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Capital Structure and Stock Returns

-A study of the Swedish large cap companies

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Abstract

This study uses multiple regression models to examine how capital structure and stock returns affect each other. Using a panel data study that includes 50 Swedish companies over a period of five years, the results show that leverage has a positive effect on stock returns. The results also shows that the pecking order theory best explains the behaviour of Swedish companies listed on large cap during the period after the financial crises, 2009–2013. Therefore a high leverage leads to a demand of higher stock returns from the investors and companies prefer to use debt rather than equity. We have found that profitability negatively affects leverage and growth positively affects stock returns. Size has a significant effect on both leverage and stock returns, liquidity has a positive effect on stock returns and volatility has a significant effect on leverage. Stock returns have no significant effect on leverage and growth has no significant effect on leverage.

Key words: Capital Structure, Trade-off Theory, Pecking Order Theory, Leverage, Stock Returns, Sweden.

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1. Introduction

Capital structure, the combination of a company's liabilities and equity, has long been an important issue from a financial economic point of view. The capital structure plays a decisive role when it comes to a company's survival, growth and performance (Ahmad, Fida & Zakaria 2013). The choice of financial leverage is a trade-off between risk and returns. The risk of bankruptcy will increase as debt increases, which will lead to higher required rate of returns for stockholders. Therefore a company's capital structure determines its performance. When determining the overall returns of a company, it is often important to look at the capital structure changes and financial performance (Khan, Naz, Khan, Khan & Ahmad 2013). Some studies show that capital structure determines stock returns (Bhandari, 1988). Others argue that stock returns determine capital structure (Welch 2003). There are also studies that show that stock returns and capital structure simultaneously affect each other (Yang, Lee, Gu & Lee 2010).

The present study is inspired by Yang et al. (2010) and Ahmad, Fida and Zakaria (2013), who examined both capital structure and stock returns as endogenous variables. They used data from the Taiwan Economic Journal database (TEJ) and Karachi Stock Exchange (KSE). The data in this study will be extracted from companies that are registered on large cap on the Swedish stock exchange. Since large cap contains the largest publicly traded companies, it is a good representative of how the Swedish stock markets are performing overall.

Because of the different theories that exist within the field and the lack of significant amount of research that examines the Swedish stock exchange, it is of high interest to continue this kind of research. The study aims to use both leverage and stock returns as endogenous variables and to use a mix of explanatory variables inspired by Yang et al. (2010) and Ahmad, Fida and Zakaria (2013).

Over the years the capital structure subject has received a lot of attention in financial literature. Modigliani and Miller (1958) built the foundation for future studies by observing the cost-of-capital-problem. Several theoretical models have since then been developed and they have resulted in quite a few dissident results (Baker & Martin 2011).The traditional trade-off theory sees the choice of capital structure as a trade-off between the benefits and cost of borrowing (Myers 1984). The benefits of debt include, for example, the tax reduction

and reducing of the free cash flow problems. The costs of debt include potential bankruptcy costs and agency conflicts between stakeholders (Fama & French 2002).

The pecking order theory by Myers (1984) and Myers and Majluf (1984) see the choice of capital structure based on the result of asymmetric information. According to the pecking order theory, firms will issue the safest security first. They prefer retained earnings to debt, short-term debt over long-term debt and as the last resort equity. The principle is that investors believe that managers will only issue new equity when the equity is overvalued, and therefore equity will be a less preferred way to finance the company. Therefore the theory suggests that company performance and leverage are negatively related (Baker & Martin 2011). It would therefore be interesting to examine which of these two theories that best explains the behaviour of Swedish large companies listed on the Swedish stock exchange.

1.1 Aim

The objective of this study is twofold. The first objective is to quantitatively study how capital structure and stock returns affect each other after the financial crises during the period 2009–2013, based on data collected from some Swedish companies listed on large cap. Secondly, the objective is – based on the statistic results – to increase the understanding of which theory of capital structure best explains the financing behaviour of Swedish companies after the financial crises.

1.2 Hypothesis development

To further study the effect of Capital Structure and Stock Returns of Swedish Large Cap companies, two hypotheses are formulated. Both hypotheses will be tested by using a regression model.

H1: Leverage will have a positive effect on stock returns and stock returns will have a negative effect on leverage.

H2: The pecking order theory is the theory that best explains the behaviour of Swedish companies listed on large cap.

1.3 Disposition

The rest of the paper is organised as follow: the next section, section 2, provides a review of the source of inspiration and their explanation on the relationship between stock returns and capital structure. This section also explains the two theories on capital structure, the trade-off

theory and the pecking order theory. Section two ends with a discussion about the two research questions and a hypotheses development. The third section presents the methodology used in the research and how the data has been collected. The fourth section consists of results and analysis of the collected data and the hypotheses are tested and analysed. In the fifth section the conclusion is presented along with some suggestions for future research. Finally the sixth section presents the references used in this thesis and in the seventh section the appendix is presented.

2. Literature and Hypotheses

In this section the literature connected to capital structure, stock returns and the relationship between this two is presented.

2.1 Previous studies

The source of inspiration for this study, Yang et al. (2010) and Ahmad, Fida and Zakaria (2013), looked at the co-determinants of capital structure and stock returns on the Karachi stock exchange and the Taiwan stock exchange. Ahmad, Fida and Zakaria used a structure model where they applied a generalized method of moments (GMM) model to overcome the potential endogeneity problem. They used a panel data set for 100 non-financial companies in the period 2006–2010. They found that stock leverage and stock exchange both affect each other but that leverage has a dominant effect on stock returns. The theory that best explains the behaviour of Pakistani companies was the pecking order theory. Evidence from sources to the studies made by Yang et al. (2010) and Ahmad, Fida and Zakaria (2013) indicates that the relationship between stock returns and leverage is expected to be negative ($\beta_1 < 0$). The results from Yang et al. (2010) also suggest that one can expect a positive relation between leverage and stock returns($\alpha_1 > 0$).

