower the cost of debt, in general uncollateralized tangible assets could in fact have a negative impact on debt.

The composition of tangible assets is stated to have a great importance for companies' ability to raise their leverage capacity. Campello and Giambona (2010) conclude, "*The redeployable component of tangible assets drives observable capital structure"*(p. 22). Further, they argue that the importance of having assets that are redeployable is especially important for smaller, unrated,

low-pay-out firms that confront credit frictions. In another study by Giambona et al. (2014) it is shown that the least firm specific assets *Land and Buildings* have the highest explanatory power and the strongest effect on the debt level. Consistent with these results, the importance of the redeployability of an asset for the debt level was shown in Benmelechs paper (2009;2007). This paper specifically examines the redeployability of rolling stocks and tracks from the19th century railroad industries in the US in order to conclude how asset saleability and debt maturity are related with each other. This study is interesting because it presents evidence that more easily sold assets, for example tracks that could be used by many firms are a variable of impact to determine debt, especially for longer debt maturities. Moreover, the results from a study of U.S. airlines suggest that the possibility to pledge collateral increases firms' debt capacity, specifically the redeployable collateral is shown to have the greatest impact (Benmelech & Bergman, 2009). Consistently are the evidence from a study made by Hall and Thomas (2012;2011). Their paper show that when creditors have access to perfect claims on physical assets, in particular land, there is a strong association between tangibility and leverage and in addition the tangible assets can be used to increase the debt financing. Inconsistently with these previous studies, Titman (1988) results show that the collateral value does not have an effect on the debt level.

4 Methodology

In order to perform the analysis, two separate regression models are used based on panel data. The aim with the first regression model is to analyse the impact of tangible assets on the debt to total asset ratio. The second regression models goal is to examine if some specific tangible assets have a larger impact than other on the capital structure decision. In order to perform these regressions data are collected from all of the 271 listed companies on the OMX Stockholm Exchange (data gathered 30/03/15), the numbers collected is used to perform pooled OLS regressions to test our hypothesises. In order to evaluate these hypothesises t-statistics and p-values of the coefficients will be examined. The level of the p-value at which we conclude a coefficient to be significant is chosen to be 0,05, in addition this level of significance was suggested by Fisher (1958) as a convenient significance level and have since then been the standard significance level in statistics.

4.1 Overall effect of tangible assets

The first regression model aims to explore and provide evidence whether tangible assets have a positive and significant impact on the debt to total asset ratio or not. This model is constructed with inspiration from the one used in Charalambakis and Psychoyios paper (2012). In their model they use leverage as the dependent variable and the following independent variables: tangibility, size, profitability and growth opportunities, which according to them are the four key drivers of leverage. Based on their regression model we make an adjustment, instead of growth opportunities (which is defined as market value of assets divided by book value of assets) the variable growth is included instead. Growth is measured as the difference between total asset in the current and previous time period divided by total assets in the previous time period. One of the main reason for this definition and measurement change from the original model is due to the fact that there are a lots of missing values in the data file that are needed to calculate growth opportunities. Furthermore, we find the definition for growth opportunities a bit abstract and we think this is hard to quantify in real numbers. In comparison the variable growth is more straightforward in its definition. In addition, we also chose to include industry classification dummies in order to capture the differences between the industries in the sample.

The first model is:

$$Lev_{i,t} = \beta_0 + \beta_1 Tang_{i,t} + \beta_2 SZ_{i,t} + \beta_3 PF_{i,t} + \beta_4 GW_{i,t} + \beta_5 ICB_{1_i} + \beta_6 ICB_{2_i} + \beta_7 ICB_{3_i} + \beta_8 ICB_{4_i} + \beta_9 ICB_{5_i} + \beta_{10} ICB_{6_i} + \beta_{11} ICB_{7_i} + \beta_{12} ICB_{8_i} + \beta_{13} ICB_{9_i} + \varepsilon_{i,t} \quad (1)$$

Leverage is denoted *Lev* and is measured as total debt divided by total assets, tangibility is designated *Tang* and is measured as fixed assets divided by total assets, *SZ* is a short for size and is measured as the natural logarithm of total assets, *PF* is profitability and is calculated as net income divided by total assets and *GW* is growth and is calculated as the difference between total assets in the current and previous time period divided by total assets in the previous time period. ICB dummies 1-9 are also included[1]; ICB_{10} is the industry dummy for *Oil & Gas* and is the reference group. Furthermore, the validity of the results of this thesis relies on the model we have taken inspiration from. This model have been used and proven to work in earlier published work, which makes us believe that the validity of this model is good.

