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Credit Supply and SME Corporate Capital Structure in Finland: Evidence from the Financial Crisis

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Abstract of master's thesis

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This paper tests how firm characteristics and credit supply fluctuations affect Small and Medium Enterprises (SME)'s external funding. This is done by doing empirical research on panel data consisting of 4990 Finnish SME during a time-period of 2002-2012, gathered from Voitto+ database. Analysis is done by researching the leverage ratio as a function of firm specific attributes, which are hypothesized by capital structure theories, and using them as controlling variables in order to find exogenous factors effect on yearly development of Finnish SMEs' capital structure.

Empirical part of the study utilizes fixed effect and logit regression models on panel data to test the hypotheses. Regression models include level model, where the explanatory variables are ratios of related to total assets of the firms. Second model used is difference model, where ratios of variables related to total assets are calculated as yearly differences between these ratios. Last model used is the logit model for funding decisions, where issuance of external capital is defined as overall change in capital between years being higher than threshold value of 1% of total assets in the previous year.

The results suggest a significant reduction of external debt during the years of financial crisis. Exogenous factors account for -1,05 percentage point reduction in the level of total debt to assets during the period of 2009-2012. Difference model shows a significant reduction during the years 2008-2009 for the amount of -1,3 percentage point of total leverage scaled by total assets. Latter is also supported by the logit model for capital issuances, which shows a -1,56% decrease in the probability of external debt issuance during the years 2008-2012 compared to the earlier years 2002-2007. Most of the determinants of the capital structure presented by capital structure theories appear to be relevant for the Finnish SMEs. Size, fixed tangible assets, growth opportunities and inventory seems to have positive relationship with leverage. Age, profitability, non-debt tax shields, effective tax rate and accounts payable have a negative relationship with debt. Profitability plays an important role in defining the amount of internal funds the company has available and it has a significant effect on capital issuance decisions by reducing the probability of external debt issuance for 13,6 percentage points of the total assets scaled profitability. Therefore, the results suggest that Finnish SMEs favor internally generated funds over external funds, which only strengthens if companies become more profitable. This applies for both, debt issuances and equity issuances. From the results for capital structure determinants and funding choices, Finnish SMEs seem to follow pecking order theory in their funding decisions.

Keywords Capital Structure, Small to Midsized Enterprises (SMEs), Financial Crisis

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Tutkimukseni käsittelee miten yrityskohtaiset pääomarakennetekijät ja velkatarjonnan vaihtelut vaikuttavat Suomalaisten PK-yritysten ulkoiseen rahoitukseen. Tutkimuksessa tarkastellaan empiirisin menetelmin Voitto+-tietokannasta kerättyä paneelidataa, joka koostuu 4990 Suomalaisesta PK-yrityksestä vuosien 2002–2012 välillä, käyttäen. Velkaa suhteessa tasearvoon käsitellään funktiona hypoteesin mukaisista pääomarakennetekijöistä, jotka toimivat yrityskohtaisien tekijöiden kontrollimuuttujina, jotta menetelmien myötä voitaisiin havaita eksogeenisten tekijöiden vaikutus Suomalaisten PK-yritysten pääomarakenteeseen.

Empiirinen tutkimus tehdään käyttämällä kahta eri kiinteiden vaikutusten mallia, jotka tutkivat tasearvolla skaalattujen yrityskohtaisten tekijöiden ja eksogeenisten tekijöiden vaikutusta Suomalaisten PK-yritysten tasearvolla skaalattuun velkaan. Ensimmäinen kiinteiden vaikutusten malleista tutkii vuosittaisesti tasearvolla skaalattuja arvoja ja toinen vuosittaisia muutoksia tasearvolla skaalatuista arvoista. Tutkimuksessa käytetään myös logit-mallia selvittämään edellä mainittujen tekijöiden vaikutuksen suomalaisten PK-yritysten yritysrahoituspäätöksien todennäköisyyksiin. Rahoituspäätös on luokiteltu kyseisen pääoman tasearvon muutoksen suuruudesta suhteessa kokonaiseen tasearvoon. Jos tämän pääoman osalta on tapahtunut yli 1% muutos verrattuna kokonaistasearvoon, käsitellään sitä vuotta rahoituspäätöksenä kyseisen pääoman kasvattamisen suhteen.

Tuloksien mukaan finanssikriisin aikaan on tapahtunut merkittävä ulkoisen velkapääoman vähennys. Eksogeenisen tekijöiden vaikutus kattaa -1,05 prosenttiyksikön vähennyksen kokonaistasearvolla skaalatussa velkamäärässä vuosien 2009-2012 aikana vuosittaisissa tasearvoissa verrattuna muihin käsiteltyihin vuosiin. Myös vuosittaisten muutosten malli havaitsee -1,3 prosenttiyksikön vähennyksen vuosien 2008-2009 aikana Suomalaisten PK-yritysten ulkoisen velan määrässä. Myös rahoituspäätöksiä tutkiva logit-malli havaitsee eksogeenisen vaikuttajan negatiivisen vaikutuksen todennäköisyyteen ulkoisen velan lisäämiseen 1,56 prosentilla. Suurin osa teorioiden mukaisten pääomarakennehypoteesien indikoimista suhteista pääomarakennetekijän ja velkarakenteen suhteista pitävät paikkansa. Koko, pysyvät kiinteät vastaavat, kasvumahdollisuudet ja varaston määrä näyttävät omaavan merkittävän positiivisen suhteen velkarakenteen kanssa. Ikä, tuottavuus, ei-velkamääräiset verosuojat, efektiivinen veroaste ja ostovelat ovat merkittävässä negatiivisessa suhteessa yrityksen velkarakenteeseen. Lisäksi tutkimus osoittaa, että Suomalaiset PK-yritykset käyttävät mieluiten omaa vapaata pääomaa toimintansa rahoittamiseen. Tämä näkyy 13,6 prosenttiyksikön vähenemisenä ulkoisen velan lisäämisen todennäköisyydessä suhteessa yrityksen kokonaistasearvolla skaalattuun tuottoon. Kyseinen vaikutus näkyy myös oman pääoman lisäämisessä, ja tuoton muuttuminen vahvempaan suuntaan näyttää vahvistavan kyseistä vaikutusta. Tulokset tukevat pecking order-teoriaa Suomalaisten PK-yrityksien rahoituspäätöksien teossa.

