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Basel III - Evidence from Sweden

Possible implications of Basel III on capital
structure of companies in the Industrial Goods
sector

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by

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Abstract

This paper investigates if and how capital structure of companies in the Industrial Goods sector in Sweden have been affected by the implementation of Basel III. Capital structure incorporates both long-term and short-term debt and it is related to the total value of capital in the calculations performed in this thesis. The results obtained propose, in contrast to other findings, that Basel III slightly decreases capital structure and effect some of the determinants of it. We can see that some of the estimated coefficients differ between the two periods, thus indicating an effect of Basel III on capital structure. Many previous studies discussed in this thesis show that it has been difficult to prove any effects of Basel III, consequently often resulting in the conclusion that the Modigliani-Miller theorem holds. However, this is not entirely supported by this thesis. Another possible cause of the results from the estimated coefficients is that Sweden currently has a negative repo rate policy. However, the Swedish Central Bank estimates the effects of this to be neglectable, thus possibly suggesting the effects of Basel III.

Key-words: Basel III, Capital structure, Capital requirements, Modigliani-Miller Theorem, The Pecking Order Hypothesis

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List of abbreviations

ACCA	The Association of Chartered Certified Accountants
AccP	Accounts Payables
AS	Asset Structure
CET1	Core Tier Capital
CorpB	Corporate Bond
CS	Capital Structure
BCBS	Basel Committee on Banking Supervision
BIS	Bank for International Settlements
EBA	European Banking Authority
EU	European Union
EquityR	Equity Ratio
FE	Fixed Effects model
FV	Face Value
GDP	Gross Domestic Product
GROW	Growth
IASB	International Accounting Standards Board
IRB	Internal Rating-Based Approach
IRD	Interest Rate on Debt
LCR	Liquidity Coverage Ratio
M&M	Modigliani-Miller Theorem
NSFR	Net Stable Funding Ratio
RE	Random Effects model
RWA	Risk Weighted Assets
ROA	Return on Assets
ROE	Return on Equity
SME	Small- Medium Sized Entities

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1. Introduction

The introducing chapter aims to present the background of why capital structure has been a subject of interest. This following chapter will include the problematization, purpose of the study, research question, defining capital structure and as well as the delimitations of the study.

1.1 Background

Throughout the course of history, economies have been subjected to various financial crises, especially in the more recent history. The latest financial crisis of 2008 is known to have caused a great deal of damage to the global economy (Economist, 2013b). Irresponsible lending to unsuitable clients, inflation in the rating systems and unusual risk taking are believed to have been the main contributors to this crisis (ibid). Another important aspect appears to be that low inflation accompanied by stable growth and low interest rates forced banks, hedge funds and other investors, to explore less traditional ways of making money - often associated with extensive risk taking (ibid). Ever since the “Tulip Mania” in The Netherlands, the need for regulation of the financial market has been discussed and with each new crisis, new regulatory needs appear. The latest financial crisis has, amongst others, resulted in an extensive new regulation, Basel III, containing stricter capital requirements for banks. The implementation of Basel III started approximately in 2014 in Sweden (Riksbanken, 2016).

1.2 Problematization

A financial crisis is a consequence of a lack of balance in the financial system. This system is to a large extent constituted by the commercial banks, which purpose mainly is to transform savings to financing, deal with risks and enable effective payments (Riksbanken, 2008). If a bank encounters a problem with its payment, the risk of the problem spreading to other banks is substantial due to the inter-connection between banks. If the same scenario hits the world economy, a similar cause-and-effect scenario is likely to occur (ibid). Therefore, trust in the financial system is an important factor, and in order to ensure the trust of the customers of the banks', regulations on a national and international level exists. These rules are mainly provided by the Basel Committee on Banking Supervision (BCBS) and are simply known as the Basel Regulations. The main purpose of these being to strengthen the stability of the financial market as well as to enhance risk management. This is mainly carried out through stricter capital requirements (Riksbanken, 2010).

The Basel regulations have existed since the 1980's, and despite the fact that Basel II was published in 2007, it was evident during the financial crisis of 2008 that this regulation was not sufficient enough to deal with the issues in the contemporary world economy. Even though, Basel II, in relation to Basel I, enhanced the requirements of capital for banks, it failed with regards to the estimation of credit risk and covering market risk (Perez, 2014). Indeed, in hindsight, banks are believed to have had too much freedom when estimating credit risks through individual models causing them to be overly optimistic. Moreover, Basel II deemed apparently insecure capital as high quality capital. The latter causing the requirements to practically fail as the retained capital was not of the intended quality (ibid).

Updating and formulating regulations intend to result in several positive aspects as described above, however, they do come at a cost. Firstly, the implementations are known to have negative impact on national GDP growth. According to Slovik and Cournède (2011), the average effect on national GDP growth will be in the range of -0.05 to -0.15 percentage points per annum. Secondly, funding costs offered by the bank's' are estimated to have increased on average with 50 basis points by 2019. Thus making debt in general costlier (ibid). Indeed, corporate banking is a sector likely to be specifically affected by the contents of Basel III (Härle et al., 2010). Both long- and short-term financing are likely to increase with at least 50 basis points. It is however unclear if the banks will be able to fully pass on these increased costs as a result of Basel III to its customers. Nevertheless, it is plausible that these cost increases will result in less capital being available for financing for the corporate clients of the banks (ibid), thus potentially affecting capital structure for the corporate clients.

Moreover, companies of various sizes could be affected differently. This is mainly due to the fact that Basel III incorporates the potential risk of various clients. Generally speaking, smaller companies are known to be riskier as clients, consequently affecting the bank's capital requirements. This is due to the fact that the banks need to hold more capital the riskier the client. In order to ensure that these clients, in Basel III defined as Small- Medium Sized Entities (SME), do not suffer from this regulation lower capital requirements have been put in. The latter however, is subject to much debate as Angelkort and Stuwe (2011) amongst others claim that the increased costs of debt financing and credit quality will cause a fall in the volume of bank financed debt for SMEs.

Previous studies of Basel III have mainly been on either a macroeconomic level, such as the one by Slovik and Cournède (2011), or on microeconomic one, which then mainly have included the banking perspective. A main summary from these studies is that to prove the effects of Basel III sometimes is challenging, even though consequences are anticipated. For example, Rhenberg and Wikström (2014) tried to prove that Swedish banks, as a consequence of Basel III, raised their interest margins. They were unable to show this, which led to the conclusion that the Modigliani-Miller (M&M) theorem holds. Thus suggesting that there is no correlation between capital requirements under Basel III and changes to interest rates.

1.3 Purpose

The purpose of this study is to investigate if and how capital structure of corporate banking clients in Sweden have been affected by the implementation of Basel III. Consequently, we will investigate if and how the potential determinants of capital structure of companies in the Industrial Goods sector (traditionally financed by bank debt due to their fixed assets) change as the implementation of Basel III started.

1.4 Research Question

Does Basel III affect capital structure?

This research question will practically be examined through the following hypotheses (more specific details can be found in the section “5. Previous Research and Hypotheses”):

H1: Basel III have reduced the level of debt and alternative financing channels such as accounts payables and issuing of corporate bonds have become determinants of capital structure

H2: Basel III have increased the importance of equity as a determinant of capital structure

H3: Basel III have resulted in interest rates becoming an increasingly important determinant of debt and caused an asymmetry with regards to SMEs

1.5 Defining Capital Structure

Capital structure refers to the long-term financing decisions of a firm (Naidu, 2011). In other words, the level of debt or equity that the firm uses to finance its operations. Capital structure has been operationalized in several ways, and it is common to incorporate both long-term and short-term debt and relate it to the total value of capital. The latter being defined as the sum of debt and equity (Song, 2005). The decisions that the managers make about capital structure play a substantial role in the health of companies (ibid). Capital structure could also be measured as the ratio of debt through equity or debt through total assets (Örtqvist et al., 2006). However, we have decided to use the definition by Song.

1.6 Delimitations

1.6.1 Data Delimitations

The thesis is limited by focusing on Swedish data from listed and unlisted corporate companies as well as to a four-year time period (2012-2013, 2014-2015). As the situation and effects of Basel III are likely to differ from country to country, this thesis will focus on and only to be directly applicable to Sweden. Furthermore, the data is only from companies in the Industrial Goods sector due to their substantial fixed assets, thus making them eligible for bank debt. The database used for this thesis is Serrano, which is provided by Bisnode.

1.6.2 Theoretical Delimitations

The focus of this thesis is how the banks' customers have been affected by Basel III. According to previous studies, this depends on how the banks are affected, but it is not the focus of this thesis to dig deep into the specific effects on the banks. The contents of the regulation is accounted for, in a separate section, as described by sources such as the BCBS, European Banking Authority (EBA) and the Swedish Central Bank. As the contents of the regulations are aimed at the banks, this section of the thesis will have an emphasis on the banks.

Moreover, there are also limitations with regards to the theories used. The theoretical framework is mainly based on core pillars of financial theory geared towards capital structure. These include Modigliani-Miller (M&M) theorem, the Pecking Order Hypothesis and the Trade-off Theory. As these are connected to theories such as Information Asymmetry and Signaling Theory, these will also be shortly accounted for. There are other core pillars of financial theory, such as Agency theory and Positive Accounting theory, which will not be discussed as the applicability of these are believed to be limited.

Important to highlight is that this thesis is limited with regards to the specific connections to Basel III. Even though variables more directly relating to this specific regulation have been added, it is still challenging to be precise about to what extent Basel III has played in actually causing the potential changes. The post implementation period have been decided based on information provided by the Central Bank in Sweden. This in order to specify the post implementation period and further relate this study to specific events connected to Basel III. There are other events that could have contributed, which will be discussed more in detail in our empirical findings (Chapter 8).

1.7 Sustainability

Sustainability is defined as the sustainable development that meets the need of the present without compromising future generations (UN, 1987). It also focuses on the needs of the less fortunate and the importance of limitations as to ensure that the needs of future generations can be met. Furthermore, it is of high importance to integrate sustainable themes when setting social and economic goals. These areas are within environmental, human rights, ethics, corruption and diversity (ibid).

The role of the financial system in the economy and broader society is to fund a sustainable economy. The role of the financial regulators is to ensure that excessive risks that would threaten the stability of the financial system and for the sustainability of the economy, are not taken (CISL, 2014). As a result of the latest financial crises of 2008, the world still faces challenges of dealing with the consequences of climate change and unsustainable path for economic growth. We believe that our study can be linked to the social and economic sustainability aspect as they both go hand in hand - a sustainable society will create a stable economic environment and vice versa. Our study of Basel III highlights the challenges for these types of regulations to actually be effective. Indeed, the latter can be questioned as the results obtained in this thesis are limited. These regulations cost a lot of money to implement and it is questionable to what extent they play in creating a sustainable financial society. As banks with the implementation of Basel III will need to retain more capital, this might hinder economic growth of companies due to impediments to receiving funding from this traditional source. This could have social implications on society as well as economic ones. The social aspect of Basel III is mainly to ensure a stable economy. However, to what extent Basel III is connected to environmental issues is, according to us, limited.

1.8 Disposition

This thesis is divided into nine chapters. Following the Introduction chapter, Chapter 2 will summarize the Basel framework where Basel III will have a main focus. Chapter 3 focuses on the methodology and aims to explain how our quantitative study is conducted. We will also reason regarding data selection, the regression model and the variables. Chapter 4 is focused

on the theoretical framework, where we will present the selected theories on capital structure which primarily are the Modigliani-Miller (M&M) theorem, the Pecking Order Hypothesis and the Trade-off Theory. Chapter 5 introduces previous research and hypotheses. This chapter is constructed on the three hypotheses, accounted for in our research question. These hypotheses will be tested in the multiple regression models in Chapter 6. In the following chapter, we will account for the steps and choices made along the process of the study regarding data, data loss and the significance value. We will perform test to make sure of the reliability of the results. Chapter 8 presents the results of the empirical findings – the correlation matrix, descriptive statistics and regression results. These will further be discussed and linked to theories and previous research. In Chapter 9 conclusions are derived and the study limitations and suggestions for future research are discussed.