Modigliani and Miller (1958) are the founders of the modern thinking on capital structure. They present a theoretical view on how the value of a company will stay the same, regardless of which type of capital structure is chosen. What they mean by this is that a company cannot change the total value of its outstanding assets by changing the magnitudes of its capital structure. Modigliani and Miller introduced three different models of capital structure:

M&M proportion #1 without taxes implies that the value of the levered company is identical to the value of the unlevered company. The value of any company is then independent of its capital structure (Modigliani & Miller 1958). This proportion is based on the fact that investors can create homemade leverage, which means that investors can borrow on the exact same terms as large copmanies can duplicate corporate leverage trough purchasing and financing options. Homemade leverage is one of the most important findings in the area of corporate finance (Ross, Westerfield & Jaffe 1993)

M&M proportion #2 without taxes concludes that without taxes you cannot change equity to debt to reduce the total cost of capital. When a company adds debt it increases the risk of the

remaining equity, which will increase the cost of equity capital. The constant Weighted Average Cost of Capital (WACC) in this model shows that the value of the company and the company's overall cost of capital are independent to leverage (Modigliani & Miller 1958).

M&M proportion #1 and #2 with taxes were developed because of the criticism that resulted from their first two assumptions where taxes were not included. In the proportion 1 with taxes the company should take on 100% debt to optimize company value. This is because a levered company pays less tax then an all-equity company does (Modigliani & Miller 1963). In proportion 2 with taxes the company's WACC will decrease with higher leverage compared to no taxes where WACC is constant. This indicates that a high level of debt will lead to an increase of the company's value (Copeland & Weston 1992).

In this study, two models that explain capital structure theory will be used: trade-off theory and pecking order theory. The trade-off theory is the one of these two that actually uses a formula to calculate the optimal capital structure. Pecking order theory tries to explain the optimal capital structure by words (Copeland & Weston 1992).

2.2 Trade-off Theory

M&M proposed in proportion 1 and 2 with taxes that companies prefer 100% debt to optimize company value and to benefit of the tax shield (Modigliani & Miller 1963). However this is not how companies react in the real world, which is due to that when a company increases debt, the risk of going bankrupt will also increase. Modigliani and Miller assume that there are no bankruptcy costs, which is a big thing not to consider. The trade-off theory takes this to account by saying that capital structure reflects the trade-off between tax-benefits and expected costs of bankruptcy (Kraus & Litzenberger 1973). This means that the optimal capital structure is founded where the gain from an additional debt is offset by the extra-incurred costs of bankruptcy, as seen in figure 1. The optimal capital structure, according to the figure, is where the curve has its highest point. When looking at figure 1, value of the company is used on the y-axle. The value of the company consists of the sum of all claimants: creditors (secured and unsecured) and equity holders (preferred and common). Equity holders are all investors that hold equity in a company for example bondholders and stockholders. In this thesis stock returns are used in the regression models, which means that creditors and some equity holders are not accounted for. The optimal capital structure in this thesis is therefore on the blue line and not on the pink line.

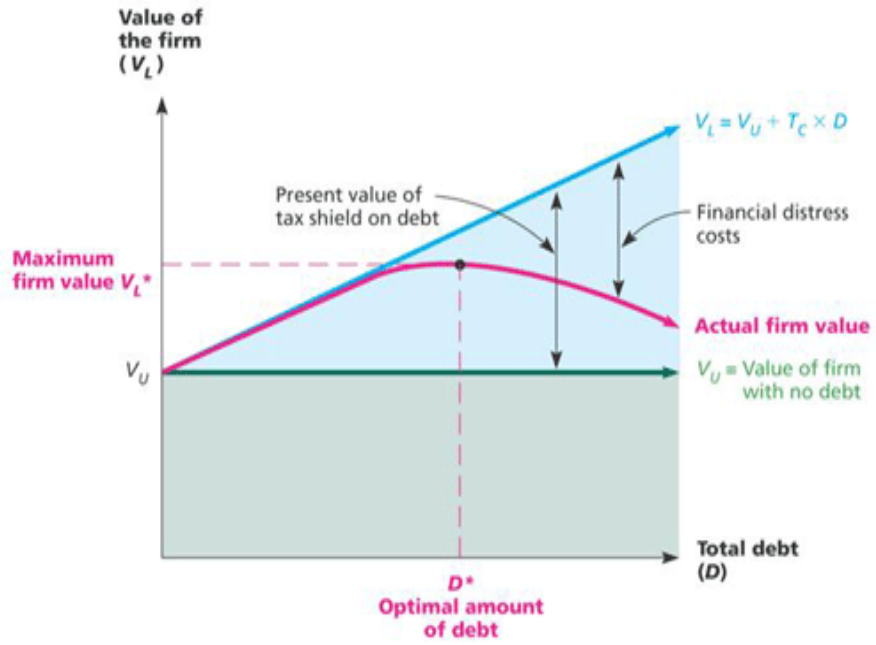

Figure 1 The Optimal Capital Structure

2.2.1 Bankruptcy Costs

When a company takes on debt it provides tax benefits, but it also puts pressure on the company since, according to the trade-off theory, interest and principal payments are requirements. The financial distress increases with the increased risk of bankruptcy. Bankruptcy costs can be divided into two parts: direct and indirect costs. Direct costs are costs that occur directly, so called out-of-pocket cash expenses. They are directly related to the filling of bankruptcy and the action of bankruptcy. Examples of direct costs are fees for investment bankers, administrative fees and lawyers (Haugen & Senbet 1978). The costs of bankruptcy for large companies are less important when deciding the capital structure than it is for smaller companies since the direct costs of bankruptcy decreases when the size of the company increases (Warner 1977). Indirect costs are not cash expenses on the process itself but are a result of bankruptcy. Examples of indirect costs are losses of key employees after the company becomes bankrupt and sales that are lost during and after the bankruptcy (Titman & Wessels 1988).

2.2.2 Agency Conflicts

Agency conflicts arise when there is a conflict between the owner and the CEO of a company. There are two kinds of costs: agency costs of equity and agency costs of debt. Agency costs of equity arise because the owner of a company has a larger incentive to work hard than an employee. The same relation exists if you own a large percentage of the

company compared to a small percentage (Copeland & Weston 1992). Agency costs of debt occur when there is a conflict between stockholders and bondholders. When a company increases its debt in the capital structure, bondholders will start taking on an increasing fraction of the company's business and operation risk but stockholders and owners still have the overall control of the company's investment and operating decisions. This will provide the managers with different ways to implement selfish strategies, which will increase their own wealth at the cost of the bondholders (Smith & Warner 1979).