Keywords Pääomarakenne, PK-yritykset, Finanssikriisi

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1. Introduction

1.1 Background

The end of last decade marked the time for one of the worst financial crisis there has ever been in the modern economy. Its effect was felt all over the world and it posed to have large adverse effects to not only the financial business sector but also spilling out to the real economy. A massive amount of financial derivatives was created from a pool of different assets and these derivatives were assumed to be safe and lucrative investments in the markets. However, these investments proved to be a lot more risky than perceived by the markets. Bursting of the bubble in American housing markets spilled out worldwide due to these financial derivatives. According to Brunnermeier (2008), the losses from the mortgage-backed securities were modest compared to the $8 trillion of U.S. stock market wealth lost between October 2007 and October 2008. The financial crisis led to a few repercussions like market declines all over the world, liquidity dry-ups, defaults and bailouts all of which had an effect that spilled from the financial world into the real economy. For example, national GDP of Finland fell for almost 10%, compared to previous year's figures, in some quarters during the year 2009.

There has been discussion that the slow recovery, and the reason for the whole recession is partially due the result of banks poor performance to transfer the expansive monetary policy of governments and central banks through interest rates to create more liquidity (J. Boyd, S. Kwak, B. Smith 2005). This could be because of banks reduced willingness to lend money to the public, regardless of underlying interest rates, due to increased uncertainty in the financial markets. The phenomena of reduction of bank borrowing during financially troubled times has been defined as "Credit Crunch" by Bernanke, Lown and Friedman (1991).

The effects of the credit crunch has been the source of discussion widely and it has been argued whether or not the slowdown in bank lending has had a significant macroeconomic effect during the recessions, by hindering the recovery of the economy from it (J. Boyd, S. Kwak, B. Smith 2005). In theory, significant reduction in credit has been defined by using the theory of supply and demand as a significant leftward shift in the supply curve for bank loans, holding constant both the safe real interest rate and the quality of potential borrowers (Bernanke, Lown and Friedman 1991). Bernanke, Lown and Friedman (1991) defined the previously mentioned phenomena as credit crunch. Definition of credit crunch includes

determination of current lending patterns differ from lending patterns at the same phase of previous business cycles in order to differentiate it from the natural tightening of credit (Syron 1991). Bernanke Lown and Friedman (1991) show that declining asset prices lead to the reduction in companies' balance sheets, which in turn leads to the revision of policies of banks in a way that one could see this as a lowering of the supply of money.

The businesses that are the most affected by this reduction are the ones that are most dependent on external funding, but which are excluded from financing when the market liquidity dries up. According to Holmström and Tirole (1997), small to midsized enterprises (SME[1]) would be most vulnerable to previously explained reduction or total lack of credit, since SMEs are usually dependent on bank financing. Because of their characteristics, it is unusual for a SME to acquire external funds. The reasons for the changes of credit conditions to SME ranges from business cycles, regulation changes to the future views of financial intermediaries (Ayyagari et al. 2007).

Since Modigliani and Miller (1958) introduced their seminal paper, which considered debt as irrelevant factor in businesses' capital structure decisions a large number of papers have, been researching the explanation between the different debt ratios across firms. Three main theories behind debt variation have risen above from the discussion: existence of taxes and bankruptcy costs (DeAngelo and Masulis 1980), information asymmetry between investors and business managers (Myers (1984)) and agency theory by Jensen and Meckling (1976).

The aim of this field of study has been to unveil whether firms favor different sources of funding over others (Pecking order theory (Myers 1984; Myers and Majluf 1984) or does the existence of interest rate tax shields make firms more profitable financing with debt instead of equity (DeAngelo and Masulis 1980). Earlier research on capital structure has shown that the mix of costs related to debt and tax advantages related to debt shows us that the optimal capital structure for companies is indeed under 100% debt financing. These studies have had emphasis on the firm characteristics, which are assumed to reflect the foretold costs and benefits, related to debt. Leading papers on capital structure determinants have identified firm factors such as firm size, profitability, growth rate, firm risk and industry characteristics as defining factors in determination of optimal capital structure (Titman and Wessels 1988;

[1] For the definition of SME I will use the standard created by European Comission: Under 250 employees, turnover is under 50€ mil. and size of the balance sheet is under 43€ mil.

Michaelas et Al. 1999; Sogorb-Mira 2005 amongst others). However, majority of these studies have concentrated on large firms and they have left small and growing firms, which usually are credit constrained because of their nature and riskiness.

''Empirically, the emphasis on large companies has led us to ignore (or study less than necessary) the rest of the universe: the young and small firms, who do not have access to public markets''. Zingales (2000)

Theory frameworks typically use empirical evidence from large firms as a base for evidence for the capital structure decisions. However, there are exceptions such as previously mentioned Michealas et Al. (1999), Sogorb-Mira (2005). SME differ from large publicly traded firms by shorter expected life, presence of different tax regulations and intergenerational transfer problems. Furthermore, there is a lack of information on how the capital structure decisions of SME are affected by a large exogenous shock such as financial crisis. I will try to find evidence from Finnish data to shed some light on financial crisis effects on Finnish SME capital structure decision making.