2. Basel Framework

This chapter will introduce the Basel Regulations and the different Basel Accords will be accounted for. As Basel III will have a main focus in this thesis, the framework will also include a description of the liquidity ratios and a definition of an SME.

2.1 Basel Introduction

The Basel Regulations are frameworks issued by the BCBS, which is the European Union's (EU) highest instance for banking supervision (BCBS, 2011). Overall they include reforms to increase global capital requirements and levels of liquidity with the purposes of enhancing banks' ability to absorb financial strains and reduce the likelihood of future financial crises (ibid).

2.2 Basel I

In 1974 the BCBS was formed to inform on international financial regulations on common capital requirements for active banks. This was the consequence of the financial deregulations that many countries experimented with (BIS, 2011a). This resulted in the first Basel Accord known as Basel I.

Basel I mainly consist of a minimum regulatory ratio for internationally active banks (BIS, 1998). The BCBS also defined a classification of what was to be considered regulatory capital. These were to be divided into Tier 1 and Tier 2 capital. Tier 1 capital includes the highest quality of capital, which is the capital stock and retained earnings. Tier 2 capital consists of unsecured lending and other forms of lending activities, which was of the lower quality in the capital base (ibid).

Basel I however was not successful as it failed to oversee a link between risk and capital requirements in individual cases. This was due to the same risk weights being used for all banks. For a banking regulation to be effective, it requires that there are as few variations as possible as to how the banks actually conduct their business (Lind, 2005). It can be a costly process for banks in cases where the rules are too standardized, as this means that they are forced to have dual systems; one of their own management and one designed to provide regulators with information. Moreover, state authorities were in need of a more adaptable system to better be able to monitor banks with different structures (ibid). Besides that, Basel I was unable to connect the capital requirements to the actual risks. This eventually resulted in a partial reconstruction of the framework in the form of Basel II.

2.3 Basel II

Basel II was production ready in January 2007 and was made up of three main components, referred to as "pillars". These pillars contain three requirements that banks must conform to; a minimum capital requirement (8% in total), the supervisory review process and market discipline (BIS, 2001). The first pillar has become the most important and controversial part of Basel II as it focused on the credit risk of a bank's assets when calculating Risk Weighted Assets (RWA). This term can be explained as the categorizing of a bank's assets according to

credit risk and then weighting these categories consequently. Thus RWAs are a bank's assets, including off-balance sheet exposures, which have been weighted for risk.

Basel II has, in contrast to Basel I, two alternative methods to calculate this risk. The first is a further development of the standardized method also used in Basel I. The second is a method where companies apply their own internal methods for calculating this exposure. Both are fully accepted by the Basel Committee.

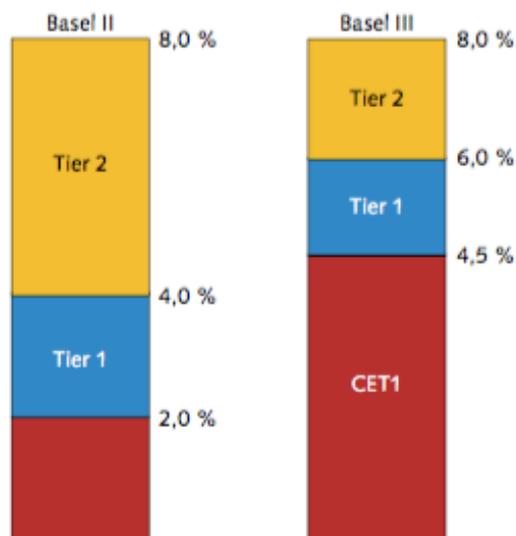
2.3.1 Standardized Approach

As a consequence of the implementation of Basel II, the method for calculating the capital requirements, known as the Standardized Approach, changed. The differences in the Standardized Approach of Basel II in relation to Basel I is that there no longer is any distinction between OECD countries. Instead risk weights shall be determined on the basis of the counterparty's credit rating. This further implies that the risk weight is determined based on what credit rating that is assigned to the counterparty by the independent rating agency. The risk is high when the counterparty has a low rating and therefore, the new Standardized Approach method was more risk sensitive (Finansinspektionen, 2001).

2.3.2 Internal Rating-Based Approach

As an alternative to the Standardized Approach, banks could under Basel II determine risk weights using an internal credit rating method, called the Internal Rating-Based Approach (IRB). The IRB Approach provided an opportunity for banks to determine the different factors that affect the capital requirement for its individual commitments and in total, on the basis of their own credit risk measurements, the internal rating. This however required that the bank's systems meet the requirements chartered by the financial regulator (Finansinspektionen, 2002:8). The risk weights are not to tell us how great the supposed risk of loss is in the different exposures. But instead, how large the risk is that the losses are taking in unprecedented proportions in a given period. Banks' revenues were expected to cover the average expected credit losses, while the purpose of the capital requirement was to be able to identify the risk of unexpected losses (Finansinspektionen, 2001).

2.3.3 Picture 1



Source: Riksbanken, 2016, page 74

2.4 Basel III

As previously stated, regulations prior to the financial crisis of 2008 did not capture the potential risks associated with the banking business to a satisfying extent. Therefore, the BCBS created a new regulation for banks, built on the three pillars of Basel II, yet far more extensive, called Basel III (Riksbanken, 2016). The overall purpose of this being to enhance the bank's ability to resist losses and reduce the likelihood of a new financial crises. Basel III results in stricter capital requirements for banks as well as the quality of the Tier Capital and demands on the liquidity regulation (ibid). Basel III thus stipulates that a greater part of the capital requirement should consist of CET1 capital and must cover at least 4.5 percent of the RWA (SOU, 2013). As previously stated, the key structure with the three pillars of Basel II was kept and passed on to Basel III. These have been revised and improved and additional frameworks regarding liquidity have been added (BIS, 2013a, BIS, 2013b).

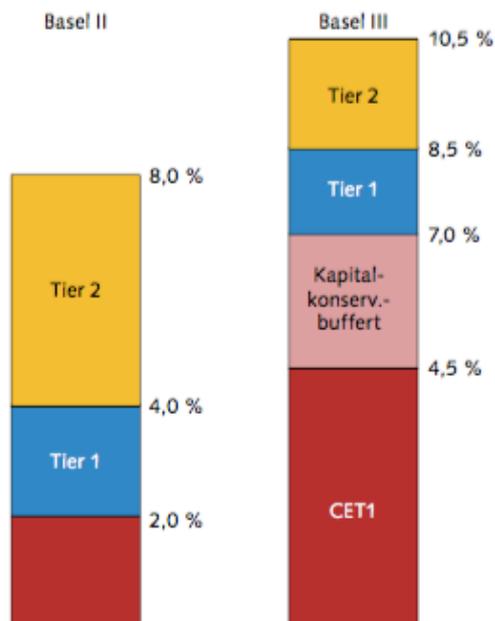
2.4.1 Liquidity regulations

Basel III includes two new liquidity regulations, Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR). Firstly, LCR is incorporated in order to promote the short-term resilience of the liquidity risks for banks (BIS, 2013a). To be more precise, it forces banks to have an adequate stock of high-quality liquid assets that can easily be converted into cash. This in order to ensure that the liquidity need for a 30 calendar-day liquidity stress scenario is met (ibid).

The second liquidity regulation is NSFR, which requires banks to maintain a stable funding in relation to the composition of assets and off-balance sheet activities (BIS, 2014). This is incorporated in order to minimize the effects of a potential disruption in the bank's regular sources of funding. This will affect the bank's liquidity and thus the risk of failure (ibid). The

NSFR also states that the bank's stable financing shall be greater than the need for stable financing (Riksbanken, 2016). This will be in addition to the Tier Capital requirements.

2.4.2 Picture 2



Source: Riksbanken, 2016, page 75

2.4.3 SME

According to both Basel II and III, SMEs are relieved of some of the implications of the regulations. According to Basel II and III, banks are permitted to distinguish exposures to SME borrowers. These companies are traditionally defined as a staff count of maximum 250 and either a turnover of less than EUR 50 Million or Balance Sheet total of EUR 43 Million (European Commission, 2015).

However, the average European company only employs six people and have far less in both turnover and Balance Sheet total compared with the above (ibid). This implies that since far greater companies are included in the traditional SME definition, it may not reflect the true average of smaller companies. Therefore, a micro definition may be used to reflect the features of the realistic SMEs. These are defined as a staff count of ten employees or less. Indeed, the staff count, which is compulsory in defining the SMEs (ibid), will solely be used in this thesis. Consequently, when we refer to an SME it is a company which employs ten people or less.

3. Methodology

This chapter aims to describe and evaluate the methodology used for this thesis. The research design is accounted for in order to explain how the purpose of the thesis is linked to the methodology. We will also reason regarding primary and secondary data as well as how suitable a tool Multiple Regression Analysis is. Moreover, factors such as reliability and validity will be discussed as well as the selection of companies.

3.1 Research Design

The research design of this thesis is a quantitative examination of the potential effects of Basel III on capital structure through multiple regression analysis. We have retrieved the financial information from both listed and unlisted Swedish companies in the Industrial Goods sector on company level.

3.1.1 Secondary Data

As the financial information is provided by external sources this is to be regarded as secondary data. In this thesis, the database used is Serrano (2016), which is provided by Bisnode. The data is downloaded to STATA where the calculations and regressions are performed. The data is to be regarded as panel data as it is data collected at different points in time, which consequently allows an examination over time. The articles that this thesis is based on are also to be regarded as secondary data. The use of secondary data has many advantages as it enables the authors to shape the problematization, decide how to practically carry out the study and simply be inspired by previous researchers. There are however, negative aspects of using secondary data which also need to be highlighted. First and foremost, researchers can be tempted to use sources based on the easy-access, instead of the relevance. Secondly, it is also problematic to control for potential errors in the secondary data. Thirdly, authors can also possibly be held responsible for the study if it is based on incorrect information.

3.2 Multiple Regression Analysis

The Multiple Regression Analysis will be performed in STATA, which is a statistical tool. The variables in the regression model (specific details will follow) have been chosen based on previous research and from core pillars of financial theories on capital structure. In other words, we have decided to create our own regression model based on the work of others. We have also included variables and definitions closely linked to Basel III, such as the Equity Ratio (EquityR) and measure size in terms of the SME definition. The aim is to examine the relationship between the independent variables and the dependent one (capital structure). This will be carried out in a multiple regression analysis, known to be a powerful statistical tool as it enables the examination of complex models and relationships. Models are not perfect and it is impossible to include and control for all possible relationships. However, multiple regression analysis can at least incorporate more complex relationship with various variables (Brooks, 2008). There are also issues with using multiple regression models. For example, one needs to be aware of the fact that interpretations can be increasingly difficult in relation to

simple linear regressions. Besides that, the ability to choose the best model is known to be challenging (ibid). For a detailed description of the model used in this thesis, see Chapter 6.

3.3 Validity

The core use of models is that they are simplified reflections of reality in order to make predictions. This is an argument why many criticize models. However, as Milton Friedman (1953) stated with his “As-If” assumptions, a model should be judged by the accuracy of its predictions, not on its simplifying assumptions (Blackford, 2016). Therefore, models can still be viewed as beneficial when studying various fields of economics. They tend however, to provide the study with more internal rather than external validity (ibid). To concretize, the model is likely to achieve relevant internal validity as we will examine the relationship between the variables clearly defined. The problem for all models will be to achieve external validity. This because all the other factors affecting, in this case capital structure, then the ones stated by the model. Consequently, the reality is more complex compared with the relationships in the model.