2.3 Pecking Order Theory

The pecking order theory constructed by Myers (1984) and Myers and Majluf (1984) is based on asymmetric information between companies and investors (Baker & Martin 2011). According to the pecking order theory, equity is a less preferred way to finance a company due to the investors' beliefs that managers only issue new equity when the equity is overvalued. When managers need to finance their operations they should use a pecking list (Graham & Harvey 2001). There is empirical evidence that shows that issuance of new equity results in stock price reductions (Baker & Martin 2011). The pecking order theory suggests that the company should only seek external financing when there are insufficient internal funds (Graham & Harvey 2001). When the company do seek external funding, they always prefer debt to issuing new equity (Myers 1984).

2.3.1 Leverage

In a simple pecking order world when holding investments are fixed, leverage is higher for companies with more investments and lower for more profitable companies (Fama & French 2002). According to Myers (1984) companies are concerned with both current and future financing costs. It is possible that, when controlling other factors, companies with large expected investments have less current leverage. This is due to that companies with large expected investments maintain low-risk debt capacity to be able to finance future investments by internal funding.

2.3.2 Volatility

Current and future financing costs will lead to a pecking order prediction on how volatility of net cash flows affects dividends and debt. When net cash flows are low, a company with high volatile net cash flows is likely to have less leverage than a company with less volatile net cash flows (Yang et al. 2010).

2.4 Hypotheses development

To study the effect of Capital Structure and Stock Returns of Swedish Large Cap companies over the years 2009-2013, two hypotheses are developed.

H1: Leverage will have a positive effect on stock returns and stock returns will have a negative effect on leverage.

H2: The pecking order theory is the theory that best explains the behaviour of Swedish companies listed on large cap.

To test the hypothesis stated above, the regression models presented below will be used:

$$SR_{it} = \alpha_0 + \alpha_1 LEV_{it} + \alpha_2 SZ_{it} + \alpha_3 PF_{it} + \alpha_4 GW_{it} + \alpha_5 LQ_{it} + \alpha_6 SECTOR_i + \alpha_7 LISTED_n + \varepsilon_{it} \quad (1)$$

$$LEV_{it} = \beta_0 + \beta_1 SR_{it} + \beta_2 SZ_{it} + \beta_3 PF_{it} + \beta_4 GW_{it} + \beta_5 V_{it} + \beta_6 SECTOR_i + \beta_7 LISTED_n + \mu_{it} \quad (2)$$

3. Methodology

The methodology is divided into two parts, where the first part describes the use and definition of variables for stock returns and capital structure and the second part describes the data and method for the regression analysis. The data presented is taken from the Bloomberg database. The objective of this study is firstly to quantitatively describe the determinants of stock returns and then capital structure and secondly to show which theory of capital structure best explains the financing behaviour of Swedish large public traded companies. Therefore the results and analysis will be separated into two different sections: one where the quantitative data is described and analysed and one where the two different theories of capital structure mentioned above is analysed from the result of the data.

3.1 The Regression Models

In this section, the theoretical models and its variables are presented. The proposed econometric models, as in other research such as Ahmad, Fida and Zakaria (2013) and Yang et al. (2010), is as follows:

$$SR_{it} = \alpha_0 + \alpha_1 LEV_{it} + \alpha_2 SZ_{it} + \alpha_3 PF_{it} + \alpha_4 GW_{it} + \alpha_5 LQ_{it} + \alpha_6 SECTOR_i + \alpha_7 LISTED_n + \varepsilon_{it} \quad (1)$$

$$LEV_{it} = \beta_0 + \beta_1 SR_{it} + \beta_2 SZ_{it} + \beta_3 PF_{it} + \beta_4 GW_{it} + \beta_5 V_{it} + \beta_6 SECTOR_i + \beta_7 LISTED_n + \mu_{it} \quad (2)$$

SR_{it}= Stock returns at time t

LEV_{it}= Leverage at time t

SZ_{it}= Size of company at time t

PF_{it}= Profitability at time t

GW_{it}= Growth of company at time t

LQ_{it}= Liquidity ratio at time t

V_{it}= Volatility at time t

$SECTOR_i$= Sector dummy, with sector i

$LISTED_n$= Year's listed at large cap, with n years

ε_{it}, μ_{it} = Error terms at time t

Table 1 Definition and Calculation of variables

Variables	Calculations
Stock returns	$\frac{Stock\ Price_t - Stock\ Price_{t-1}}{Stock\ Price_{t-1}}$
Leverage	$\frac{ST\ Borrowing + LT\ Borrowing}{Total\ Assets}$
Size	$\ln(Total\ Assets)$
Profitability	$\frac{Net\ Income}{Average\ Total\ Assets}$
Growth	$\frac{Total\ Assets_t - Total\ Assets_{t-1}}{Total\ Assets_{t-1}}$
Liquidity	$\frac{Current\ Assets}{Current\ Liabilities}$
Volatility	$\sigma\left(\frac{Stock\ Price_t - Stock\ Price_{t-1}}{Stock\ Price_{t-1}}\right)$

Table 1 describes the equations that are used for the explanatory variables.

3.2 Determinants of Stock Returns

This section consists of the variables when stock returns are the dependent variable. The explanatory variables will here be defined and motivated as why they are relevant to the model.

Leverage

Bhandari (1988) suggested that debt ratio is one of the stock return's risk premiums, since debt ratio has a positive relation with stock returns. Because of the greater risk of bankruptcy, the company's risk of its common equity will rise with an increase in leverage. With higher risk the investors will demand higher returns. Therefore one can expect a positive relation between leverage and stock returns ($\alpha_1 > 0$). According to Ahmad, Fida and Zakaria (2013) following the standard practice is to calculate leverage as the ratio of total liabilities to total assets, therefore the same calculation has been used in this study. Total liabilities include short-term and long-term debt.

Size

Previous research concluded that small companies may suffer from long periods of low earnings whereas large companies don't, which indicates that size is associated with common risk factors. This risk factors lead to a negative relationship between size and stock returns. Smaller companies then exhibit more risk, which means that they should have higher stock returns to compensate for the higher level of risk (Gallizo & Salvador 2006). Hence one could expect a negative relation between size of company and stock returns ($\alpha_2 < 0$). The logarithmic of the company's total assets is used as a proxy for company size. Total Assets is the average of the beginning balance and ending balance.