4.1.1 Tangibility

Tangibility measures the ratio between fixed assets over total assets a firm have on its balance sheet. Charalambakis and Psychoyios (2012) claims it exist a positive relationship between such a ratio and the level of debt because tangible assets could be used as collateral for the debt holders. Furthermore, having a high proportion of collateralized tangible assets could lower the conflict between managers and shareholders, because managers will not have the same excess of free cash to use on wasteful investments (Almeida & Campello, 2007). Tangible assets also tend to reduce the financial distress costs because of the liquidation possibility in case of default. Considering these factors lenders are expected to feel more confident and reluctant supplying loan to a company with high level of tangible assets than an identical company with less tangible assets on its balance sheet. On the other hand, Morellec (2001) claims there could be a negative relationship between tangible assets and leverage because it exists a risk for firms with high access to liquid tangible assets. In more detail, this risk is that the managers exploit debt and

[1] The dummies are 1) Basic Materials 2) Industrials 3) Consumer Goods 4) Health Care 5) Consumer Services 6) Telecommunications 7) Utilities 8) Financials 9) Technology 10) Oil & Gas

shareholders by selling uncollateralized tangible assets underprized for short term funding (Morellec, 2001).

4.1.2 Size

The size of a company is assumed to have a positive relationship with leverage. The reason is first and foremost that bigger firms tend to have less volatile cash flows and that they take on more debt to maximize the benefits from a tax shield. Another aspect that stems from the pecking order theory is that bigger firms have greater prospects to attract more analysts to provide information about the company. In turn, this decreases the information asymmetry with the market, which makes it possible for the firm to get access to equity financing without ruin firm value. According to Marsh (1982) larger firms tend to use long-term debt in larger extent than small firms. Furthermore, long-term debt makes it possible to reduce transaction costs connected with debt issuing (Wald, 1999).

4.1.3 Profitability

There exists no consensus between theory and studies concerning if profitability have a negative or positive effect on debt. The trade-off theory suggest it exists a positive relationship, thus it claims that increased profit over time will lower the probability of financial distress costs and therefore motivates increased usage of debt to take full advantage of the tax shield to reach optimal debt level. This explanation was roughly criticised by Myers (1993) just as a "weak guide to average behaviour", instead he claimed it existed a negative relationship between profitability and leverage, this findings was also justified in studies made by Rajan and Zingles (1995). This is also consistent with the predictions of the pecking order theory, which suggest that profits over time leads to accumulated retained earnings and firms will use that money instead of external financing.

4.1.4 Growth

Growth opportunities can be considered a type of intangible asset and can due to that reason not be used as collateral and therefore a firm that holds future growth opportunities tend to carry less

leverage. According to the trade-off theory it exist a negative relationship between the debt level and firms with growth opportunities.

4.1.5 Industry Classification Benchmark

It is of importance to account for how debt and costs varies due to the characteristics of the firm (Berk & DeMarzo, 2014). The possibility that tangible assets may have different impact on debt within various industries has motivated the inclusion of dummy variables for the different business sectors. The dummies will capture the sector specific effect on debt. The grouping of industries that have been made is according to the Industry Classification Benchmark standard (ICB), which divide the industries into the following ten major groups: Consumer Goods, Industrial, Technology, Health Care, Oil and Gas, Telecommunications, Basic Materials, Utilities, Financials and Consumer goods.

4.2 The impact of the composition of tangible assets

The focus of the second regression is to investigate which kind of tangible assets that affect the debt to total asset ratio the most. In order to examine the relative importance of the components of tangible assets, the same kind of subdivision as Campello and Giambona (2010) used is made. Their paper categorized tangible assets into three major identifiable groups: *Land & Buildings, Machinery & Equipment* and *Other Tangible Assets*. From providing this subdivision the idea is that tangible assets that are the least firm specific and most saleable should have a higher impact on firms leverage in comparison with more firm specific assets. We use the same regression model as before, but we exclude *Tangibility* and replace it with the three previously mentioned categories of tangible assets. The following pooled panel regression model is used:

$$Lev_{i,t} = \beta_0 + \beta_1 L\&B_{i,t} + \beta_2 M\&E_{i,t} + \beta_3 OTA_{i,t} + \beta_4 SZ_{i,t} + \beta_5 PF_{i,t} + \beta_6 GW_{i,t} + \beta_7 ICB_{1_i} + \beta_8 ICB_{2_i} + \beta_9 ICB_{3_i} + \beta_{10} ICB_{4_i} + \beta_{11} ICB_{5_i} + \beta_{12} ICB_{6_i} + \beta_{13} ICB_{7_i} + \beta_{14} ICB_{8_i} + \beta_{15} ICB_{9_i} + \varepsilon_{i,t} \quad (2)$$

The variable denoted *L&B* is land and buildings and is calculated as book value of land and

buildings divided by total assets, *M&E* is machinery and equipment and is calculated as book value of machinery and equipment divided by total assets, *OTA* is other tangible assets and is calculated as book value of other tangible assets divided by total assets. The other variables in this regression are the same as in regression model 1.