Since we have created a model we practice experimental control in the sense that we have chosen and operationalized the variables. We also exercise elimination as we decide which factors to exclude, even though they have been used in similar scenarios prior to this thesis.

3.4 Reliability

A condition for validity is that a study also possesses reliability. This can be defined as the absence of random errors in measurement (Lundahl & Skärvad, 1999). Put differently, that the study is not affected by; (1) who conducts the study or (2) of the circumstances in which the investigation takes place. Reliability highlights the need for objectivity and a neutral standpoint in an investigation. In order to achieve reliability in this study, the secondary sources, such as the academic articles and database, are chosen carefully. Many of the studies have independently reached the same or similar conclusions which contributes to the reliability of the sources. In order to enhance reliability in this thesis, objective definitions are used as presented by the glossary in Appendix A and our assumptions are clearly stated later on in this chapter. The theoretical framework and previous research are mainly based on recent academic articles as well as on articles provided by the BCBS, Bank for International Settlements (BIS) and the Central Bank in Sweden. We have no reason to doubt the reliability of these, as they are provided by substantial sources. Moreover, many of the articles have been accessed via the library at KTH, which is also an indication of the trustworthiness of the sources used. Many of the sources are published articles in well-known publications or published by universities, both Swedish as well as international ones. These factors, we believe, add to the trustworthiness of the sources.

The database has also been chosen with caution as it was important to have accurate financial information from both listed and unlisted Swedish companies. The latter proved difficulties as this information is not easily retrieved.

3.5 Selection of Companies

We have chosen to study both listed and unlisted Swedish companies in the Industrial Goods sector. This specific sector is defined as companies producing goods used in both construction

as well as manufacturing (Investopedia). This includes companies of various sizes involved with aerospace, industrial machinery and metal fabrication (ibid). The choice to include both listed and unlisted companies stem from the aim of examining the potential asymmetry between various sizes in the implications of Basel III on capital structure. In accordance with the Trade-off Theory, these capital intensive companies generally finance themselves with debt. In other studies on capital structure, such as the one by Andersson (2016) both industrial and technological companies are studied. However, as this thesis focuses on debt we felt it natural to study companies which generally have debt thus resulting in the study of only industrial companies.

3.7 Assumptions

This thesis is created with the following underlying assumptions:

1. Existing literature is sufficient to draw inferences about capital structure and its effects on banks, Sweden and, to a certain extent, the customers of the banks
2. All banks are assumed to be in line with the implementations of the regulations as stated by the Swedish Central Bank and the contents of the regulations. This is of importance for this thesis as this information decides the post implementation period of Basel III
3. The sector chosen is capable of shedding light on how the effects on capital structure (through increases of regulatory capital) at the banks might affect capital structure of the corporate clients of the banks
4. Multiple Regression Analysis is a suitable tool for quantitatively examining this scenario
5. Possible changes occurred after the implementation began will be assumed to be associated with Basel III. This because previous studies highlight the extensive Macroeconomic impacts of this implementation
6. It is important to differentiate between the term leverage and the occurrence of bank debt. Traditionally, leverage refers to a more extensive debt ratio whereas bank debt is the presence of bank financed debt. In this thesis we will focus on bank debt and not if this is to be considered as leverage or not

4. Theoretical Framework

The theoretical framework used in this thesis mainly consists of theories regarding capital structure. However, these are also connected to other core pillars in financial theory such as Information Asymmetry and Signaling theory, which will also be shortly accounted for in this section.

4.1 Modigliani-Miller Theorem

One of the core pillars in financial theory is the Modigliani-Miller (M&M) theorem. Also referred to as the “Capital Structure Irrelevance” proposition by Franco Modigliani and Merton Miller. The hypothesis states that there is no optimal relationship between equity and debt for a firm and that this mix does not affect a firm’s average cost of capital (Cline, 2015). This is motivated by the fact that any increase in profitability through debt will be offset by an equally sized increase in equity as a consequence of the increased risk debt causes (ibid). The M&M theorem assumes that financial markets are perfect as well as efficient, and in the most basic form of M&M, taxes are not included (Balling, 2015). The latter makes the M&M theorem questioned as it includes drastic simplifications. However, the theory is still taken seriously and is considered useful (ibid).

The M&M theorem is divided into two propositions; “Proposition 1” and “Proposition 2”.

4.1.1 Proposition 1

According to this proposition, the value of the company is independent of the mix of equity and debt in the absence of taxes, transaction costs and Information Asymmetry (Miller & Modigliani, 1958). The value of a company is based on the market value of the company’s total cash flows. A change in the capital structure merely results in a change in the allocation of cash flows between equity and debt and this has no effect on the size of the cash flows (ibid). Since the benefits of a potential tax shield is not included, the cost of capital is not affected by an increase in debt and the stock price of a company is not affected by the capital structure. Hence the irrelevance proposition (ibid).

4.1.2 Proposition 2

According to Proposition 2, an increase in debt within a company results in an increase in stockholders demands for return (ibid). This is based on the fact that there are differences between cost of equity and debt and stems for the inclusion interest expenses. Indeed, an increase in debt results in the company becoming a riskier potential client for bank debt. This further results in that the shareholders will demand a higher return on invested capital. Consequently, the M&M theorem reaches the conclusion that the cost saving in average cost of capital stemming from the interest tax shield, is netted by the increased demand of return from the shareholders.

4.2 The Pecking Order Hypothesis

Since the M&M theorem was popularized in the 1950's there have been several theories aimed at developing the seemingly simplified Propositions. One of the most well-established theories is "The Pecking Order Hypothesis" introduced by Meyer and Majluf in 1984. More of the traditional theories on capital structure investigate the optimal level of interest-bearing debt. This in order to determine at which point the benefits of the tax shields are exceeded by the costs associated with the increase in risk. An alternative viewpoint is the Pecking Order Hypothesis, based on the cost of Asymmetric Information. To be more precise, the management of a company, in relation to external actors, have more information regarding the well-being and potential risks of the company. This relative level of information and the costs associated with it, will decide how the company will finance itself.

According to Meyer and Majluf (1984) the choice of finance has the following ranking order; retained earnings, debt and issuing of new equity. The first option, retained earnings, is considered the least costly alternative since the risks and cost of the company are not increased by re-investing previous profit. As firms grow and make investments, retained earnings may not be sufficient thus making companies turn to debt. This can also be connected to the Signaling Theory, as the ability to take on bank debt in itself is a signal to the public of financial health. Another benefit is also that interest related costs are tax-deductible (Naidu, 2011). As a third option, a company will issue new equity, which is considered the costliest alternative. This because the managers of a company, with more internal knowledge, will tend to over-value it. When new equity is issued, investors will think the share-price is overvalued, which will cause a decline in the share-price and thus the value of the company.

4.3 The Trade-off Theory

In contrast to the Pecking Order Hypothesis, the Trade-off Theory is one of the more traditional ones. Indeed, the Trade-off Theory states that the choice of capital structure for a company depends on value maximization with regards to tax (Meyers, 1984). Consequently, the Trade-off Theory suggests that managers view the capital structure decision of a firm as a trade-off between interest tax shield and the costs of financial distress.

The Trade-off Theory claims that there are benefits with debt until a certain level, which is where optimal capital structure is achieved. This is dissimilar with the M&M Proposition 1, since it includes corporate tax and the benefits of a so-called tax shield. The Trade-off Theory incorporates an optimal level of debt and this vary between companies depending on the security in the assets (ibid). Consequently, the Trade-off Theory explains how various industries differentiate with regards to capital structure. To exemplify, technologically intensive companies who are characterized by rapid growth and intangible assets, usually have limited amounts of debt. On the other hand, capital intensive companies, often in the manufacturing sector, with substantial fixed assets, tend to finance themselves with more debt (ibid).

4.4 The Pecking Order Hypothesis versus the Trade-off Theory

The authors Shyam-Sunder & Myers (1999) suggest that the Pecking Order Hypothesis propose a better model for describing reality than the Trade-off Theory. Controversially,

according to Hovakimian, Opler & Titman (2001) the most suitable theory largely depends on the time horizon. In the long run the Trade-off Theory works best as managers tend to make choices regarding capital structure that move the firm towards the optimal level of debt. In the Pecking Order Hypothesis there is no well-defined optimal debt ratio (Shyam-Sunder & Myers 1999). Furthermore, the Pecking Order Hypothesis makes more sense in the short-run, implying that more profitable firms are generally less indebted. However, profitable firms are more likely to issue debt than equity in comparison to less profitable firms.

5. Previous Research and Hypotheses

Based on the theories presented above and previous research, the hypotheses will be formulated and later tested in fixed effects, multiple regressions. These regressions will be divided into two periods, pre and post the implementation of Basel III. The reasoning below will also include some of the variables chosen, however, a more detailed description of these will follow in the section about the regression model (Chapter 6).

5.1 H1: Basel III have reduced the level of debt and alternative financing channels such as accounts payables and issuing of corporate bonds have become determinants of capital structure

There appears to be contradictory claims regarding the effects of Basel III on Swedish banks and thus its customers. Indeed, many believe that the banks will try to pass on as large share as possible of the increased costs associated with Basel III to its clients. As previously stated, Härle et al (2011), amongst others, anticipate an increase in the interest rates with as much as 50 basis points for corporate clients as a result of Basel III. On the other hand, Jaffee and Walden (2010) do not agree with this. Rather, they anticipate that Swedish banks will account for the increases in capital requirements in Basel III through “swopping” debt for equity in their own capital structure. To practically assess the costs of this swap is challenging. Jaffee and Walden refer to studies by the BCBS, which anticipate the effects of these changes in capital structure to be limited. The main reason for this is that Central Banks will counteract these increases in interest margins by lowering the interest rates on a national level.

Moreover, these studies by BCBS appear to ignore the fact that a significant part of the core pillars of the capital structure theories suggests that costs of debt and equity are related to risk, such as by the Pecking Order Hypothesis. This would theoretically result in banks and their customers not being affected by Basel III. In other words, this reasoning is in line with the M&M theorem. In defense of the BCBS claims, some previous studies have had difficulties with proving the specific effects of Basel III. On the other hand, Cline (2015) states that banks are affected by increases in capital requirements with the consequence of decreased profits and reduced lending, which would potentially affect capital structure of the banks’ clients. Indeed, a considerable amount of studies conducted, such as the one by Slovik and Cournéde (2011) and Angelkort and Stuwe (2011) as previously discussed, show great concern for the practical implications of Basel III. Especially, on bank financed debt for corporate clients. When summarizing the impressions from previous studies, the overall consensus appears to be that Basel III is anticipated to reduce the availability of debt. Consequently, the hypothesis is that bank debt will be lower in period two (2014-2015) compared with period 1 (2012-2013).

Despite Jaffee and Waldens’ limited belief in the practical implications of Basel III, the authors still believe that the usage of alternative financing channels have increased post implementation. In this thesis, these include accounts payables and issuing of corporate bonds. If the interest margin at Swedish banks have increased, the financial market will adapt to the situation and use alternative ways of financing. This phenomenon is yet another

argument against the practical implications of Basel III developed by Jaffee and Walden - companies will simply adapt and not suffer from this implementation. These alternative financing channels have previously been limited in Sweden due to fixed friction costs, but are hypothesized to have increased post the implementation of Basel III and thus become determinants of debt.