Profitability

Haugen and Baker (1996) suggested that companies that are profitable have bigger potential for future growth. This indicates that companies with higher profitability earn higher returns since profitability is one of the determinants of stock returns. One can therefore conclude that there is a positive relation between profitability and stock returns ($\alpha_3 > 0$). To define profitability, the returns of assets is used and calculated as the net income over average total assets.

Growth

Haugen and Baker (1996) showed empirical evidence that growth potential and profitability has a positive impact on future stock returns ($\alpha_4 > 0$). A company´s growth is measured by the percentage change in average total assets, where assets average total is the average of the beginning balance and ending balance.

Liquidity

Pastor and Stambaugh (2003) as well as Haugen and Baker (1996) show that stock with lower liquidity earn higher returns, which may compensate for the liquidity risk.
Many researchers have found a negative relationship between liquidity and stock returns. This is because liquidity stock has less risk so the returns on liquidity stock are low (Yang et al. 2010). There is therefore a negative relationship between liquidity and stock returns ($\alpha_5 < 0$). Liquidity is measured as the ratio of current assets to current liabilities. The total of all current assets is the summation of cash and cash equivalents, marketable securities and other short-term investments, accounts and notes receivable, inventories and other current assets. The total of all current assets also includes accrued income. The current liabilities are a

summation of accounts payable, short-term borrowings and other short-term liabilities.

Sector

Titman and Wessel (1988) suggested that companies within different sectors look at the cost of liquidation differently and are therefore more or less willing to use debt. That's why dummy variables have been used to measure sector classification (See appendix A1). These dummy variables are there to increase our R-squared and therefore the significance of our result. In this study the sector information technology will be used as a benchmark and will therefore be excluded in the regression.

Listed

A dummy variable for listed years is used because there is a difference between a company that has been listed recently and a company that has been on large cap for a while. To be listed on large cap a company must have a market capitalization of one billion euro, mid cap between 150 million and one billion euro and small cap less than 150 million euro. This indicates that a company that recently has gone from mid-cap to large cap probably has had an exponential growth the last years, which will have or has had effect on its debt and/or stock returns.

The dummy variables used are:
Dummy variable LISTED 1= listed on large cap 2013, listed 1 year in total
Dummy variable LISTED 2= listed on large cap 2012, listed 2 years in total
Dummy variable LISTED 4= listed on large cap 2010, listed 4 years in total
Dummy variable LISTED > 4= listed on large cap before 2010, listed more than 4 years in total

Note that there was no company that moved up or entered large cap in 2011.

In the regression model, only three of the four dummy variables presented above will be used. This because if including all dummy variables, perfect collinearity will be introduced to the models and one can then fall into the dummy variable trap (Wooldridge 2013, p. 236). The choice of benchmark dummy, the dummy that will be excluded from the regressions, is the one that represents the companies that where listed to the large cap more than four years in total.

3.3 Determinants of Capital Structure

This section consists of the explanatory variables when leverage is the dependent variable.

Stock Returns

A company's stock returns may explain its equity issuance. For instance Baker and Wurgler (2002) presented empirical evidence that high-leverage companies, in many cases, raised funds when their valuation was low in addition to low-leverage companies that tended to raise funds when their valuation was high. There is also evidence that companies that raise equity have low subsequent returns, which is consistent with the evidence from Baker and Wurgler that states that companies issue equity when the cost of equity is low (Jegadeesh 2000). Since companies usually use more equity financing than debt when the stock returns increases, it can be fair to say that the relationship between stock returns and leverage will be expected as negative ($\beta_1 < 0$). Stock returns are measured as the ratio of the monthly last price for the security. To make the stock returns into annual stock price, the average of all monthly stock prices for each year has been used.

Size

Large companies are usually more diversified and more leveraged because they are less likely to go bankrupt than smaller companies. Larger companies also have the ability to use internal financing on a larger scale than smaller companies (Bevan & Danbolt 2002). This indicates that there is a negative relation between size and debt level ($\beta_2 < 0$).

Profitability

The pecking order theory tells us that companies prefer to issue the safest security first when external finance is required, but that internal financing is preferable (Myers 1984). When external financing is required companies start with debts, then possibly hybrid securities such as convertible bonds and lastly common equity. Smaller companies, that are generally less profitable than larger companies, issue debt because they do not have enough internal funding for their capital investments program. In other words, smaller companies use debt financing as first priority according to the pecking order theory. Hence, the relation between leverage and profitability should be negative ($\beta_3 < 0$). This is contrary to what Jensen (1986) claimed in his theory of agency costs of free cash flow where the relation between profitability and leverage is positive. Jensen stressed the risk that managers with access to a large amount of cash flow could invest in ill-advised acquisitions or mature business. If a

large company that has access to a large amount of cash flow should have this kind of problem it could be better to use debt instead of internal financing. The interest and principal payments will force the company to pay out cash, which will reduce overinvestment problems.

Growth

Companies that grow at a higher pace may have more agency costs (underinvestment problem) and in order to minimize these problems, companies with higher proportion of "real options" (growth opportunities) are expected to have a lower debt ratio. This is because the existence of "real options" causes shareholders to transfer wealth from the company's bondholders by forgoing projects that have positive net present values (Myers 1977). This suggests a negative relationship between debt and growth opportunities ($\beta_4 < 0$).

Volatility

When earnings vary a lot under positive bankruptcy costs it implies that it is a high possibility for bankruptcy, which indicates a lower debt ratio. A negative coefficient on earnings variance then may indicate the existence of bankruptcy costs ($\beta_5 < 0$). The coefficients magnitude measure the importance of bankruptcy costs when determining an optimal capital structure (Yang et al. 2010). Indicators of volatility used are standard deviation of returns on stock.

Sector

As mentioned in the chapter regarding the stock returns, there are eight sector variables used.

Listed

As for stock returns, the listed dummy is included to measure the differences between sectors when it comes to how long they have been listed at large cap.

3.4 Data collection

The data used for this study was collected from the Avanza banks large cap list (2014), which contains Sweden's biggest non-financial companies listed on the Swedish stock exchange for the period 2009–2013. The data was obtained from the Bloomberg database. The original sample consisted of 72 companies. Some of the companies didn't have values for the period 2009–2013, which narrowed the selection down to 67 companies. Additionally, 17 companies were excluded due to missing values. After excluding these companies the final selection consisted of 50 companies. See appendix A1 for a detailed description of the companies included.