1.2 Objectives and Motivation for the Study

The purpose of this paper is to analyze the effects of adverse economic conditions on Finnish SMEs. There is some earlier paper's studying the capital structure determinants of Finnish SME but it does not take into account the exogenous factors (Vigren 2009). From the days of Modigliani and Miller (1958), capital structure theories have sought out for definitive answer for capital structure theories, therefore it is vague to assume that this paper would offer thorough answers considering the theory. In addition, capital structure theories offer a wide range of control variables for businesses capital structure, which can be used to capture firm specific effects on external financing.

Since SME employ most of the working population in the western economies, they are a very important part of creating wealth for an economy, thus researching the impact of financial crisis to SME funding is to be considered of importance (Ayyagari et Al. 2007). In Finland SMEs employed more than 64% of working population during 2011. As consequence, SMEs are an important factor for Finnish economy. Therefore, any information, which could offer better understanding of SME funding and capital structure in Finland, might pave the way for

better actions from legislators, lenders and SMEs themselves to ensure funding of these companies, even in adverse economic conditions.

There have already been studies that have analyzed the reduction of credit from financial institutions for companies during recessions caused by financial crises (see Michaelas et Al. 1999; Borenztein and Lee 2002; Kim et Al. 2002; Hancock and Wilcox 1998; Vousinas and Werner (2011) amongst others). The main goal of these studies is to find out the determinants for companies capital structures and the effect of exogenous shocks on the capital structure decisions of those companies. However, there are no earlier papers which study the effect of the latest financial crisis as exogenous shocks on the capital structure determinants and leverage of Finnish SME. Therefore, this study could yield interesting results because of the fact that SME are more dependent on debt financing and could face more problems due to reduction of credit than larger companies. In addition, this paper aims to unveil some facts behind the funding patterns of Finnish SMEs with methods obtained from Leary (2009) and Voutsinas and Werner (2011).

Main aim of this thesis is to find whether there has been a reduction in external debt for Finnish SMEs during the aftermath of financial crisis, which is not attributable to firm-specific factors. Secondary aim is to test the capital structure determinants of Finnish SMEs against earlier research and capital structure theories. Lastly, this paper will research the funding decisions of Finnish SMEs and aim at finding support for either trade-off theory or pecking order theory.

1.3 Main Findings

Recent financial crisis led to reduction of credit for Finnish SMEs. Statistics show a reduction of credit during the year 2009 and the same reduction is seen while controlling for the firm-specific factors via capital structure determinants. Reduction during the financial crisis period was during the years 2008 and 2009, on which the combined reduction during those years was approximately 1,3 percentage points of leverage ratio of the companies.

Capital structure determinants yielded close results to ealier research of the subject. Size and asset tangibility increases the leverage of the companies. Unexpectedly, effective tax rate shows a positive relationship with leverage which hurts the validity of trade-off theory as the basis of Finnish SME capital structure decisions. Age, profitability, non-debt tax shields and

business risk show a negative relation to debt as was expected by their respective capital structure theories. However, growth opportunities show a positive relationship between leverage which is against the underlying agency costs theory. The results indicate support for pecking order theory hypotheses, since none of related hypotheses were rejected. Two of the hypotheses considering trade-off theory were rejected. However, literature presents a lot of variability in the results of capital structure determinants thus these variables' main objective in the regressions is to act as a controlling variable in determining the demand for external leverage.

Finally, the funding decisions of Finnish SMEs seem to favor internal funding over other sources of finance. Debt issuances are favored compared to equity issuances and debt is considerably more frequent method of financing. These results show support for the hierarchical choices of usage between different internal and external funds, where internal funds are at the top of pecking order. Therefore, Finnish SMEs seem to apply pecking order theory in their funding decisions and together with the results from capital structure determinants tax-planning and bankruptcy costs seem to play a smaller role in financing decisions of Finnish SMEs.

1.4 Structure of the Study

First part of the study will go through the literature considering the theories affecting the capital structure decisions of companies and show results of earlier empirical researches on the subject. The most important subjects of this chapter are asymmetric costs (Leland and Pyle 1977; Ross 1977; Myers 1984), taxes and bankruptcy costs (DeAngelo and Masulis 1980) and agency costs (Jensen and Meckling 1976).

Second part of the literature review will review the literature considering the financial crisis, which namely started in 2007. The aim is to familiarize the reader on how the crisis might have affected financial intermediaries and their lending policies during adverse economic events. This will be explained by the theory behind financial intermediaries and loanable funds (Holmström and Tirole (1997)). This part will cover the matters on how the financial crisis that started on the other side of the world could have an effect on the small to midsized businesses in Finland. In order to understand the fragility of the banking system I will introduce key concepts, which are behind the problems that banks face when they make their

financing decisions. The key concepts are banks as a financial intermediary and the main issues they face in the event of a financial crisis and how they react on these events.

Last part of the literature review will concentrate on the SME side, where I will define key concepts for SME lending from the view of SMEs. This part is based on conceptual framework for SME financing by Berger and Udell (2006). I will also go through specific information about Finnish SME and peculiar aspects of Finnish SME access to credit by providing latest statistics from Finnish economy and going through relevant literature considering Finnish SMEs.

