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CAPITAL STRUCTURE IN NEGATIVE INTEREST RATE MARKETS

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ABSTRACT

This study examines the development of firm capital structures in European negative interest rate markets. This kind of new market phenomenon has not been occurred before in Europe, thus creating an intriguing opportunity to inspect empirically its effects on corporate leverage. One of the main goals of negative interest rates, by the central banks that have set it, is to promote bank lending to companies so they would invest more, hence creating a positive cycle in the economy. This is also one perspective in the study, and it is important to measure if these actions have really had the desired result.

This paper covers the main previous theory and literature regarding trade-off and pecking order theories on capital structure. Aggregated deficit model is used to investigate pecking order theory, whereas conventional leverage model and dynamic partial adjusted model are used for trade-off theory. The data consists all listed public companies in Denmark, Sweden, Switzerland and the 500 largest companies in the Euro area from year 2007 to 2015.

The empirical results give mixed evidence regarding both pecking order and trade-off theory. Trade-off theory is better supported than pecking order theory considering fast adjustment to target leverage by the dynamic partial adjusted model and pecking order model not giving proper support for the after-mentioned. However, the evidence strongly supports that leverage started rising during the period of negative interest rates.

KEYWORDS: Capital Structure, Interest rate

1. INTRODUCTION

It is widely agreed that corporation's main purpose is to maximize its value and generate value for its shareholders. As a company seeks to fulfill this objective, it has to balance between different financing options while arranging its capital structure. There are countless factors affecting this structure, but the right choices can help the firm to decrease the cost of capital and survive in the market. Also, if we assume that cost of capital is tied into discounted future cash flows, it might have an effect on the present value of those flows and to the firm's market value. For example, Niskanen and Niskanen (2000) describes that optimal capital structure means in theory an ideal ratio between equity and debt. A firm tries to maximize the benefits of debt, such as cheaper issuance cost and tax shield, while minimizing the disadvantages, such as bankruptcy costs.

However, there are many competing theories for this optimal capital structure, and different theories emphasize different factors and priorities. Clear winner among the theories cannot be declared yet, and as financial field is ever changing and developing, it is interesting to try shed light on this controversial topic. The question: "What is corporate's optimal capital structure?", has been in the minds of researchers for over a half century. Nobel prize winners Franco Modigliani and Merton Miller are arguably one of the first and most influential researchers in the area of capital structure and whole finance theory. They claim in their paper of 1958 that in efficient markets, the composition of firm's capital does not affect the value of the firm. This proposition is named after them as "Modigliani-Miller theorem" or "Capital structure irrelevance principle". However, already in 1963 they made a correction to their original paper and argued that taxes actually cause an exception to their theorem, which leads debt to be the preferred choice over external equity.

Modigliani and Miller (M&M) can be regarded as the founding fathers of modern capital structure research. Two other influential theories are trade-off and pecking order hypotheses. In 1973 Kraus and Litzenberger continued to improve M&M's theorems by adding bankruptcy costs into the equation, giving a reason for the constraint for maximum debt, thus making it closer to the real life conditions. It would also mean that there can be some optimal leverage ratio, where the value of the company is the highest. Jensen and Meckling (1978) refined this even further by adding principal-agent problem into examination. Rajan and Zinglaes (1995) conducted a study finding many factors

that affect the capital structure, while Flannery and Rangan (2006) conducted a dynamic model to capture the adjustment of leverage in trade-off theory.

Pecking order hypothesis by Myers and Majluf (1983) can be regarded as major competitor of trade-off theory. It assumes that there is crucial information asymmetry between the managers and investors in external debt and equity. This would cause internal financing to be the cheapest option, next debt and finally equity. Therefore, this theory assumes that current financing mix is only the result of financing decisions of the past. Shyam-Sunder and Myers (1999) came up with up an empirical model using aggregated financial deficit variable to test this and found support for it. However, Frank and Goyal (2003) found evidence that does not support their findings. There are also newer theories, such as market timing hypothesis. Graham and Harvey (2001) find out that majority of CFOs confirm that the current stock price of the firm is an important factor when considering issuing new equity. Baker and Wurgler (2002) confirm this in their study by finding out that firms issue more equity when their stock is overpriced.

Macroeconomic factors may play a major role in capital structure decisions. Bhamara, Fisher and Kuehn (2011) show in their study that inflation and inflation expectations have an impact on corporate defaults. This would lead to higher bankruptcy risk, and thus decreasing the leverage by the trade-off theory. However, Abaidoo and Kwenin (2013) argue expected inflation affecting positively on firm performance and profitability. Europe has faced low inflation for several years now. For example, European Central Bank's (ECB) main policy goal is to have inflation close to two percent. However, recently inflation has been far from the target, and ECB has been using low interest rates to boost the inflation. Ameer (2012) finds nominal interest rate, industrial production and initial IPO returns having significant relation to the number of IPOs. There are numerous studies regarding macroeconomic effects on stock markets, for example, Bernanke and Kuttner (2005) show that on average stock prices grow by one percent when FED cuts its target rate by 25-basis points without prior notice. Stock prices may affect firm capital structures as high potential gain from IPO can cause firms to prefer equity financing instead of debt, as found out in the market timing studies.

1.1. Purpose of the study

The subject of interest in this paper is to study the effect of the global financial crisis on capital structures and especially pay attention to the recent negative central bank interest rates and LIBOR in Europe. The purpose of monetary easing is to boost lending to corporations, which in turn should lead to increased investment activities by these corporations. This would generate more jobs and uplift the economy from the recession.

Traditional corporate capital structure theories assume that cheap lending would lead to higher leverage by firms. However, the absence of profitable bond markets has caused a surge in equity markets. For example, market timing theory expects that firms should prioritize stock issuances in this kind of period. Therefore, the current low interest rate regime offers rather unique time-window to study corporate capital structures in European perspective. Financial and public utility firms will be left out in this study, as they have distinct incomparable capital structure compared to “normal” firms.

1.2. Structure of the study

Theory chapter will begin after this introduction chapter. It will cover the main theories regarding capital structure: it shall start with Modigliani and Miller theorem in order to understand the foundation of other theories. Next, trade-off theory will be covered with relating agency theory. Pecking order being the major competitor will be issued after, and these two theories will be discussed together. This thesis will mainly focus on these two theories in the empirical part too. Next the relevant empirical research will be discussed.

I will go through the data and methodologies after the three first chaopters . All used regressions and hypotheses will be covered. Descriptive statistics shall be presented afterwards. Main factors affecting hypotheses will be covered and discussed. Finally, empirical results will be presented with analysis.

2. THEORETICAL FRAMEWORK

A corporate's capital structure contains usually equity, debt and possibly some hybrid instruments mixing some characteristics of both equity and debt. Typically, firm issues equity or debt to finance its investments, thus permitting future growth and success of the company. Equity and debt have different costs and traits and neither is clearly superior to each other, otherwise both of them would not exist. The interest of researchers revolved around whether or not there is an optimal capital structure, which will maximize the value of the company, and does the choice and timing of financing tell something about the company.

Equity and debt mainly differ from each other by the terms, how they must be paid back to the investors. Debt is a loan, which usually has interest payments as a steady flow of costs until it has been completely paid back to the lenders. However, interest is most often tax deductible, making it more appealing. Even though lender does not receive ownership rights over the company, there might be a mortgage or covenant constraining the firm. For example, a covenant might require the firm to upkeep some specific key ratios over the creditors pre-determined level. If this requirement is not met, the lender can have the right to raise the interest rate or even cancel the contract. High leverage also possesses a bankruptcy risk, because if company fails to meet its obligations to the creditors, they have the right to declare the company bankrupt and liquidate its assets to repay the debt.

Equity can be split into internal and external equity. Internal equity is generated by firm's own cash flow and therefore there are no major direct costs associated with it. Generally, after an equity issuance, the investors in external equity becomes an owner of the company and is thus eligible to receive part of the profit as dividend. Company is not obliged to pay dividend, but often an investor expects some dividends to earn return for the initial investment. The risk is higher when investing in external equity instead of debt, because in the case of bankruptcy, debt is paid back before equity. Therefore, an investor requires higher return from equity and financing through it might become more expensive for a company in the long run.

This chapter will cover the two mainstream capital structure theories: trade-off and pecking order. Few other theories will be also discussed, which shall broaden the understanding of different motivations and motors that may drive the capital structure. The very first theory to be explained is Modigliani-Miller (M&M) theorem, which gives

the basis for many other capital structure theories. However, this theory is not really practical, as it has heavy assumptions that do not hold in the real life. Nevertheless, it is still crucial to understand this more theoretical and abstract framework, in order to measure and perceive violations in market efficiency and derive new theories that might reflect the real reasons and motivations behind capital structure.

2.1. Modigliani-Miller theorem

Modigliani and Miller's (1958) capital structure irrelevancy theory can be regarded as the foundation of different capital structure theories. The presumptions for this are companies' and individuals' option to lend money for no risk and equal rate, no taxes, no transaction costs, perfect information symmetry and management's willingness to maximize the value of the company. Their study proposes that all price differences stemming from the capital structure are exploited quickly by arbitrageurs in efficient capital markets. After these assumptions, Modigliani and Miller formed their two famous propositions.

2.1.1. Modigliani-Miller theorem without taxes

The proposition I claims that in a world without taxes, a change in a corporate's capital structure does not have an effect on the firm's value. One common way to explain this is to model the capital structure as a pie. No matter how you slice it, the total size or value does not change. If Modigliani and Miller's presumptions are correct, it should matter if the company is financed by debt or equity, it should not have an effect on the firm's ability to create revenue or profit, thus is should not either have an effect on its value.

The proposition II claims that weighted average cost of capital (WACC) does not change when capital structure is altered. Figure 1. illustrates this and simple algebra proves it by solving the equation:

1) $$WACC = r_a = r_e * \frac{E}{V} + r_d * \frac{D}{V}$$

(2) $$r_e = r_a + (r_a - r_d) * \frac{D}{E}$$

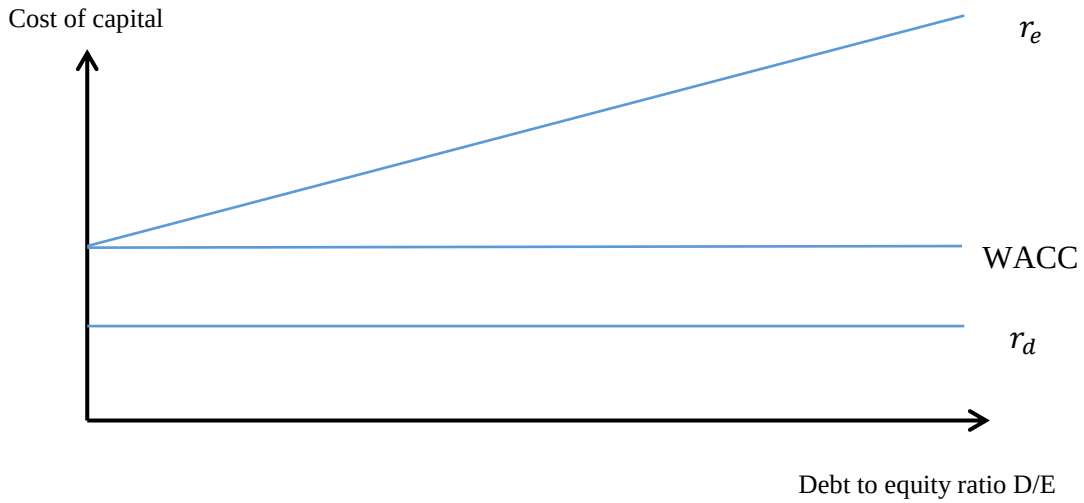

Figure 1. Weighted average cost of capital, $\boldsymbol{r_e}$ = return on equity, $\boldsymbol{r_d}$= return on debt, E = equity, D = debt, V = E + D. (Knüpfer & Puttonen 2009: 187.)

2.1.2. Modigliani-Miller theorem with taxes

Graham and Harvey (2001) find out that 45% of 392 surveyed CFOs agree that taxes influenced to their capital structure choices. When taxes are taken into account and all else equal, propositions I & II change (Modigliani & Miller 1963). Tax deductibility of interest payments will increase the value of the firm in theory, thus making debt more attractive option. Interest payments increase the free cash flow to the firm (FCFF) and measures the amount that can be paid back to the creditors and shareholders. Increasing FCFF will also increase the value of the company. Interest costs create a tax shield, which is behind the increasing FCFF. Therefore, if there would be no direct or indirect costs associated with high level of debt, such as bankruptcy costs, it would be optimal to have close to 100% debt ratio in theory. Table 1. Compares the FCFF of an unlevered and levered firm.

Table 1. Calculating free cash flow to firm (FCFF).

	Unlevered (U)	**Levered (L)**
EBIT	1000	1000
Interest (10%)		100
Taxable income	1000	900
Taxes (20%)	200	180
Net income	800	720
FCFF	**800**	**820**

Table 1. shows that the annual tax shield in this example is: 100 * 20% = 20. Figure 2. portrays the growth of tax shield as debt ratio rises. If assumed that the company will keep the debt perpetual, the present value (PV) of the tax shield will be:

(3) $$PV = \frac{annual\ tax\ shield}{interest\ (\%)} = \frac{20}{0{,}1} = 200$$

(4) $$PV = \frac{D * r_d * T_c}{r_d} = D * T_c = 1000 * 20\% = 200$$

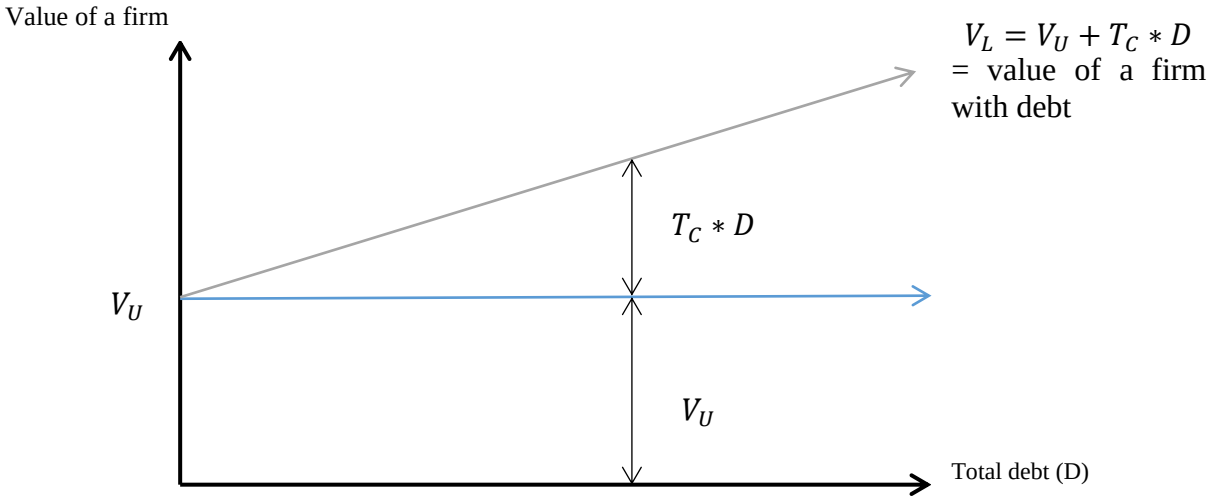

Figure 2. Tax shield increases the value of a firm as total debt ratio raises. (Knüpfer & Puttonen 2009: 189.)

Tax deductibility changes the second proposition too. An increasing in leverage will decrease WACC, as proved by formulas 5 and 6. Interest reduces the paid taxes, reducing WACC and this is shown in figure 3. Therefore, the optimal capital structure will be achieved at 100% debt ratio as already stated in the first proposition.

(5) $$WACC = r_A = r_E * \frac{E}{V} + r_D * (1 - T_C) * \frac{D}{V}$$

6) $$r_E = r_A + (r_A - r_D) * \frac{D}{E} * (1 - T_C)$$

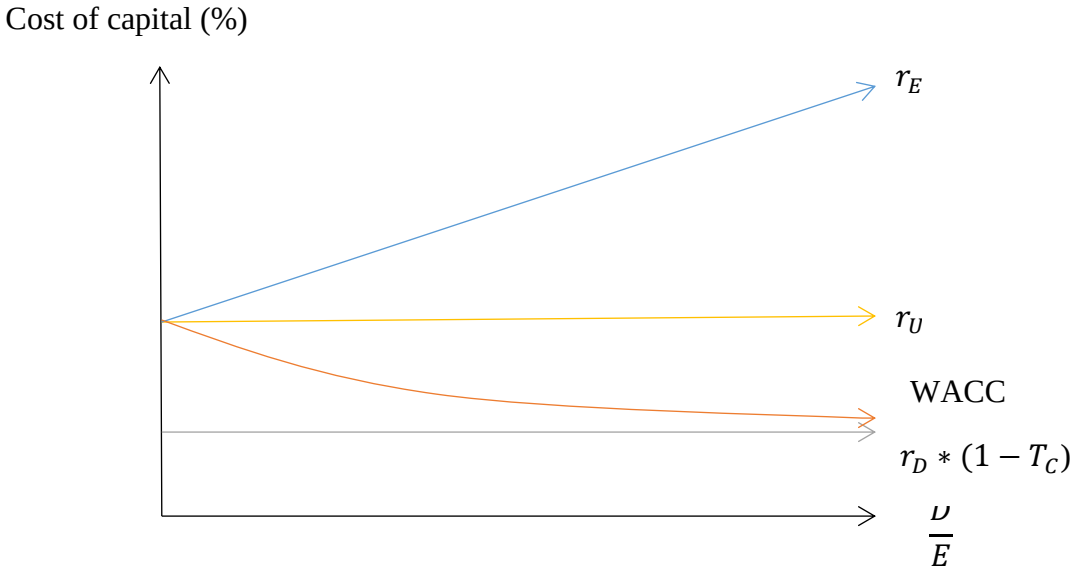

Figure 3. Weighted average cost of capital decreases as debt-to-equity ratio increases. (Knüpfer & Puttonen 2009: 188.)