3.5 Regression Tests

To test the relationship between the dependent variables and the explanatory variables, a multiple linear regression analysis will be used. Then, hypotheses testing will be carried out.

Throughout the study, the ordinary least squares (OLS) method will be used to estimate the unknown parameters in the model. The reason for choosing the OLS estimator method is because it creates the result with the smallest variance in the coefficients (Wooldridge 2013, p. 61). A multiple regression model is necessary because the disturbance term in the regression model contains all other factors that are not included as control variables. These are the unobserved factors of the model. If the control variables were not included in the multiple regression models, it would generate a biased OLS estimator (Wooldridge 2013, p. 77).

One of the multi-linear regression assumptions assumes that there is no correlation between the unobserved factors in the error term and the independent variables. However, the assumption that the average value of the unobserved factors is unrelated to the explanatory variables will never be absolutely certain (Wooldridge 2013, p. 74). In this study the specified model is correct under the key assumption MLR 4, which means that the OLS is unbiased. When using panel data one can analyse the results using a pooled OLS model, a random effect model or a fixed effect model. The pooled OLS key assumption means that there are no unique attributes of individuals within the measurement set, and no universal effects across time. The random effect assumes that the variations across entities are random and uncorrelated with the independent variables in the model. The fixed effect is used when analysing the impact of variables that vary over time. First a Breusch and Pagan Lagrange Multiplier test will be carried out to conclude whether the pooled OLS model or the random

effects model is the most appropriate. Secondly, a Hausman test will be used to decide whether fixed effect or random effect model is best for the panel data analysis (Wooldridge 2013, p. 399).

Finally, a Breusch and Pagan test will be conducted to see if the model suffers from heteroscedasticity. If heteroscedasticity is present in the model, the robust regression will be used to adjust the standard errors and increase the significance of the regression variables (Wooldridge 2013, p. 213). The R-squared and the correlation will also be analysed. Furthermore, the differences between statistical significance and economic significance will also be emphasized.

Pair-wise Correlation

The pair-wise correlation between the explanatory variables has been used to describe their functional relationship. The coefficients β_1 (stock returns) and α_1 (leverage) will explain whether that relationship is negative or positive (Wooldridge 2013, p. 20).

Breusch and Pagan Lagrange Multiplier Test

This test helps to decide whether the random effects regression or the pooled OLS regression should be used. The null hypothesis in the test is that variances across the entities are zero. This means that there is no significant difference across units, i.e. no panel effect. Therefore, if one fails to reject the null hypothesis, the random effects may not be appropriate (Wooldridge 2013, p. 221).

Hausman Test

Generally, the Hausman test is conducted when two models can be used to answer the same question. In this study; both random effects model and fixed effects model. The test formally tests for statistically significant differences. The difference is to be found within the coefficients on the time-varying independent variables. If the Hausman test fails to reject the null hypothesis, the random effects model is the one that is the most appropriate to use to estimate the regression. A failure to reject the null hypothesis means that the sampling variation in the fixed effects estimates is to large, it would not be possible to conclude any differences that are statistically significant. Another reason can be that the estimates are so close that it does not matter which one to use. (Wooldridge 2013, p. 399). Even if the Breusch and Pagan Multiplier test and the Hausman test are utilized, Wooldridge (2013)

emphasizes the importance of computing all the three regression models to compare the estimates and through that determinate the nature of the biases.

Heteroscedasticity Test

If heteroscedasticity is present in the model, the estimators of the OLS parameters are unbiased and consistent, but the standard errors are not efficient. If the standard errors are not adjusted for heteroscedasticity, the usual *t* statistics or *F* statistics for testing our hypothesis cannot be used. When heteroscedasticity is present, robust standard errors tend to be trust worthier. However, the use of robust standard errors does not change coefficient estimates, but the test statistics will give reasonably accurate p-values. To demonstrate if the models we have estimated suffer from heteroscedasticity, the Breusch and Pagan test will be used. This test can evaluate whether the variance of the error process appears to be independent of the explanatory variables. If the null hypothesis is rejected, the statistical evidence implies that heteroscedasticity is present (Wooldridge 2013, p. 220).

Hypothesis Test

The hypothesis we've set up to test in this study is whether leverage affects stock returns and if stock returns affects leverage. The null hypothesis is therefore H_0: β_1 or $\alpha_1 = 0$. The alternative hypothesis is H_1: β_1 or $\alpha_1 \neq 0$, which means that there is a statistically significant relationship between the variables. A t-test and an analysis of the p-value will be conducted in order to ensure that the estimated coefficient is not due to sampling error. In addition to selecting a specific critical value for the t-statistic, an analysis of the p-value will be conducted. By using the p-value, the smallest significant value at which the null hypothesis would be rejected, can be obtained. The level of the p-value at which the null hypothesis can be rejected is selected at 0,05. The reason why this p-value is selected is due to the relative small sample that is used (Wooldridge 2013, p. 120). The tests are presented below.

For equation 1:

$$SR_{it} = \alpha_0 + \alpha_1 LEV_{it} + \alpha_2 SZ_{it} + \alpha_3 PF_{it} + \alpha_4 GW_{it} + \alpha_5 LQ_{it} + \alpha_6 SECTOR_i + \alpha_7 LISTED_n + \varepsilon_{it}$$

$\boldsymbol{H_0}$**:**	$\alpha_1 = 0$	There is no statistically significant relationship between stock returns and leverage
$\boldsymbol{H_1}$**:**	$\alpha_1 \neq 0$	Null hypothesis rejected
Significant at:	0.05	

For equation 2:

$$LEV_{it} = \beta_0 + \beta_1 SR_{it} + \beta_2 SZ_{it} + \beta_3 PF_{it} + \beta_4 GW_{it} + \beta_5 V_{it} + \beta_6 SECTOR_i + \beta_7 LISTED_n + \mu_{it}$$

$\boldsymbol{H_0}$**:**	$\beta_1 = 0$	There is no statistically significant relationship between leverage and stock returns
$\boldsymbol{H_1}$**:**	$\beta_1 \neq 0$	Null hypothesis rejected
Significant at:	0.05	

Goodness-of-fit

The R-squared in the regression analysis measures how much of the variation in stock returns that can be explained by the leverage and how much of the variation in leverage that can be explained by the stock returns. An important thing to keep in mind is that the R-squared will not influence the generation of the model but it will explain how much the independent variables explains the movements of the dependent variable (Wooldridge 2013, p. 68).