5.2 H2: Basel III have increased the importance of equity as a determinant of capital structure

The possible implications of Basel III on Swedish banks and its customers can also be connected to the Pecking Order Hypothesis. After the implementation of Basel III, it is possible that banks will be forced to issue new equity as they need to increase their regulatory capital due to increased capital requirements. As this is the costliest alternative, one might reach the conclusion that this will increase the costs of the banks. Which, in due course, could be compensated for by making bank financed debt costlier for the customers. Therefore, it is possible that this will also force the corporate customers of the banks to issue new equity. According to the Pecking Order Hypothesis, the highest ranked alternative is retained earnings. However, as companies grow this option may not be sufficient enough with providing capital. The next alternative is debt, which has its benefits as it results in tax-deductible costs. If Basel III have impeded companies, due to less availability or increases in costs, to use this option they will be forced to issue new equity.

Moreover, the Trade-off Theory states that the financing behavior of companies will differ depending on how capital versus technologically intensive the company is. The selection of companies in this thesis is companies in the Industrial Goods sector, which are known to be capital intensive. They tend, according to the Trade-off Theory, to finance themselves with more debt due to the security in fixed assets. This hypothesis will consequently investigate if Basel III will have an effect on capital structure for corporate customers of the banks in the form issuing of new equity (introduced in chapter 6). This hypothesis will be examined through comparing the coefficients of the equity ratios between the two periods and relate to the confidence intervals, where the hypothesis is an increasingly negative, statistically different relationship after the implementation started (2014-2015).

5.3 H3: Basel III have resulted in interest rates becoming an increasingly important determinant of debt and caused an asymmetry with regards to SMEs

According to Basel III, the risk of a potential client will affect how much capital that needs to be added to the regulatory capital. As larger companies tend to be less risky as potential clients for the banks, there are some concerns that banks will prioritize its lending to these companies and thus create an asymmetry. In order to counteract this, Basel III introduces lower capital requirements for SMEs. Despite that, many still believe that the SMEs will be more affected by the implications of Basel III compared with larger companies. Angelkort and Stuwe (2011) for instance, claim that the increased cost of debt financing and credit quality will cause a fall in the volume of bank financed debt of these. Even if the funding available for SME financing is not reduced as a result of Basel III, Angelkort and Stuwe still fear that SME financing will be impeded by higher requirements with regards to credit quality. On the other hand, studies conducted on the British market showed that an almost

doubling of the capital requirements had modest impacts on the average funding costs. However, Eklund and Braunerhjelm (2013) state that capital- and liquidity requirements as well as the gearing in Basel III, could reduce the bank's' ability to lend money to SMEs.

According to a study by the Association of Chartered Certified Accountants (ACCA) in 2011, the lending to SMEs had little to do with the severity of the 2008 financial crises. Yet, since then, these companies have struggled to achieve growth, which is actually worrisome for the society as these companies are known to be the engines of growth. Basel III is, by many, known to be a recipe in order to avoid a future economic crises. However, the concern that it will disproportionately affect SMEs, is once again highlighted. The companies in this investigation will be divided into two categories depending on if they are defined as SMEs or not. The hypothesis is to obtain increasingly negative coefficients for SMEs post the implementation, thus indicating an asymmetry. Also, to further investigate the potential implications of being an SME through the inclusion of interaction variables. The aim of this hypothesis is also to examine if interest rates as a determinant of debt, have increased with regards to importance post the implementation. This is examined due to possible implications of Basel III on costs in the form of increases in interests as highlighted by Härle et al. et cetera. Put differently, that these cost increases have resulted in interest rates affecting the possibility to acquire debt further, thus increasing its importance as a determinant of capital structure.

6. Regression Model

In this section the variables used in the regressions will be presented and accounted for. These variables have been chosen based on previous studies, Basel III and the theories presented in this thesis.

6.1 Capital Structure (CS)

When summarizing previous studies, it becomes evident that there are various directions to operationalize capital structure. As the study by Song (2005) highlights, there are several aspects that needs to be incorporated in the discussion of how to define capital structure in terms of financial information. Song further stresses the importance of painting a plausible and reliable picture, thus including both short-term and long-term debt. Moreover, Song reaches the conclusion that total debt over capital is appropriate, where capital is defined as the sum of total debt and equity. Other studies, such as by Prahalatan (2010) supports the study by Song and concludes that one can either measure capital structure separately over short- and long-term debt, or combined as a total measure of total debt over total assets. Rhenberg and Wikström (2014) also argues that capital structure can be measured as total debt in relation to total capital. We will use the term capital structure interchangeably with CS throughout the rest of the thesis. Consequently, based on previous studies capital structure is defined according to the below:

$$\begin{aligned} \text{Debt} &= D \text{ (total debt, includes both long- and short-term debt)} \\ E &= \text{Equity (total equity)} \\ V &= D+E \\ CS &= \frac{D}{V} \end{aligned}$$

6.2 Potential Determinants of Capital Structure

In this section the potential determinants of capital structure are presented and defined. These are chosen based on previous studies and thus on what capital structure have been shown to be affected by. Potential determinants more closely linked to Basel III are also included.

6.2.1 Profitability

Previous studies show that a significant potential determinant of capital structure is profitability. This often result in the usage of either Return on Equity (ROE) or Return on Assets (ROA). These will be presented and discussed below.

6.2.1.1 Return on Equity (ROE)

When reviewing previous studies on capital structure many share the view that profitability is a potential determinant. This statement can, amongst others, be related to the Pecking Order Hypothesis and Asymmetric Information. According to Chen (2010) this is because firms will

prioritize internal finance and then turn to debt if internal financed is exhausted. This view is shared by Song (2005) which also state that profitability is a determinant of capital structure, due to much the same reasons as discussed by Chen (2010). Myers (1984) described a negative relationship with debt due to more profitable firms being likely to have retained earnings and thus not utilize debt to finance its operations. Indeed, many studies agree upon the fact that profitability is a determinant of capital structure, however they differ with regards to how to measure it. There are several ways of doing this; Song (2005) uses EBIT, Chen (2010) uses Return on Equity (ROE) and Naidu (2011) uses both Return on Assets (ROA) as well as ROE. The latter is known to be more popular as it is used by a majority of other studies. It measures profitability as it relates to how well the equity creates a profit (Gabriel, 2015). In other words, it tells shareholders how effectively their money is used (ibid). According to Naidu (2011) it can be defined according to the below:

$$ROE = \text{Net Profit} / \text{Total Equity}$$

6.2.1.2 Return on Assets (ROA)

Another profitability measure, often denoted as a potential determinant of capital structure, is Return on Assets (ROA). It measures profitability of a firm in relation to the assets utilized in order to generate profit (Naidu, 2011). The core use of ROA is when the profitability of firms in the same type of business are compared. This variable will be directly retrieved from the Serrano Database where it is calculated in accordance with the following formula:

$$ROA = \frac{\text{Adjusted operating profit (or loss) after financial income} / t}{\text{Total Assets}}$$

This is hypothesized to have a negative relationship with capital structure, as it is similar to ROE, meaning that firms will be able to finance themselves with retained earnings when this particular ratio is high.

6.2.1.3 ROE and ROA

According to Gabriel (2015) ROE is considered the most popular measure of profitability due to its ability to provide a rapid analysis of company health. However, it is not without fault and it is often criticized as it lacks attachment to risk. In other words, cost of risks and the quality of assets are not reflected in this measure. It is also known to be more of a short-term measure of profitability, which makes it less sustainable (ibid). Moreover, investors need to be aware of how the occurrence of debt is related to ROE. If a company has a disproportionate amount of debt in relation to equity this could, in combination with a small net income, result in a high ROE even though the company is not that profitable (ibid). This can be claimed with regards to the definition of ROE (see 6.2.1.1).

ROA is often used when companies in the same type of business are studied (ibid). As this thesis studies Swedish companies in the Industrial Goods sector, which tend to be characterized by fixed assets, we consider ROA to be the best suited measurement of profitability.

6.2.2 Growth (GROW)

When firms grow, their requirement of finance often increases. The capacity and increasing demand on finance strongly depends on the internal finance. So, if the firms rely on internal

funding options, then growth may be more restricted. However, if the firm pursues external finance, the chances of risk increases (Chen, 2010). According to Mayers (1977), firms with strong growth potential will tend to have less capital structure. Growth on the other hand, can also produce Moral Hazard effects and drive firms to take more risk. This is why growth opportunities should be financed with equity instead with debt, as according to Smith and Watts (1992) who predicted the negative relationship between debt and growth opportunities. To the contrary, firms with high growth will tend to lean towards external funds, which will more likely put a strain on retained earnings and drive the firms into borrowing (Michaelas et al, 1999). The hypothesis in this thesis is that GROW is positively correlated with capital structure as the need for external financing is known to increase with growth. It is, in accordance with Andersson (2016) operationalized according to the below. However, Andersson's study found that growth was not working well as an explanatory variable for Industrial firms.

$$GROW = \frac{\Delta Net Sales}{Net Sales}$$

6.2.3 Asset Structure (AS)

Asset structure (AS), or tangibility of assets, is known to be a determinant of capital structure and can be connected to various theories. These mainly include the Pecking Order Hypothesis and the Trade-off Theory. If a firm have considerable fixed assets, which can be regarded as satisfactory collateral due to its substantial liquidation value, the possibility to finance its operations via bank debt is achieved in accordance with the Trade-off Theory. This is also supported by the Pecking Order Hypothesis, as fixed assets reduce the level of Asymmetric Information (Chen, 2010). Consequently, debt, when needed, is preferred over equity, as the level of Asymmetric Information is lower. This is hypothesized to result in a positive relationship between AS and CS. When reviewing previous studies, such as Chen (2010), there appears to be consensus in how to operationalize AS and it is calculated according to the below:

$$AS = \frac{Fixed Assets}{Total Assets}$$

6.2.4 Accounts Payables (AccP) and Issuing of Corporate Bonds (CorpB)

According to the study by Jaffee and Walden (2010), alternative financing channels in Sweden are presumed to have increased post the implementation of Basel III and being connected to the occurrence of debt. These include Accounts Payables (AccP) and Issuing of Corporate Bonds (CorpB) in this thesis. These will be gathered as noted in the financial reports - as factual numbers in 1000's of SEK. The hypothesis is a negative correlation with capital structure, as these are thought to increase as CS decreases.

$$AccP = Accounts Payables$$

$$CorpB = Amount from issuing of a Corporate Bond$$

6.2.5 Equity Ratio (EquityR)

According to Basel III, equity in relation to total assets can be an indicator of both capital structure and how costly it is. Through calculating the so called equity ratio (EquityR), an increase in this determinant can suggest increases in funding costs. That is, if equity in relation to total assets increases, debt is used to a reduced extent. Traditionally, this is the result of increases in cost of debt. This can also be connected to the Pecking Order Hypothesis, which states that equity is the costliest alternative and should thus be used as “a last resort”. But perhaps the EquityR is, first and foremost, an indicator of how much equity that is used in relation to total assets. This is calculated according to the below:

$$EquityR = \frac{E}{V}$$

This is hypothesized to have a negative correlation with capital structure, as an increase in this ratio means that CS, as defined in this thesis, has decreased.

6.2.6 Measure of cost of Debt (IRD)

In this thesis we will include a variable that relates cost of debt to CS. This in order to examine if interests continue to be a determinant of CS post the implementation of Basel III. This variable is directly retrieved from the Serrano Database and it is calculated according to the following:

$$IRD = (Financial\ costs - Financial\ Expenses\ affecting\ comparability) / Adjusted\ total\ liabilities$$

6.2.7 SME

As previously stated, in the section of Basel III and SMEs, there are ambiguous ways of defining the above. There is, according to the European Commission (2015) a traditional definition, which appears not to represent the realistic features of the traditional European company. Therefore, the most central part of the definition of a micro-company is used. This is a dummy variable and thus take on the number one if a company is defined as an SME. The hypothesis is that SMEs is negatively correlated with capital structure due to the anticipation of an asymmetry in the implications of Basel III with regards to company size.