2.2. Trade-off theory

Even though Modigliani and Miller's (1958, 1963) propositions are good on paper, there are numerous costs, asymmetrical information and imperfect markets in practice. A perpetual bond is real financial instrument, but it is quite rare and generally debt is paid back to the creditors. Therefore, the leverage ratio is more likely to fluctuate. Also variation in a company's revenues and profits can change its ability to carry debt. One of the well-known theories of capital structure is trade-off theory. It is mainly based on M&M's propositions with taxes and bankruptcy costs taken into account. The name of this theory comes from the aim to optimize the value of a firm by trading off the benefits and costs of debt. (Kraus & Litzenberger 1973.)

When a company cannot meet its obligations to creditors, there will usually occur so called financial distress costs. If the firm's earnings before interests and taxes (EBITDA) to interest coverage ratio falls too low, it might trigger these financial distress costs, as creditor's profit becomes riskier and thus, the lender might require risk premium for it. High debt ratio may cause the firm to be more vulnerable to firm specific and systematic risks, because EBITDA to interest coverage ratio becomes more sensitive. Figure 4. shows how the trade-off between the cost of distress and tax shield presents the optimal capital structure. For first, the benefit of tax shield out weights other costs,

but at the point when financial distress costs are more than the benefit of tax shield, the value of firm starts a downturn. Figure 4. demonstrates the market value of a firm is equal to the level of the unlevered firm (V_U), plus the product of market value of the firm's debt and the corporate tax rate, while subtracting the costs associated with bankruptcy risk. Consequently, the optimal level of leverage can be reached at the point at which the slope of tax-shield plus bankruptcy costs reaches zero.

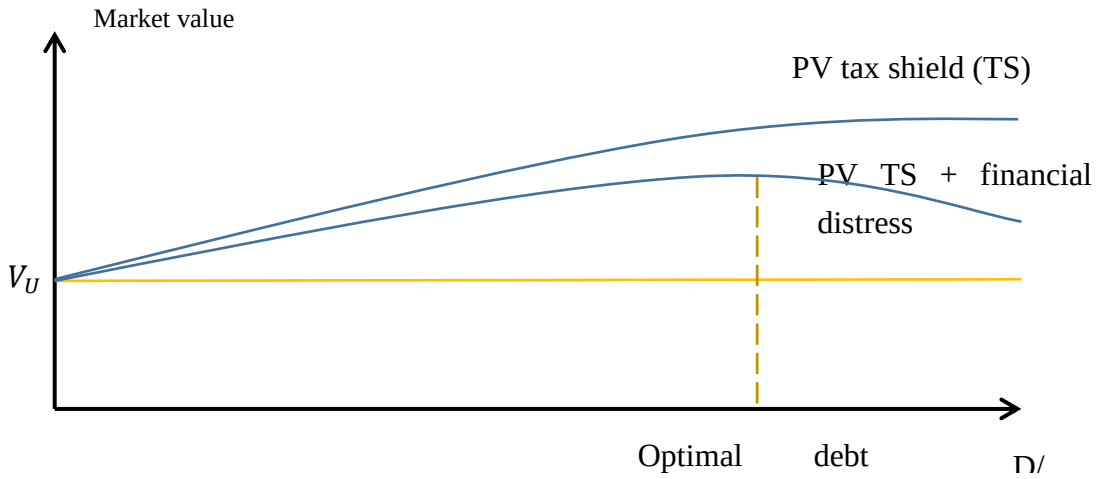

Figure 4. Market value and financial distress costs. (Knüpfer & Puttonen 2009: 189.)

Bankruptcy costs may be the most significant financial distress cost. It is a deadweight cost, which is not usually paid to anyone directly. When a firm defaults, its all assets are liquidated. The creditors are paid as well as possible, but often the assets are more valuable to the firm that is liquidated than to potential buyers. Therefore, there is a risk that creditors will not receive their share completely. Financial distress costs can variate depending, if the company limited or unlimited. In the case of unlimited company, the owners are liable for all the firm's debt. Consequently, the financial distress cost is determined by owners' solvency. If there are wealthy individuals sponsoring the company, the creditors can be more confident on the payback of debt, causing the risk premium to be smaller. However, in the case of limited liability, the stockholders can walk away from the company at bankruptcy and just leave it to creditors. If there are no-one backing up the company, the lender might have to price the risk in the interest and covenants. In addition to chance of not getting back full payment, there are always some direct costs paid to lawyers, consultants and accountants. L. A. Weiss (1990) studied these direct costs in United States between 1980 and 1986. He found out large companies having average costs approximately 3% of book value of assets. On the other hand, these direct bankruptcy costs can absorb 20% to 40% of small companies' assets

(Franks & Sussman 2008). This might be obvious, because small companies have smaller total assets than larger companies. Hence, there is meaningful economy of scale in going bankrupt.

When a firm is close to bankruptcy, there can be involved large indirect costs, which may push the firm into bankruptcy even if the company would not default in the first place. Business partners may start to question firm's solvency and tighten payment terms. Employees might start to look out for a new firm and customers may lose their confidence. For example, they could start to avert the firm's products, if they believe they will not receive spare parts or customer service in the future. (Brealey, Myers, Allen 2011: 478-480.)

Trade-off theory can be split into two sub-theories: static and dynamic. Fischer, Heinkel and Zechner (1989) argued that the static trade-off model, which has only one optimal level of leverage, is too distant from the real world. Their empirical research found that companies did not have a constant debt ratio, thus making older models questionable. They introduced a dynamic model, which set an upper and a lower bound for the amount of debt. These limits are determined by tax-shield, costs associated with debt, interest rates and transactions costs of recapitalization. Fischer et al. (1989: 21) assumed: "A firm following an optimal financing policy offers a "fair" risk-adjusted rate of return to its investors. Then, assuming leverage being advantageous because of the tax-shield, unlevered firms must offer "below fair" risk adjusted rate-of-return." An unlevered asset's value expresses the possibility to lever them. Thus, in a no-arbitrage world, the difference between levered and unlevered firms' value must be equal to the transaction costs related to the issuing of debt. The upper bound is determined by the level at which bankruptcy costs overweight the transaction costs of recapitalization, whereas the lower level is set by the point at which the benefit of the leverage is equal with its costs.

Regardless of the popularity of trade-odd theory, there is a lot controversy within the theory. Studies show that small growth firms usually rely more on equity financing than debt. It is often a big investment heavy firm with large tangible assets that has high leverage. On the contrary, this is not constant either. Some large and successful companies strive with minimal debt, a way below its industry average. In fact, studies show that there is a negative correlation between debt and profitability. Especially firms with large intangible assets, for example some high tech companies, prefer equity over debt. Trade-off theory fails severely here, because high profits should mean the

capability to carry more debt, and to have a larger tax shield to protect the profits. (Fama & French 2002)
The trade-off theory cannot explain either, why there has been debt before 20th century, because corporate tax was introduced in U.S. in 1909 with rate of 1%. It means that before that and some decades after, there has not been any actual tax shield, which would justify using leverage by this theory. (Frank & Goyal 2008)

2.3. Agency theory

When trade-off theory is refined further and corporate governance is taken into account, we are introduced to agency theory of capital structure. Jensen & Meckling (1978) were first to study the principal-agent problem and capital structure together. This theory specifically takes deeper look into financial stress costs that originates from the conflict between a company's management and its creditors & shareowners. This leads to the optimal capital structure, when tax shield minus financial stress & agency costs are at the highest.

2.3.1. Principal-agent problem

Agency relationship is a contract between principal(s) and agent(s), where principal delegates responsibility and decision making authority to the agent. The problem stems from the presumption that the both, principal and agent, are utility maximizers. Therefore, we can assume that some decisions can favor more the agent than the principal, which causes the agent to prefer and conduct those, if there were no restrictions. The problem is caused mostly from asymmetric information between these parties. Management has usually much more knowledge and inside information about the firm than owners and creditors as well as stakeholders cannot control and monitor everything that management does. Thus, principals should set incentives, which will prevent the management to deviate from their interests. (Jensen & Meckling 1978)

The problem is not always between managements and stakeholders, but as well it can emerge between principals. Sometimes stockholders and creditors can have different interests. Stockholders' goal is that the company maximizes their welfare. This requires usually risk taking into some extent, as from risk comes the reward. However, a rational stockowner has a large and well diversified portfolio, which minimizes firm-specific risk.. On the contrary, risk is a major factor for bondholders. They usually want to

minimize it, since they benefit only from the interest, which has been predetermined in the contact. They do not have any chance to benefit from additional risk, which only worsens the probability of loan and interest payback. This can lead to two kinds of problems. First is asset substitution problem, which means that for first company takes cheap debt to invest in safe project, but then decides to invest to riskier asset. The second is underinvestment problem, which is a kind of opposite of the earlier. This problem arises, when a company invests too safely or little, improving the creditors' position at the expense of the owners. Dividend problem appears, when owners want to share out most of the profits, which leads the firm to weaker solvency and weakens creditor's position. In addition, there can be differences between creditors. Old creditors can suffer from new debt, as they are priced their interest and willingness to take risk by the factors that were present before the new debt. Especially new debt can harm old bondholders, if the terms of new debt are on the same level with the old debt. This is called claim dilution problem. (Jensen & Meckling 1978; Niskanen 2000; Smith & Warner 1979)

2.3.2. Agency costs

Agency costs occur when managers do not maximize the value of a firm, and stakeholders' monitoring and constraints cause costs. Morellec, Nikolov & Schürhoff (2012) predict that on average, the agency costs are 1.5% of total equity value, which would affect to leverage ratios. Maximizing value of a firm and finding all the most profitable projects can be tough and stressful. Therefore, at the lack of incentive, there can be a temptation for a manager to slack. Additionally, they can be tempted to waste firm's money on their own private benefits. For example, buying corporate jets or scheduling business meetings in a fancy resort seldom increase the firm's value. Failing project can hurt manager's position and reputation. If there is no incentive for risk taking for managers, they probably start to prefer safer projects that can hinder the company's growth. There is also chance of "empire building", which means that company begins to acquire other companies, which increases the size of a company, instead of raising the profits (Baker & Kiymaz 2011). This benefits usually more managers by lifting their status, perks, reputation and compensation, but at the cost of efficiency and value of a company. To prevent this to happen, principals have to monitor and measure the firms and its managements' performance, which also causes costs.

There legal and regulatory requirements, which reduce agency costs; it is managers' duty to act responsibly and in the interest of owners. It is also prohibited to inside trade and these are monitored by the government and financial authority. Monitoring adds direct agency costs, because financial statements must be audited. Company wants to pass the audition, because otherwise auditor issues a qualified opinion, which means that everything is not right. This result is usually bad news for the firm and for its value. Lenders are also constantly monitoring the firm and issue covenants to protect their loans. Covenant usually demands the firm to maintain certain level of gearing. Breaking the covenant can result lender to call back the obligation, but it is more probable to just re-negotiate the terms of the debt, which results to higher interests. (Jensen & Meckling 1978; Fama & Jensen 1983)

Board of Directors is elected by the shareholders, and their job is to keep eye of the management. Especially large institutional investors monitor firm performance closely and sometimes even demand their own representatives to join the board. Shareholders can also pressure the firm by just walking away from the company, which results fall in the firm's value. Still the most common way to ensure managements incentive to maximize company's value is stock options. This makes sure that management strives to add value, because otherwise the options would be worthless. However, there is still possibility that management just tries to pump up the stock with short term decisions, which could hurt the company in the long run. Therefore, as studies show, family firms succeed best on the long run, as their management owns a large portion of the firm and the firm is a kind of heritage that must be cherished. (Brealey et al. 2011; Jensen & Meckling 1978; Fama & Jensen 1983)

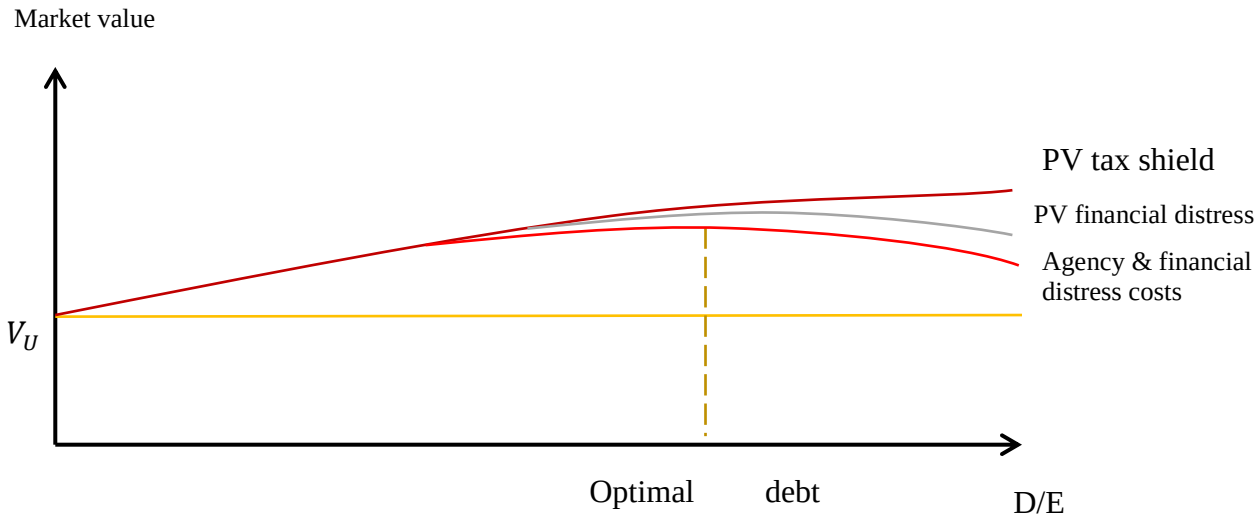

Figure 5. Agency costs. (Niskanen & Niskanen 2000: 293.)

2.4. Pecking order theory

This theory was mainly introduced by Myers & Majluf (1983), who were influenced by Donaldson's study (1961), and it can be regarded as the major competitor of trade-off theory. There is no pre-set optimal capital structure by this theory. A company's current debt ratio is just the result of accumulated financing decisions of the past. The name of the theory derives from an order of capital preference or hierarchy. Internal equity is the most preferable source, as there should be no direct costs associated with it when compared to debt with interest costs and external equity with dividends. Furthermore, raising external capital involves bureaucracy with the government's regulators, which causes indirect costs. In addition to costs, the reason behind this order is information asymmetry between management and stakeholders, which means that managers know more about firm's values, risks and prospects (Frank & Goyal 2008).

In pecking order theory (POT) Internal financing is used first, because it is the cheapest choice; there are no interests or issuing costs. Management has also more information than other parties. Therefore, they can spend the money more freely, as they do not have to explain the use of funds at the same detail as they would have to with debt or new stocks. The problem this brings is that same underinvestment problem as in agency theory. If there is no pressure, management may not put the maximum effort in finding the highest possible NPV projects, and may want to play too safe with investments, which might not be optimal for a firm's value. However financial slack is valuable, because it allows a firm to invest easily, if a good investment opportunity appears. (Myers & Majluf 1983; Myers 1984.)

When the firm faces a budget deficit and its internal funds are not enough to cover it, the following step would be cutting dividends. The firm could also sell some of its marketable securities to generate cash. When the company's own means to generate financial slack have been used, the second step would be raising debt by POT. This step is before raising external equity, because interest payments are usually cheaper than a stock issuance and dividend payments. In addition to costs, new equity worsens the position of old owners as their voting power and chance to influence and monitor diminish. (Myers & Majluf 1983; Myers 1984.)

One major reason why equity is the last resort, in addition to costs, is again the asymmetric information between management and investors. If a mature firm attempts to sell stocks, a rational investor would think that the firm has used all of its financial

slack, plus the firm has already so remarkable financial stress costs that it could not raise any new debt. This may lead the asking price of stock to decrease along with the firm's value, even if investors' and analytics' assumptions are wrong. (Myers 1984.)

3. PREVIOUS EMPIRICAL EVIDENCE

Scholars have been arguing and comparing trade-off and pecking order theories to each other for a long time. Studies show that debt ratios are determined mostly by four factors. First factor is size. Large companies have often higher debt ratios. Second factor predicts that companies with high fixed assets to total assets tend to have higher debt ratios. Third factor is profitability, which expects that well profitable companies have lower debt ratios. Fourth factor is market to book ratio (M/B), which predicts that high M/B is positively correlated with low debt ratio. (Fama & French 2002; Frank & Goyal 2008; Rajan & Zingales 1995.)

The first factor goes along well with trade-off theory, because large firms can usually afford to take more debt compared to smaller companies. One reason behind this could be financial stress costs. From the lender's perspective, large companies tend to be more stable and they have more assets to use as securities, which also links to the second factor. On the other hand, Fama and French (2002) have some evidence that high investment ratio lessens the debt ratio, because of deprecation deduction acts as a tax shield instead of interest. Also small growth companies' cash flow might be more volatile than large and mature firms'. Therefore, a period of cash flow could stress more high leveraged small firm than large firm, because of the probable lack of decent financial buffer. Large firms often have better access to public bond markets, which might also explain bigger debt ratio. If investment heavy small companies cannot rely so much on debt, they may have to resort more in external equity, which is against the second factor.