4.2.1 The division of tangible assets

The division of tangible assets into the three sub-categories is made to test the assumption concerning if the degree of redeployability of assets leads to different effects on the debt ratio. Following Campello and Giambonas (2010) division of tangible assets makes sense, since this is the most detailed division of the balance sheet post "Net fixed assets" that the companies reports in their notes of the annual report.

The goal of the division is to roughly divide tangible assets into categories that represent the liquidity of the asset. The group land and buildings is expected to be the most liquid one according to previous mentioned studies, whereas Machinery and Equipment is expected to be most firm specific and therefore hardest to sell on the second hand market. Other Tangible Assets is all other tangible assets that do not classify into Land and Buildings or Machinery and Equipment. This means that it is not perfectly clear what this variable consist of and any deeper analysis of this variable will not be made.

4.3 Ordinary Least Squares

Our statistical estimation of the coefficients of our variables is made with ordinary least squares (OLS). Since we expect our explanatory variables to have linear relationships with our dependent variable, OLS is a good choice because according to the Gauss-Markov Theorem OLS is the best linear unbiased estimator (Wooldridge & Wooldridge, 2014).

4.3.1 Heteroskedasticity

Heteroskedasticity means that the variance of the unobserved factor (the error term) increases with some of the independent variable. For instance, if the variance of the error term affecting our

dependent variable *Leverage* increases when *Tangibility* increases, there is evidence for heteroskedasticity. The consequence from having data suffering from heteroskedasticity is that the estimators of the variances get biased and since the standard errors are calculated from these variances it means that the calculated standard errors also will be wrong. In addition, this makes the standard errors not valid to calculate confidence intervals and t-statistics, thus hypothesis testing cannot be done. (Wooldridge & Wooldridge, 2014)

To detect if our data suffers from heteroskedasticity, we will perform a Breusch Pagan test. The level of the p-value at which we reject the null hypothesis is, consistent with previous tests of the thesis, chosen to be 5%. If we reject the null hypothesis we have evidence for heteroskedasticity and robust standard errors will be used to get rid of the eventual problem.

5 Data Collection

Considering the nature of this study, a quantitative method is motivated due to the extent of all numerical data that have to be analysed. The data gathering for the first regression model was made from Bloomberg's database and we use quarterly data covering ten years (2005-2014) for the 271 listed companies on the OMX Stockholm Exchange (data gathered 30/03/15). One of the major advantages from using Bloomberg's database is the availability of standardized numbers from each company's balance sheet, this is beneficial because it decreases the risk of misleading results.

In accordance with Fama and French (2002) we chose to exclude the banks and financial institutions from the sample since these have very different numbers and assets in their balance sheet in comparison with other types of industries. Additionally, companies with less than eight observations are excluded from the sample. The reason for this choice is that we claim that if a company has existed for less than two years, the data from these companies are not representative for the sample since they probably have extreme values concerning debt, growth and so on. After excluding these companies we are left with observations from 230 firms.

The second regression model, which examine if the difference in the liquidity of assets affect the capital structure differently, required more detailed data than Bloomberg could provide. The data needed for this regression is possible to find reported in the notes of the annual report and was available to access through Datastream. This kind of notes is generally not presented in the quarterly reports. Therefore, the data for the second regression is collected on an annually basis and not on a quarterly basis, from the past 10 years (2005-2014). Even if a lot of company data was available to access through Datastream, this detailed information was not provided for all of the companies. Trying to manually collect data on all 271 companies on the OMX Stockholm Exchange would be far too time consuming and there is even problems regarding finding all reports. Therefore, we are finally left with satisfying data for 126 companies, after excluding banks and companies without observations. In order for Stata to include the observations, a full set of observations for all variables needed to exist. This implies that a company can have data for all variables except one and still the software will consider the entire row as missing. This is the reason model 2 is run on just 658 observations and not 1260 observations.

From using two different databases, attention is drawn that minor differences in the reports exist. For example numbers that were missing in one database were in some cases possible to get from the other. This is evidence that depending on which database you use, you will get different samples and results. If the data were manually collected the reliability of this paper would have been higher and in addition a larger sample would be available to analyse.

One of the constraints imposed in this study is to solely investigate the relationship between tangibility and debt on Swedish companies. The reasons for choosing to investigate ultimately Swedish companies are two. Firstly, as can be seen in Appendix 1, Swedish companies stands out in comparison with the other Scandinavian countries, with slightly higher debt and a higher proportion of intangible assets. Secondly, the advantage that the firms within one country all follow the same national regulations, accounting rules and have the same currency makes the reported numbers easier to compare if you choose a sample to consist of firms within just one country.

Concerning the shortfall of data in our sample, we consider it more advantageous to have a larger sample with some losses of data in comparison with a smaller but complete dataset. The databases we use lack data for some observations, but to manually manage the shortfall is not possible due to time constraints and the problems with finding all reports. We tried to run the regressions of a sample consisting of only the OMX 30 companies to have a full dataset of observations, but the result is unsatisfying with lower explanatory power of the model (see Appendix 2).