Second part of this thesis will be an empirical study on small to midsized firms in Finland and the second part aims to answer whether there has really been a credit crunch in the years of financial turmoil. First, I will define a set of hypotheses for the research and go through the methodology and data used to test them. For the empirical research I will adopt research methods from studies by Michaelas et Al (1999), Sogorb-Mira (2005), Leary (2009) and Voutsinas and Werner (2011) in which the financial obligations by companies are studied through capital structures during the financially unstable period and I will try to compare those results with period before the crisis. The analysis is made by doing a panel data study, which analyses the adverse effect of the financial crisis on bank lending to SME, along with factors, which could explain the reduction of credit due to the nature and state of those businesses and economic environment.

2. Literature Review

This section will cover the literature considering financial intermediation and a review of theories behind capital structure decisions, financial intermediation and SME financing. First, I will go through the most important theories considering capital structure decisions, which are closely related to the hypothesis later in the thesis. Next, I will cover the most important aspects of financial intermediaries. I will introduce a theoretical model for financial intermediation by Holmström and Tirole (1997). The model will cover the theory behind reduction of credit and the reasons behind the question why it affects more SMEs than larger companies. On the latter part of the study will concentrate on SME and go through recent literature considering SME borrowing such as relationship lending, transaction lending and

lending channels. I will do this in order to explain the importance of bank lending for SME as a source of access to funds compared to other possible financing substitutes.

2.1 Theories of Capital Structure

As explained in the introduction part the first study which started the research on capital structures was Modigliani and Miller's (1958) paper on capital-structure irrelevance. They hypothesized that when the markets are perfect, it does not matter what capital structure a company uses to finance its operations. From its early days, theory of capital structure has grown into three categories: tax-based theories, agency cost theories and asymmetric information and signaling theories. According to these theories, there are costs and benefits associated with financial contracting.

These theories do not make a distinction between large and small firms. As studies from Zingales (2000) and Ang (1991) argue, the theory of finance was not developed with the small business in mind. Consequently, I will go through the prevailing capital structure theories keeping the focus on SMEs. In addition, I will show a table of the empirical results of the most relevant papers considering capital structure. In addition, these theories are closely linked to the hypotheses of determinants of capital structure made in this study.

2.1.1 Taxes and bankruptcy costs

Tax based theories state that capital structure decisions are influenced by tax and bankruptcy considerations of the companies. DeAngelo and Masulis (1980) state that if debt interest shields income from taxation, i.e. interest payments on debt are deductible, profitable companies which have low amount of non-debt tax shields should use more debt. Following this theory firms should raise debt to the level where the risk of bankruptcy starts to be relevant.

"Where the expected marginal tax effect a just equals the expected marginal cost of leverage b, so that a* is always positive. If a*>b, a firm could increase its value by increasing its debt; and, if a*<b, its value could be increased by decreasing debt…"*

-DeAngelo and Masulis about the optimal debt level (1980)

Since smaller firms are expected to be less profitable and do not necessarily have need to for tax shields as much as larger firms have we should see a decreased amount of leverage on

smaller firms. Paper of DeAngelo and Masulis (1980) is considered as base of trade-off theory of capital structure.

2.1.2 Agency Costs

Agency costs are considered as conflicts of interest between bondholders (Lenders) and stockholders (SME business owners). Jensen and Meckling (1976) and Myers (1977) state agency costs as one of the most important determinants of capital structure decisions of businesses. Agency models tell us that there is an incentive for the stockholders to undertake projects which benefit themselves at the expense of the bondholders and do not maximize the firm value. Therefore, the bondholders usually try to protect themselves with various types of covenants and monitoring. Holmström and Tirole (1997) state that financial intermediaries are specialized in dealing with agency costs by monitoring closely the businesses in which they lend to. In addition, Stiglitz and Weiss (1981) argued that banks respond to agency costs, namely moral hazard and adverse selection, via collateral seeking. Thus, raising debt secured by an asset with known value lowers the agency costs and makes it more secure for the bondholder to provide the debt.

Agency cost theory is considered especially serious in situations where there are assets which give the firm an option to undertake growth opportunities in the future. Therefore, this would support the intuition that those assets would not be financed with debt. However, Myers (1977) argues that agency problem is mitigated when the firm issues short-term debt instead of long-term debt. Jensen and Meckling (1976) mention bankruptcy costs as one of the determining costs, alongside with monitoring and incentive effects on debt, in determining debt level for companies. Therefore, agency theory has ties with trade-off theory and is often added in the balance when considering the trade-off theory of capital structure (Frank and Goyal 2005).

2.1.3 Asymmetric information costs

Theory behind asymmetric information costs assumes that private firm managers and business insiders possess private information considering the company at hand. This information can be used to signal outside investors about the characteristics of company's future return opportunities. Firm's capital structure can be one way to signal previously mentioned information. Leland and Pyle (1977) and Ross (1977) research the previously mentioned signaling scheme. Furthermore, Myers (1984) argues that firm's capital structure is designed

to mitigate the inefficiencies in the firm's investment decisions, which are caused by information asymmetry between managers and investors and creditors.

Main theory derived from asymmetric information is the pecking order hypothesis, which implies that firms gather funds in hierarchical order starting from internally generated funds, and then preferring debt over external equity (Myers (1984)). This is argued to be caused by the costs associated with the different types of ways of financing. Pettit and Singer (1985) found that pecking order theory is highly relevant in the context of SME since it is very costly for them to issue new external equity compared to larger firms. Therefore, it can be derived from the theory that SME prefer internally generated funds and debt to new external equity issues.

Bigger firms are considered less opaque than their smaller counterparts are; therefore there will be lesser amount of asymmetric information and according to this theory it should make size a relevant determinant in capital structure decisions, alongside with the reason shown in tax and bankruptcy reasons. Also in the on the next part of the literature review Holmström and Tirole (1997) consider size to be a relevant factor considering the availability to acquire bank financing.