In contrast to the first and second factor, the third goes along with pecking order theory. Highly profitable firms can choose to use internal financing instead of debt. High market to book ratio can be also regarded as measure of profitability (Rajan & Zingles 1995). However, this is in complete contradiction with trade-off theory, which assumes that high profits should be protected with a tax shield that high debt ratio would provide. Large and profitable firms probably also follow pecking order, because they can prioritize the internal funding, but these can easily take debt if external financing is needed, leaving the option of external equity for the last resort. This can be figured out by the fact that large companies issue new stock less than smaller companies (Myers & Shyam-Sunder 1999).

3.1. Tactic and timing based theories of capital structure

Studies show that there is some evidence relating to how current state in the markets links to the financing choice of a firm. This is called market timing hypothesis. An upward trend in the stock markets is called a bull market, whereas downward trend is called bear. This theory predicts that during bull markets firms prefer external equity. On the contrary, when bear market hits, firms shift to debt. This can be related to behavioral corporate finance, as the moods of investors can determine the capital structure. Graham and Harvey (2001) find that two-thirds of CFOs agree that "the amount by which our stock is undervalued or overvalued was an important or very important consideration" when they are issuing equity.

This theory is example of behavioral finance, because by contrast to other theories, it presumes that market is not efficient, and there is asymmetric information between management and investors. Baker and Wurgler (2002) explain in their study that during bull market, firm's stock is overpriced. Therefore, as management knows the value of their stock better than investors, it would be wise to issue new equity during this period, as they would get higher price per share than normal. This supports Rajan and Zingales' (1995) findings that firms with high market-to-book value have lower debt ratios. If firm issues equity when the price is high, it results to expansion of M/B ratio, and as they get abnormally good returns from it, the need of debt would probably shrink.

On the other hand, if there is a bear market, firm's stock may be underpriced. Then it would be better to raise debt, as the results with external equity financing would not be very effective. However, a forward looking company could benefit from this underpricing by stock repurchase. When firm's stock is again overpriced, it can sell their repurchased stocks with profit. In addition, empirical evidence shows that stock repurchases are interpreted as good news by the markets, which leads on average to 2-3% increased abnormal returns (Comment and Jarrell, 1991; Stephens and Weisbach, 1998). (Baker & Wurgler 2002; Adams Bonaimé, Öztekin, Warr 2014.)

Alti (2006) studied how initial public offerings (IPO) affected to the leverage of firms. Companies issue IPO when they first time list in a public stock market. He had separated firms to two groups based on the status of the market at the time they were listed. "Hot market" means that there are lots of IPOs happening during specific period, while in a "cold market" there are not many IPOs going. His results show that hot market firms get better price from the IPO, thus leading to lower debt-to-equity ratio.

Whereas cold market firms do not get as good price from their IPO, which leads to relatively higher D/E-ratio. However, the study predicts that the difference between the groups persists only two years, which after it vanishes.

There could be at least two reasons behind the difference between hot and cold markets disappears in two years. One could be that a hot market firm starts to raise debt after IPO, as it is usually cheap, if the debt ratio is low. Other reason could be that during hot market, there can be a bubble present, or the stock at the IPO can be overpriced. After the bubble bursts or investors realize the stock's real price, its value diminishes and D/E ratio adjusts with the cold group. Overall market timing theory has some problems, for example, why would some company issue debt during bull market and equity during bear.

However, there is not always bull market during expansion and bear market during recession. Expansive monetary policies can boost stock prices. Because the yields from bonds are weak, stocks become relatively better in profit making. For example, after the financial crisis FED and ECB have used expansive monetary policies and kept low interest rates for a long period, as they have tried to keep financial markets stabile and especially the Euro Crisis has hindered the economic growth in Europe. Nevertheless, stock indexes have broken all time high records in the USA and Europe. (Chatziantoniou, Duffy and Filis 2013.)

Asymmetric information is intertwined to almost every capital structure theory. However, signaling theory's view point inspects how a firm's financing behavior and capital structure sends information to outside investors, thus changing the value of the firm. It is very hard for investors to observe in the most accurate detail and calculate the value of all the marketed securities. Thus outsiders try to deduce the value of a firm by observable actions and characteristics, such as capital structure, debt, dividend and investment policies. (Kose 1987.)

Management has often better understanding of firm's value than outsiders have. Therefore, good quality firms should try to minimize the asymmetric information with investors, analytics and lenders, and prove that they are highly valued and trustworthy. This could be achieved by sending specific signals that separate themselves from lower quality firms. As stated earlier, small and volatile firms have higher financial stress costs. Therefore, large companies with good and steady profits could send positive signals by increasing leverage. Taking more debt implies that their bankruptcy costs are

not yet too high, which sends an image of good quality. This separates firms with good solvency from bad, because it is harder for the bad companies to raise more debt, and mimic the actions of the good companies. (Ross 1977; Krasker 1986.)

Empirical evidence shows that issuing new external equity has an opposite effect compared to debt (Korwar & Masulis 1986). According to signaling theory, investors interpret that the firm has used its all debt holding capacity, when it raises new equity. Therefore, it is a sign of lower quality, which decreases the value of a firm (Ross 1977; Krasker 1986). Thus, this assumes pecking order theory to be in the background. Also, if investors believe that there is asymmetric information between the issuer and them, they can believe that the firm tries to take advantage of stock overpricing, as it was explained in market timing theory. Therefore, the value decreases as investors realize this. Additionally, voting power per share decreases, which could be also a direct reason behind the falling value.

Stock repurchase is a strong factor in signaling theory, as it is in market timing theory. One of the reasons why these repurchases have caused abnormal returns, is that a firm sends a signal that it believes that the price of its stock is undervalued. When this signal is interpreted by outsiders, they react to this positively, and the value of the company should rise. However, stock repurchases are less attractive to execute, if the company's stock is overpriced, as it makes the repurchasing expensive for the firm. Therefore, it is expected that overvalued firms avert and undervalued firms prefer repurchases. Extra dividend is also a good signal, as it means that firm has surplus cash, and it directly raises the return and value of its stock. (Adams Bonaimé et al. 2014.)

4. DATA AND METHODOLOGY

The data of this study covers all the active publicly listed firms in European countries that have faced negative interest rates for the past few years (Euro area firms are limited to the 500 largest companies by market capitalization). Countries included are Denmark, Sweden, Switzerland and Euro area. Total number of firms is 841 and the period covered is from 2007 to 2015. This time period is chosen, because the subprime crisis or the beginning of financial crisis, caused the interest rates to decline dramatically due to central banks' monetary policy easing, in order to boost the economies. Lowering and even negative interest rates provide exciting opportunity to observe the developments of corporate capital structure, because interest rates are often tightly tied to the structure and to the theories concerning them.

The company data is obtained from Orbis database. The common practice in capital structure studies is to exclude financial firms (6000-6999) and regulated utilities (4900-4999) from the data, as the composition and drivers of their financial statements differ from "regular" companies. The measured interest rate in this study is 3-month LIBOR (London Interbank Offered rate) or equivalent, because it may be the best option to capture the cost of lending for a bank. It can be expected that in competitive lending markets, the bank's marginal on top of LIBOR is approximately the same in the markets and for all companies. LIBOR does not either take into account firm specific risks, which may affect the margin, thus capturing the real direction of interest rate development over time. LIBOR is used for Swiss market and its data is obtained from The Swiss National Bank's statistical database. STIBOR (Stockholm Interbank Offered Rate) is used with Swedish companies and it is published by NASDAQ. CIBOR (Copenhagen Interbank Offered Rate) is used with Danish companies and it is also published by NASDAQ. EURIBOR (Euro Interbank Offered Rate) is used for the Euro area companies and its data is obtained from the Bank of Finland.

4.1. Descriptive statistics

I will start this section by describing the overall leverage characteristics of the listed companies in Denmark, Sweden, Switzerland and the largest 500 firms in Euro area. Financials and utilities are excluded from the sample. The period spans from 2007 to 2015 and it is divided into four sub samples: first 2007-2009, second 2010-2012, third 2013-2015 and fourth 2007-2015 (total). First period covers the global financial crisis,

second can be regarded as the period of European sovereign debt crisis and last period considers the time of near zero to negative interest rates. All the factors are measured in book values instead of market values, because market value may yield biased and distorted results. For example, if market based debt to total assets ratio shrinks, it can be hard to measure if the value of assets have increased or if the level of debt has decreased. Therefore, book value reflects the financing decisions more clearly.

Table 3 investigates three different measures of leverage: total debt (long-term + short-term) to total assets, long-term debt to total assets and total debt to capital (equity + total debt). Total debt to total assets is relatively common and easy way to measure the leverage of firm. Total debt does not include relatively irrelevant liabilities such as untaxed reserves or accounts payable, which makes is good measure of financing decisions relating to debt. Long-term debt reflects the future investments and expectations better than total debt. Using capital instead of total assets as denominator helps to clear out all the non-financing decision related accounts, thus probably making it the best factor measuring the past financing decisions of a firm.

Table 2. Mean and median values of total debt to totals assets, long-term debt to total assets and total debt to capital (shareholder equity + debt) of listed companies in Denmark, Sweden, Switzerland and top 500 Euro area in 2007-2015. Unbalanced data is used with financial and general utility companies excluded from the sample.

Denmark									
Year		2007-2009	obs.	2010-2012	obs.	2013-2015	obs.	Total	obs.
Total debt/	Mean	0,46	254	0,52	273	0,47	276	0,49	803
Total assets	Median	0,46		0,46		0,43		0,45	
Long-term debt/	Mean	0,14	254	0,15	273	0,15	276	0,14	803
Total assets	Median	0,08		0,09		0,08		0,09	
Total debt/	Mean	0,78	254	0,78	273	0,79	276	0,78	803
Capital	Median	0,87		0,86		0,88		0,87	

Euro500									
Year		2007-2009	obs.	2010-2012	obs.	2013-2015	obs.	Total	obs.
Total debt/	Mean	0,56	1063	0,55	1126	0,55	1182	0,55	3371
Total assets	Median	0,56		0,55		0,54		0,55	
Long-term debt/	Mean	0,21	1063	0,20	1126	0,21	1182	0,20	3371
Total assets	Median	0,19		0,19		0,18		0,19	
Total debt/	Mean	0,91	1063	0,92	1126	0,92	1182	0,92	3371
Capital	Median	0,95		0,95		0,95		0,95	

Sweden

Year		2007-2009	obs.	2010-2012	obs.	2013-2015	obs.	Total	obs.
Total debt/	Mean	0,45	884	0,45	1022	0,45	1268	0,45	3174
Total assets	Median	0,44		0,45		0,44		0,45	
Long-term debt/	Mean	0,12	884	0,12	1022	0,11	1268	0,12	3174
Total assets	Median	0,05		0,05		0,04		0,05	
Total debt/	Mean	0,79	884	0,79	1022	0,80	1268	0,80	3174
Capital	Median	0,89		0,89		0,90		0,90	

Switzerland

Year		2007-2009	obs.	2010-2012	obs.	2013-2015	obs.	Total	obs.
Total debt/	Mean	0,39	425	0,40	455	0,41	466	0,40	1346
Total assets	Median	0,40		0,39		0,39		0,39	
Long-term debt/	Mean	0,11	425	0,13	455	0,13	466	0,12	1346
Total assets	Median	0,06		0,08		0,09		0,07	
Total debt/	Mean	0,85	425	0,85	455	0,84	466	0,85	1346
Capital	Median	0,92		0,93		0,94		0,93	

All countries

Year		2007-2009	obs.	2010-2012	obs.	2013-2015	obs.	Total	obs.
Total debt/	Mean	0,48	2626	0,49	2876	0,48	3192	0,48	8694
Total assets	Median	0,49		0,49		0,48		0,48	
Long-term debt/	Mean	0,15	2626	0,16	2876	0,15	3192	0,15	8694
Total assets	Median	0,12		0,12		0,12		0,12	
Total debt/	Mean	0,85	2626	0,85	2876	0,85	3192	0,85	8694
Capital	Median	0,92		0,93		0,93		0,93	

Table 3 shows that the ratios stay almost constant over the period. This supports mostly static trade-off theory, where the leverage stays at optimal, defined level. Majority of the ratios vary by only one percentage point. The biggest change can be observed in Danish companies mean total debt to total assets ratio, where it increases by 6 percentage points from 0,46 to 0,52 and then decreases to 0,47, which is close to the starting point. Considering the fact that interest rates have gone down significantly over the whole period, the table does not suggest that firms would have changed their leverage because of it.

The factors are relatively close between Denmark and Sweden. They have larger debt to total assets ratio than Switzerland, which in turn has larger debt to capital ratio. This suggests that Swiss companies rely relatively less on equity financing that Danish and

Swedish. However, they all have smaller ratios in every factor than Euro500, which means that they are less leveraged and may have better buffer against financial distress than European average.

Table 4 displays the averages of key variables in pecking order testing. The data and table is divided into countries and three different time periods as was the table 3. Δ stands for change from year t-1 to t.

Table 3. Average of key variables as a fraction of total assets (book value) over 2007-2015 and three sub periods. Results are gathered from unbalanced data, with financials and utilities excluded from the sample.

			Denmark					
Year	2007-2009	obs.	2010-2012	obs.	2013-2015	obs.	Total	obs.
Cash dividends	0,026	176	0,030	171	0,062	155	0,038	502
Investments	0,072	253	0,031	275	0,037	289	0,046	817
Δ Working capital	-0,023	170	0,108	284	-0,003	299	0,034	753
Cash flow	0,036	254	-0,044	283	0,028	288	0,006	825
Deficit	0,039	254	0,200	284	0,037	299	0,093	837
Δ Debt	0,006	170	-0,017	284	-0,017	299	-0,012	753
Δ Equity	0,009	170	-0,022	284	-0,019	299	-0,014	753

			Euro500					
Year	2007-2009	obs.	2010-2012	obs.	2013-2015	obs.	Total	obs.
Cash dividends	0,027	797	0,021	867	0,022	987	0,023	2651
Investments	0,073	869	0,058	944	0,053	1110	0,061	2923
Δ Working capital	-0,012	714	0,004	1129	0,002	1184	-0,001	3027
Cash flow	0,084	1059	0,079	1125	0,076	1171	0,079	3355
Deficit	-0,012	1066	-0,010	1129	-0,005	1184	-0,009	3379
Δ Debt	0,013	714	-0,002	1129	-0,004	1184	0,001	3027
Δ Equity	0,001	714	0,000	1129	-0,001	1184	-0,001	3027

			Sweden					
Year	2007-2009	obs.	2010-2012	obs.	2013-2015	obs.	Total	obs.
Cash dividends	0,044	417	0,069	494	0,051	515	0,055	1426
Investments	0,079	741	0,088	879	0,075	1164	0,080	2784
Δ Working capital	0,026	606	0,012	1135	0,001	1508	0,009	3249
Cash flow	-0,084	873	-0,061	1086	-0,095	1402	-0,081	3361
Deficit	0,185	898	0,169	1135	0,164	1508	0,171	3541
Δ Debt	-0,002	606	0,000	1135	-0,011	1508	-0,005	3249
Δ Equity	0,001	606	0,004	1135	-0,024	1508	-0,010	3249

Switzerland								
Year	2007-2009	obs.	2010-2012	obs.	2013-2015	obs.	Total	obs.
Cash dividends	0,028	271	0,031	321	0,036	360	0,032	952
Investments	0,056	362	0,054	421	0,053	451	0,054	1234
Δ Working capital	-0,014	287	0,094	456	0,005	466	0,034	1209
Cash flow	0,077	415	0,020	445	0,062	452	0,053	1312
Deficit	-0,019	426	0,147	456	0,024	466	0,052	1348
Δ Debt	0,000	287	0,008	456	-0,003	466	0,002	1209
Δ Equity	-0,006	287	0,011	456	0,003	466	0,004	1209

All countries								
Year	2007-2009	obs.	2010-2012	obs.	2013-2015	obs.	Total	obs.
Cash dividends	0,032	1661	0,036	1853	0,035	2017	0,034	5531
Investments	0,072	2225	0,065	2519	0,060	3014	0,065	7758
Δ Working capital	0,000	1777	0,031	3004	0,001	3457	0,012	8238
Cash flow	0,022	2601	0,007	2939	-0,002	3313	0,008	8853
Deficit	0,059	2644	0,101	3004	0,076	3457	0,079	9105
Δ Debt	0,005	1777	-0,001	3004	-0,008	3457	-0,003	8238
Δ Equity	0,001	1777	0,001	3004	-0,012	3457	-0,005	8238

Firms have increased their dividends in Denmark, Sweden and Switzerland but decreased in Euro500 over the whole period. Danish companies have approximately increased their dividends by 150% from 0,026 to 0,062, while in Euro500 firms have decreased them from 0,027 to 0,022. Money used in investments has relatively decreased in every market, which may indicate that companies have favored distributing wealth back to shareholders instead of growing the company by funding new investments. Reason behind this can be numerous, for example lack of demand and insecure market situation.

Change in working capital was negative in every market expect in Sweden during financial crisis of 2007-2009, which tells of reducing operational efficiency. After the crisis in 2010-2012 the value rallied across the board and in the recent years of 2013-2015 it toned down and in Denmark it even turned negative again. Cash flow has remained mainly positive in every market expect in Sweden, where it has remained negative during the whole period.