4. Empirical Results and Analysis

In this section the result and analysis is presented. First the common results as descriptive statistics for all variables will be presented. Secondly the analysis between stock returns and leverage. Finally the analyses between leverage and stock returns will be presented.

4.1 Descriptive Statistics of the variables

Table 2 below presents the descriptive statistics for the included variables in the two regression models. The result shows information about the mean, standard deviation, minimum values and maximum values. This is to find out if the variables are reliable.

Table 2 Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Obs
Stock returns	overall	0.020	0.037	-0.065	0.207	N=250
Stock returns	between		0.014	-0.001	0.071	n=50
Stock returns	within		0.034	-0.070	0.180	T=5
Leverage	overall	0.227	0.143	0.000	0.721	N=250
Leverage	between		0.136	0.000	0.664	n=50
Leverage	within		0.045	0.045	0.409	T=5
Size	overall	10.060	1.287	6.422	12.775	N=250
Size	between		1.284	6.618	12.729	n=50
Size	within		0.186	9.371	11.561	T=5
Profitability	overall	0.075	0.073	-0.125	0.367	N=250
Profitability	between		0.060	-0.015	0.291	n=50
Profitability	within		0.043	-0.093	0.276	T=5
Growth	overall	0.076	0.410	-0.238	5.643	N=250
Growth	between		0.179	-0.082	1.138	n=50
Growth	within		0.369	-1.139	4.580	T=5
Liquidity	overall	1.526	0.654	0.153	5.521	N=250
Liquidity	between		0.559	0.309	2.765	n=50
Liquidity	within		0.352	-0.052	5.014	T=5
Volatility	overall	0.086	0.049	0.032	0.427	N=250
Volatility	between		0.030	0.042	0.182	n=50
Volatility	within		0.040	-0.031	0.353	T=5

The descriptive statistics shows that all variables contain usable values and that no minimum or maximum is outside of what is reasonable. When looking at growth one can see some extreme variables on minimum and maximum, but according to the data these values are correct.

4.2 Pair-wise Correlation Matrix

The explanatory variables in the regression models are not only likely to be correlated with the dependent variable, but also with each other. *Table 3* presents the Pair-wise Correlation Matrix and explains the correlation between all variables included in the models. The multicollinearity problem arises when the correlation between two variables exceeds 0.9 (Wooldridge 2013, p. 98).

Table 3 Pair-wise Correlation Matrix

	Stock returns	**Leverage**	**Size**	**Profitability**	**Growth**	**Liquidity**	**Volatility**
Stock returns	1.000						
Leverage	-0.008	1.000					
Size	-0.098	0.081	1.000				
Profitability	-0.038	-0.105	-0.127	1.000			
Growth	0.034	-0.003	0.043	0.176	1.000		
Liquidity	0.095	-0.219	-0.051	0.175	-0.081	1.000	
Volatility	0.627	-0.058	0.147	-0.177	-0.001	0.005	1.000

As seen in *Table 3* above, none of the explanatory variables has a correlation that exceeds 0.9 and one can therefore conclude that the variables do not suffer from the mulitcollinearity problem. When the correlation is -1.000 then it is a perfect negative correlation and when the values are 0.000 then there is no correlation. The value of the coefficient of leverage is -0.008, which indicates that stock returns and leverage are inversely correlated with each other. Therefore, a value of -0.008 then means that there is very low negative correlation between stock returns and leverage.

4.3 Regression Results for Stock Returns

When using pooled OLS one will not get rid of the unobserved fixed effect that can cause the coefficient to be correlated with the error term. This means that the estimates can end up being biased. The reason not to use the pooled estimates is because the panel data has the same *i* for each year *t* (Wooldridge 2013, p. 361). The results from the Breusch and Pagan Lagrange multiplier test in *Table 4* below shows that the null hypothesis can not be rejected. This indicates that pooled OLS estimates should be used according to this model. Though, according to the results from the regressions the fixed effects shows a higher level of significance and the results from the Breusch and Pagan Lagrange multiplier test will therefore be ignored. Further Wooldridge (2013) suggests that the Hausman test will decide whether the fixed effect model or random effect model should be used instead. According to the Hausman test used for this study, also presented in *Table 4* below, the fixed effect model should be used. The robust standards errors is used because of the results from the Breusch and Pagan heteroscedasticity test that says that heteroscedasticity is present in the model.

Table 4 Regressions for Stock returns

Variables	Pooled effects estimates	Random effects estimates	Fixed effects estimates	Fixed effects robust estimates
Leverage	0.004	0.004	0.151***	0.151**
	(0.018)	(0.018)	(0.055)	(0.073)
Size	-0.002	-0.002	-0.081***	-0.081***
	(0.002)	(0.002)	(0.016)	(0.016)
Profitability	-0.040	-0.040	-0.081	-0.081*
	(0.036)	(0.036)	(0.057)	(0.040)
Growth	0.003	0.003	0.027***	0.027**
	(0.006)	(0.006)	(0.009)	(0.011)
Liquidity	0.005	0.005	0.012*	0.012**
	(0.004)	(0.004)	(0.007)	(0.005)
Sector 1	-0.024**	-0.024**		
	(0.011)	(0.011)		
Sector 2	-0.020	-0.020		
	(0.013)	(0.013)		
Sector 3	-0.017	-0.017		
	(0.011)	(0.011)		
Sector 4	-0.003	-0.003		
	(0.021)	(0.021)		
Sector 5	-0.014	-0.014		
	(0.015)	(0.015)		
Sector 6	-0.014	-0.014		
	(0.011)	(0.011)		
Sector 7	-0.017*	-0.017*		
	(0.009)	(0.009)		
Listed 1	0.001	0.001		
	(0.018)	(0.018)		
Listed 2	0.012	0.012		
	(0.015)	(0.015)		
Listed 4	-0.010	-0.010		
	(0.021)	(0.021)		
Constant	0.053**	0.053**	0.790***	0.790***
	(0.023)	(0.023)	(0.163)	(0.155)
		Weighted Statistics		
Observations	250	250	250	250
Number of companies	50	50	50	50
R-squared within	0.070	0.070	0.146	0.146

Breusch and Pagan Multiplier Test: Chibar2 (01) = 0.000 Prob > Chibar2 = 1.000

Hausman Test: Chi2 (5) = 31.87 Prob > Chi2 = 0.000

Modified Wald Test For Group Wise Heteroscedasticity infixed Effect Regression Model: Chi2 (50) = 5687.09 Prob > Chi2 = 0.000

Standard errors are presented in parentheses.