2.1.4 Results from earlier studies

While I explained determinants, which could affect the capital structures of businesses, the real question is whether there is real evidence for capital structure determinants. To support the upcoming hypotheses on the third part of the study and to give some general information about the results of previous empirical tests Table 1 will show the effect of different determinants of capital structure. These results concentrate on the papers, which have focused on the SME capital structure. In addition to SME results, I have added results from Titman and Wessels (1988), which includes also large companies and is one of the most cited article considering capital structures. The proxies for different determinants vary between the studies, however there can be seen a pattern between different firm characteristics effect on

Table1. Empirical Results in Literature (Capital Structures Determinants Effect on Leverage)

Author (Year of Study) (Country of Data)	Michaelas et Al. (1999)(UK)			Sogorb-Mira (2005)(Spain)			Titman and Wessels (1988)(USA)		
Dependent Variable	LTD	STD	TD	LTD	STD	TD	LTD	STD	TD
Size	+	+	+	+	+*	+	-	-	
Profitability	-	-	-	-	-	-	-	-	
Past Growth	+	+	+						
Growth Opportunities	+	+	+	+	-	+	+	+	
Risk	+	+	+				-	-	
Asset Structure									
Fixed Tangible Assets	+	+	+	+	-	+	+	-	
Inventory	+	+	+						
Non-Debt Tax Shields	+*	+*	-	-	-	-	-	-	
Effective Tax Rate				-	-*	-			
Age	-	-	-						

LTD=Long-Term Debt, STD=Short-Term Debt, TD=Total Debt
**=Not significant 5%-Confidence*

capital structure. Many of the results on table 1 will be revisited in the upcoming hypotheses and on the results of this paper.

As can be seen from table 1, size is considered a leverage-increasing factor. The plus sign indicates a relationship were bigger the firm is, the more leverage it has. As an example of an opposite relationship, profitability has a negative sign, which indicates that firms that are more profitable have less leverage than less-profitable businesses. The reasoning for these effects was explained in the previous part and it seems like most of the results from empirical studies support these hypotheses. However, there are differences and insignificances between the empirical results, which increase the interest in finding out significant and comparable results on different kind of datasets. In this study Finnish SME data will be used to find out the relationships between firm-specific factors and leverage. The definition for the variables in the table might vary between different studies. Therefore, only the characterizing determinant is shown and the relative relationship between the determinant and external leverage is shown as a positive or negative sign. Thorough explanation of the proxies for these determinants will be explained in the hypotheses section.

2.2 Financial Intermediation

While this topic might be familiar to most of people, who are well aware on how financial intermediaries work, it is useful to recap some of the information within the framework of SME borrowing.

Economic environment consists of real wealth, which refers to a stock of assets which are made available to purchase via money. Keeping in mind that money itself is not an asset it is a measure for the value of the real asset. Money makes it easier to obtain goods, because the transfer costs are very small. Money is thus a source of liquidity, since it makes it easy and fast to give real assets a value in which they could be traded. However, there are situations where the buyer does not have enough money to buy the real asset, thus the buyer has to obtain money from another agent in order to get enough capital to obtain the asset. The buyer needs to compensate the agent for the loan with an interest, which is the cost of the loan. It is important to separate real wealth from nominal wealth, because most of the recent economic crises revolve around the fluctuation of nominal wealth, for example financial assets value.

Financial intermediation enables transfer of money from those who have surplus of it, which means that their real consumption is lesser than their real income, to those who have insufficient funds to make investments or to survive liquidity shocks. Banks' role in monitoring the values of assets and investment projects it finances is essential for the economy to be well functioning. In the context of SME lending, the SME are the ones that have insufficient funds and require additional funding and banks do the transferring of funds from the surplus sector to them and at the same time monitor their actions in order to ensure whether the firm-specific factors support the decision of providing credit to a SME. Monitoring is an important part of the theory of Holmström and Tirole (1997) when formulating bank lending.

The amount of financial activity in the world nowadays is enormous and on the bottom line, its function is to channel value from one group to another. This is done through direct lending, organized markets or using a financial intermediary. Usually in developed economies, it is carried out by using a financial intermediary, such as a bank. On this chapter, I am going to emphasize the way that financial intermediation happens through banks and seek reasons that would unveil the reduction of credit supply on the financial intermediation system and how it might affect the leverage ratios of SMEs.

2.2.1 Importance of Liquidity in Banking System

"When the music stops, in terms of liquidity, things will be complicated. But as long as the music is playing, you've got to get up and dance. We're still dancing."

- Chuck Prince, the former CEO of Citigroup July 10, 2007

Bank's use their ability to transfer the maturity of their funds to create liquidity in to the economy. Banks create assets for lenders and liabilities for borrowers, which are more attractive to each than would be the case if the parties had to deal with each other directly (Howells and Bain 2008). In general, liquidity means the ability or ease by which these assets can be converted into cash. This is an important fact in this paper, because the issue of credit crunch revolves around the loss of liquidity in the markets (Bernanke 1991; Brunnermeier 2009). In addition, Diamond and Rajan (2005) research this in a bigger scale, where the

liquidity of the banking system is spread across the pool of banks, and if one of them defaults, it could, in the worst-case scenario, cause meltdown of the whole banking system.