Companies have faced financial deficit in every market during the whole time, except Euro500, where it has been negative in the period. Deficit and change of debt should have same signs and level, if the first hypothesis, a firm financing financial deficit my

same amount of debt, holds. Firm can also choose to finance deficit with equity and the change of equity expresses the difference between new stocks issued minus repurchases. Descriptive statistics show that Danish firms issued new shares in 2007-2009 but focused more on repurchases during 2010-2015. Change of equity has remained rather stable in Euro500. Swedish companies issued new shares from 2007 to 2012 but started to repurchase during 2013 to 2015 on average. On the contrary, Swiss firms repurchased during 2007 to 2009 and then started to issue new stocks in the later period.

Table 5 describes the mean values of variables relevant to the conventional mode of leverage testing, which is also often used to test trade-off theory, as for example Rajan and Zinglaes (1995) and Frank and Goyal (2003) conducted in their studies. These factors describe the general characteristics of firms, mainly the composition of assets, firm growth potential, size and profitability, which all have been normalized and comparable by dividing them by total assets. This table also shows the LIBOR equivalent interest rate in the respective countries.

Table 4. Descriptive statistics of conventional model of leverage testing. Values represent averages of variables in the investigated time frames. Excluded sectors are financials and utilities. Tangibility = tangible fixed assets / total assets; Market-to-book = market capitalization / total assets; Sales = turnover / total assets; Profitability = profit before taxes / total assets; Interest rate = LIBOR equivalent in the respecting country.

Denmark								
Year	2007-2009	obs.	2010-2012	obs.	2013-2015	obs.	Total	obs.
Tangibility	0,30	254	0,28	284	0,26	298	0,28	836
Market-to-book	1,30	225	1,14	254	1,75	272	1,41	751
Sales	1,05	254	1,05	278	1,05	287	1,05	819
Profitability	-0,01	254	-0,09	284	-0,03	299	-0,04	837
Interest rate	3,69%	303	0,83%	303	0,15%	303	1,56%	909

Euro500								
Year	2007-2009	obs.	2010-2012	obs.	2013-2015	obs.	Total	obs.
Tangibility	0,25	1066	0,24	1129	0,23	1184	0,24	3379
Market-to-book	0,70	972	0,67	1004	0,84	1119	0,74	3095
Sales	1,04	1063	1,01	1126	1,01	1181	1,02	3370
Profitability	0,06	1066	0,05	1129	0,05	1184	0,05	3379
Interest rate	2,76%	1191	0,85%	1191	0,08%	1191	1,23%	3573

Sweden

Year	2007-2009	obs.	2010-2012	obs.	2013-2015	obs.	Total	obs.
Tangibility	0,14	897	0,13	1121	0,11	1487	0,12	3505
Market-to-book	1,91	572	1,54	774	1,97	841	1,80	2187
Sales	1,05	866	1,05	1092	0,97	1432	1,01	3390
Profitability	-0,12	898	-0,13	1135	-0,16	1508	-0,14	3541
Interest rate	2,74%	1596	2,15%	1596	0,27%	1596	1,72%	4788

Switzerland

Year	2007-2009	obs.	2010-2012	obs.	2013-2015	obs.	Total	obs.
Tangibility	0,25	425	0,25	456	0,25	466	0,25	1347
Market-to-book	1,15	382	1,11	420	1,49	439	1,26	1241
Sales	1,04	424	1,00	447	1,00	461	1,01	1332
Profitability	0,04	426	-0,02	456	0,03	466	0,02	1348
Interest rate	1,22%	501	0,08%	501	-0,27%	501	0,35%	1503

All countries

Year	2007-2009	obs.	2010-2012	obs.	2013-2015	obs.	Total	obs.
Tangibility	0,22	2642	0,20	2990	0,19	3435	0,20	9067
Market-to-book	1,16	2151	1,07	2452	1,40	2671	1,22	7274
Sales	1,04	2607	1,03	2943	1,00	3361	1,02	8911
Profitability	-0,01	2644	-0,04	3004	-0,05	3457	-0,04	9105
Interest rate	2,62%	3576	1,32%	3576	0,12%	3576	1,35%	10728

Tangible fixed assets are often machinery, buildings, factors and other concrete investments and projects. This value has decreased in every market, excluding Switzerland, from 2007 to 2015. There can be two reasons behind this. The first is that companies have invested less in these assets; therefore the value has decreased with depreciations. The other reason could be that total assets have relatively increased. Table 4 supports the first explanation, as the level of investments has gone down in the same period. If compared to the interest rate, it seems that reducing interest rate has not increased real investments, if tangible assets can be regarded as such.

Market-to-book measures the market capitalization of firm (stock price multiplied by the amount of stocks outstanding) divided by the book value of the company (total assets). Usually market price reflects the value of a company and its growth and return potential for an investor. For example, the change of market-to-book value seems to be much more volatile than profit ratio by the table. If we assume that profits are relatively stationary on average, then we can conduct that change in market-to-book is most likely

to be driven by the stock price and not by the book value of assets. The decline of market-to-book ratio from 2007-2009 to 2010-2012 could be explained by the financial crisis and country and system wide plummeting stock markets. In 2013 to 2015 stock markets have rallied again and if market-to-book is used as a proxy for stock market movement, we can infer that stock markets have returned on growth track, as well as investors believe in the markets again. One reason behind increased stock prices can be relative unattractiveness of interest based bond markets, which is caused by low interest rates.

Company sales to total assets have remained relatively stable, although there has been some decline over the period. Only in Denmark the ratio has remained constant over the time. Euro500 and Switzerland faced drop after 2007-2009, whereas Sweden faced drop in 2013-2015. Profitability results look interesting in Denmark and Sweden, because they have been negative on average during the whole period. Especially in Sweden the ratio has declined from -12% to -16% of total assets, which does not look good on long-run. Declined sales can be one reason behind this. Only in Euro500 the profitability has remained stable on positive in every period. Swiss firms had a drop during 2010-2012 but recovered afterwards.

Interest rates declined in every country within the data. Swiss LIBOR was negative on average already in 2013-2015. Every country faced negative market rate latest in 2015, whereas local central bank rates were already negative few years before that. In Denmark's central bank's deposit rate hit negative rate first time in July 2012 (Danmarks Nationalbanken 2016). Erupean Central Bank's overnight deposit rate turned negative in June 2014 (European Central Bank 2016). Swedish deposit rate changed to negative in July 2014, although it dipped momentarily under zero in 2010 (Riksbank 2016) Swiss deposit rate (SARON) stayed around zero, touching negative side in 2012 and 2013, but turning decisively negative in January 2015 (Swiss National Bank 2016). Table 6 has detailed view on the rates by year and figure 5 show graphically the development of the rates over time.

Table 5. Yearly overnight interest rates as they were in 31. December by the year, country and its currency. DNB = Danmarks Nationalbanken; ECB = European Central Bank; RB = Riksbank; SNB = Swiss National Bank; Deposit rate = central bank's deposit rate; CIBOR = Copenhagen Interbank Offered rate; EURIBOR = Euro Interbank Offered Rate; STIBOR = Stockholm Interbank Offered Rate; LIBOR = London Interbank Offered Rate.

	DNB		ECB		RB		SNB	
	Deposit rate	CIBOR	Deposit rate	EURIBOR	Deposit rate	STIBOR	Deposit rate	LIBOR
2007	4,25	4,61	3,00	4,68	2,71	4,75	2,31	2,76
2008	3,75	4,91	2,00	2,89	3,39	2,55	0,25	0,66
2009	1,15	1,55	0,25	0,70	0,08	0,90	0,10	0,25
2010	0,70	1,21	0,25	1,01	-0,12	2,22	0,30	0,17
2011	0,40	1,00	0,25	1,36	1,01	2,76	0,08	0,05
2012	-0,20	0,28	0,00	0,19	0,71	1,47	-0,08	0,01
2013	-0,10	0,26	0,00	0,29	0,24	0,94	-0,05	0,02
2014	-0,05	0,28	−0,10	0,08	-0,29	0,26	0,03	-0,06
2015	-0,75	-0,09	−0,30	-0,13	-1,00	-0,40	-0,73	-0,76

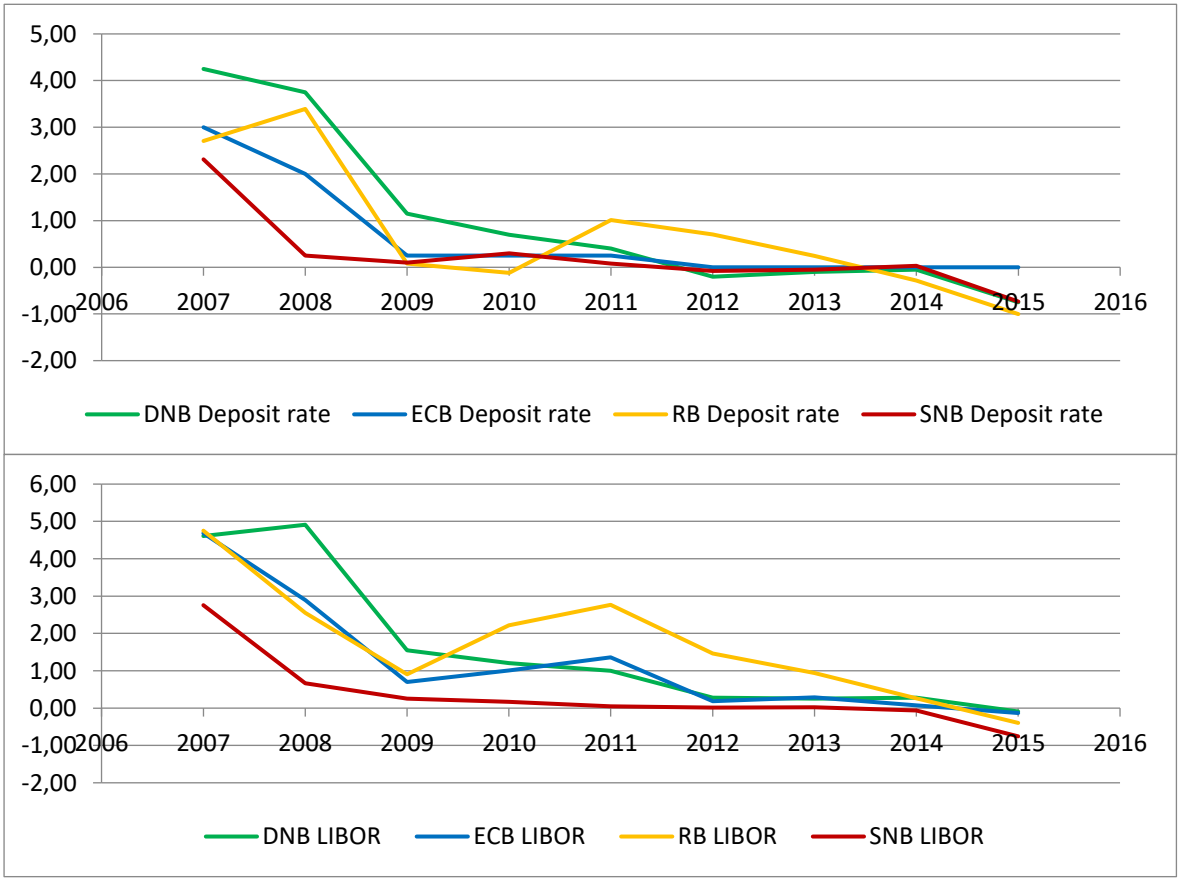

Figure 6. These two graphs plot the development of Denmark's (DNB), Euro area's (ECB), Sweden's (RB) and Switzerland's (SNB) interest rates from 2007 to 2015. Picture on the top shows the change of central bank deposit rates, and the bottom picture shows the change of LIBOR equivalent interest rates over the time period.

4.2. Hypotheses and methodologies

I will test the two most common theories within capital structure studies with the before mentioned data. These are pecking order and trade-off theory. I shall start with testing pecking order theory in the footsteps of Shyam-Sunders and Meyers (1999) and Frank and Goyal (2003).

3.1.1. Testing pecking order theory

To test the theory, they constructed a model to measure the relationship of financial deficit to change in debt. The theory suggests that the deficit should be covered with equity only in the extreme conditions and normally the deficit should be funded by debt, if internal financing is not sufficient. For this, we define the required variables as follow:

DIV_t = cash dividends in year t;
INV_t = net investment in year t;
ΔWC_t = change in working capital in year t;
CF_t = cash flow in year t;
ΔD_t = change in net debt in year t;
ΔE_t = change in share capital in year t (issues – repurchases of shares).

Financial deficit is calculated by summing the outgoing flow of funds and subtracting the incoming funds:

(1) $DEF_{i,t} = DIV_{i,t} + INV_{i,t} + \Delta WC_{i,t} - CF_{i,t} = \Delta D_{i,t} + \Delta E_{i,t}$.

Using this equation, we can create a regression model to capture the relationship of deficit and change in net debt:

(2) $\Delta D_{i,t} = \alpha + \beta_{PO}\ DEF_{i,t} + \varepsilon_{i,t}$,

where α is constant and $\varepsilon_{i,t}$ is error term. We can construct the first hypothesis by expecting that firms follow pecking order hypothesis. Therefore, a financial deficit is completely financed by debt, which means that the coefficient of deficit (β_{PO}) should be equal to one:

H1: $\beta_{PO} = 1$.

To check whether or not the aggregation of deficit variable is justified, we can run the regression 2. in disaggregated form:

(3) $\Delta D_{i,t} = \alpha + \beta_{DIV} DIV_{i,t} + \beta_{INV} INV_{i,t} + \beta_{WC} \Delta WC_{i,t} + \beta_{CF} CF_{i,t} + \varepsilon_{i,t}$.

An increase of unit in any component of DEF_t should have identical effect on ΔD_t. So, a growth in dividends, investments or working capital should increase debt by the same amount, whereas rise in cash flow should decrease the need for debt by the equivalent number. Hence, the second hypothesis expects that the coefficients of these variables equal one:

H2: $\beta_{DIV} = \beta_{INV} = \beta_{WC} = \beta_{CF} = 1$.

3.1.2. Static trade-off theory and conventional leverage testing

According to the trade-off theory, there is one optimal level of debt for each company, which they strive to reach and maintain. By obtaining this target level of debt, the firms have achieved the optimal capital structure. Many empirical studies on capital structure and trade-off theory list variables that might have an effect on it. Harris and Raviv (1991) observe in their study that important determinants are: fixed assets, non-debt tax shields, investment opportunities, firm size, earnings volatility, default risk, profitability, advertising expenditures and research & development expenditures.

Rajan and Zingales (1995) empirical study in G-7 countries found out that the most important factors affecting capital structure are size, tangible assets, profitability and market-to-book-ratio. These same factors have also been raised into importance by Fama and French (2002) and Frank and Goyal (2003, 2008). As this study's data considers similar developed countries as the researchers in their studies mentioned before, it is highly likely, that those same factors play important role in this sample too. I will follow the conventional model presented by the researchers before, with adding interest rate as a new variable.

The conventional leverage regression tries to explain the level of debt and this is used to justify the trade-off theory and can be used as a robustness check for pecking order theory. The regression used in this study is:

(3) $\Delta D_{i,t} = \alpha + \beta_T \Delta T_{i,t} + \beta_{MTB} \Delta MTB_{i,t} + \beta_{LS} \Delta LS_{i,t} + \beta_P \Delta P_{i,t} + \beta_{DEF} DEF_{i,t} + \beta_I I_{i,t} + \mu_i + \varepsilon_{i,t}$.

Hypotheses are concluded in table 2 and new variables in regression 3 are as follow:

$\Delta T_{i,t}$ = tangible assets' first difference between years;
$\Delta MTB_{i,t}$ = market-to-book ratio's first difference between years;
$\Delta LS_{i,t}$ = logarithm of sales' first difference between years;
$\Delta P_{i,t}$ = profitability's first difference between years;
$I_{i,t}$ = local LIBOR equivalent in year t,
μ_i = unobserved firm fixed effect.

In terms of pecking order theory argued by Harris and Raviv (1991), firms with high level of tangible assets should have low asymmetric information, thus allowing more successful equity financing. Vice versa, low level of tangible assets creates high asymmetric information, which would force companies to prioritize debt. However, as pecking order theory priorities debt over equity, high tangibility supports high leverage as tangible assets serve well as collateral for the debt. Thus, the role of tangibility can be interpreted by two ways.

Rajan and Zingales (1995), Frank and Goyal (2003) argue that tangibility is significant factor regarding trade-off theory. Tangible assets serve as natural collateral for debt, thus allowing higher gearing. One of the main reasons to create collateral is to reduce information asymmetry. Therefore, it also reduces financial distress costs and raises the maximum potential level of debt by trade-off theory. On the other hand, Fama and French (2002) find evidence that high investment ratio, which can be tied to tangible assets, reduces the dependency on debt, because of depreciation serving as tax shield.

Market-to-book ratio is often viewed as a measure of company's future growth prospects. Frank and Goyal (2003) claim that real growth usually requires investments. Pecking order theory expects that investments are financed as debt before equity, thus assumes positive relationship between market-to-book ratio and debt. Myers (1977) argued that growth firms should not be highly leveraged, because it could limit the ability to raise debt when needed to secure the necessary investments for the growth. Because of high financial distress cost of debt and its hindrance on future growth, trade-off theory expects negative relationship between market-to-book ratio and debt ratio.