*, **, *** Denote significance at the 0.10, 0.05 and 0.01 level or better.

4.3.1 Regression Analyse for Stock Returns

When using pooled and random regression, none of the independent variables are significant when weighed towards the depended variable stock Returns. Comparing pooled and random with fixed, one can see that only one variable is insignificant at a 10% level for fixed effect and that is profitability. In this study a 5% significant level is used and therefore three variables are significant in the fixed effect model and those are: leverage, size of company and growth. With fixed effect using robust there is only one variable that is insignificant at a 5% significance level and that is profitability. When using fixed effect, one can observe that no values for the dummy variables show. This is because the dummy variables that have been used are time invariant which means that there will be no values when using fixed effect regression. (Wooldridge 2013, p. 391). The fixed effects r-squared are also higher than both pooled and random r-squared. This means that when using fixed effect more of the variation in stock returns can be explained by the explanatory variables.

The regression using fixed effect with robust standard errors shows that the model being tested i.e. leverage effect on stock returns, holds with the 5% significant level. The result is also economically significant since a 1% change in leverage will increase stock returns by 0.15%, which makes sense. One can also see that the effect of the leverage coefficient on stock returns is positive as expected and in line with the determinants of stock returns in the methodology. This indicates that as leverage increases, the risk of the company will increase which leads to a higher demand of stock returns from the investors. Higher leverage indicates that companies prefer to raise debt before equity because according to the calculations debt/equity and debt/asset, higher level of equity/asset will lead to a decrease in leverage. This is in line with what the pecking order says that a company only raises new equity as a last resort. One can also see that among the significant coefficient of stock returns, leverage has the largest coefficient and has the largest determining power on stock returns. Size of company has a negative relationship to stock returns. This means that when the size of the company grows, the stock returns will decrease. The reason is that a large size company often is related to lower risk and therefore a lower risk premium is demanded from investors. The result is economically and statistically significant at a 1% level. The coefficient of profitability shows that if profitability increases by 1%, the stock returns decreases by 0.081%.

According to the p-value this is insignificant at the 5% level. The result is also economically insignificant. Since the results are insignificant a reliable conclusion can't be drawn. Growth has a positive impact on stock returns, which indicates that the more a company grows, the higher their returns will be. This is also statistically significant at a 5% level, but it is not economically significant. It does not make sense that a 1% increase in growth only leads to a 0.027% increase in stock returns. The coefficient of liquidity shows that if liquidity increases by 1% the stock returns will increase by 0.012%. According to the p-value the liquidity coefficient is significant at a 5% level. The results show that it is not economically significant. This result is not in line with what is discussed in the methodology part, where liquidity is supposed to have a negative impact on stock returns. According to these results the more liquid a company is, the higher stock returns they will be able to expect, which indicates that investors might be more interested in companies that are more unlikely to go bankrupt. A reason for this can be that when times are bad, people tend to be more risk-averse.

The three r-squared 'overall', 'between' and 'within' means: The r-squared 'overall' computes the fitted values using the fixed effect parameter vector and the original, untransformed independent variables. The r-squared 'between' uses the within-individual and the fixed effect parameters to calculate the r-squared as the squared correlation between those predicted values. The R-squared 'within' uses the mean-deviated regression, i.e. the ordinary r-squared from running OLS on the transformed data. This means that when using fixed effect, also known as the within estimator, one should look at the 'within' r-squared. The R-squared within in the model is 14.6%, which means that 14.6% of the total variation in stock returns can be explained by the explanatory variables. A reason why the r-squared is this low could be that there exists more variables that affect the model that are not included in this model. Even if the r-squared is low in this regression, most of the predictors are statistically significant. This means that an important conclusion can still be drawn from the explanatory variables (Frost 2013).

4.4 Regression Results for Leverage

The regression results from the model where leverage is the dependent variable are the same as for the model for stock return presented in section 4.3 above. Though, the result for leverage say, as from the Breusch and Pagan Lagrange multiplier test in *Table 5* below, that

the null hypothesis can be rejected. This indicates that pooled OLS estimates should not be used according to this model.

Table 5 Regressions for Leverage

Variables	Pooled effects estimates	Random effects estimates	Fixed effects estimates	Fixed effects robust estimates
Stock returns	0.218	0.041	0.068	0.068
	(0.309)	(0.113)	(0.11)	(0.121)
Size	-0.004	0.039***	0.097***	0.097**
	(0.008)	(0.014)	(0.022)	(0.039)
Profitability	-0.227*	-0.257***	-0.232***	-0.232*
	(0.135)	(0.070)	(0.070)	(0.129)
Growth	0.020	0.031***	0.012	0.012
	(0.022)	(0.009)	(0.011)	(0.020)
Liquidity	-0.281	0.184*	0.244**	0.244**
	(0.245)	(0.098)	(0.097)	(0.117)
Sector 1	-0.037	-0.055		
	(0.040)	(0.095)		
Sector 2	0.093*	0.076		
	(0.048)	(0.113)		
Sector 3	0.093**	0.108		
	(0.039)	(0.095)		
Sector 4	-0.078	-0.098		
	(0.076)	(0.184)		
Sector 5	-0.112**	-0.117		
	(0.055)	(0.128)		
Sector 6	-0.063	-0.038		
	(0.042)	(0.099)		
Sector 7	0.025	0.004		
	(0.035)	(0.084)		
Listed 1	0.078	0.145		
	(0.063)	(0.154)		
Listed 2	0.086	0.119		
	(0.056)	(0.135)		
Listed 4	0.165**	0.156		
	(0.076)	(0.180)		
Constant	0.289***	-0.180	-0.750***	-0.750*
	(0.090)	(0.161)	(0.218)	(0.396)
		Weighted Statistics		
Observations	250	250	250	250
Number of companies	50	50	50	50
R-squared within	0.070	0.070	0.146	0.146

Breusch and Pagan Multiplier Test: Chibar2 (01) = 365.58 Prob > Chibar2 = 0.000

Hausman Test: Chi2 (5) = 11.68 Prob > Chi2 = 0.039

Modified Wald Test For Group Wise Heteroscedasticity infixed Effect Regression Model: Chi2 (50) = 0.000025 Prob > Chi2 = 0.000

Standard errors are presented in parentheses.