Liquidity of the markets balances the difference of maturities on the liability and asset side of bank's balance sheet. For example, if the liquidity of interbank money markets is reduced it hurts the bank's ability and willingness to lend money to the markets, because it will become harder for them to survive from their short-term liabilities. This is due to the previously mentioned banks' ability to make maturity transformation, by using short-term deposits to fund investments, which are longer-term than the deposits. This creates a maturity mismatch between the assets and liabilities of the banks. For banks, interbank markets serve as a source of liquid cash and interbank credit lines allows banks to cope with liquidity shocks while reducing the cost of maintaining reserves (Freixas et Al. 2000). Since SME are considered as risky investments, which require banks to have decent amount of capital reserved in order to carry out SME lending, the efficiency and state of interbank markets could be very important factors considering SME lending. Moreover, the whole ability of banking system to withstand the effects of adverse economic effects might depend on the interbank market and its ability to offer liquidity to the banking system (Freixas et Al. 2000).

Brunnermeier and Pedersen (2008) explain that market liquidity stands for the difference between security's current price and the value of the collateral of the security when you are selling the security or asset you own in order to obtain liquid funds. For example, the value of mortgage-backed security differs from the underlying collateral's value, which is the asset, a house for instance. The amount of difference between the security and collateral is called the margin. Margins provide information about the state of market liquidity in the markets. When the margins are high, for example security's price is greatly lower than underlying collaterals assumed value and there is a need for liquidity in a bank, the bank must liquidate its security receiving a loss which is the amount of margin. This loss is taken away from the capital of the bank, thus lowering the capital-to-asset ratio. If there is regulation for capital ratios and the losses from liquidating assets become too high, the bank could face financial distress. In other words, market liquidity is low when it becomes very costly to shrink the balance sheet because of the losses in assets' values (Bean 2004).

Funding liquidity means the situation where one obtains an asset in order to use it as collateral against a loan. This is the typical form of financing for short-term liquidity needs for a bank,

where they use commercial papers as collateral for a short-term loan. If TED-spread, which is the difference between short-term U.S. government bond and the interest rates on interbank loans', becomes too high for the collaterals of the bank to satisfy, some banks may not meet their short-term liquidity needs. This might lead to a bank run, and as explained earlier the result of one bank failure can cause serious economic damage thorough the whole financial system due to contagion (Diamond and Dybvig 1983).

2.1.2 Loanable Funds Theory

This section is highly influenced by Loanable funds theory by Holmström and Tirole (1997). It will present a simple mathematical model for financial intermediation in firm's investment project financing. The aim of the model is to offer an understanding of the reduction of credit for SME rather than offer a universal set of academically accepted determinants for it. The model needs a definition of moral hazard, which is a major reason for intermediate financing's existence and its ability to finance small and mid-sized companies. Then we are going to go through the mathematical formulation's assumptions, in which the primary assumptions are that firm can get their debt financing from either banks or directly from the financial money markets, or ultimately be left without financing at all, depending on its own level of capital. Therefore, the access to either one of these external financing options depends on the capital the firms has available to their investments. The aim is to explain theoretically, with the help of the mathematical model to offer understanding about why there is intermediate financing and direct financing. Furthermore, elaborating on how external economic shocks on bank financing can affect lending to SMEs and what are the determinants that have an effect on loanable funds of banks according to Holmström and Tirole (1997).

Much of the risk in lending between SMEs and banks comes from asymmetric information because of the opacity of SMEs. Paper by Berger and Udell (1998) argue that SMEs can be more opaque than larger companies are, due to the lesser requirements on financial reporting, which is why moral hazard could be a significant problem in SME lending. Therefore, we need to define the risks involved in the lending processes. In the context of loanable funds theory, moral hazard is seen as a major contributor for the risks that banks take in their lending operations. In order to have a loan from the bank the borrower is required to provide collateral. In the case where a firm is the borrower that collateral is often the firm's own capital to the investments which it seeks to finance with debt. Bank loans can be viewed as

”inside” debt that is, debt financing provided by a party with inside information. The inside information is acquired by a bank through access to firms’ operations under the contracts that have been made for the loan, moreover access to private information of the company. The latter is especially when the amount of external finance needed is large relative to the amount of insider finance (Berger and Udell 1998).

When banks are considering lending options and the creditworthiness of firms own capital matters is that banks and markets require certain amount of own capital inside investment projects to avoid moral hazard (Holmström and Tirole 1997; Besanko and Kanatas 1993). The main reason why this is important considering this paper is because the asymmetric information that arises from the uncertainties in the market raise the bar of acquiring loans, thus leading to reduction in lending, also known as credit crunch. I will present a table of different variables in my calculations before the presentation of the conditions for moral hazard; more variables will be presented in the next section, which considers the mathematical model for financial intermediation itself.

	Project A	Project B
Propabilites for success	p_a	p_b
Returns	A	B
Return required from the debtor in success	R	R
Cost of monitoring	C	C

Moral hazard is a situation where for example a firm has two projects, good project with return A and bad project with return B. Probabilities for these projects are p_a for good project and p_b for bad project. The present values for these projects are $p_aA>1>p_bB$, but that B>A, which implies that $p_a>p_b$. We have to assume that the success of the project is verifiable by outsiders, but not the firm’s choice of technology nor the return. Thus, the firm promises to pay a fixed amount R in the case of success. In this case, if the project fails the firm goes bankrupt and the money is lost. We can see that in this case the level of R defines the project

that the firm chooses. In the real world, R would be defined as the interest paid for loan which bank provides for the firm to finance its investments.

If there is no monitoring firm will choose good project only if $p_a(A-R)>p_b(B-R)$. Because $p_a>p_b$ the maximum level of debt where the good project is chosen is $R<R_c=(p_aA-p_bB)/(p_a-p_b)$. If the cost level of debt is set too high, only bad projects are financed. This means that if the required return for debts is too high, investing in good projects becomes a worse choice than investing in bad projects (B>A).