In order to explore the impact of being an SME on capital structure, interaction variables are also included. These are to be interpreted as the interaction of SME and ROA, AS and IRD on CS. As the VIF test in chapter 7 will account for, the interaction of GROW was excluded due to the presence of multicollinearity.

6.2.8 Other Possible Determinants of Capital Structure

When reviewing previous studies, it becomes evident that there are numerous potential determinants of capital structure that are not included in this thesis. We have chosen the above with the basis of our specific hypotheses and on what many previous authors appear to be in consensus about. We also study capital structure in relation to Basel III, which also leads us to include variables such as EquityR and SME, which are more related to this specific regulation.

Many are in unison of the fact that the size of a company matters when discussing capital structure. In this thesis this variable is incorporated in the shape of the SME variable. However, it is common to measure size in the shape of, for example, sales. As we have a distinct Basel III emphasis, it felt natural to use a size-variable related to the specific regulation and thus not a general one. Besides that, some studies, such as the one by Song (2005), include a more direct measures of a tax shield as well as time variables. In this thesis the time effect is achieved through the comparison of the coefficients from the two time periods. The variable “uniqueness” is also included in the study by Song. This in order to measure the value of collateral in the case of a bankruptcy as more “unique” assets have limited value for others. This is not included in this thesis as the aspect of bankruptcy is not studied. Some also include profitability and debt measures related to the share price. However, as this study includes both listed and unlisted companies we have decided not to include these types of measurements.

6.3 Table of Predicted Relationships

Below is our table of Predicted Relationship between the potential determinants of capital structure and capital structure.

Table 1: Predicted Relationships

Variable	Variable Name	Definition	Predicted Relationship
Profitability	ROA	Return on Assets, Adj. operating profit/loss /total assets	-
Growth	GROW	Percentage Change of Net Sales	+
Asset Structure	AS	Fixed Assets/Total Assets	+
Accounts Payables	AccP	Amount under Accounts Payables	-
Corporate Bond	CorpB	Amount from issuing of Corporate Bond	-
Interest Rate on Debt	IRD	(Financial Costs/ Adj. Total Liabilities)	-
Equity Ratio	EquityR	Equity/Total Assets	-
SME	SME	Dummy Variable, less than 10 employees	-

6.4 Basis for Hypothesis Testing

Based on previous studies and theories, the potential determinants of capital structure have been selected. These regressions will be run separately for the two periods, pre (2012-2013) and post (2014-2015) the implementation of Basel III. In order to statistically differentiate between the two periods, the confidence intervals will be compared to investigate if these overlap between the two periods. Where a potential overlap would indicate no verified change. The observations are for firm *i* at time *t*. As will be further discussed in “7.5 Robustness”, indications that some of the independent variables affected the others were found. Thus, in order to reduce these effects, the regressions will be run separately. To be more precise, both EquityR and SME appeared to affect the other estimated coefficients once included. The same can be said of the interaction variables for SMEs.

6.4.1 Core Determinants of Capital Structure

Below is the core model used in this thesis to investigate capital structure. It states the potential relationship between capital structure (CS) and Profitability (ROA), Growth (GROW) and Asset Structure (AS). These are selected based on previous research, as many studies such as Naidu (2011), Song (2005) and Chen (2010) agree upon these. It is common to

include a size-related variable. However, this will be applied in Hypothesis 3, where a potential asymmetry with regards to size is examined through the SME variable.

$$CS = \beta_0 + \beta_1 ROA_{i,t} + \beta_2 GROW_{i,t} + \beta_3 AS_{i,t}$$

6.4.2 Hypothesis 1

Below are the variables listed to test our first hypothesis. It is based on the core model with the addition of Accounts Payables (AccP) and Corporate Bond (CorpB) for firm i at time t . These are included to see if the hypothesis by Jaffee and Walden (2010) holds – that alternative financing channels have become determinants of capital structure post the implementation of Basel III.

$$CS = \beta_0 + \beta_1 ROA_{i,t} + \beta_2 GROW_{i,t} + \beta_3 AS_{i,t} + \beta_4 AccP_{i,t} + \beta_5 CorpB_{i,t} + \varepsilon_{i,t}$$

6.4.3 Hypothesis 2

Below is the regression model aimed at examining Hypothesis 2, which states that the importance of equity have increased post the implementation of Basel III. Therefore, the variable EquityR is included in addition to the core model.

$$CS = \beta_0 + \beta_1 ROA_{i,t} + \beta_2 GROW_{i,t} + \beta_3 AS_{i,t} + \beta_4 EquityR + \varepsilon_{i,t}$$

6.4.4 Hypothesis 3

Our third and final hypothesis aims to examine the potential asymmetry in the implications of Basel III on SMEs and non-SMEs. Therefore, the variables Interest Rate on Debt (IRD) and SME are included in this model. Moreover, a separate regression including the interaction variables of SMEs is performed. This was also due that the Robustness tests indicated that they affected the other independent variables (see “7.5 Robustness”).

$$(1) CS = \beta_0 + \beta_1 ROA_{i,t} + \beta_2 GROW_{i,t} + \beta_3 AS_{i,t} + \beta_4 IRD_{i,t} + \beta_5 SME_{i,t}$$

$$(2) CS = \beta_0 + \beta_1 ROA_{i,t} + \beta_2 GROW_{i,t} + \beta_3 AS_{i,t} + \beta_4 IRD_{i,t} + \beta_5 SME_{i,t} + SME_{i,t}ROA + SME_{i,t}AS + SME_{i,t}IRD + \varepsilon_{i,t}$$

7. Data

In this section more specific details of the data and how it is handled is accounted for. This will include what type of data, the significance level and the number of tests performed in order to ensure reliability.

7.1 Data Loss

After gaining access to the Serrano Database several observations were excluded in order to make the data fit to the purpose of this thesis. We started off with about ten million observations. Firstly, the data set was narrowed down to the years in question and the specific industry. Thereafter, missing observations were removed and we selected the components needed to be able to calculate our variables. This resulted in 88 439 observations, only including companies that were deemed as active. The next step was to exclude incorrect data; this step included omitting companies with revenue less than SEK 500 000 (5 836 observations dropped), less than 1 employee (12 316 observations dropped) and negative notations on the various forms of debt (74 observations dropped). Thereafter the variables were examined in histograms to visualize how normally distributed they were. From that, it could be concluded that ROA and IRD suffered substantially from suspected values, which led to the exclusion of extreme values deemed highly unrealistic (1 405 observations dropped). Moreover, a slight number of the observations have zero in debt. These are not excluded due to their limited number and the fact that these are deemed as correct observations. Thus limiting the amount of data manipulation exercised. This resulted in a total of 68 808 observations.

7.2 Significance Level

The data set used for this thesis is extensive and contains a great number of observations. According to Brooks (2008), when a data set is large it is usual to reduce the significance level, which is why a 1% - level is chosen.

7.3 (Un)Normal Distribution

The variables chosen have been examined with regards to normal distribution to see which type of regression that is the most suitable. As the data set contains correct observations, yet a few outliers, we had to decide if we wished to keep the data set as it was and use Median regression or omit outliers and use Ordinary Least Squares (OLS) regression. We decided to run the regressions separately on the data set and received results which did not differ substantially from each other with regards to significance level, coefficients and r-square (see Appendix B). This leads us to conclude that this data set does not suffer from immense problems with outliers. However, it is more suitable to use Median regression (also known as Quantile regression) since it is more robust to outliers (Baum, 2013), as we do not wish to exclude observations containing correct information. In other words, the extent to which data manipulation takes place is limited.

7.4 Robustness

In order to investigate if the regression model is robust, meaning not changing drastically when modified, several checks and modifications had to be made during the process (White & Lu, 2010). From all these tests one can draw the conclusion that, overall, the coefficients of the variables do not change significantly when added and removed. Also, no significant changes occur with regards to r-square as well as p-values. Our variable EquityR is the only variable that significantly affect the coefficients of the other variables once added. Moreover, the variable SME affect GROW somewhat, which also needs to be highlighted. The latter also applies for the interaction variables. Overall, the regression models are estimated as robust and can thus ensure the reliability of the regressions. The fact that we see some effects in the coefficients that some variables cause, is a reason why the regressions are run separately.

7.5 Autocorrelation

In order to ensure the reliability of panel data, it is common to check for autocorrelation. Even though we do not suspect autocorrelation in our data, this test was used in order to be precise. According to Brooks (2008) this is when the correlation between the residuals are different from zero. One way to detect autocorrelation is through performing a Durbin-Watson test, where a value of near two, indicates no clear evidence of autocorrelation. In this thesis a value of about 1.99 was received, which does not indicate any sign of autocorrelation.

7.6 Heteroscedasticity

In order to ensure that our data does not suffer from heteroscedasticity, which could damage the results, a Breusch-Pagan test is performed in STATA. In such a test the null hypothesis tested is that of constant variance, where a p-value not rejecting this confirms no heteroscedasticity. This was performed at a 5% significance level and we obtained a p-value supporting the alternative hypothesis, thus confirming no issue with heteroscedasticity in our data.

7.7 Model Fit

The r-square retrieved from the regression results are usually an indicator of how well the model fits the data. However, this does not have to be the case. According to Dougherty (2011), a model with a low r-square can still have been obtained from an adequate model if the p-values are significant and the data set is extensive.

7.8 Choice of Model for Panel Data

Panel data is data collected at different points in time, which consequently allows an examination of a supposed change over time. There are various types of models available for panel data such as Fixed Effects Model (FE) and Random Effects Model (RE). FE is used whenever there is an interest in analyzing the impact of variables that vary across time. The FE model include a disturbance term as it is assumed to contain an individual specific effect, which could vary over cross-section but also time-series observations. However, FE does not account for heterogeneity. Controversial, as the RE model solves the problem of heterogeneity, it requires to treat all unobserved variables as randomly drawn and distributed

independently of all explanatory variables. Moreover, by using the FE model one can control for omitted variable bias. This could potentially be an issue in this thesis (Brooks, 2008) since we, to a certain extent, have omitted variables. This model is also used by Andersson (2016) and Song (2005) as they have analyzed panel data containing information on company level over time, thus making similar investigations as this thesis. These are reasons why the FE model is used.

8. Empirical Findings

In this section the empirical findings from the correlation matrix, descriptive statistics and fixed effect Median regressions are presented, discussed and analyzed. The results will be linked to previous research and theories in order to analyze the possible effects on capital structure post the implementation of Basel III.

8.1 Correlation and Near Multicollinearity

According to Brooks (2008), the presence of multicollinearity can negatively impact the results of a regression, which is why the variables need to be examined with regards to this. This examination is firstly carried out through a correlation matrix, where a correlation of less than 0.8 or -0.8 are known to have a level of multicollinearity not damaging to the regression (ibid). As shown below in 8.1.1, EquityR has a strong correlation of -0.9671 with CS. Since EquityR mirrors CS with regards to the definitions, this is to be expected. According to Brooks, this could however indicate multicollinearity in our data. Therefore, a VIF-test is performed in STATA to investigate how much variance inflation factor that is present. Thus allowing a more precise measure of multicollinearity. As shown in 8.1.2 all variables, except SMExGROW, have a VIF less than ten. Consequently, despite a strong correlation between EquityR and CS, there is no issue of multicollinearity in our data when SMExGROW is omitted.