6 Results

In this chapter the results from the two regressions are presented in two separate parts, further analysis of the results will be conducted in the analysis chapter.

6.1 Overall effect of tangible assets

The summary statistics for the first regression model, which evaluates the overall effect of tangible assets, is presented in Table 1.

Table 1 Summary statistics of the effect of tangible assets
This table presents the summary statistics for the sample consisting of observations from 230 firms on the OMX Stockholm Exchange between 2005 and 2014. The data is collected quarterly.

Variable	Mean	Std. Dev.	Min	Max	Obs
Leverage	0,210	0,189	0	1,161	7207
Tangibility	0,227	0,270	0	0,999	8123
Size	7,419	2,088	1,368	12,856	8123
Profitability	0,004	0,067	-1,405	0,655	8123
Growth	0,042	0,258	-0,869	6,472	7808

The data provided from this regression seem reasonable, even if the maximum value of tangibility could be argued as a bit extreme. However, this could be explained by the characteristics of the companies in the sample, for example real estate companies have by nature a large proportion of tangible assets on their balance sheet in comparison with other industries. Furthermore, the maximum value of growth is 6,472 which means that one of the companies in the sample have grown with 647,2% in one quarter, which could be argued being an extreme value. Nevertheless this is a possible growth figure for a company in for example the oil and gas business sector.

Table 2 Regression results

The estimated model is:

$$Lev_{i,t} = \beta_0 + \beta_1 Tang_{i,t} + \beta_2 SZ_{i,t} + \beta_3 PF_{i,t} + \beta_4 GW_{i,t} + \beta_5 ICB_{1_i} + \cdots + \beta_{13} ICB_{9_i} + \varepsilon_{i,t}$$

Independent variables	OLS (regression 1)
Tang	0,183***
	(0,013)
SZ	0,023***
	(0,001)
PF	-0,204***
	(0,045)
GW	0,026**
	(0,010)
ICB_1	0,44***
	(0,013)
ICB_2	0,132***
	(0,014)
ICB_3	0,146***
	(0,014)
ICB_4	0,82***
	(0,015)
ICB_5	0,094***
	(0,015)
ICB_6	0,107***
	(0,016)
ICB_7	0,301***
	(0,038)
ICB_8	0,239***
	(0,014)
ICB_9	0,044***
	(0,014)
Constant	-0,114***
	(0,015)
Observations	6953
Number of firms	230
R-squared	0,359
Breusch Pagan[2]	
$F(13, 6939)$	27,6
P – Value	0,000

***, **, * denotes significance at the 1, 5 and 10% levels, respectively

ICB_{10} is the reference group for the ICB dummies. The Breusch Pagan test concludes that there is evidence for heteroskedasticity. This is corrected by using robust standard errors.

[2] The estimated model for the Breusch Pagan test is:

$\hat{u}^2 = \delta_0 + \delta_1 Tang + \delta_2 SZ + \delta_3 PF + \delta_4 GW + \delta_5 ICB_1 + \cdots + \delta_{13} ICB_9 + \varepsilon_{i,t}$

H_0: $\delta_0 = \delta_1 = \cdots = \delta_{13} = 0$

H_1: $Atleast\ one\ of\ \delta_k \neq 0$

The results from regression 1 can be seen in Table 2 and shows that Tangible assets have a positive effect on the debt to asset ratio, as expected. The coefficient of tangibility is 0,183, which implies that if tangibility increases with 1%, the debt ratio increases with 0,183%. Furthermore the p-value is 0,000 thus the coefficient is significant at the 1% level.

Ideally our regression should be performed on a sample of 9200 observations, but due to some shortfall of observations the regression is run on 6953 observations. The R-squared of the regression is 0,359, which means that 35,9% of the variation in the dependent variable is explained by the variation in the independent variables. The overall significance of the model is evaluated by the F-value and this model has a F-value of 326,99 with 6939 degrees of freedom, which gives a p-value of 0,000. Subsequently, this result implies that the model is statistically significant.

Both of the variables size and growth have positive coefficients and are significant at the 1% level and the 5% level respectively. Profitability on the other hand has a negative coefficient and is significant on the 1% level. Inclusion of the ICB dummies added additional explanatory power to the model, which is confirmed with a F-test. The result from this test gave a F-value of 89,33, with 6939 degrees of freedom and a p-value of 0,000, thus it is confirmed that the ICB dummies should be included. The base group is ICB_{10}, which represents the oil & gas sector. All ICB dummies have positive coefficients, which imply that on average the companies in the oil & gas sector have a lower debt ratio.

6.2 The impact of the composition of tangible assets

The summary statistics for the second regression model, which evaluates the impact of the composition of tangible assets, is presented in Table 3.

Table 3 Summary statistics for regression model 2
This table presents the summary statistics for the sample consisting of observations from 126 firms on the OMX Stockholm Exchange between 2005 and 2014. The data is collected annually.