Thus,

$$p(R)=\begin{cases} p_a \; if \; R \le R_c \\ p_b \; if \; R > R_c \end{cases} \qquad (1)$$

In the absence of monitoring a competitive equilibrium of the credit market is obtained for R such that p(R)R=1, expected return of a project is at least as much as invested in it, where the probability of repayment of the debt comes from the project that the firms choose according to the cost of the debt. Because the expected return of $p_bR<1$ for $R\le B$, equilibrium in the credit market is obtained only through choosing the good project A, where $p_aR\ge1$.

Specialized firms in intermediate financing, e.g banks, use monitoring as a way to prevent borrowers from carrying out bad projects. The need for borrowing arises from the fact that the markets are full of uncertainty, when assuming perfect competition between banks, the nominal value of bank loans at equilibrium is determined by the break-even condition:

$p_aR_m=1+C$, where R_m is the required return on debt for monitoring and C is the cost of monitoring.

There has to be two assumptions in order for bank lending to be at equilibrium:

1. Firms need to profit from the successful projects: $p_aA-1>C$.

2. Direct lending has to be impossible: $p_aR_c<1$.

This tells us that intermediate lending (bank lending) occurs when the probability of success of a good project is between $p_a(p_a\in[(1+C)/A \; , \; 1/R_c])$ derived respectively from the two assumptions above.

In conclusion, this reasoning tells us that if there is a high probability of success, firms issue direct debt ($p_a > 1/R_c$). When there is an intermediate probability of success firms borrow from banks at a rate between $p_a \in [(1+C)/A , 1/R_c]$. If he probability of success goes below the value of (1+C)/A the credit market collapses, because good projects cannot be financed and bad projects have negative present value.

As said, intermediaries do monitoring in order to alleviate the moral hazard problem. Monitoring is done by inspecting a firm's cash flows, balance sheet, and the management and so on. Also, monitoring could be done by using covenants that bind the firm to hold, for example a solvency ratio above a certain degree. In the financial sector there are amounts of different lending technologies that the intermediaries can use and monitoring is carried out in different ways considering the risks of the borrowing SME (Berger and Udell 2006). Monitoring can rely on two different ways; through hard information and/or soft information (Berger and Udell 2006). I will cover previous topics more thoroughly in next section of the literature review. The next section will elaborate on the importance of information and relationship between banks and SME.

During the last few recessions, where there were assumed to have occurred credit crunch, there has been a possibility to have been moral hazard problem. For example, the monitoring of assets such as structured financial innovations, or banks' overzealous lending in the 1990s had failed, because the costs of monitoring and the seen difference between the probabilities of good projects and bad projects have become harder to see. For instance, the inefficiencies in monitoring could raise the gap between A and B in favor of B or lower the probability of A, which in turn leads to less bank lending or even credit market collapse in light of the theory we just covered.

Berger and Udell (2006) discuss the opaqueness of SME as a factor in SME lending. In the context of SME the opaqueness is also very prevalent issue since SME usually contain a lot of private information. This increases the chances of the lender not to observe the changes in project profitability and their possibilities for success. Therefore, issues in monitoring due to uncertainties caused by adverse economic events could raise the gap between A and B in favor of B or lower the probability of A, as in the previous example. This problem is mitigated by close relationships formed between SME and banks (Berger and Udell 2006).

One important factor is also that the probability of a good project to be financed by a bank is observed by the bank. In times when illiquidity and uncertainty hits the market, it could be that the intermediaries make their assumptions of probabilities of good projects more pessimistic, thus leading to tightened credit conditions and reduced supply of money, which we have defined as credit crunch. The implications of moral hazard on lending will be observed more thoroughly in on the loanable funds theory on the next section, which is going to explain why moral hazard is such a relevant concept when considering the financing of SME.

Before defining the loanable funds theory, a few assumptions a few assumptions have to be made. Firstly, firms have access to the same investment opportunities, only difference is the amount of capital **K** that the firms have. Firms can also be considered as the ”The Real Sector” where the real wealth, as described before, is produced but we will stick to the term firm. For the latter reason capital **K** could be considered as any kind of collateral but in this case we will assume, for simplicity that it is cash. There is distribution of assets across the firms which is represented by a cumulative distribution function **G(K)**, some firms are bigger and they have more capital to use and some firms have less. They could be distinguished as small, medium and large-sized firms according to the capital they have. As I discussed before the credit crunch is assumed to have a larger effect on SME than the large ones companies (Borensztein and Lee 2002; Kim et Al. 2002; Hancock and Wilcox 1998; Taketa and Udell 2007).

In this case firms have only one project that generates profit. The cost of the project is the investment it requires, which is denoted as **I**. We will make an assumption that the investment scale **I** is fixed for the projects. If firm’s capital K is smaller than the investment requires then the firm needs to get external funds by the amount of **A-I**, which is the difference between firm’s capital and the size of its investment. When the investment is financed and undertaken, the project generates profit by **0**(failure) or **P**(success).

As discussed before, moral hazard problem exists when external financing is used. In this model the problem of moral hazard is taken into account by offering the firms to undertake three different kind of projects. These projects are either good projects with probability $\mathbf{p_a}$ where the private benefit for the firm is zero or two kind of bad projects with the same probabilities $\mathbf{p_b}$ with high private benefit **B** and low private benefit **b**. Therefore, when there is

no monitoring, the firm will prefer more the bad project, which gives more private benefit. Private benefits represent the moral hazard problem, which we just covered in the previous section. We assume that the probability of a good project is bigger than the one for a bad project $p_a > p_b$. We also have to assume that the project which is undertaken yields a profit that is economically viable, moreover its NPV has to be over zero.