Rajan and Zingales (1995) argue and confirm in their study that larger companies are relatively higher leveraged. For example default risk is lower for a large company than for a small one. Large firms are often also older, their stock is more liquid, and they are under vigilant eye of rating agencies, stock analysts and the public. These factors attribute to lower information asymmetry and financial distress costs. This supports the positive relationship between size and debt and also trade-off theory. Pecking order theory is also supported by this relationship, because the main reason between different choices of financing lies on information asymmetry. Bond and debt markets may not be willing to provide the required financing for a small company, as they can be more opaque. Thus, it lessens the potential debt ratio, and it is common that small companies (which are also often growth companies) are forced to rely relatively more on external equity financing.

Fama and French (2002) and Frank and Goyal (2003, 2007) find that there is often negative relationship with weak explanatory power between profitability and leverage. This find is consistent with pecking order theory. Highly profitable firms have higher cash flow and possess good starting point to use internal financing in their investment projects. High cash flow decreases financial deficit and if the cash flow is greater than deficit, it directly decreases the debt ratio of a company as proposed in the second formula and financial surplus allows larger amortizing of debt, instead of accruing it.

Trade-off theory suggests the total opposite. Well profitable firms should use debt to create a tax-shield over the profits. Furthermore, if the profitability is stationary, so it stays relatively constant over time, it can also reduce financial distress costs and increase the potential leverage as a result. Deficit can be seen as an opposite of profitability. High deficit can mean that the firm is forced to lend, which would increase the financial distress costs. It may also imply that there are no high profits to cover with the tax shield. Thus I expect negative relationship between deficit and trade-off theory. Agency theory supports the positive relationship between profitability and debt too. High cash flow can make the managers more careless in the use of the funds. Therefore, debt with collaterals and monitoring from the outside can cause the managers to stay better in line.

Market timing theories can be regarded to be more focused on equity side of capital structure. Important determinant is the price of the share and the market condition (“bull/bear”). These have an effect on capital structure by issuing new stocks when the

value of company's stock is overpriced and repurchasing when it is underpriced. However, could debt be underpriced too? As it is common for firms to have debt, it would be wise to time the loaning when it is affordable. Low rates decrease financial distress costs too. Trade-off theory also claims that during period of low interest rates, ceteris paribus, firms should increase their level of debt to keep stable tax-shield. Low interest rate favors debt over equity, and thus it supports also pecking order theory. The major target behind the monetary policy tool of lowering interest rates is to boost the economy to increase the level of corporate debt, so they could invest and spend more. All these factors support the expectation of negative relationship between interest rate and leverage.

Table 6. Hypotheses (H3) regarding conventional capital structure regression.

Factor β	Pecking order theory	Trade-off theory
Tangibility	+/-	+
Growth	+	-
Size	+	+
Profitability	-	+
Deficit	+	-
Interest rate	-	-

3.1.3. Testing leverage with dynamic trade-off theory

Fischer, Heinkel and Zechner (1989) argued that the static or traditional trade-off theory, which sets only one optimal level of debt, is too far away from the real world. Their empirical research indicates that companies do not have constant debt ratio, which weakens the power of static model. They introduced a dynamic model, which sets an upper and a lower bound for the debt ratio. These limits are determined by the benefit of tax-shield, interest rates, transaction costs of recapitalization and other direct and indirect costs associated with debt.

Fischer et al. assume that a company following an optimal financing policy offers a "fair" risk-adjusted rate of return to its investors. Assuming leverage being advantageous because of the tax-shield, unlevered firms must offer "below fair" risk-adjusted rate of return. Thus, an unlevered firm's asset's value reflects the potential to lever it. In a non-arbitrage situation, the difference between levered and unlevered firms' values must be equal to the transaction costs of debt. This is because it should not

matter, whether the company or the investor uses leverage. The upper bound is determined by the level at which financial distress costs overweight the transaction costs of recapitalization, whereas the lower level is set by the point where the benefit of the leverage is equal with its costs.

The cyclical nature of individual businesses, countries and the world's economy can cause disturbances to the optimal level of debt. In addition to the upper and lower limits, there might be some long term mean and reversion to the mean caused by the disturbances. Dynamic trade-off theory allows time variance and reversion to the mean. Flannery and Rangan (2006) investigate long-run capital structures and the speed of adjustment of U.S. firms. First in formula (4), the target leverage ratio as $D^*_{i,t}$, with $\beta X_{i,t-1}$ defining the characteristics affecting it. Next, the standard partial adjustment model is given in formula (5). Finally, substituting (4) into (5) creates dynamic partial adjusted model of leverage (6):

(4) $D^*_{i,} = \beta X_{i,t-1}$

(5) $D_{i,t} - D_{i,t-1} = \lambda(D^*_{i,t} - D_{i,t-1}) + \mu_i + \varepsilon_{i,t}$

(6) $D_{i,t} = (\lambda\beta)X_{i,t-1} + (1-\lambda)D_{i,t-1} + \mu_i + \varepsilon_{i,t}.$

λ is the adjustment speed coefficient, μ_i is a time-invariant unobserved variable (firm fixed effect) and ε_i is the error term. Flannery and Rangan expects all firms having the same adjustment speed to eliminate the deviation from the long-run mean. The difference between the current and previous debt ratio increases by λ, if the current deviation from the target debt ratio has marginally increased. $\lambda = 0$ means that the speed of adjustment is zero and it does not adjust at all, whereas $\lambda = 1$ indicates that the adjustment is instant and that the leverage is always at its target level. $X_{i,t-1}$ represents the lagged company characteristics and $D_{i,t-1}$ is the lagged level of debt, which are scaled by total assets. In addition to equation 4, I will create another regression by adding lagged interest rate $I_{i,t-1}$ as an independent variable. This factor will capture the influence of interest rate to the adjustment speed:

(7) $D_{i,t} = (\lambda\beta)X_{i,t-1} + (1-\lambda)D_{i,t-1} + \gamma I_{i,t-1} + \mu_i + \varepsilon_{i,t}.$

I assume that in developed markets, high interest rate indicates good macroeconomic condition, which would suggest less financial constraints for firms on average. Thus, I expect that the adjustment speed is higher in the equation seven than in equation six.

Also, the relationship between interest rate and debt should stay negative as it was hypothesized in the conventional model:

H4: $\lambda_7 < \lambda_6; \gamma < 0.$

5. EMPIRICAL RESULTS

This chapter shows and describes the results of empirical analysis and regressions. For first, both aggregated and disaggregated models of pecking order theory are first gone through. The second part consists of static and dynamic trade-off models. The results are divided by the market or country and by different time periods. As stated in previous chapter, the markets consist of all listed public companies in Denmark, Sweden, Switzerland and top 500 firms in European Monetary Union (Euro 500). Time period is from 2007 to 2015, with three sub-sections: 2007-2009 marking financial crisis, 2010-2012 for European sovereign debt crisis and 2013-2015 depicting adjustment into negative interest rates. Panels are unbalanced, because for example all companies have not paid dividends in every year and including all firms in the data gives more robust results because of diminishing survivorship bias. If not stated otherwise, firm fixed effects are used in the panel regressions, because the chosen firms are specifically selected (public listed companies versus completely random sample of companies). Independent variables are scaled with total assets and interest rate is measured in percent form, so that the coefficient of interest rate variable denotes the change in dependent variable, if the interest rate changes by one percentage point. Using decimals gives otherwise identical results, but the coefficients are only multiplied by a hundred.

5.1. Pecking order theory tests

Table 7 shows the results of testing pecking order theory, with deficit independent variable in an aggregated from and change of net debt as dependent variable The hypothesis expects that financial deficit of the company (dividends + investments + change in working capital – cash flow) should be completely financed by debt, thus, the coefficient of financial deficit should be one. If the hypothesis does not hold, it implies that firms have been using other sources of financing instead of debt, which is mainly external equity by the theory.

The results in table 7 are mainly highly statistically significant. However, the DEF's coefficient for whole sample is only 0,08 with R^2 0,19. The coefficient is 0,13 during 2007-2009, changing to 0,04 in 2010-2012 and to 0,20 in 2013-2015. These results do not support pecking order hypothesis, because the figures are far from unity. Nevertheless, the use of debt seems to be highest in the period of near zero and negative interest rates, supporting the motivation of studying the relationship between the negative rates and capital structure.

Especially in Denmark there seems to be relatively strong increase in the use of debt. The coefficient doubles from 0,15 to 0,30 from the first to the third period. Also in Sweden it almost doubles from 0,10 to 0,19. Euro500 gives results in the same direction with the change from

Table 7. Test for pecking order with aggregated model. Sample period is from 2007 to 2015, which is also divided into three sub-periods: 2007-2009, 2010-2012 and 2013-2015. Financials and utilizes are excluded. Table is also shared into different markets by separate currencies and interest rates. The estimated regression is: $\Delta D_{i,t} = \alpha + \beta_{PO}\ DEF_{i,t} + \mu_i + \varepsilon_{i,t}$. $\Delta D_{i,t}$ is the change of net debt between year t and t-1. $DEF_{i,t}$ stands for financial deficit, which is calculated by: dividends + investments + change in working capital – cash flow, μ is the unobservable firm fixed effect and ε is the error term. All variables are scaled by total assets. T-values are reported in the parentheses.

Denmark				
	2007-2009	2010-2012	2013-2015	Total
Constant	0,04	0,00	0,05	0,03
	(2,08)	(0,38)	(3,63)	(4,18)
Financial deficit	0,15	0,20	0,30	0,23
	(1,09)	(2,75)	(4,14)	(5,80)
N	104	151	127	382
R^2	0,44	0,50	0,38	0,25

Euro500				
	2007-2009	2010-2012	2013-2015	Total
Constant	0,03	0,03	0,02	0,02
	(5,21)	(7,37)	(3,81)	(9,24)
Financial deficit	0,14	0,38	0,23	0,22
	(3,33)	(9,32)	(5,22)	(11,50)
N	506	819	930	2255
R^2	0,52	0,42	0,43	0,24

Sweden				
	2007-2009	2010-2012	2013-2015	Total
Constant	0,01	0,01	0,02	0,00
	(0,73)	(1,69)	(3,71)	(0,90)
Financial deficit	0,10	0,01	0,19	0,03
	(2,04)	(1,15)	(5,58)	(3,97)
N	254	415	407	1076
R^2	0,44	0,32	0,44	0,15

Switzerland

	2007-2009	2010-2012	2013-2015	Total
Constant	0,03	0,04	0,02	0,03
	(3,08)	(3,79)	(2,09)	(7,56)
Financial deficit	0,15	0,23	0,14	0,20
	(3,21)	(3,31)	(2,94)	(8,71)
N	178	307	350	835
R^2	0,53	0,35	0,43	0,21

All countries

	2007-2009	2010-2012	2013-2015	Total
Constant	0,02	0,00	0,02	0,01
	(5,78)	(1,46)	(6,53)	(6,48)
Financial deficit	0,13	0,04	0,20	0,08
	(4,86)	(3,77)	(9,07)	(11,03)
N	1042	1682	1814	4548
R^2	0,50	0,36	0,43	0,19

0,14 to 0,23, however, it peaks in 0,38 in the second period. This difference relative to other markets could be reasoned behind European Central Bank's (ECB) actions towards European sovereign debt crisis, which in turn would have reflected to the companies within the area. However, this exact reason cannot be proved by the data. Switzerland faces same kind of increase in debt in 2010-2012, but when comparing the first and third period, the coefficient stays in 0,14-0,15 frame. It is also worth to notice that R^2 has the lowest values in the second period within every market excluding Denmark.

Table 8. models pecking order theory in disaggregated form. It is separated into different markets and time periods as the previous table. Dependent variable is also the same change in net debt, but the independent variable, financial deficit, is sliced into its components: dividends, cash used in investments, change in working capital and cash flow before taxes. On the contrary to the aggregated model, disaggregated model provides mostly statistically insignificant results. If inspecting the whole time period from 2007 to 2015, the best fit is with the Euro sample, which has dividends, investments and cash flow as statistically significant independent variables. Additionally, the coefficients are far from unity, thus causing rejection of second hypothesis, which expects all individual disaggregated independent variables to act as the aggregated model. Only coefficient of determinations seem to be in the same ball-

Table 8. Test for pecking order with disaggregated model. Sample period is from 2007 to 2015, which is also divided into three sub-periods: 2007-2009, 2010-2012 and 2013-2015. Financials and utilizes are excluded. Table is also shared into different markets by separate currencies and interest rates. The estimated regression is: $\Delta D_{i,t} = \alpha + \beta_{DIV} DIV_{i,t} + \beta_{INV} INV_{i,t} + \beta_{WC} \Delta WC_{i,t} + \beta_{CF} CF_{i,t} + \mu_i + \varepsilon_{i,t}$. ΔD is the change of net debt between t and t-1, α is constant, DIV is paid ordinary dividends, INV is investments, ΔWC is the change in working capital between t and t-1 and CF is the cash flow before taxes, μ is the unobservable firm fixed effect and ε is the error term. All variables are scaled by total assets. T-values are reported in the parentheses.

Denmark				
	2007-2009	2010-2012	2013-2015	Total
C	0,03	-0,03	-0,01	-0,01
	(1,33)	-(2,15)	-(0,64)	-(0,85)
Div.	-0,11	0,80	0,01	0,19
	-(0,20)	(2,78)	(0,07)	(1,71)
Inv.	-0,10	0,10	0,32	-0,03
	-(0,38)	(0,56)	(1,95)	-(0,39)
ΔWC	-0,10	-0,09	-0,10	-0,06
	-(0,56)	-(1,15)	-(1,27)	-(1,62)
CF	-0,04	-0,09	0,12	-0,04
	-(0,21)	-(0,59)	(0,89)	-(0,93)
N	115	169	151	435
R^2	0,43	0,5	0,29	0,19

Sweden				
	2007-2009	2010-2012	2013-2015	Total
C	0,00	0,03	-0,01	0,00
	-(0,31)	(2,57)	-(1,32)	-(0,35)
Div.	0,10	0,00	-0,01	0,00
	(0,46)	(0,27)	-(0,11)	(0,46)
Inv.	0,28	-0,07	0,38	0,11
	(1,36)	-(0,86)	(3,97)	(2,24)
ΔWC	0,05	0,06	0,23	0,09
	(0,52)	(0,93)	(3,47)	(3,06)
CF	-0,09	-0,21	0,06	-0,01
	-(0,52)	-(2,09)	(0,63)	-(0,18)
N	284	482	507	1273
R^2	0,43	0,35	0,42	0,17

Euro 500				
	2007-2009	2010-2012	2013-2015	Total
C	0,00	0,03	0,02	0,00
	(0,32)	(3,17)	(1,60)	(0,02)
Div.	1,60	0,13	0,05	0,52
	(6,06)	(0,52)	(0,26)	(5,42)
Inv.	-0,60	0,14	-0,10	-0,16
	-(4,01)	(1,39)	-(1,23)	-(3,30)
ΔWC	0,05	0,17	0,18	0,03
	(0,58)	(2,36)	(2,00)	(0,95)
CF	-0,29	-0,49	-0,31	-0,14
	-(1,66)	-(3,83)	-(2,19)	-(2,56)
N	531	848	975	2354
R^2	0,58	0,35	0,41	0,2

Switzerland				
	2007-2009	2010-2012	2013-2015	Total
C	0,01	0,05	-0,01	0,02
	(0,50)	(2,49)	-(0,61)	(3,85)
Div.	0,35	0,21	0,09	-0,11
	(0,52)	(0,66)	(0,40)	-(1,03)
Inv.	-0,12	-0,06	-0,31	-0,07
	-(0,63)	-(0,37)	-(2,24)	-(0,98)
ΔWC	-0,02	0,22	-0,05	0,00
	-(0,61)	(1,98)	-(0,84)	-(0,20)
CF	-0,16	-0,45	0,03	-0,14
	-(1,03)	-(2,45)	(0,27)	-(3,52)
N	184	311	356	851
R^2	0,54	0,35	0,43	0,16

All countries

	2007-2009	2010-2012	2013-2015	Total
Constant	0,01	0,02	-0,01	0,00
	(1,02)	(2,93)	-(1,82)	(0,86)
Div.	0,47	0,00	0,02	0,01
	(3,17)	(0,37)	(0,29)	(0,81)
Inv.	-0,19	-0,02	0,09	-0,02
	-(1,98)	-(0,31)	(1,63)	-(0,58)
ΔWC	-0,02	0,03	0,09	0,01
	-(0,91)	(1,03)	(2,61)	(0,78)
CF	-0,15	-0,18	0,04	-0,03
	-(2,01)	-(3,22)	(0,81)	-(1,44)
N	1114	1810	1989	4913
R^2	0,49	0,36	0,38	0,17

park with the aggregated model. In the end these results more weaken than makes the results robust for supporting pecking order theory.

The results of disaggregated might be better and more significant, if continuous data and balanced panel were in use. However, available data in Orbis is not complete enough and even if there were companies that would fulfill the continuous data within every variable, the sample would probably be much smaller and the results would not necessarily reflect the characteristics of the whole desired population.

Table 9. compares table 7. regression with different leverage factors as dependent variable. ΔND is the change in net debt, which is the same dependent variable as previous tables. ΔLTD is the change in long-term debt and ΔTD is the change in total debt. All the variables are scaled with total assets. Shyam-Sunders and Meyers (1999) and Frank and Goyal (2003) argue that net debt is the best dependent variable paired with measuring deficit, because current assets have been subtracted from the figure, thus it should reflect the "true" or net amount of liabilities the best. Therefore, it controls for liquidity and measures potential financial distress better than other variables. However, it is also interesting to measure the effects on long-term debt and total debt. Long-term debt should reflect for example investments better, because usually investments have longer time frames than operational work. On the other hand, total debt takes all debt into account without any subtractions, thus giving the clearest view on pure debt ratio.