8.1.1 Correlation Matrix

	CS	ROA	GROW	AS	IRD	SME	EquityR	CorpB	AccP
CS	1,00								
ROA	-0,21	1,00							
GROW	0,04	0,08	1,00						
AS	0,07	-0,12	-0,01	1,00					
IRD	0,13	-0,06	-0,04	0,19	1,00				
SME	-0,13	0,02	0,06	-0,08	0,03	1,00			
EquityR	-0,97	0,16	-0,03	-0,09	-0,10	0,15	1,00		
CorpB	0,01	0,00	0,00	0,01	0,01	-0,01	-0,01	1,00	
AccP	0,03	0,00	-0,01	0,03	-0,01	-0,08	-0,03	0,06	1,00

8.1.2 VIF test

Variable	VIF
EquityR	1,05
ROA	1,04
SME	1,04
AS	1,02
GROW	1,01
AccP	1,01
CorpB	1
IRD	1
SMExIRD	5,52
SMExROA	5,46
SMExAS	6
SMExGROW	1041,27

8.2 Descriptive Statistics

The tables below show descriptive statistics of the data of Swedish companies in the Industrial Goods sector. This will show some potential indications concerning the situation pre versus post the implementation of Basel III. The descriptive statistics will be divided into two, based on the two periods (2012-2013, and 2014-2015).

8.2.1 Table 2: Descriptive Statistics Pre Basel III Implementation (2012-2013)

	CS	ROA	GROW	AS	IRD	SME	EquityR	CorpB	AccP	(In thousands of SEK)
Mean	0,58	0,08	-0,05	0,24	0,02	0,72	0,38	132,59	5 678,62	*
Median	0,60	0,07	0,00	0,17	0,01	1,00	0,35	0,00	421,50	*
Max	1,00	2,19	2,05	1,00	0,30	1,00	1,00	1 699 200,00	7 436 000,00	*
Min	0,00	-2,49	-0,95	0,00	0,00	0,00	0,00	0,00	0,00	*
Stdv	0,24	0,18	0,65	0,24	0,03	0,45	0,22	12 785,36	97 383,64	*

8.2.2 Table 3: Descriptive Statistics Post Basel III Implementation (2014-2015)

	CS	ROA	GROW	AS	IRD	SME	EquityR	CorpB	AccP	(In thousands of SEK)
Mean	0,56	0,10	2,01	0,24	0,02	0,72	0,39	947,23	6 334,54	*
Median	0,58	0,08	0,00	0,16	0,01	1,00	0,27	0,00	426,00	*
Max	1,00	2,10	19,50	1,00	0,30	1,00	1,00	8 071 000,00	12 400 000,00	*
Min	0,00	-2,29	-0,90	0,00	0,00	0,00	0,00	0,00	0,00	*
Stdv	0,24	0,19	4,59	0,24	0,03	0,45	0,22	78 208,99	118 032,80	*

8.2.3 Empirical Findings from the Descriptive Statistics

If not otherwise stated, the median is discussed as outliers are not omitted. Starting off with the variable CS, one can see a slight decrease in the post implementation period. This could imply that debt in relation to total capital has decreased as the implementation of Basel III started in Sweden. When taking into account the variable IRD, it has not changed between the two periods. With regards to the variable AS, the mean is the same for the two periods, but the median has slightly decreased after the implementation of Basel III started, thus potentially suggesting a decrease.

Another aspect is that ROA appears to have increased after the implementation. Besides that, all measures regarding the alternative financing channels are greater in the post implementation period. This could potentially indicate that the usage of these alternative financing channels have increased post the implementation of Basel III. The variable GROW and SME are the same in the two periods. In order to examine this more thoroughly, multiple regressions will be run in order to test the hypotheses more directly. This is due to the limitations of the conclusions one is able to draw with statistical certainty from descriptive statistics.

8.3 Regression Results

In order to examine the hypotheses below, FE Median regressions for our two periods (2012-2013, 2014-2015), are run separately. The aim is to compare the coefficients for each variable between the two periods to be able to draw conclusions regarding the effect Basel III potentially has on capital structure and its determinants. Also, to link the coefficients to the standard deviations, in order to statistically differentiate between the two periods. In other words, we will compare the confidence intervals for the coefficients in order to statistically verify a potential change between the two time periods. For all regressions, including OLS made for comparison, see Appendix B. These potential findings will then be discussed and linked to previous research. The regressions are split into three versions and run separately. This as our Robustness tests show that EquityR and SME (with its interaction variables) affect the other variables in a more extensive way. Consequently, a total of eight regressions are presented in this section.

This shows all the estimated coefficients received from the regressions as well as the number of observations and firms. The regressions including the name “Int” refers to the inclusion of the interaction variables.

Table 4: Regression Results (1)

Dependent Variable Capital Structure (CS) Total Debt/Total Capital				
Quantile Regression				
	Regression 1 Pre	Regression 1 Post	Regression 2 Pre	Regression 2 Post
Constant	0.61*** (0.003)	0.60*** (0.003)	1.00*** (0.0008)	1.00*** (0.0009)
ROA	-0.36*** (0.010)	-0.36*** (0.010)	-0.07*** (0.002)	-0.05*** (0.002)
GROW	0.024*** (0.003)	0.004*** (0.0004)	-0.003*** (0.0005)	-0.0007*** (0.00008)
AS	0.12*** (0.008)	0.06*** (0.008)	-0.08*** (0.001)	-0.01*** (0.002)
AccP	4.59e ⁻⁰⁸ ** (1.89e ⁻⁰⁸)	4.66e ⁻⁰⁸ (1.61e ⁻⁰⁸)		
CorpB	-8,23e ⁻⁰⁸ (1,44e ⁻⁰⁷)	8.19e ⁻¹⁰ (2.44e ⁻⁰⁸)		
EquityR			-1.06*** (0.002)	-1.05*** (0.002)
No. Obs	34 640	34 640	34 640	34 640
No. Firms	17 320	17 320	17 320	17 320
Pseudo R2	0.04	0.04	0.81	0.80

*, ** and *** indicates significance at 10, 5 or 1 percent respectively, standard deviation in brackets

Table 5: Regression Results (2)

Dependent Variable Capital Structure (CS) Total Debt/Total Capital				
Quantile Regression				
	Regression 3 Pre	Regression 3 Post	Regression 3 Pre Int	Regression 3 Post Int
Constant	0.62*** (0.004)	0.63*** (0.005)	0.63*** (0.004)	0.63*** (0.005)
ROA	-0.32*** (0.010)	-0.33*** (0.010)	-0.28*** (0.015)	-0.29*** (0.016)
GROW	0.02*** (0.003)	0.002*** (0.004)	0.01*** (0.002)	0.002*** (0.0003)
AS	0.04*** (0.008)	0.01* (0.008)	-0.04*** (0.01)	-0.05** (0.012)
IRD	2.16*** (0.07)	1.84*** (0.07)	1.22*** (0.010)	0.97*** (0.010)
SME	-0.06*** (0.004)	-0.07 (0.004)	-0.08*** 0.005	-0.09*** (0.005)
SMExROA			0.02 (0.02)	0.03* (0.02)
SMExAS			0.09*** (0.01)	0.07*** (0.013)
SMExIRD			-0.2* (0.11)	0.034 (0.12)
No. Obs	34 640	34 640	34 640	34 640
No. Firms	17 320	17 320	17 320	17 320
Pseudo R2	0.06	0.06	0.05	0.06

*, ** and *** indicates significance at 10, 5 or 1 percent respectively, standard deviation in brackets

8.3.1 Hypothesis 1

H1: Basel III have reduced the level of debt and alternative financing channels such as accounts payables and issuing of corporate bonds have become determinants of capital structure

As the regressions above show, ROA is negatively correlated with CS and it has not changed after the implementation started. GROW is positively correlated, but has decreased in the second period. The comparison of the confidence intervals show that this change is statistically different. This could indicate that, since Basel III was implemented, GROW is less positively correlated with CS. Put differently, this could suggest that firms that grow use debt to a reduced extent since 2014, which is when the implementation began in Sweden. The coefficients obtained for AS has also decreased by half, in the second period but continues to be positively correlated with CS. With regards to the confidence intervals these suggest statistically differentiated coefficients between the time periods. This implies that fixed assets over total assets continues to be a determinant of CS, but appears to play a less important role post 2014.

Regarding the variable AccP, it is not significant. The same applies for the amount retrieved from issuing a Corporate Bond (CorpB). This makes us unable to draw any conclusions about its connection to CS. This is not in line with the findings by Jaffee and Walden (2010) as they imply a correlation of alternative financing and debt post the implementation of Basel III. With regards to potential indications of the situation obtained from the descriptive statistics, CS appears to decrease slightly in the period defined as the post implementation one. Moreover, the mean of the alternative financing channels suggest that these measures increase

post the implementation. However, the changes are modest and the statistical certainty of descriptive statistics is limited.

The general findings from these regressions are partly in line with the study by Jaffee and Walden (2010) and the M&M theorem. Jaffee and Walden claim that the impact of Basel III on CS on the banks' customers is limited. The examination of the data shows a decrease, although slight, in CS, which indicates an effect where debt could be used to a more reduced extent after the implementation of Basel III. Besides that, the M&M theorem implies that changes in CS at banks will not be affected by Basel III. Thus not affecting the customers of the banks. Many previous studies, such as the one by Rhenberg and Wikström (2014), have had difficulties with proving any effects of Basel III, which often have led to the conclusion that the M&M theorem holds. In this thesis, we can see a slight decreasing effect in CS, which could indicate results contrary to several other findings and thus the M&M theorem. However, the decrease identified can be denoted as limited.

8.3.1.1 Conclusions from Hypothesis 1

Consequently, the descriptive statistics indicate that debt appears to have been slightly reduced since Basel III was implemented. To comment on this with statistical certainty however is not possible due to only slight changes. Moreover, we cannot comment on the usage of alternative financing sources as there are no statistically verified relationships.

8.3.2 Hypothesis 2

H2: Basel III have increased the importance of equity as a determinant of capital structure

Overall, we have significant p-values and a rather high r-square of about 0.8. The latter is expected, as EquityR mirrors CS with regards to the definitions and thus results in a high degree of explanatory power. As the Robustness tests show how much the other variables are affected by the inclusion of EquityR, we will make no thorough comments with regards to the other variables in this regression.

When studying EquityR one can identify a negative coefficient, becoming less negative post implementation of Basel III. When taking into account the confidence intervals, the results are statistically verified to differ between the two periods. This change for the coefficients indicate that as CS decreases, EquityR increases and vice versa. Conclusively, when debt is used to a more reduced extent the use of equity appears to increase.

The findings in this hypothesis could be in line with the Pecking Order Hypothesis. This predicts that when the ability to acquire debt is inhibited, companies will turn to finance its operations with equity. This is shown by obtaining negative coefficients. On the other hand, the coefficients show a slight decrease in this negative relationship post the starting point of the implementation of Basel III. This implies that this negative relationship grows weaker post 2014. Indeed, as Basel III is thought to disrupt the Pecking Order Hypothesis and force banks to issue more equity, the costs of the banks are thought to increase. In due course, this could be compensated for by passing these costs onto their customers or reducing the amount available for acquiring debt. Thus forcing corporate customers of the banks to issue more equity. The results from this regression could however indicate the opposite. Important to emphasize once again is that the changes to the coefficients, although statistically verified to

be different between the time periods, are minor. Thus limiting the strength of the potential conclusions drawn.

8.3.2.1 Conclusions from Hypothesis 2

Consequently, we find no statistically significant indication of Basel III resulting in increases in equity as a determinant of debt. This is also suggested by the Descriptive Statistics tables, where a slightly decreasing median in the post implementation period is shown.

8.3.3 Hypothesis 3

H3: Basel III have resulted in interest rates becoming an increasingly important determinant of debt and caused an asymmetry with regards to SMEs

This section will be divided into two parts as we have run the regression with and without interaction variables separately due to indications from the Robustness test as previously discussed.