Variable	Mean	Std. Dev.	Min	Max	Obs
Leverage	0,248	0,173	0	0,892	1042
L&B	0,127	0,230	0	0,998	869
M&E	0,103	0,123	0	0,867	846
OTA	0,064	0,135	0	0,951	840
Size	8,375	1,806	3,399	12,856	1053
Profitability	0,044	0,136	-1,612	0,727	1053
Growth	0,091	0,281	-0,585	3,023	1053

From the descriptive statistics we find that the values seem reasonable and according to us we find that neither the minimum nor maximum values seem unreasonable. However, the quality of the data collected from Datastream could be questionable in some cases. An example of such situation is concerning the maximum value of land and buildings, which is almost 100%. This value could be argued as being a bit extreme, but nevertheless it is possible for this value to be true depending on the characteristics of the business.

Table 4 Regression results model 2

The estimated model for regression 2 is:

$Lev_{i,t} = \beta_0 + \beta_1 L\&B_{i,t} + \beta_2 M\&E_{i.t} + \beta_3 OTA_{i,t} + \beta_4 SZ_{i,t} + \beta_5 PF_{i,t} + \beta_6 GW_{i,t} + \beta_7 ICB_{1_i} + \cdots + \beta_{15} ICB_{9_i} + \varepsilon_{i,t}$

The estimated model for regression 3 is:

$\mathrm{Lev}_{i,t} = \beta_0 + \beta_1 \mathrm{Tang}_{i,t} + \beta_2 \mathrm{SZ}_{i,t} + \beta_3 \mathrm{PF}_{i,t} + \beta_4 \mathrm{GW}_{i,t} + \beta_5 \mathrm{ICB}_{1_i} + \cdots + \beta_{13} \mathrm{ICB}_{9_i} + \varepsilon_{i,t}$

Independent variables	OLS (regression 2)	OLS (regression 3)
Tang	-	0,252***
		(0,040)
L&B	0,451***	-
	(0,061)	
M&E	0,012	-
	(0,070)	
OTA	0,233***	-
	(0,044)	
SZ	0,008***	0,007**
	(0,003)	(0,003)
PF	-0,126	-0,120
	(0,083)	(0,084)
GW	0,053**	0,057**
	(0,027)	(0,028)
ICB_1	0,019	0,033
	(0,042)	(0,049)
ICB_2	0,079*	0,141***
	(0,044)	(0,048)
ICB_3	0,107**	0,170***
	(0,046)	(0,049)
ICB_4	0,046	0,114**
	(0,048)	(0,051)
ICB_5	0,062	0,128**
	(0,049)	(0,053)
ICB_6	0,120***	0,125**
	(0,046)	(0,052)
ICB_7	0,535***	0,474***
	(0,092)	(0,094)
ICB_8	0,027	0,223***
	(0,073)	(0,072)
ICB_9	-0,040	0,024
	(0,046)	(0,050)
Constant	0,073	0,010
	(0,049)	(0,054)
Observations	658	658
Number of firms	126	126
R-squared	0,239	0,220

Breusch Pagan[3]	
F(15, 642)	2,79
P – Value	0,000

***, **, * denotes significance at the 1, 5 and 10% levels, respectively
ICB_{10} is the reference group for the ICB dummies. The Breusch Pagan test gives evidence for heteroskedasticity which is solved by using robust standard errors.

The results from running regression model 2 can be seen in Table 4 (OLS (regression 2)). Since the sample for this regression is smaller than in the previous regression, model 1 is performed on this sample as well for comparison. These results are labelled "OLS (regression 3)".

The results from running regression 2 shows that the variable "*Land and Buildings*" has a positive coefficient of 0,45 and is statistically significant at the 1% level. In other words this result implies that a 1% increase in land and buildings increase the leverage with 0,45%. Consistent with the previous mentioned variable *"Machinery and equipment"* got a positive coefficient of 0,012, but this number is not statistically significant. Furthermore, the variable *"Other tangible assets"* got a coefficient of 0,233 and is statistically significant at the 1% level.

The results of the regression are based on 658 observations. Ideally we expect to have 1260 observations (126 companies), but the reason for this shortfall is missing values. Concerning the goodness-of-fit of the model the R-squared of model 2 is 0,239, which means that 23,9% of the variation in the dependent variable is explained by the variation in the independent variables. The significance of the model is given by the F-value, which is 31,96 with 642 degrees of freedoms, which gives a p-value of 0,000.

Regarding the signs before the coefficients of the variables, size, profitability and growth, these are unaltered since the first regression. However profitability is now insignificant. The reference group for the ICB dummies is ICB_{10}. In order to see if the ICB dummies should be included or not one F-test is performed and the result from it confirms that they should be included. The F-test gives a F-value of 16,7 with 642 degrees of freedom, in turn this gives a p-value of 0,000 and

[3] The same methodology is used as in footnote 2

confirms that inclusion of the ICB dummy variables contributes with additional explanatory power to the model.