This table has also regressions with interest rate as an additional control variable. It is intriguing to see, whether or not it has a significant effect on the leverage ratios. Interest rate may not have direct effect on the pecking order theory, but it does have an indirect effect through information asymmetry and financial distress, which are the main reasons why debt is preferred over external equity by the theory.

Table 9. Test for pecking order with aggregated model including interest rate. Sample period is from 2007 to 2015 including all the public listed companies in Denmark, Sweden, Switzerland and the top 500 corporations by market capitalization in European Monetary Union. Financials and utilizes are excluded. Table is also shared into six columns by different leverage measures as dependent variables. The estimated regression is: $\Delta D_{i,t} = \alpha + \beta_{PO}\ DEF_{i,t} + I_{i,t} + \mu_i + \varepsilon_{i,t}$. $\Delta D_{i,t}$ is the change of debt between year t and t-1. ΔND is the change of net debt, ΔLTD is the change of long-term debt and ΔTD is the change of total debt. $DEF_{i,t}$ stands for financial deficit, which is calculated by: dividends + investments + change in working capital – cash flow. $I_{i,t}$ is the LIBOR equivalent interest rate within each market, μ is the unobservable firm fixed effect and ε is the error term. All variables are scaled by total assets. T-values are reported in the parentheses.

	ΔND		ΔLTD		ΔTD	
Constant	0,009	0,005	0,003	0,001	0,004	-0,001
	(6,48)	(2,95)	(2,52)	(0,36)	(1,71)	-(0,75)
Financial deficit	0,077	0,076	0,028	0,027	0,038	0,037
	(11,03)	(10,88)	(4,36)	(4,25)	(5,81)	(5,67)
Interest rate		0,005		0,003		0,004
		(4,14)		(2,96)		(3,75)
N	4548	4548	4534	4534	4534	4534
R^2	0,19	0,19	0,14	0,14	0,18	0,18

Regressions with net debt as the dependent variable give the highest r-squared and t-values, which are also highly statistically significant. These results support the use of net debt as the dependent variable. It is also logical that net debt has higher coefficient relative to two other leverage measures, because they have not been netted. However, the coefficients are far from unity and therefore do not support pecking order hypothesis. Also interest rates have an unexpected plus signs on their coefficients. Positive correlation with leverage show that firms have decreased their leverage, while the interest rates have gone down. Common sense might suggest otherwise, since it should be cheaper to lend and thus one would expect negative correlation with interest rate and leverage. However, the coefficients might be economically insignificant. On the other hand, if perceived from the information asymmetry and financial distress

perspective, the decreasing leverage with interest rate might suggest that equity financing would have become relatively more affordable and attractive.

Table 10. Test for pecking order with disaggregated model including interest rate. Sample period is from 2007 to 2015 including all the public listed companies in Denmark, Sweden, Switzerland and the top 500 corporations by market capitalization in European Monetary Union. Financials and utilizes are excluded. Table is also shared into six columns by different leverage measures as dependent variables. The estimated regression is: $\Delta D_{i,t} = \alpha + \beta_{DIV} DIV_{i,t} + \beta_{INV} INV_{i,t} + \beta_{WC} \Delta WC_{i,t} + \beta_{CF} CF_{i,t} + I_{i,t} + \mu_i + \varepsilon_{i,t}$. $\Delta D_{i,t}$ is the change of debt between year t and t-1. ΔND is the change of net debt, ΔLTD is the change of long-term debt and ΔTD is the change of total debt. α is constant, DIV is paid ordinary dividends, INV is investments, ΔWC is the change in working capital between t and t-1 and CF is the cash flow before taxes. $I_{i,t}$ is the LIBOR equivalent interest rate within each market, μ is the unobservable firm fixed effect and ε is the error term. All variables, excluding interest rate, are scaled by total assets. T-values are reported in the parentheses.

	ΔND		ΔLTD		ΔTD	
Constant	0,002	-0,002	0,005	0,003	0,026	0,023
	(0,86)	-(0,94)	(2,50)	(1,36)	(11,91)	(9,94)
Div.	0,007	0,007	0,008	0,008	0,037	0,037
	(0,81)	(0,82)	(1,09)	(1,09)	(4,46)	(4,47)
Inv.	-0,016	-0,017	0,104	0,104	0,032	0,031
	-(0,58)	-(0,61)	(4,19)	(4,18)	(1,22)	(1,20)
ΔWC	0,009	0,010	0,000	0,002	0,011	0,014
	(0,78)	(0,89)	(0,01)	(0,16)	(0,98)	(1,19)
CF	-0,029	-0,034	-0,062	-0,067	-0,321	-0,328
	-(1,44)	-(1,68)	-(3,09)	-(3,34)	-(15,21)	-(15,56)
Int.		0,006		0,003		0,005
		(4,89)		(3,35)		(4,68)
N	4913	4913	4890	4890	4890	4890
R^2	0,17	0,17	0,14	0,14	0,21	0,21

The table 10. shows the previous table in disaggregated form. Dependent variables are the same as in table 9. and the sample includes the same countries and time period. Independent variables are the same as in table 8. with an additional regression including interest rate. On the contrary to the aggregated models in table 9, the most significant results are gained using total debt instead of net debt. Net debt has only interest rate as statistically significant variable, which is also significant with all three dependent variables. Cash flow has negative and statistically significant coefficient for both long-term debt and total debt, which support pecking order theory, because internal funds should reduce the use of debt. Additional significant variables are investments for long-term debt and dividends for total debt. Change in working capital is insignificant for

them both. Investment's significance for long-term debt could be explained because of its own nature of tending to be long-term projects with matching long-term finance.

However, all the variables are far from being unity, so they are not mirroring change in deficit with the same change in debt. Interest rate has same kind of implications in aggregated and disaggregated models, thus it can be regarded robust in that sense. However, the economic effect on the change in debt is doubtful.

5.2. Static trade-off theory tests

This section of the chapter is used to test the static trade-off theory, using conventional leverage testing model. As pecking order theory is the main competitor of trade-off theory, deficit is added to the model. If pecking order was a key driver, the effect of deficit should dominate and wipe the other independent variables' effects. On top of interest rates being one major point of interest in this thesis, it can also have a major effect on leverage by trade-off theory. Tax-shield is a fundamental argument and key driver in the theory. Debt is raised to create that shield out of paid interests. Thus, interest rate should be a major factor contributing to the required amount of debt.

Table 11. shows the regression of tangible assets, market-to-book ratio, natural logarithm of sales, profitability, financial deficit and interest rate on leverage. All the accounting variables are taken with first differences and they are also scaled with total assets. Fixed effects with unbalanced panels are used as in the previous tables. These factors have been highly significant in many major papers, including Rajan and Zingales (1995), Fama and French (2002) and Frank and Goyal (2003). Tangible assets measure the amount of fixed tangible assets to total assets. Empirical evidence thus far has supported positive relationship between leverage and this factor. One reason could be that financing tangible asset with debt it relatively easy, because the asset itself can be used as collateral in many cases.

Market-to-book (MBT) ratio is often used as a proxy for growth and value companies. High MBT means that investors value the potential of company to greater what it's book value of assets would prove otherwise. This implies higher expected growth in the future. On the other hand, lower value predicts that investors do not see high growth potential in the firm. Using debt may not be always the best or easiest way to acquire financing for a growth company. Lenders usually want secure collateral for debt, and

Table 11. Test for trade-off model using conventional leverage testing regression. Sample period is from 2007 to 2015, which is also divided into three sub-periods: 2007-2009, 2010-2012 and 2013-2015. It includes all the public listed companies in Denmark, Sweden, Switzerland and the top 500 corporations by market capitalization in European Monetary Union. Financials and utilizes are excluded. Regression used is: $\Delta D_{i,t} = \alpha + \beta_T\ \Delta T_{i,t} + \beta_{MTB}\ \Delta MTB_{i,t} + \beta_{LS}\ \Delta LS_{i,t} + \beta_P\ \Delta P_{i,t} + \beta_{DEF}\ DEF_{i,t} + \beta_I\ I_{i,t} + \mu_i + \varepsilon_{i,t}$. ΔD is the change in net debt, α is the constant variable, ΔT is the change in tangible assets, ΔLS is the change in logarithm of sales, ΔP is the change in profitability, DEF measures the financial deficit (dividends + investments + change in working capital – cash flow) and I stands for the local LIBOR equivalent interest rate, μ is the unobservable firm fixed effect and ε is the error term. All variables, excluding interest rate, are scaled by total assets. T-values are reported in the parentheses.

Denmark				
	2007-2009	2010-2012	2013-2015	Total
Constant	0,018	0,018	0,041	0,029
	(0,56)	(1,43)	(2,91)	(4,26)
ΔT	-0,093	-0,253	-0,496	-0,041
	-(0,40)	-(2,12)	-(2,84)	-(0,66)
ΔMTB	-0,083	-0,015	-0,018	-0,008
	-(2,45)	-(1,58)	-(1,26)	-(1,10)
ΔLS	-0,016	0,009	0,026	0,069
	-(0,19)	(0,28)	(0,66)	(3,50)
ΔP	-0,334	-0,479	-0,311	-0,319
	-(1,88)	-(4,57)	-(3,32)	-(6,63)
DEF	0,230	0,284	0,160	0,153
	(1,62)	(5,87)	(2,22)	(4,47)
I	-0,008	0,023	-0,040	-0,006
	-(1,04)	(1,94)	-(1,24)	-(2,33)
N	96	143	120	359
R^2	0,57	0,68	0,61	0,35
Euro 500				
	2007-2009	2010-2012	2013-2015	Total
Constant	-0,022	0,014	-0,015	0,002
	-(3,44)	(2,81)	-(3,08)	(1,09)
ΔT	-0,525	-0,063	0,105	-0,127
	-(4,48)	-(0,86)	(1,65)	-(3,46)
ΔMTB	-0,039	-0,031	-0,009	-0,032
	-(4,16)	-(3,54)	-(1,13)	-(7,82)
ΔLS	-0,084	-0,012	0,014	0,002
	-(3,62)	-(1,19)	(1,28)	(0,27)
ΔP	-0,255	-0,188	-0,262	-0,218
	-(5,68)	-(4,61)	-(4,71)	-(9,81)
DEF	0,132	0,161	-0,110	0,064
	(3,66)	(4,42)	-(2,85)	(4,10)
I	0,013	0,000	0,002	0,001
	(3,78)	(0,09)	(0,15)	(0,88)
N	475	746	867	2088
R^2	0,67	0,39	0,41	0,26

Sweden

	2007-2009	2010-2012	2013-2015	Total
Constant	-0,060	-0,007	0,029	0,000
	-(3,85)	-(0,46)	(4,07)	-(0,02)
ΔT	0,208	0,053	0,237	0,148
	(1,00)	(0,36)	(1,77)	(2,09)
ΔMTB	-0,003	-0,010	-0,014	-0,016
	-(0,36)	-(1,52)	-(2,51)	-(5,20)
ΔLS	0,013	0,092	0,080	0,090
	(0,34)	(3,94)	(4,70)	(8,53)
ΔP	-0,102	-0,195	-0,221	-0,186
	-(1,78)	-(6,40)	-(5,40)	-(9,63)
DEF	0,093	-0,003	0,108	0,005
	(1,49)	-(0,32)	(2,88)	(0,64)
I	0,031	0,002	-0,018	-0,002
	(4,21)	(0,28)	-(2,96)	-(0,96)
N	230	385	361	976
R^2	0,71	0,45	0,61	0,37

Switzerland

	2007-2009	2010-2012	2013-2015	Total
Constant	0,022	0,029	0,021	0,012
	(0,67)	(3,11)	(1,86)	(2,48)
ΔT	-0,536	-0,074	-0,290	-0,262
	-(1,77)	-(0,55)	-(1,67)	-(3,19)
ΔMTB	-0,031	-0,011	-0,026	-0,023
	-(1,34)	-(0,90)	-(2,09)	-(3,82)
ΔLS	-0,028	0,007	-0,086	-0,014
	-(0,34)	(0,34)	-(2,07)	-(0,91)
ΔP	-0,167	-0,094	0,115	-0,060
	-(1,10)	-(1,85)	(2,14)	-(1,83)
DEF	0,084	0,217	0,179	0,106
	(0,66)	(3,72)	(2,37)	(3,51)
I	-0,040	-0,082	-0,019	-0,011
	-(0,60)	-(1,46)	-(1,91)	-(1,58)
N	157	279	327	763
R^2	0,44	0,52	0,36	0,18

All countries				
	2007-2009	2010-2012	2013-2015	Total
Constant	-0,021	-0,003	0,007	0,000
	-(3,33)	-(0,81)	(2,08)	(0,10)
ΔT	-0,335	-0,006	-0,030	-0,053
	-(3,78)	-(0,10)	-(0,59)	-(1,94)
ΔMTB	-0,022	-0,016	-0,015	-0,019
	-(4,15)	-(4,08)	-(3,61)	-(9,06)
ΔLS	-0,052	0,027	0,042	0,036
	-(2,72)	(3,24)	(4,68)	(7,28)
ΔP	-0,217	-0,210	-0,127	-0,191
	-(5,84)	-(10,75)	-(5,16)	-(15,53)
DEF	0,112	0,014	0,037	0,021
	(3,52)	(1,81)	(1,57)	(3,46)
I	0,013	0,003	-0,012	0,000
	(4,37)	(0,86)	-(2,71)	-(0,33)
N	958	1553	1675	4186
R^2	0,58	0,43	0,42	0,26

book value is closer to the liquidating value. Growth ventures tend to be riskier, and thus external equity can be more logical and plausible financing choice. Sales is the size factor. Literature predicts that it is easier for big companies to acquire debt relative to small companies. Mature, proved and established business can be regarded as a factor that is often connected with the size, and this is often interpreted as a feature, which reduces the financial distress costs and allow higher leverage potential. Trade-off theory expects that profitable firms should increase their leverage, because good profitability reduces financial distress costs, thus rises the maximum leverage potential. High profit should also mean the need for larger tax-shield, which also validates increasing leverage. However, the empirical literature does not support this, but the opposite. Profitable firms seem to have less debt, which coincides pecking order theory.

Regression results for combined markets and total period show mainly highly statistically significant results. Constant and interest rates are not significant in the total period and tangibility is very close to be significant at 5% level. However, the results implicate negative relationship between tangibility and debt, which is in the contrary to the previous research and what the theory and even common sense could suggest. Strongest negative relationship is in 2007-2009 (-0,335) and the crisis period may be one reason behind the relationship. In rest of the period the relationship is weak and

insignificant. Aftermath of the crisis could be one reason causing mixed results and thus insignificant coefficients.

Market-to-book ratio seems has highly significant results for the total and sub periods. The sign is negative as predicted. Thus, growth companies tend to have less leverage by the table. Positive relationship between size and leverage is also well supported in the results. Only in period 2007-2009 it has negative relationship. One possible explanation behind this could be that large companies were more able to deleverage in the crisis, If we assume that large companies have smaller financial distress costs and they are less financially constrained on average. After the crisis, these large companies would have been able to increase leverage again.

Profitability has negative relationship with debt, as found out in the previous empirical papers. The factor has relatively high coefficients and they are highly statistically significant. As already mentioned, this is against trade-off theory, and supports more pecking order theory. Financial deficit is significant factor in total period and in 2007-2009. However, it does not seem to dominate the results and therefore explicit support and evidence in the favor of pecking order theory cannot be claimed. Interest rate does not have significant result when inspecting the whole time period. Interestingly, it has statistically significant coefficient in 2009-2009, while it has statistically significant negative coefficient in 2013-2015. On average, there was clear declining trend of interest rates in the both periods, as can be checked in table 6. Positive relationship in 2009-2009 might not be surprise after pecking order regressions, but in this conventional leverage regression, the period of negative interest rates shows finally negative relationship between the rates and debt. Thus, this column indicates that declining interest rates under zero-bound has caused an increase on corporate debt.

Denmark has statistically significant independent variables when measured the whole period, excluding tangibility and MTB. However, tangibility has significant negative coefficients from 2010 to 2015. This result is surprising as tangibility should support leverage. MTB has only significant and result in 2007-2009, which goes along with the established theory with the negative coefficient. Even though sales or the size factor does not have statistically significant results when inspecting the sub periods separately, it does have a significant positive correlation when using the whole period, which supports trade-off theory and previous papers. Profitability is highly statistically significant, excluding in 2007-2009, with negative sign and it also supports previous empirical research. Deficit has relatively large and significant coefficients. Combining

with the results in profitability might suggest stronger support for pecking order in Denmark. It also has negative relationship between interest rate and debt ratio. Only in 2010-2012 there is positive, but insignificant coefficient. This outcome supports central bank's policy of decreasing interest rate in order to increase corporate lending.

For the EMU companies within the full sample period, size and interest rate do not have statistically significant results. Tangibility is significant with the full sample and in 2007-2009, but insignificant in 2010-2012 and 2013-2015 periods. However, all the coefficients follow the same negative notion as Denmark and the whole market sample. Market-to-book ratio is highly significant in the total time period and only insignificant period can be found between 2013-2015. It also follows the same trend of negative relationship with leverage, indicating less debt for growth companies. Size factor is not significant with the total time period with only 2007-2009 being significant, and the direction of coefficients are also mixed. Profitability is highly significant in every measured period and the relationship stands negative as the results have been thus far. Deficit is also statistically significant and has a fair impact on the leverage. Interestingly the relationship turns negative in 2013-2015, which at least counters the pecking order theory possibility in that period. Interest rate is significant only in 2007-2009 for Euro 500 sample.