8.3.3.1 Part 1

Regarding the first regression, without the interaction variables, one can see that ROA continues to be negatively correlated with CS and it is not statistically different between the two time periods. The estimated coefficients of GROW decreases. When observing the confidence intervals one can conclude that this decrease is statistically different between the time periods. Thus suggesting that Basel III potentially have contributed to the result that companies that grow appear to use debt less as a source of financing (this is also shown in Hypothesis 1). The coefficients of AS follow the patterns as earlier described. However, the coefficient obtained post the implementation is not significant at a 1% significance level.

The SME coefficient is increasingly negative in the second period. This indicates that companies denoted as SMEs have an even less portion of debt in relation to total capital after the year 2014. With regards to the standard deviation, one can statistically separate the two periods and claim an increasingly negative relationship with CS. However, this increase is limited. As several other studies have predicted, SMEs are anticipated to be worse off after the implementation of Basel III. These include Angelkort and Stuwe (2011) as well as Eklund and Braunerhjelm (2013) which share the fear that the bank's ability to lend money to these companies could be impeded by Basel III. Indeed, this is worrisome for society and could potentially be a factor contributing to the macroeconomic impacts on GDP growth, as described by Slovik and Cournéde (2011). This because SMEs are known to be important engines of growth in society as they are innovative as well as hiring people in earlier stages of their careers.

The results regarding IRD show a positive coefficient which decreases in the post implementation period. This suggest a decreasing importance of interests as a determinant of debt. Thus not in line with the hypothesis. When taking into account the standard deviations it can also be statistically differentiated between the two periods. This could indicate results that differ from the findings by Wikström and Rhenberg (2014) as the authors came to the conclusion that there is no correlation between changes in capital ratios under Basel III and interest rates. Studies by, for example, Härle et al (2011) predict increases in interest

margins as a bank's way of passing on the cost of the implementation to its customers. This reasoning can be connected to the findings in Hypothesis 2, since an increase in EquityR could suggest increases in funding costs. As the negative coefficients decrease, this does not indicate increases in funding costs. Consequently, we have no evidence of increases in interest margins in this thesis. However, one could imagine that banks would be able to account for potential cost increases through other methods than increases in the specific interest margins. For example, through charging more for other types of services. This could be one reason why these cost increases do not show.

8.3.3.2 Part 2

With regards to the second regression testing Hypothesis 3, the effect of being an SME and how this affects the relationship with CS is further examined. The estimated coefficients for ROA is increasingly negative in the period defined as the post implementation period. However, the standard deviations makes us unable to statistically differentiate between the two periods. This is also shown in Hypothesis 1 and the first version of Hypothesis 3. The coefficients obtained for GROW follows the pattern as earlier described, and thus show a decreasing positive coefficient statistically different between the time periods.

Interestingly, the estimated coefficients for AS are, in contrast to previous findings, negative. Thus implying that as CS decreases, AS increases and vice versa. Although, the difference between the two periods cannot be entirely statistically verified as the confidence intervals overlap. This is not in line with the Trade-off Theory, which predicts that capital intensive companies, as the ones examined in this thesis, have higher levels of debt. The studies by Chen (2010) and Song (2005) however, have also obtained some negative values for AS when only short-term debt is considered.

The results obtained regarding IRD in this regression is similar to the previous findings - a positive relationship becoming less positive in the post implementation period. With regards to the confidence intervals one can draw the conclusion that these estimated coefficients are statistically different. Moreover, the coefficient of SMEs has become increasingly negative post the implementation. Although, not statistically verified to differ between the two periods.

8.3.3.3 Discussing the Interaction Variables

The interaction variables show that SMExROA have a slight positive correlation with CS, although some issues with statistical significance exist. The estimated coefficients for the interaction variable SMExAS are in line with previous findings, showing a positive relationship growing weaker post the implementation of Basel III. Once again suggesting a decreasing importance of fixed assets when acquiring debt. This is statistically different between the two periods, thus verifying this decrease. If the coefficients are compared with the coefficients for AS in the first version of Hypothesis 3, these are greater. Possibly suggesting that it is increasingly important for SMEs to have fixed assets when acquiring debt. Regarding the estimated coefficients for the interaction variable for SMExIRD, there are issues with statistical certainty not making it possible to draw any conclusions.

8.3.3.4 Conclusions from Hypothesis 3

Consequently, the estimated coefficients of IRD suggest it becoming a less important determinant of CS, as Basel III was implemented. Thus not in line with the hypothesis that

potential cost increases ought to result in interests becoming an increasingly important determinant of debt. This is possibly implying that the financial market has been affected by the implementation of Basel III. There are also indications of the negative impacts of being an SME in this scenario, suggesting implications of an asymmetry in the effects of the implementation of Basel III. Although, this is not entirely statistically verified over the two versions of Hypothesis 3. In contrast, the descriptive statistics show no or slight changes to the SME and IRD variables post the implementation.

8.4 Discussing the Core Determinants of Capital Structure

8.4.1 ROA

In almost all regressions ROA is negatively correlated with CS. However, the value of the coefficients differ somewhat between the regressions. This negative relationship is in line with the Pecking Order Hypothesis, which states that more profitable firms will use retained earnings as a source of financing. It is also in line with the findings by Chen (2010), Song (2005) and Naidu (2011) to mention a few. The coefficients received from the regressions differs somewhat from the ones previously stated as they show less negative estimated coefficients. Consequently, this study shows coefficients even more in line with the Pecking Order Hypothesis.

8.4.2 GROW

GROW is positively correlated with CS, as suggested by Chen (2010), Song (2005) and Naidu (2011). Although the findings of this thesis implies a weaker, positive relationship in contrast to previous studies. The positive correlation can be regarded as logical since firms that grow have an increasing need of external financing. This can also be related to the Pecking Order Hypothesis. Furthermore, this contradicts the findings by Andersson (2016) as this thesis clearly shows the effects of GROW on capital structure for firms in the Industrial Goods sector.

8.4.3 AS

AS is mostly positively correlated with CS. This finding is in accordance with both the Pecking Order Hypothesis and the Trade-off Theory. Firstly, this relationship is predicted by the Pecking Order Hypothesis, as a substantial level of fixed assets reduces the level of Asymmetric Information when acquiring debt. Thus making it less risky and less expensive. Moreover, the Trade-off Theory predict this positive relationship as fixed assets, due to its substantial liquidation value, is traditionally regarded as satisfactory collateral by the banks. Besides that, the security in the assets will affect the optimal level of debt for a company, as more secure assets reduces risks and thus the cost of debt.

As this thesis has a shorter time horizon, the Pecking Order Hypothesis might, in accordance with Hovakimian, Opler & Titman (2001) best explain the results. In other words, that corporate customers of the banks in the short-run will base its capital structure decisions on the Pecking Order Hypothesis. This would then predict a positive relationship. Perhaps not a very strong relationship, since firms in the short-run will choose retained earnings instead of acquiring debt as a source of financing. Consequently, reducing the importance of fixed assets. There are implications in this thesis of a rather weak positive relationship growing

weaker post implementation of Basel III. Thus implying that the importance of having fixed assets when acquiring debt is reduced as Basel III is implemented. This suggest that AS as a determinant of CS decreases, thus indicating that other factors will be of importance when acquiring debt. Conclusively, this is known to be a traditional determinant of debt and since this becomes less important one can, yet again, contemplate on if Basel III is disrupting the financial market's "rules of the game".

8.5 General Thoughts

Overall, we see a slight change in CS after the implementation of Basel III started. Many previous studies discussed in this thesis show that it has been difficult to prove any effects of Basel III. Consequently, often resulting in the conclusion that the M&M theorem holds. To be more precise, banks are believed to be able to swap equity for debt in their own capital structure without it affecting the costs at the banks. Thus not affecting neither interest margins nor corporate customers. Furthermore, we can see that some of the determinants of CS differ between the two periods. This is claimed with regards to some statistically verified differences to the estimated coefficients obtained. The changes to these could possibly indicate an effect of Basel III on CS. The effects are most evident when studying GROW, AS and IRD.

With regards to the descriptive statistics, these show limited changes to the determinants of capital structure. Thus only indicating slight changes since the implementation of Basel III started in Sweden. However, the extent to which conclusions can be drawn from descriptive statics in general is limited in itself. It is however important to highlight that the changes to the coefficients are believed to have been caused by the implementation of Basel III. This is assumed with the basis of previous studies, such as the one by Slovik and Cournéde (2011), which highlights the potentially extensive macroeconomic impacts with regards to the implementation of Basel III. However, it is impossible to be precise about this and it is therefore necessary to emphasize this assumption.

Other macroeconomic aspects that potentially could have played a part in causing these changes to the estimated coefficients is the negative repo rate policy currently applied in Sweden. According to a report by Riksbanken (2016b) the negative interest rates in combination with the financial climate in Sweden could have resulted in higher lending rates and reduced profitability of banks. Consequently, also potentially contributing to the changes to the estimated coefficients obtained in this study. Thus, likely, also playing a small part in the effects on capital structure. The same report however, reaches the conclusion that the negative interest rates have been shown to have limited effects in causing changes to acquiring debt.

8.6 Table of Actual Relationships

After conducting the multiple regressions, it is time to revisit the table of predicted relationships and include the actual relationships. As shown below, many of the predictions with regards to the nature of the relationships are confirmed by the regressions.

Table 5: Actual Relationships

Variable	Variable Name	Definition	Predicted Relationship	Actual Relationship
Profitability	ROA	Return on Assets, Adj. operating profit/loss /total assets	-	-
Growth	GROW	Percentage Change of Net Sales	+	+
Asset Structure	AS	Fixed Assets/Total Assets	+	+
Accounts Payables	AccP	Amount under Accounts Payables	-	?
Corporate Bond	CorpB	Amount from issuing of Corporate Bond	-	?
Interest Rate on Debt	IRD	(Financial Costs/ Adj. Total Liabilities)	-	+
Equity Ratio	EquityR	Equity/Total Assets	-	-
SME	SME	Dummy Variable, less than 10 employees	-	-

9. Conclusion

The concluding chapter will reconnect with the research question and present the conclusions that can be drawn from this thesis. This chapter finishes off by discussing the limitations and suggestions for future research.

9.1 Concluding Discussion

To conclude this thesis, it is time to revisit the research question:

Does Basel III affect capital structure?

The empirical findings in this thesis suggest that Basel III could have an effect on capital structure. This because, capital structure decreases slightly post the implementation of Basel III in Sweden, as shown in the descriptive statistics. However, the potential effect of Basel III is perhaps more evident when the estimated coefficients of the determinants are studied. Indeed, the estimated coefficients for both interest rates and fixed assets (measured as IRD and AS respectively), known as traditional determinants of debt, appears to decrease as Basel III has been implemented. GROW also decreases post the implementation. This further suggests that the rules of the financial market could have been impacted by Basel III, as traditional determinants of debt decrease in their importance. However, this is not supported by our descriptive statistics showing no or slight changes to these variables.

On the other hand, there appears to be no indications of Basel III resulting in increases in equity as a determinant. Nor in the relationship between capital structure and alternative financing channels. This was hypothesised with the basis of previous studies as well as the Pecking Order Hypothesis. This could suggest the limitations in the effects that Basel III has on capital structure in Sweden. The conclusion from this thesis is therefore somewhat contradictory.

The results in this thesis also indicate the negative impacts of being an SME. Although, this is not entirely statistically verified due to the coefficients relationship when being interpreted in relation to the standard deviations over the regressions. A negative effect of Basel III on SMEs are anticipated by, for example, Braunerhjelm and Eklund (2013). Moreover, what consequences this can result in for the society if these companies are impeded when acquiring debt.