To be able to compare if regression model 2 gives additional explanatory power compared to model 1, we run the smaller sample which we used on model 2, on model 1 as well. From doing this it is possible to compare the two models. The results from this regression can be seen in Table 4, and shows that *Tang* still has a positive coefficient of 0,252 and is statistically significant on the 1% level. Further the results are in line with previous regressions. The R-squared for this regression is 0,22.

7 Analysis

This chapter analyse the results from the two regression models. The analysis is structured in two parts, where the first part analyses the overall effect of tangible assets on the debt ratio and the second part analyses the impact of the composition of tangible assets.

7.1 Overall effect of tangible assets

From a sample of Swedish listed firms we provide evidence and answer one of the two main questions of this thesis, tangible assets are positively related with leverage. This result was concluded from receiving a statistically significant p-value of 0,000 on the coefficient of the variable tangible assets. The real effect on the debt ratio of increasing tangible assets on the balance sheet is revealed by the magnitude of the coefficient, 0,183. The coefficient implies that if tangible assets increase with 1%, leverage increases with 0,183%. In other words, this result implies that leverage increases with about 18% of the value of the increase of tangible assets, which we consider as being a result of economic significance. Furthermore, this result is consistent with our expectations and confirms the first hypothesis of this paper.

The result that tangible assets are a significant key driver of leverage is consistent with previous studies made by Charalambakis and Psychoyios (2012). Even though their paper's conclusion is based on an investigation of American and British firms it is notable to see from this papers findings that the results are corresponding for firms in Sweden as well, tangible assets explain in some extent the capital structure decision. In addition from using more or less the same model as the one used in Charalambakis and Psychoyios paper (2012) it is interesting to compare our results further with their results. Concerning the sign of the coefficients for the two independent variables *PF* and *SZ,* the results from the regression are in accordance with the results provided by Charalambakis and Psychoyios (2012). On the other hand, the variable *GW* in contrary to their study received a positive coefficient. However, this result is not completely comparable with Charalambakis and Psychoyios (2012) result since they use the variable *Growth Opportunities* and not *Growth*. Anyway, this result was not expected, instead we had expected *Growth* and *Growth Opportunities* to roughly measure the same effect and thus have the same sign on the

coefficient. In this new definition we use a backward looking measurement of growth, which might as well tell something about the future. A company with high growth in the previous quarter is likely to continue to grow in the next quarter. Thus, the effect of previous growth was expected to have the same effect as the variable growth opportunities.

The findings of this paper are not enough to reject Morellec's (2001) assumption concerning the possibility for managers to take advantage of tangible assets and selling them underprized. However, if this effect exists it is not strong enough to make tangible assets negatively associated with leverage. A potential explanation to our findings is given by Shleifer and Vishny (1992) who claim that tangible assets are easier to redeploy and should lower the cost of financial distress. This claim and our results are also consistent with the theoretical explanation given by the trade-off theory.

The trade-off theory predicts that there should be a positive relationship between tangibility and leverage. In addition, this theory suggests that tangible assets should lower the potential financial distress costs and therefore increase a firm's debt capacity, which could explain our results. However, one could argue that just collateralized debt should lower the cost of financial distress and about this we cannot make any further conclusions. To explore this relationship, additional investigations and information concerning the amount of secured debt within the companies would be needed. On the other hand, a tangible and liquid asset, secured or not, should give cause to less trouble when selling it in case of bankruptcy. The question for a forthcoming study might rather be if a division of total debt into secured and unsecured debt would lead to even stronger results for the secured debt.

Inconsistent with our results, the pecking order theory assumes a negative relationship between tangible assets and leverage. This is because tangible assets are expected to reduce the information asymmetry and therefore ease the financing of equity. By having a large proportion of tangible assets on the balance sheet the valuation of the company becomes easier for the stakeholders due to the higher degree of information symmetry. This should lead to less weight being put on eventual signals that come from equity issue, and thus not risking decreased firm value. One explanation for pecking order theory to contradict the result could be due to that listed

companies already have a large degree of information symmetry in the first place. This means that the managers are not afraid of signalling the wrong message to the stakeholders and those tangible assets does not have any larger impact for their choice to raise equity.

7.2 The impact of the composition of tangible assets

Concerning the impact of the composition of tangible assets, the findings of this paper conclude that the composition of tangible assets has a significant and positive impact on the capital structure decision for firms in Sweden. Further, we employ evidence that the least firm-specific assets have the strongest positive impact on a firm's debt ratio. Given the results showing the fundamental importance of the composition of tangible assets it is possible to answer the second question of this paper and to conclude that the result are consistent with our second hypothesis.