Conventional leverage testing variables are all significant in Swedish sample. Tangibility is significant with total time period, but the variables of three sub periods are not. However, tangibility has positive relationship with debt in Sweden, which in contrary to all other countries in the sample. Positive relationship is also what many other papers have found thus far and this result supports trade-off theory in Sweden. Market-to-book ratio has negative relationship with leverage also with Swedish companies. Size factor is highly significant and positive, supporting trade-off theory too. Profitability has statistically significant negative coefficient, continuing the fashion. Deficit has mainly insignificant parameters, excluding 2013-2015. Interest rate behaves with Swedish sample like it does with whole sample. It is highly significant and positive in 2007-2009, while it turns to negative in 2013-2015.

Tangibility is highly significant in Switzerland using the total time period as the sample. However, it is not significant in the individual sub samples. It has also negative relationship with debt, as found in the other countries, excluding Sweden. Growth companies continue facing negative relationship with debt, while size is mainly insignificant factor. Unlike in other countries, profitability factor is not highly

significant in Switzerland. 2013-2015 period is the only one with significant profitability parameter and it is positive as opposed to rest of the findings. This small finding supports a bit trade-off theory. On the other hand, deficit factors are more significant and speak for pecking order theory. Interest rate is not statistically significant, but it has negative coefficients in every period, which gives small hint towards reducing interest rate increasing leverage, but this cannot be statistically proven by the results.

5.3. Comparing trade-off theory to pecking order theory

Table 12. shows the summed up results of conventional leverage testing regarding pecking order and trade-off theories. Results are divided by a market with total time period. A point "+" is given to the respective theory, if the factor supports it by hypothesis 3 (table 2.). When including all countries in the sample, pecking order wins by 4 against 2. It is also dominant in Denmark by 5-2 and Euro 500 with 3-1. Only in Sweden trade-off theory wins by 2-4, where as in Switzerland the points are even with 2-2. However, this table does not sum the effects of interest rate that well, but it is worth no note that there was significant negative relationship between debt and interest rate in 2013-2015 (negative interest rate period) in the sample including all countries and in Danish, Swedish and Swiss individual samples. Thus one can conclude that, at least in this period, there is evidence and support for the argument of reducing interest rate does increase the leverage of a company on average.

Table 12. Results of leverage testing regarding the hypothesis 3. Evidence supporting pecking order theory or trade-off theory is marked with "+", and the total amount of points is showed at the bottom. The coefficients of the total time period are used.

	Denmark		Euro 500		Sweden	
	Pecking order	Trade-off	Pecking order	Trade-off	Pecking order	Trade-off
Tangibility	+		+			+
MTB				+		+
Sales	+	+			+	+
Profit	+		+		+	
Deficit	+		+			+
Interest	+	+				
Points	5	2	3	1	2	4

	Switzerland		All countries	
	Pecking order	Trade-off	Pecking order	Trade-off
Tangibility	+		+	
MTB		+		+
Sales			+	+
Profit		+	+	
Deficit	+		+	
Interest				
Total	2	2	4	2

5.4. Dynamic trade-off theory test

Next is tested dynamic partial adjustment model by Flannery and Rangan (2006). This test acts as a robustness check as the conventional part in the model should give same kind of results as in the dynamic model. Additionally, this measures the adjustment speed of debt, which comes from the assumption that firms do not have exactly constant level of debt all the time. Their model tries to capture the speed of adjustment to the target level of debt. If the adjustment speed is great, it implies that the level is closer to being static, and vice versa.

Upper part of the table shows the results of regressions without interest rate as variable. The adjustment speed of leverage is 0,57 (1-0,43) for whole sample. This indicates that it takes under two years on average to adjust to the target leverage ratio. Switzerland has the highest speed by 0,78, next Denmark with 0,66 and Euro500 and Sweden have roughly same adjustment coefficients with 0,43 and 0,44. All these figures are highly statistically significant. Tangibility has positive relationship with leverage in the whole sample and in every distinct market. It is also statistically significant in every market, excluding Euro500. Positive relationship with tangibility is expected by trade-off theory, which this result support. Market-to-book ratio has mixed results. It has positive and statistically significant coefficients in Denmark and Euro500, but in Sweden and Switzerland it has negative and insignificant results. Total sample's result is also insignificant. The positive relationship with Denmark and Euro500 is against trade-off theory, because it implies that growth companies have relatively more debt. Size has mostly insignificant results with negative relationship with debt. This is against trade-off theory, but statistical prove cannot be concluded from these results. Profitability has also negative relationship in every market, which is in line with other findings thus far, and it continues to be counter to trade-off theory. However, these results are not

statistically significant, which is surprising, considering it was highly statistically significant in conventional model. Overall, r-squared has high value in every column within each sample and the table suggests that the leverage adjustment variable is the driving factor.

The bottom table shows the same regression with interest rate attached to it. Adjustment speeds and control variables stay almost intact. Compared to the upper part, only profitability turns out to be statistically significant in Euro500 and total sample. Interest rate is statistically significant in the total sample and with Euro500 sample, however, the coefficients are rather small and may not be economically significant. Table suggests that the adjustment speed has been strongest in Switzerland, where the sensitivity to interest rate has been weakest, whereas in Euro500 sample has the slowest adjustment speed with highly significant interest rate factor.

Table 13. Test for dynamic partial adjusted trade-off model. Sample period is from 2007 to 2015. It includes all the public listed companies in Denmark, Sweden, Switzerland and the top 500 corporations by market capitalization in European Monetary Union. Financials and utilizes are excluded. Regression used are: $D_{i,t+1} = (\lambda\beta)X_{i,t} + (1-\lambda)D_{i,t} + \mu_{i+1} + \varepsilon_{i+1}$ (upper table), $D_{i,t+1} = (\lambda\beta)X_{i,t} + (1-\lambda)D_{i,t} + \gamma I_{i,t} + \mu_{i+1} + \varepsilon_{i+1}$ (bottom table). D is the leverage ratio, X is a vector of firm characteristics (tangibility, market-to-book, logarithm of sales and profitability), I stands for the local LIBOR equivalent interest rate, μ is the fixed effect and ε is the error term. All variables, excluding interest rate, are scaled by total assets. T-values are reported in the parentheses.

	Denmark	Euro500	Sweden	Switzerland	Total
Constant	0,16	0,22	0,19	0,28	0,24
	(6,11)	18,203	(14,70)	(13,55)	(30,30)
Leverage(-1)	0,34	0,57	0,56	0,22	0,43
	(7,87)	(31,97)	(20,87)	(6,17)	(31,41)
Tangibility	0,42	0,02	0,09	0,18	0,15
	(6,37)	(0,84)	(2,02)	(2,90)	(7,01)
Market-to-book	0,017	0,014	-0,001	-0,001	0,002
	(3,32)	(4,10)	-(0,47)	-(0,23)	(1,55)
Log Sales	-0,08	-307,09	-4,30	-117,14	-0,79
	-(0,02)	-(0,52)	-(0,74)	-(2,45)	-(0,28)
Profitability	-0,04	-0,01	-0,01	-0,03	-0,02
	-(1,51)	-(0,80)	-(0,98)	-(1,38)	-(1,79)
N	643	2702	1735	1076	6156
R^2	0,73	0,92	0,85	0,80	0,85

	Denmark	Euro500	Sweden	Switzerland	Total
Constant	0,15	0,23	0,19	0,28	0,24
	(5,84)	(19,18)	(14,10)	(13,51)	(29,95)
Leverage(-1)	0,34	0,55	0,56	0,22	0,43
	(7,89)	(30,79)	(20,81)	(6,13)	(31,15)
Tangibility	0,42	0,01	0,09	0,19	0,15
	(6,36)	(0,48)	(2,02)	(2,90)	(6,98)
Market-to-book	0,017	0,012	-0,001	-0,001	0,002
	(3,22)	(3,69)	-(0,49)	-(0,25)	(1,35)
Log Sales	0,32	-1110,96	-4,50	-116,89	-0,51
	(0,07)	-(1,85)	-(0,77)	-(2,44)	-(0,18)
Profitability	-0,04	-0,04	-0,02	-0,04	-0,02
	-(1,55)	-(2,15)	-(1,08)	-(1,39)	-(2,22)
Interest	0,003	0,004	0,002	0,001	0,004
	(1,01)	(6,85)	(1,32)	(0,26)	(4,53)
N	643	2702	1735	1076	6156
R^2	0,73	0,92	0,85	0,80	0,85

6. ROBUSTNESS CHECKS

This chapter introduces the same models as previously inspected, but with dummy variables for period of zero or negative interest rates. Table 15 investigates aggregated pecking order model with dummy for negative interest rate I_{neg}, gaining value one if interest rate is zero or negative and zero otherwise. Def*I_{neg}which indicates the deficit during negative interest rates. Countries are measured separately and together with firm and time fixed effects.

Table 14. Test for pecking order theory. Sample period is from 2007 to 2015. Financials and utilizes are excluded. . It includes all the public listed companies in Denmark (DK), Sweden (SE), Switzerland (CH) and the top 500 corporations by market capitalization in European Monetary Union (Euro500). The estimated regression is: $\Delta D_{i,t} = \alpha + \beta_{PO}\ DEF_{i,t} + \delta_1 I_{neg} + \delta_2(Def^* I_{neg}) + \mu_i + \varepsilon_{i,t}$. $\Delta D_{i,t}$ is the change of net debt between year t and t-1. $DEF_{i,t}$ stands for financial deficit, which is calculated by: dividends + investments + change in working capital – cash flow, $I_{neg}$is a dummy variable for negative interest rate period, $Def^* I_{neg}$ denotes deficit during negative interest rate period, μ is the unobservable firm and time fixed effect and ε is the error term. T-values are reported in the parentheses.

	DK	Euro500	SE	CH	Total
Constant	0,03	0,02	0,00	0,03	0,01
	(2,42)	(4,92)	(0,73)	(5,35)	(1,81)
Def	0,25	0,21	0,03	0,21	0,07
	(6,01)	(6,00)	(1,78)	(5,15)	(2,22)
I_{neg}	0,02	0,00	0,02	-0,01	0,01
	(1,78)	-(0,91)	(4,80)	-(1,15)	(1,41)
Def*I_{neg}	-0,04	0,01	0,10	-0,07	0,04
	-(0,72)	(0,37)	(6,26)	-(1,65)	(1,29)
N	382	2255	1076	835	4548
R^2	0,26	0,24	0,15	0,22	0,2

Table 15 implies that pecking order was stronger before negative interest rates than during it, because the coefficient of Def is higher than Def*I_{neg}, also Def*I_{neg} is mostly statistically insignificant, except in Sweden. Overall, the coefficients are too far from unity, so pecking order hypothesis cannot be accepted and this table strengthens the findings of table 7. These results also strongly support that leverage increased in Sweden during negative interest rates.

Next, Table 16 is a modified table 9 with added dummy variables for period of negative interest rates and different countries with Euro500 being the base category. Changes in net debt (ND), long-term debt (LTD) and total debt (TD) are measured. Firm fixed effects are left out and time fixed effects are kept.

Table 15. Test for pecking order with aggregated model including dummies for negative interest rate and countries. Euro500 is the base category. Sample period is from 2007 to 2015 including all the public listed companies in Denmark, Sweden, Switzerland and the top 500 corporations by market capitalization in European Monetary Union. Financials and utilizes are excluded. Table is also shared into six columns by different leverage measures as dependent variables. The estimated regression is: $\Delta D_{i,t} = \alpha + \beta_{PO}\ DEF_{i,t} + \delta_1 I_{neg} + \delta_2(Def^* I_{neg}) + \delta_3 DK + \delta_4 SE + \delta_5 CH + [\delta_6(DK^* I_{neg}) + \delta_7(SE^* I_{neg}) + \delta_8(CH^* I_{neg})] + \mu_i + \varepsilon_{i,t}$. $\Delta D_{i,t}$ is the change of debt between year t and t-1. ΔND is the change of net debt, ΔLTD is the change of long-term debt and ΔTD is the change of total debt. $DEF_{i,t}$ stands for financial deficit, which is calculated by: dividends + investments + change in working capital – cash flow. , $I_{neg}$is a dummy variable for negative interest rate period, $Def^* I_{neg}$ denotes deficit during negative interest rate period, DK is dummy variable for Denmark, SE for Sweden and CH for Switzerland. μ is the time fixed effect and ε is the error term. T-values are reported in the parentheses.

	ΔND		ΔLTD		ΔTD	
Constant	0,006	0,007	0,003	0,003	0,003	0,003
	(1,48)	(1,87)	(1,58)	(1,56)	(0,66)	(0,85)
Def	0,059	0,058	0,023	0,022	0,042	0,042
	(2,18)	(2,18)	(2,61)	(2,64)	(1,51)	(1,51)
I_{neg}	0,007	-0,003	0,001	-0,002	-0,009	-0,015
	(1,24)	-(0,63)	(0,24)	-(0,73)	-(1,03)	-(1,62)
Def*I_{neg}	0,028	0,040	0,007	0,014	-0,031	-0,026
	(0,97)	(1,32)	(0,62)	(1,21)	-(0,53)	-(0,42)
DK	-0,001	-0,005	0,000	-0,002	0,004	0,002
	-(0,19)	-(0,71)	(0,01)	-(0,34)	(0,74)	(0,40)
SE	0,000	-0,002	-0,002	-0,003	0,002	0,001
	(0,05)	-(0,37)	-(0,58)	-(0,84)	(0,66)	(0,34)
CH	0,004	0,002	0,000	0,000	0,001	0,000
	(0,84)	(0,34)	(0,04)	-(0,09)	(0,22)	-(0,11)
DK*I_{neg}		0,030		0,019		0,013
		(4,31)		(3,07)		(1,90)
SE*I_{neg}		0,014		0,009		0,006
		(3,07)		(2,34)		(1,25)
CH*I_{neg}		0,013		0,004		0,008
		(2,68)		(0,82)		(1,86)
N	4548	4548	4534	4534	4534	4534
R^2	0,04	0,04	0,02	0,02	0,03	0,03

Table 16 shows that deficit is statistically significant with positive interest rates but not during negative rates. However, the figures are again far from unity, thereby rejecting the first hypothesis. Interestingly, DK/SE/CH* I_{neg} are all positive and statistically significant for the change in net debt. Same applies for ΔLTD in Denmark and Sweden. ΔTD does not receive statistically significant results at 5% level, but Denmark and Switzerland have at 10% level. These results imply that net debt has increased in the respecting countries during the period of negative interest rates.

Table 17 shows conventional leverage testing model with dummies for negative interest rate period. This table includes all the markets separately and together. This provides a change to inspect the effect of tangibility, market-to-book, sales, profitability and deficit before and after the negative rates. Table shows that during negative rates the change in leverage increased in every sample, excluding Switzerland with the second model. It seems that tangibility was mostly negatively correlated with change in net debt before negative rates, but for Denmark and Switzerland, it turned to positive after the change. MTB correlates negatively before negative rates but turns positive in Sweden and total sample after the introduction of negative rates (NR). Sales is mainly positively correlated across the samples but turns negative in Sweden after NR. Profitability is negatively correlated before negative interest rates, but it changes to positive after. Finally, financial deficit seems to correlate positively with debt before NR, however after its economic and statistical significances drop with Switzerland's coefficient falling to negative during NR. Overall, this table's results seem to go well align with Table 11's results.

Table 18 examines dynamic partial adjusted trade-off model with dummy variables for the negative interest rate period. First interesting notion is that before negative interest rates, the adjustment speed for debt (1- coefficient for D(-1)) is faster in Euro500 and Sweden, but slower in Denmark and Switzerland that what Table 13 implies. Total sample's speed is also a bit faster. However, these coefficients change quite dramatically in negative interest rate period. Only Switzerland has statistically significant result, but this might be due to having longest and steepest declining market rates compared to the other markets. Nevertheless, it seems that this coefficient has changed to negative across the sample excluding Denmark and they are close to zero, indicating almost instant adjustment speed to target leverage. Negative figure depicts that there is mean reversion, so that an increase in leverage during the previous year has led to a small decrease in leverage in the present year.

Table 16. Test for trade-off model using conventional leverage testing regression with dummies for negative interest rate period. Sample period is from 2007 to 2015. It includes all the public listed companies in Denmark, Sweden, Switzerland and the top 500 corporations by market capitalization in European Monetary Union. Financials and utilizes are excluded. Regression used is: $\Delta D_{i,t} = \alpha + \beta_T\ \Delta T_{i,t} + \beta_{MTB}\ \Delta MTB_{i,t} + \beta_{LS}\ \Delta LS_{i,t} + \beta_P\ \Delta P_{i,t} + \beta_{DEF}\ DEF_{i,t} + + \delta_1 I_{neg} + [\delta_2(\Delta T_{i,t} * I_{neg}) + \delta_3(\Delta MTB_{i,t} * I_{neg}) + \delta_4\ (\Delta LS_{i,t} * I_{neg}) + \delta_5(\Delta P_{i,t} * I_{neg}) + \delta_6(Def * I_{neg})] + \mu_i + \varepsilon_{i,t}$. ΔD is the change in net debt, α is the constant variable, ΔT is the change in tangible assets, ΔLS is the change in logarithm of sales, ΔP is the change in profitability, DEF measures the financial deficit (dividends + investments + change in working capital – cash flow) and I_{neg} is a dummy variable for negative interest rate period, μ is the unobservable fixed effect and ε is the error term. All samples have firm fixed effects and the total sample has additionally time fixed effect. All variables are scaled by total assets. T-values are reported in the parentheses.