*, **, *** Denote a significance at the 0.10, 0.05 and 0.01 level or better.

4.4.1 Regression Analyse for Leverage

The results shows that the regression for pooled OLS only has one significant independent variable, profitability, but not at the 5% significance level. For random effect there are three variables that are significant at a 5% level and even at a 1% level: size of company, profitability and growth. Volatility is significant at a 10% level. As one can see, random effect has better significant values than both the fixed effect model and fixed effect with robust standard errors. Looking at the coefficient for stock returns one can see that it is neither statistically nor economically significant. According to the theories discussed in the methodology, stock returns were assumed to have a negative effect on leverage. Therefore the results are inconsistent.

The coefficient of size is economically significant and statistically significant. This indicates that larger companies are more leveraged and are less likely to go bankrupt than smaller companies. The results are therefore in line with our theories. The coefficient of profitability is economically significant because a 1% change in profitability will lead to a decrease of 0.23% in leverage, which makes sense. Though, the result is not statistically significant at a 5% level, only at a 10% level. According to the model, looking at the results of growth one can see that a 1% increase in growth will lead to a 0.012% increase in leverage. This small effect leads to the conclusion that the results are economically insignificant. Though, there is no evidence for the result since the results are insignificant. A 1% change in volatility will lead to a 0.244% increase in leverage. The result makes sense because if the volatility increases the company is more willing to raise debt to finance its operations. When debt increases the leverage of the company increases i.e. high volatility will lead to higher leverage. This indicates that companies use the pecking order theory of capital structure because they raise debt before equity since equity will decrease the leverage of the company. The significance of the result is within the 5% significance level. This means that the results are both economically and statistically significant but not in line with the theories in the methodology part.

R-squared is 25.4%, which means that 25.4% of the total variation in leverage can be explained by the explanatory variables. The r-squared in this model is therefore larger than the r-squared in the other model. This means that there are fewer variables left out that explains the depended variables in the model.

4.5 Comparison of our results with previous research

It would be interesting to contrast the results of this study with the results of the articles that this study is based on. When analysing the results of the two base articles, the signs of the explanatory variables are mainly the same but there are some differences.

Firstly, the leverage has a positive effect on stock returns in this study, which is in line with Ahmad, Fida and Zakaria and Yan et al. In this study size has a negative effect on stock returns and a positive effect on leverage and in both of the sources of inspiration the study's size has an insignificant effect. A reason for this is that our thesis only contains of companies that are listed on large cap and the comparing thesis contains of companies of different sizes.

Profitability has a negative effect on leverage, which is in line with comparing studies. Furthermore, the profitability coefficient on stock returns is also negative but not significant. Just as in the comparing studies, growth has a positive effect on stock returns but in this study the effect on leverage is insignificant. Liquidity has a positive effect on stock returns, which is the opposite of the results in the two comparing studies. A reason for this could be that this thesis analyse data from 2009-2013, which was right after the financial crisis. During the financial crisis most people and company's lost a lot of money. Therefore they might have been more risk-averse during 2009-2013 and invested more money in companies that where save and had a high liquidity ratio. Finally, volatility has a positive effect on leverage, which was insignificant in the two comparing studies but significant in this study.

5. Conclusion and Further Research

This study first examined the relationship between capital structure and stock returns. The presented result in this study indicates a clear causality when it comes to leverage effect on stock returns as expected. Since the results are insignificant in the case of stock returns effect on leverage, no conclusions can be drawn. Secondly this study examined which theory, pecking order or trade-off theory, that best explains the financing behaviour of Swedish company´s listed on large cap. The significant coefficients show that the pecking order theory of capital structure best explains the financing behaviour of Swedish companies listed on larger cap. This indicates that they follow a hierarchy in their methods of financing rather than a specific debt ratio. It also suggests that Swedish companies listed on large cap prefer to use internal financing rather than external financing.

Since this study is based on the variables and method used in Ahmad, Fida and Zakaria (2013) and Yang et al. (2010) it would be interesting to compare our results with the previous research. This study shows that leverage has a positive effect on stock returns, profitability has a negative effect on leverage and growth has a positive effect on stock returns, which is consistent with the results by Ahmad, Fida and Zakaria (2013) and Yang et al. (2010). The difference in this study is that size has a significant effect on both leverage and stock returns, liquidity has a positive effect on stock returns and volatility has a significant effect on leverage. The result on stock returns effect on leverage and the coefficient of growth effect on leverage is insignificant in this study, which was not the case in the comparing studies. This can be due to the small number of observations in the sample of this study.

For future research it would be interesting to look at the whole Swedish stock market and also to compare industries with each other. Such a study would be interesting since that would show how different industries use debt financing and whether leverage and stock returns have higher effect on some industries than others. Also, one could include a macroeconomic variable into the regression models to investigate if this has had an effect on the choice of capital structure or the stock returns. Furthermore one could look at the period before the financial crisis, for example 2003-2007, using the same methods as in this thesis to compare the results.

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Appendix

Appendix 1 Sector and Company information

Sector	Company
Basic Material	Billerud Korsnäs
	Boliden
	Holmen
	HEXPOL
	Lundin Mining Corp. SDB
	SSAB
Communications	Millicom Int. Cellular SDB
	Tele2
	Telia Sonera
Consumer Discretionary	AAK
	Electrolux
	Husqvarna
	Oriflame
	SCA
	Swedish Match
Everyday Commodities	Axfood
	Hennes & Mauritz
	ICA Gruppen
	Modern Times Group
Finance & Real Estate	Intrum Justitia
	JM
	Kinnevik
	Latour
	Atrium Ljungberg
	Lundbergföretagen
Healthcare	AstraZeneca
	Elekta
	Getinge
	Meda
	Swedish Orphan Biovitrum
Industrial Goods & Services	ABB Ltd
	Alfa Laval
	ASSA ABLOY
	Atlas Copco
	Hexagon
	Lundin Petroleum
	NCC
	NIBE Industrier
	Peab
	SAAB
	Sandvik
	Securitas
	Skanska
	SKF
	Trelleborg
	Volvo
Information Technology	Axis
	Ericsson
	Nokia Oyj
	Tieto Oyj