From the results, we observe that the least firm-specific asset *Land & Buildings* coefficient is 0,451 and is significant on the 1% level. The magnitude of the coefficient means that if land and buildings increases in value with 1% on the balance sheet, leverage will increase with 0,451% as a result. This we consider to be a result of economic significance. In addition, this coefficient also means that on average, a company will borrow against 45,1% of the value of their land and buildings, which seems to be a reasonable loan to value ratio. We find that this result is in line with our expectations that land & buildings has high debt capacity, since it should not matter who the owner of a property is, buildings and land will always be attractive on the market and thus be good collateral for loans.

Our paper gives evidence that *Machinery & Equipment* did not receive a statistically significant coefficient. The coefficient was 0,012 and had a p-value of 0,86, which means that we cannot ignore the possibility that the true value of the coefficient is zero. In extent, this result implies that properties as machinery & equipment have no impact on firms debt ratio, which we think make sense. Machinery and equipment can be highly firm specific and are often designed for a specific purpose. Consequently, this means that those assets will not be easy to sell in case of bankruptcy. In a best-case scenario for such assets it is possible to find a buyer who wants to buy the assets underprized. Furthermore, this means that machinery and equipment should not be

considered as collateral for debt and presumably it will not lower the cost of debt, which in turn does not affect or increase the debt ratio. This argument is also strengthened by the results we report, the magnitude of the coefficient is 0,012 and implies that if machinery and equipment is in fact affecting the debt capacity, it does so with a very small effect. Put in other words, this result implies that if machinery and equipment increased with 1%, leverage would only increase with 0,012%.

The result corresponding to the variable *Other Tangible Assets* presented a coefficient of 0,233 and a p-value of 0,000. This finding is both statistically and economically significant. However we do not think much can be said about this variable because it is not clear what assets this variable consist of and the content may vary a lot between different companies.

The result from this regression model concerning the composition of tangible assets are in line with previous studies of Campello and Giambona (2010), which indicate that the liquidity of tangible assets have impact on the debt level. Further, our results indicate that after dividing the tangible assets into three mayor groups based on their liquidity, *Land & Buildings* has the largest impact on the debt ratio. This is a logical result since land & buildings should be the least firm specific and most liquid asset on the balance sheet and this is also consistent with the results of Giambona et al. (2014). Further, even though the trade off theory does not explicity discusses the composition of tangible assets, our results are in line with the trade off theory. The trade off theory predicts a positve relationship between tangible assets and debt, since we receive postive coefficents on all of our variables for tangible assets our results are in line with the theory.

Comparing regression model 1 and 2 of this paper, it is clear from Table 4 that model 2 has higher explanatory power than model 1. The R-squared of regression 3, which is run with the first model, is 0,220. On the other hand, regression 2, which is run with the second model, gets an R-squared of 0,239. Thus, by dividing the tangible assets into three major groups the explanatory power of the model increased with about 2 percentage points, or with 8,6% compared with model 1.

What is even more interesting to compare are the coefficient of *Tang* in regression 3 and *L&B* in regression 2. *Tang* gets a positive coefficient of 0,252 using the first regression model. This number is statistically significant on the 1% level. The least firm-specific asset, *Land & Buildings*, got a coefficient of 0,451 when using regression model 2, this number is also statistically significant on the 1% level. These results clearly shows that the least firm specific tangible asset of a company have larger impact on the debt ratio than the overall tangibility of a company's balance sheet. The effect on the debt ratio from an increased value of land and buildings on the balance sheet is almost two times stronger compared to the effect of increasing the overall tangibility. Conclusively the result confirms the second hypothesis of this paper, which states that non firm specific asset should have a stronger impact on the debt level than the overall effect of tangible assets have.

8 Conclusion

This thesis investigates the relationship between tangible assets and leverage. Two separate pooled OLS regressions are made in order to investigate the relationship. The first model aim to investigate the relationship between overall tangibility and the debt to total assets ratio. Further, the second model is designed to investigate if the composition of tangible assets gives additional explanatory power for the debt level. The results are based on a sample of listed firms on the OMX Stockholm Exchange.

The result of this thesis indicates a significant positive relationship between tangible assets and the debt level. From this study's findings it is possible to argue that the company's assets side of the balance sheet to some extent explains the capital structure decision for listed companies in Sweden. In addition, the relevance of the composition of tangible assets is proven from the results, which shows that the composition of firms' tangible assets gives additional explanatory power to the model in order to explain capital structure. From dividing the tangible assets into three groups, *Land & Buildings*, *Machinery & Equipment* and *Other Tangible Assets,* the result shows that land and building is the asset that has an outstandingly effect on the debt level. The result that the least firm specific asset has the largest impact is in accordance with previous evidence. The most firm specific assets machinery and equipment was shown to have none significant impact on the debt level.

Theory is not capable to uniformly explain the results of this paper. The trade-off theory agrees with the results of both models, tangible assets have a positive relationship with the debt ratio. First and foremost this is because of the advantage for the stakeholders to use tangible assets as collateral in event of bankruptcy. The pecking order theory is on the other hand contradicting the results, which instead suggests a negative relation between tangible assets and the debt ratio.