	Denmark		Euro500		Sweden		Switzerland		Total	
Constant	0,04	0,03	0,02	0,02	0,00	0,00	0,03	0,03	0,01	0,01
	(3,96)	(3,78)	(5,85)	(5,91)	-(0,60)	-(0,70)	(5,60)	(5,52)	(1,44)	(1,37)
ΔT	-0,13	-0,14	-0,22	-0,19	-0,04	-0,03	-0,13	-0,17	-0,09	-0,08
	-(1,73)	-(1,70)	-(3,66)	-(2,92)	-(0,61)	-(0,37)	-(3,49)	-(7,29)	-(3,00)	-(2,26)
ΔMTB	-0,02	-0,02	-0,03	-0,03	-0,01	-0,01	-0,02	-0,02	-0,02	-0,02
	-(4,05)	-(3,60)	-(3,44)	-(3,28)	-(4,59)	-(5,09)	-(3,53)	-(3,35)	-(6,60)	-(7,08)
ΔLS	0,03	-0,02	0,00	0,01	0,01	0,07	0,00	-0,01	0,01	0,04
	(4,77)	-(0,65)	-(0,79)	(0,84)	(1,41)	(3,47)	(0,21)	-(0,51)	(2,53)	(3,97)
ΔP	-0,02	-0,16	0,01	-0,11	0,07	-0,06	0,00	0,02	0,04	-0,08
	-(0,63)	-(3,87)	(1,11)	-(5,71)	(3,75)	-(5,14)	(0,13)	(0,94)	(4,20)	-(4,15)
Def	-0,13	0,28	-0,10	0,20	-0,06	0,02	0,04	0,23	-0,07	0,06
	-(2,74)	(7,09)	-(4,95)	(5,43)	-(4,82)	(1,64)	(1,71)	(8,06)	-(3,36)	(2,03)
I_{neg}	0,29	0,03	0,20	0,00	0,02	0,02	0,20	-0,01	0,06	0,01
	(7,65)	(2,70)	(5,40)	(1,49)	(1,63)	(2,11)	(8,21)	-(3,54)	(2,05)	(4,07)
ΔT*I_{neg}		0,26		-0,30		-0,40		0,23		-0,14
		(2,68)		-(2,23)		-(2,15)		(2,69)		-(2,62)
ΔMTB*I_{neg}		0,00		0,00		0,02		0,00		0,02
		(0,31)		(0,21)		(6,79)		-(0,37)		(4,11)
ΔLS*I_{neg}		0,06		0,01		-0,07		0,09		0,01
		(1,52)		(0,72)		-(2,30)		(1,79)		(0,39)
ΔP*I_{neg}		0,28		0,13		-0,01		0,07		0,07
		(4,26)		(2,17)		-(0,36)		(2,58)		(3,55)
Def*I_{neg}		-0,02		0,05		0,09		-0,11		0,04
		-(0,38)		(3,78)		(2,80)		-(4,44)		(2,46)
N	361	361	2088	2088	987	987	763	763	4199	4199
R^2	0,38	0,39	0,27	0,27	0,19	0,20	0,23	0,24	0,22	0,23

Table 17. Test for dynamic partial adjusted trade-off model with dummies for negative interest rate period. Sample period is from 2007 to 2015. It includes all the public listed companies in Denmark, Sweden, Switzerland and the top 500 corporations by market capitalization in European Monetary Union. Financials and utilizes are excluded. Regression used is: $D_{i,t} = (\lambda\beta)X_{i,t-1} + (1-\lambda)D_{i,t-1} + (\lambda\delta_1)I_{neg} + (\lambda\delta_i)(I_{neg} * X_{i,t-1}) + (1-\lambda)(I_{neg} D_{i,t-1}) + \mu_i + \varepsilon_i$. D is the leverage ratio, X is a vector of firm characteristics (tangibility, market-to-book, logarithm of sales and profitability), and I_{neg} is a dummy variable for negative interest rate period, μ is the firm (and time for total sample) fixed effect and ε is the error term. All variables are scaled by total assets. T-values are reported in the parentheses.

	Denmark	Euro500	Sweden	Switzerland	Total
Constant	-0,04	0,07	0,01	-0,09	0,01
	-(0,67)	(3,36)	(1,06)	-(3,40)	(0,34)
D(-1)	0,41	0,50	0,35	0,37	0,39
	(2,96)	(8,85)	(3,43)	(3,60)	(0,00)
T(-1)	0,14	0,00	0,14	0,40	0,16
	(0,69)	(0,01)	(2,79)	(3,48)	(0,00)
MTB**(-1)**	0,03	0,02	-0,01	0,00	0,00
	(2,28)	(2,43)	-(0,93)	(0,06)	(0,84)
LS(-1)	12,84	-1225,27	-14,31	-244,96	5,48
	(1,20)	-(1,15)	-(1,81)	-(2,07)	(0,36)
P(-1)	-0,02	0,04	0,03	-0,01	0,01
	-(1,13)	(0,80)	(1,12)	-(0,27)	(0,72)
I_{neg}	-0,03	0,03	0,08	0,05	0,05
	-(1,27)	(0,93)	(3,25)	(1,01)	(0,00)
D(-1)* I_{neg}	0,09	-0,03	-0,06	-0,13	-0,04
	(1,11)	-(1,29)	-(1,11)	-(2,57)	(0,24)
T(-1)* I_{neg}	-0,11	-0,01	0,10	0,00	-0,01
	-(2,76)	-(2,02)	(3,01)	-(0,13)	(0,78)
MBT(-1)* I_{neg}	0,00	0,00	-0,02	0,00	0,00
	-(0,42)	-(1,13)	-(3,06)	(0,10)	(0,27)
LS(-1)* I_{neg}	0,00	0,00	0,00	0,00	0,00
	(1,04)	-(0,80)	-(2,06)	-(1,24)	(0,12)
P(-1)* I_{neg}	0,04	-0,02	-0,13	-0,02	-0,02
	(0,37)	-(0,28)	-(3,17)	-(0,15)	(0,78)
N	653	2694	1728	1075	6150
R^2	0,84	0,91	0,86	0,86	0,88

Across Table 18 the values before negative interest rates bring same kind of results as Table 13. Negative interest rate period causes the coefficients to be either really low or statistically insignificant. This might be due to the small sample of years with negative interest rates combined with lagged independent variables.

7. DISCUSSION OF EMPIRICAL RESULTS

The main interest of this study is to examine the relationship of capital structure to the changes in interest rate, especially the negative interest rate period in Europe. This chapter will wrap up the descriptive statistics and empirical results, presenting a comprehensive view and conclusions based on the evidence.

Table 3 shows the development of debt ratios across the sample period. Overall, the debt ratios stay relatively constant over the period. The usual change in the ratio is only one percentage point. The biggest exception is in Denmark, where total debt to assets increase from 0,46 to 0,52 from 2007-2009 to 2010-2012. However, the median stays constant, which implies that there were only few companies that increased heavily their debt ratio during this time. The mean and median of total debt to assets is otherwise the same or really close to each other in the whole sample. Long-term debt to assets has logically smaller ratio, because it is one part of total debt. However, the median is consistently smaller than mean, which implies that there is a group of companies with distinctively higher long-term debt, which increases the average. Therefore, high long-term leverage does not describe well the whole sample. Debt to capital ratio has in turn the highest ratios, because capital is a part of total assets. Here the median is actually higher than the mean, which implies that there is a group of firms with significantly lower ratios. Low debt to capital ratio indicates higher emphasis on equity financing. Nevertheless, these ratios are really static on average and imply static debt ratio.

Table 4. suggests that there was higher emphasis on distributing wealth back to the shareholders than investing in the company. Investing is probably not attractive, if the companies do not expect sufficient demand for the products and services they invest in. This is hardly surprising, if assumed that one main driver of inflation is demand, given the fact that financial and European sovereign debt crises caused a negative shock in inflation (Eurostat 2016). First there were two major hits in 2008 and 2009, but then inflation rallied in 2010. However, after the correction, inflation has steadily declined, which has caused central banks to commit new monetary policy methods, such as quantative easing and negative interest rates in order to boost the inflation and demand. The rationale behind negative interest rates is to make lending more attractive for the retail banks, because surplus funds cause costs for them. At the same time, low rates should make loaning affordable for companies, thus, allowing broader set of investment opportunities to be possible. If this equation works, these monetary policy tools should increase investments and inflation.

Unfortunately, bare cost of debt is not solely dictating the investment decision. Many companies measure the profitability of investment using net present value (NPV), internal rate of return (IRR) or similar method (Graham and Harvey 2002). These methods use cost of capital as denominator, which is a critical factor additional to future cash flows. However, interest rate of debt is only a part of cost of capital. Cost of equity is the second piece, and the return demanded by investors drives this factor. For example, market values of companies, as Table 5. shows, have soared in this sample period along with stock indices breaking all time high records. This implies that investors demand high return for equity and the discount factor for investment rises despite of low interest rate. Also, considering the low overall demand, the potential cash flows of an investment can be riskier than before. When weighting always relatively risky investment with increased rate of return expectations of shareholders, it can be easier and more safe for the management to focus on methods that increase stock price and return of equity in relatively more secure methods. Increasing dividends and stock repurchases by the company does that with Tables 4 and 5 supporting this view.

Regression analysis focus on testing pecking order and trade-off theories. Aggregated pecking order model gives statistically significant results in Table 7. It measures the effect of financial deficit to the change of debt. Deficit is measured by summing paid cash dividend and investments, change in working capital and subtracting net cash flow. However, the hypothesis requires the deficit variable to be close to one, which is not met. Disaggregated model of financial deficit, which measures the components of deficit individually, is created in order to justify the aggregated model. Unfortunately, this model gives mostly insignificant results in Table 8, which were also far from the unity condition. Tables 15 and 16 further strengthens these findings, and overall the pecking order theory cannot be accepted by these models and evidence.

Leverage testing using conventional model was used to find out factors that would support either trade-off or pecking order hypotheses. This measured the effect of tangibility, market-to-book ratio, sales, profitability, deficit and interest rate on the debt. On the contrary to the previous tests, there were more variables that supported pecking order than trade-off theory. However, this conclusion cannot be accepted as the dedicated pecking order testing does not support it. Dynamic trade-off model gave results, which indicate that firms adjust to the target leverage in two years and less. This could explain the relatively static level of debt and that there really is a target debt ratio. Combining with the evidence in the conventional model and other statistics gives the

strongest support for trade-off theory. Robustness checks with dummy variables for negative interest rate period in Table 17 and 18 further confirms the results.

Regressions also measured the effect of interest rate to the leverage. Table 11. shows that there was on average positive relationship with them between 2007-2012 and negative relationship in 2013-2015. An exception was Switzerland, where was negative relationship during the full period. Negative relationship is implicitly expected by the monetary policy makers, if they wanted to increase lending activity by decreasing the rate. However, declining interest rate with positive relationship implies that leverage also decreased in this time. Thus, the goal was not achieved in the first two sub periods. Negative relationship in 2013-2015 could be interpreted so that negative interest rate was the tipping point, which finally turned the relationship into the desired one. Furthermore, robustness checks with dummy variables for negative interest rate period indicate increased leverage during this period. Sadly, this cannot be claimed as causality. Another explanation could be increased demand, which caused firms to loan more. Investigating the relationship of leverage, investments and inflation would be interesting choice for future research. This could help in understanding the effect of inflation or consumption demand to corporate capital structure. If negative rates will last further years, future researches would give larger sample than this paper, which might give more robust results.

8. CONCLUSIONS

This study's regression analysis focuses on testing pecking order and trade-off theories. Aggregated pecking order model gives statistically significant results, but they are far from the required unity condition, which would validate pecking order hypothesis. Additionally, disaggregated model gave even more mixed results that does not support the theory either. Leverage testing using conventional model was used to find out factors that would support either trade-off or pecking order hypothesis. Surprisingly, there were more variables that supported pecking order than trade-off theory. However, this interpretation cannot be accepted as the dedicated pecking order testing does not support it. Dynamic trade-off model gives results, which indicate that firms adjust to the target leverage in two years and less. This could explain the relatively static level of debt and that there really is a target debt ratio. Combining with the evidence in the conventional model and other statistics gives the strongest support for trade-off theory.

Numerous models and tables in this paper show that leverage had positive relationship with interest rate during the fall of the rates from 2007 to 2012, which indicates that the leverage ratio decreased with interest rate during this time. However, during the last observed period of 2013-2015, this relationship turned to the opposite. Negative and decreasing interest rates describe these years. Further robustness checks confirm that firm leverage increased during the period of negative interest rates.

REFERENCES

Adams Bonaimé, Alice. Öztekin, Özde. Warr, Richard S. (2014). Capital structure, equity mispricing, and stock repurchases. *Journal of Corporate Finance*. 26. 182–200.

Alti Aydogan (2006). How Persistent Is the Impact of Market Timing on Capital Structure? *Journal of Finance*. 61:4. 1681-1710.

Baker, K. H. & Kiymaz, Halil (2011). *The Art of Capital Restructuring: Creating Shareholder Value through Mergers and Acquisitions*. 1. edition. New Jersey: John Wiley & Sons, Inc. ISBN: 978-0-470-56951-1

Baker, Malcolm & Wurgler, Jeffrey. (2002). Market timing and capital structure. *Journal of Finance.* 57. 1–32.

Brealey, Richard A. Myers, Stewart C. Allen, Franklin (2011). *Principles of Corporate Finance*. 10. edition. New York: McGraw-Hill/Irwin. ISBN: 978-0-07-131417-6

Chatziantonioua, Ioannis. Duffya, David. Filis, George (2013). Stock market response to monetary and fiscal policy shocks: Multi-country evidence. *Economic Modelling.* 30. 754–769.

Comment, Robert & Jarrell, Gregg A. (1991). The relative signaling power of Dutch-auction and fixed-price self-tender offers and open-market share repurchases. *Journal of Finance*. 46. 1243–1271.

Donaldson, C. (1961). *Corporate debt capacity.* Harvard University.

Eurostat. (2016). *Inflation in the euro area* [online]. Available from the World Wide Web: <URL: http://ec.europa.eu/eurostat/statistics-explained/index.php/Inflation_ in_the_euro_area>.

Fama, E. French, K. (2002). Testing Tradeoff and Pecking Order Predictions about Dividends and Debt. *Review of Financial Studies*. 15. 1-37

Fama, E. Jensen M. (1983). Agency Problems and Residual Claims. Foundations of Organizational Strategy, Harvard University Press; *Journal of Law & Economics*. 26.

Fischer Edwin O, Heinkel Robert & Zechner Josef (1989). Dynamic Capital Structure Choice: Theory and Tests. *The Journal of Finance.* 44:1. 19–40.

Franks, J. & Sussman, O. (2005). Financial Distress and Bank Restructuring of Small to Medium Size UK Companies. *Review of Finance*. 9. 65-96.

Frank, Murray Z. & Goyal, Vidhan K. (2005). *Tradeoff and Pecking Order Theories of Debt.* Working paper.

Frank, Murray Z. & Goyal, Vidhan K. (2007). *Tradeoff and Pecking Order Theories of Debt.* Working paper. The Handbook of Empirical Corporate Finance, chapter 7. 2. Edition. Amsterdam: Elsevier.

Graham, John R. & Harvey, Campbell R. (2001). The theory and practice of corporate finance: Evidence from the field. *Journal of Financial Economics.* 60. 187–243.

Jensen, Michael C. & Meckling, W.H. (1976). Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Structure. *Journal of Financial Economics*. 3. 305-360.

Knüpfer, S. & Puttonen V. (2009). *Moderni Rahoitus*. 4.-5. edition. Juva: WSOYpro Oy. ISBN: 978-951-0-35877-1.

Korwar, A. N. & Masulis, R. W. (1986). Seasoned Equity Offerings: An Empirical Investigation. *Journal of Financial Economics*. 15:1. 91-118.

Kose, John (1987). Risk-Shifting Incentives and Signalling Through Corporate Capital Structure. *Journal of Finance*. 42:3. 623-641.

Krasker, William S. (1986). Stock Price Movements in Response to Stock Issues under Asymmetric Information. *Journal of Finance.* 41. 93-105.

Kraus, A. Litzenberger, R. H. (1973). A State-Preference Model of Optimal Financial Leverage. *Journal of Finance*. 28:4. 911-922.

Majluf, Nicholas S. & Myers, Stewart C. (1983). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*. 13:2. 187–221.

Modigliani, Franco & Miller, Merton (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *American Economic Review*. 48. 261–297.

Modigliani, Franco & Miller, Merton (1963). Corporate income taxes and the cost of capital: a correction. *American Economic Review*. 53. 433–443.

Myers, Stewart C. (1984). The Capital Structure Puzzle. *The Journal of Finance*. 39:3, 574–592.

Myers, S. C. & Shyam-Sunder, L. (1999). Testing Static Trade-off against Pecking Order Theories of Capital Structure. *Journal of Financial Economics*. 51. 219-244.

Niskanen, J. & Niskanen, M. (2000). *Yritysrahoitus*, 2. edition. Helsinki: Edita Prima Oy.

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

Ross, Stephen A. (1977). The Determination of Financial Structure: The Incentive-Signalling Approach. *The Bell Journal of Economics*, 8:1. 23-40.

Smith, C. & Warner, J. (1979). On Financial Contracting: An Analysis of Bond Covenants. *Journal of Financial Economics*. 7. 117-1161

Stephens, Clifford & Weisbach, Michael (1998). Actual share reacquisitions in open-market repurchase programs. *Journal of Finance*. 53. 313–333.

Weiss, L. A. (1990). Bankruptcy Resolution: Direct Costs and Violation of Priority of Claims. *Journal of Financial Economics*. 27. 285-314.