To summarize, we can see that some of the estimated coefficients of the determinants of capital structure differ between the two periods, thus indicating an effect of Basel III on capital structure. It is important to emphasize that the changes to the estimated coefficients are hypothesized to have been affected by the implementation of Basel III. This is assumed, with the basis of previous studies, such as the one by Slovik and Cournéde (2011), which suggest the potentially extensive macroeconomic impacts with regards to the implementation of Basel III. In other words, the changes occurred after the implementation is probably not only the cause of Basel III, even though we have reason to believe that Basel III contributes to these changes. It is likely that these changes are also caused by the negative interest rates in Sweden. Thus making it difficult to draw specific conclusions with regards to Basel III as the implementation interacts with these negative interest rates. However, as Riksbanken (2016b)

estimate negative interest rates to play a limited role in this scenario, it is still plausible to assume the impact of Basel III in this scenario.

9.2 Limitations

Since the results from previous empirical studies are to some extent contradictory it is difficult to say what actually is correct. Results might be ambiguous due to different samples. Since this study is limited by only using Swedish data and not taking other countries or cultural effect into account, this could partly explain this. Thus, it is difficult to say if the results are applicable to other countries. However, it is reasonable to believe that these results could be applied to other countries like Sweden in terms of business climate and culture. The latter thus suggesting an explanation for other Nordic countries. This argument is supported by the fact that financing decisions to some extent are based upon international standards. The study is limited to the investigation of the Industrial Goods sector and consequently, more industries could have been studied in order to be able to draw more general conclusions. However, as previous studies show, that to prove more macroeconomic impacts of Basel III have been difficult. This is the reason why a specific sector was chosen for this particular study. As Basel III is, in some areas, still in an on-going implementation, this could be a reason why it is challenging to prove consistent effects of it.

9.3 Future Research

Since capital structure affects all kinds of firms, the topic will be of interest to discuss and investigate for future research. A diverse way to approach the subject is to do similar regressions, but with different explanatory variables. As there is a great amount of previous studies on the subject, there is also a large amount of control variables which could be tested again on other data sets or in other combinations to perhaps identify different results.

As mentioned, this thesis it is limited to investigating the Industrial Goods sector. To better draw more diverse conclusions between Basel III and capital structure more industries could be included in future investigations, perhaps on more industries or other parts of the world with more available data. One example of this could be to make a similar investigation on technologically intensive companies.

As we in this thesis focus on companies which generally have debt, it would thus be interesting to study if Basel III could affect companies trying to acquire debt for the first time. Consequently linking Basel III more to entrepreneurship and further develop the SME investigation and its potential asymmetry.

10. References

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Appendix A

In this section frequently used terms in the thesis are objectively defined and presented.

Basel III = A framework issued by the Basel Committee, the European Union's highest court for supervision of the banking sector. Includes both regulatory capital requirements and liquidity ratios. The implementation started in Sweden in 2013 according to Riksbanken and the aim is to enhance the banks' ability to absorb financial distress.

Capital Requirements = The portion of capital banks must hold as collateral for their risk-weighted assets. In Sweden, Finansinspektionen (the Financial Supervisory Authority) (FI, 2014, PM Capital) decided to raise the additional requirement of at least 16.5 per cent of risk-weighted assets for banks. Basel III states a total capital requirement of eight percent of risk weighted assets.

Capital Structure = States how a company finance itself by using various sources.

CET1 = Core Tier Capital, if a bank is not profitable it is from this type of capital losses will be deducted from.

Liquidity Coverage Ratio (LCR) = One of the two, new liquidity regulations in Basel III. LCR is incorporated in order to promote the short-term resilience of the liquidity risks for banks. To be more precise, it ensures that banks have an adequate stock of high-quality liquid assets that can easily be converted into cash to ensure that the liquidity need for a 30 calendar day liquidity stress scenario is met. LCR can be constituted by government bonds and to a 40 % maximum of mortgage bonds.

Net Stable Funding Ratio (NSFR) = Will require banks to maintain a stable funding in relation to the composition of assets and off-balance sheet activities. This is incorporated in order to minimize the effects of a potential disruption in the bank's regular sources of funding and that this will affect its liquidity and thus the risk of failure.

Small- and Medium Sized Entities (SME) = According to Basel II and III, banks are permitted to separate distinguish exposures to SME borrowers. They are defined as a staff count of maximum 250 and either a turnover of less than EUR 50 Million or Balance Sheet total of EUR 43 Million or less.

Risk Weighted Assets (RWA) = Can be explained as assets involved in the categorizing of a bank's assets according to credit risk and then weighting these categories consequently. Risk-weighted assets are a bank's assets, including off-balance sheet exposures, which have been weighted for risk.

Tier 1-Capital = Includes CET1 and general Tier Capital such as share capital, retained earnings and the yearly result and should, according to Basel III, be at least six percent.

Tier 2-Capital = includes supplementary capital such as capital instruments, subordinated loans and premium accounts related to the instruments.

Appendix B

In this appendix, the results from all the regressions are posted. Moreover, the VIF-test are included. In order for the reader to compare, we have chosen to include both the results from the Median and OLS regressions. These are divided per hypothesis and per time period. In the text, only the Median regressions are presented as well as showing rounded figures, in Appendix B however, the results as they were retrieved from STATA are presented. A test regression including all variables (with the exclusion of SME-interaction variables) is included to show the effect EquityR has on the other independent variables.

Hypothesis 1

H1: Basel III have reduced the level of debt and increased the usage of alternative financing sources such as accounts payables and issuing of corporate bonds since the implementation started

Median regression

2012-2013

	Coefficient	Standard Deviation	P>t
ROA	-.3611749	.0103167	0.000
GROW	.0241307	.0028541	0.000
AS	.1181464	.0076515	0.000
AccP	4.59e-08	1.89e-08	0.015
CorpB	-8.23e-08	1.44e-07	0.568
_cons	.6100522	.0028134	0.000

2014-2015

	Coefficient	Standard Deviation	P>t
ROA	-.3598417	.0102557	0.000
GROW	.0036921	.0004144	0.000
AS	.0564898	.0079443	0.000
AccP	4.66e-08	1.61e-08	0.004
CorpB	8.19e-10	2.44e-08	0.973
_cons	.6030673	.0030634	0.000

OLS regression

2012-2013

	Coefficient	Standard Deviation	P>t
ROA	-.2677194	.0071564	0.000
GROW	.018893	.0019798	0.000
AS	.0671458	.0053076	0.000
AccP	6.52e-08	1.31e-08	0.000
CorpB	-2.19e-08	9.99e-08	0.826
_cons	.5835704	.0019516	0.000

2014-2015

	Coefficient	Standard Deviation	P>t
ROA	-.2663688	.0069214	0.000
GROW	.0036291	.0002797	0.000
AS	.0287719	.0053615	0.000
AccP	5.14e-08	1.09e-08	0.000
CorpB	2.01e-08	1.65e-08	0.223
_cons	.5737652	.0020674	0.000

Hypothesis 2

H2: Basel III have increased the amount from issuing of Corporate Bonds

Median Regression

2012-2013

	Coefficient	Standard Deviation	P>t
ROA	-.0672731	.0019004	0.000
GROW	-.002679	.0005215	0.000
AS	-.0077085	.0014002	0.000
EquityR	-1.062309	.0015595	0.000
_cons	1.002848	.0007848	0.000

2014-2015

	Coefficient	Standard Deviation	P>t
ROA	-.0544485	.0020036	0.000
GROW	-.0006872	.0000803	0.000
AS	-.0107838	.0015353	0.000
EquityR	-1.049235	.0016974	0.000
_cons	1.00347	.000892	0.000

OLS-regression

2012-2013

	Coefficient	Standard Deviation	P>t
ROA	-.0873819	.0018121	0.000
GROW	-.0026124	.0004972	0.000
AS	-.0159394	.0013351	0.000
EquityR	-1.068681	.0014871	0.000
_cons	.9907166	.0007484	0.000

2014-2015

	Coefficient	Standard Deviation	P>t
ROA	-.0715341	.001802	0.000
GROW	-.0006403	.0000722	0.000
AS	-.0183221	.0013808	0.000
EquityR	-1.059245	.0015266	0.000
_cons	.9903777	.0008022	0.000

Hypothesis 3

H3: Basel III have resulted in costlier debt and made it less available, especially for SME companies

Median regression

2012-2013

	Coefficient	Standard Deviation	P>t
ROA	-.3219107	.0102729	0.000
GROW	.0151752	.0028868	0.000
AS	.0403439	.0077822	0.000
IRD	2.159283	.0657445	0.000
SME	-.0624386	.0041685	0.000
_cons	.623	.0042961	0.000

2014-2015

	Coefficient	Standard Deviation	P>t
ROA	-.3315821	.0096777	0.000
GROW	.0015117	.0004176	0.000
AS	.0129711	.007621	0.089
IRD	1.842095	.0688412	0.000
SME	-.0731331	.004294	0.000
_cons	.632469	.0046266	0.000

OLS regression

2012-2013

	Coefficient	Standard Deviation	P>t
ROA	-.2579774	.007074	0.000
GROW	.0112196	.0019878	0.000
AS	.0352211	.0053589	0.000
IRD	1.04405	.0452723	0.000
SME	-.0601411	.0028705	0.000
_cons	.6110639	.0029583	0.000

2014-2015

	Coefficient	Standard Deviation	P>t
ROA	-.2602016	.0068354	0.000
GROW	.0014728	.0002949	0.000
AS	.0035195	.0053827	0.513
IRD	.9706405	.0486227	0.000
SME	-.0667997	.0030329	0.000
_cons	.6144404	.0032678	0.000

Median regression with interaction variables (no OLS made for comparison)

2012-2013

	Coefficient	Standard Deviation	P>t
ROA	-.3482923	.0224649	0.000
GROW	.0157264	.0028944	0.000
AS	-.0326863	.016731	0.051
IRD	2.423873	.1437078	0.000
SME	-.0852297	.007345	0.000
SMExROA	.0360149	.0252747	0.154
SMExAS	.1023667	.0189139	0.000
SMExIRD	-.3178076	.1617177	0.049
_cons	.6396432	.0064735	0.000

2014-2015

	Coefficient	Standard Deviation	P>t
ROA	-.3919198	.0225913	0.000
GROW	.0015779	.0004196	0.000
AS	-.0513088	.0166213	0.002
IRD	1.673706	.1478708	0.000
SME	-.1057616	.0074337	0.000
SMExROA	.0762701	.0250301	0.002
SMExAS	.0814372	.0187273	0.000
SMExIRD	.2043523	.1673337	0.222
_cons	.658651	.0067449	0.000

All variables in a Median Regression 2012-2013 (To show the effect of EquityR on the other independent variables)

	Coefficient	Standard Deviation	P>t
ROA	-.0678164	.0018836	0.000
GROW	-.0019156	.0005249	0.000
AS	-.0115645	.0014173	0.000
AccP	3.52e-10	3.42e-09	0.918
CorpB	1.76e-08	2.60e-08	0.498
EquityR	-1.059161	.0015627	0.000
IRD	.2183711	.0119918	0.000
SME	.008705	.0007657	0.000
_cons	.9910659	.0009517	0.000

All variables in a Median Regression 2012-2013 except EquityR (To show the effect of EquityR on the other independent variables)

	Coefficient	Standard Deviation	P>t
ROA	-.3218558	.010319	0.000
GROW	.0147939	.0029	0.000
AS	.0395182	.007822	0.000
AccP	2.31e-08	1.89e-08	0.221
CorpB	-8.21e-08	1.44e-07	0.568
IRD	2.175907	.0660416	0.000
SME	-.0618958	.0041997	0.000
_cons	.6221561	.0043263	0.000

VIF-test

Variable	VIF
EquityR	1,05
ROA	1,04
SME	1,04
AS	1,02
GROW	1,01
AccP	1,01
CorpB	1
IRD	1
SMExIRD	5,52
SMExROA	5,46
SMExAS	6
SMExGROW	1041,27