For forthcoming studies it would be interesting to investigate if debt-secured tangible assets in a larger extent affect debt level. This kind of further investigation would be interesting because theory suggest that it is first and foremost the secured tangible asset that affects leverage.

References

Almeida, H., & Campello, M. (2007). Financial constraints, asset tangibility, and corporate investment. The Review of Financial Studies, 20(5), 1429-1460.

Benmelech, E. (2009; 2007). Asset salability and debt maturity: Evidence from nineteenth-century american railroads. The Review of Financial Studies, 22(4), 1545-1584.

Benmelech, E., & Bergman, N. K. (2009). Collateral pricing. *Journal of Financial Economics, 91*(3), 339-360.

Berk, J. B., & DeMarzo, P. M. (2014). Corporate finance. Harlow, England: Pearson.

Campello, M., & Giambona, E. (2010). *Asset tangibility and capital structure*. Working paper, University of Illinois.

Charalambakis, E. C., & Psychoyios, D. (2012). What do we know about capital structure?: revisiting the impact of debt ratios on some firm-specific factors. *Applied Financial Economics, 22*(19/21), 1727-1742.

Fama, E. F., & French, K. R. (2002). Testing trade-off and pecking order predictions about dividends and debt. *The review of financial studies, 15*(1), 1-33.

Fisher, R. A. (1958). Statistical methods for research workers. Edinburgh: Oliver and Boyd.

Giambona, E., Golec, J., & Schwienbacher, A. (2014). Debt Capacity of Real Estate Collateral. *Real Estate Economics, 42*(3), 578-605.

Hall, T. W. (2012; 2011). The collateral channel: Evidence on leverage and asset tangibility. The Journal of Corporate Finance, 18(3), 570-583.

Hillier, D. (2013). *Corporate Finance*. Berkshire: McGraw-Hill Higher Education.

Marsh, P. (1982). The Choice Between Equity and Debt: An Empirical Study. *The Journal of Finance, 37*(1), 121-144.

Modigliani, F., & Miller, H. (1958). The cost of capital, corporate finance and the theory of investment. The American Economic Review , 48 (3), pp. 261-297.

Morellec, E. (2001). Asset liquidity, capital structure, and secured debt. *Journal of Financial Economics, 61*(2), 173-206.

Myers, S. C. (1993). Still searching for optimal capital structure. *Journal of Applied Corporate Finance, 6*(1), 4-14.

Rajan, R. G., & Zingales, L. (1995). What Do We Know about Capital Structure? Some Evidence from International Data. *The Journal of Finance, 50*(5), 1421-1460.

Shleifer, A., & Vishny, R. W. (1992). Liquidation Values and Debt Capacity: A Market Equilibrium Approach. *The Journal of Finance, 47*(4), 1343-1366.

Sibilkov, V. (2009). Asset Liquidity and Capital Structure. *Journal of Financial and Quantitative Analysis, 44*(05), 1173-1196.

Titman, S. (1988). The determinants of capital structure choice. The Journal of Finance, 43(1), 1-19.

Wald, J. K. (1999). How firm characteristics addect capital structure: An international comparsion. *Journal of Financial Research, 22*(2), 161.

Wooldridge, J. M., & Wooldridge, J. M. (2014). *Introduction to econometrics*. Andover: Cengage Learning.

Appendix

Appendix 1

Comparison of average tangibility and debt ratio between countries in Scandinavia. Each country sample consists of the 30 largest companies of each land and is based from the time period 2005-2014. Source, Bloomberg

	Denmark	Finland	Norway	Sweden
Avg. Tangible assets	**24,04%**	**27,93%**	**25,34%**	**14,80%**
Std. Dev.	0,2308	0,2466	0,2394	0,1411
Min	0,0019	0,0007	0,0019	0,0003
Max	0,9131	0,9920	0,958	0,6536
Obs	294	290	270	286
Avg. Debt to Total assets	**24,08%**	**24,08%**	**23,69%**	**26,13%**
Std. Dev.	0,1741	0,1404	0,1521	0,1567
Min	0,0000	0,0029	0,0000	0,0000
Max	0,7425	0,6823	0,5850	0,7207
Obs	291	289	249	300

Appendix 2

Regression model 1, OMX30 as sample, quarterly data

Independent variables	OLS
Tang	-0,230***
	(0,043)
SZ	0,007
	(0,006)
PF	-0,304**
	(0,148)
GW	-0,007
	(0,020)
ICB_1	-0,040
	(0,028)
ICB_2	-0,085**
	(0,037)
ICB_3	0,040
	(0,032)
ICB_4	-0,070*
	(0,040)
ICB_5	-0,236***
	(0,040)
ICB_6	-0,073**
	(0,037)
ICB_9	-0,259***
	(0,042)
Constant	0,308***
	(0,062)
Observations	915
Number of firms	23
R-squared	0,222