	Good project	Bad project (with monitoring)	Bad project
Probabilites	p_a	p_b	p_b
Private benefit	0	b	B

Thus,

$p_aP-(1+r)I>0>p_bP-(1+r)I+B$, where r represents the required return on the firms project which in finance term could be represented by the firms WACC(weighted average cost of capital).

In this example, direct finance from the markets is taken into account, so we need to make a required return for the investors in the debt markets. In general, direct financing can be considered to be as external debt financing from public markets. Firms obtain direct financing straight from the private investors by issuing bonds. This required return is intuitionally (1+r) which were explained above. We need to assume that there is an infinite supply of outside investment projects that give this return of (1+r), which is the minimum level of expected profit the projects would have to yield. Private investors are assumed uninformed, thus there is a bigger moral hazard problem for them, and since they are not able to monitor the firms they invest into.

Intermediaries have also a constraint on how much they can monitor the firms. This is represented by $\mathbf{K_m}$, the amount of capital the banks have, which is a very important constraint on aggregate investment as we will see later; in addition we will see that this is argued to be one of the main sources for the reduction of credit supply.

The most important aspect of the Loanable Funds Theory is the interaction between direct financing (public debt markets) and indirect financing (private debt markets).To make it easier to remember all the defined variables I have put them together on the table on the right. A firm can finance its investments with either own capital or with the help of debt capital. As with moral hazard example above there are two kinds of debt financing: direct financing and bank financing. We start out by defining the requirements and borders for direct financing. After that we make the borders for intermediate financing and in conclusion the borders are drawn together to make the model complete. When we have the complete model, the determinants for credit crunch will be shown. Table on the left explains the different variables introduced in the model.

Capital required	K
Cumulative distribution function of firms according to their capital	G(K)
Investment	I
Profits	P
Required return by investor	(1+r)
Bank's capital	K_m
Monitoring costs	c
Required return by the bank	(1+y)

Direct financing

Direct financing consist of debt financing offered by uninformed private investors from the debt market, for example, from bonds. There is a simple structure the debt is form in direct financing. The firm invests all the available capital A to a project and the amount that is left to finance I-A is financed with debt. The outcomes can be zero for both parties or $\mathbf{P_f}>0$ for the firm and $\mathbf{P_i}>0$ for the investors. The total profit is then $P=P_f+P_i$.

The conditions for this scheme to happen without the moral hazard problem is so that $p_aP_f \geq (1+r) \geq p_bP_f+B$. Therefore, the profit that the firm requires for direct debt financing is at least:

$$P_f \geq B/(p_a-p_b)$$

This implies that the maximum profit for the investors is $P_i=P-B/(p_a-p_b)$, in order for the investors to be compensated. P is the total profit that the project offers for all participants. The the maximum expected income that investors can be promised without destroying the firm's incentives is $p_a(P-B/(p_a-p_b))$. Holmström and Tirole (1997) call this the *pleadgeable expected*

income. The latter cannot be less than the one that the investors can get from other investments (1+r)(I-K). When combining the pledgeable expected income and the restrictive alternative investment opportunity is:

(1+r)(I-K)≤p_a(P-B/(p_a-p_b)) from this we can derive the minimum level of K to acquire direct finance.

$\boldsymbol{K_d}$*=I-p_a(P-B/(p_a-p_b))/(1+r)*

In words, this minimum level of capital required from the firms tells us that the discounted expected profit from the project, considering private benefit, must be over over the investment $K \geq K_d$ in order to get direct financing from the markets. Direct financing is more used by companies that have access to public debt markets and these companies often tend to be large. Therefore, SMEs rarely use public debt as a source of funding.

Indirect financing

Now we turn to the more interesting side of the external financing market conditions considering this paper, the indirect financing. The firms that do not have the required amount of capital to get the finance from the money markets directly need the help of financial intermediaries to get the external financing for their projects. Monitoring done by the intermediaries reduces the risk for moral hazard, thus allowing external capital to be raised by the capital-constrained firms, which are excluded from the direct financing. Monitoring costs are represented by **c**. Therefore, in the case of intermediary financing there are three groups that need to be considered: the firm itself, the intermediary and outside investors. This is because the intermediary and some by the investors offer some of the financing. The profits of the project are distributed so that $P_f+P_i+P_b=P$ where $\mathbf{P_b}$ is the profit gained by the intermediary, the rest of the assumptions are the same as before. Due to the monitoring, the private benefit from choosing a bad project is b. The constraints for financing for firm and the intermediary are as follows:

P_f≥b/(p_a-p_b) , firm's constraint for profit (IC_f)

P_b≥c/(p_a-p_b), intermediary's constraint for profit (IC_b)

Two equations above tell us that the profit must exceed the costs and opportunity costs that come from using the external financing. In a way that excludes the use of private benefit projects and make the lending profitable for the bank.

In this case the minimum returns for the firm and the intermediary are the same as the pledgeable income in direct financing, including the monitoring cost: $p_a(P-(b+c)/(p_a-p_b))$.

The rate of return the intermediary requires is defined by **(1+y)**$=p_aP_b/I_b$, where $\mathbf{I_b}$ is the amount of investment made by the bank. Since there is a cost for monitoring, c, the rate of return for intermediary must exceed 1+r. When combining IC_b with the required return we get the minimum amount the intermediary needs to get paid to gain profits. The equation for the minimum investment is then:

$I_b=p_a*c/((p_a-p_b)*(1+y))$

The last condition for the intermediary financing to occur is the constraint that the profits of the financing must exceed the profits gained from other projects that could be invested in. In addition, the lowest possible acceptable rate of return for (1+y) comes from:

$p_a*c/(p_a-p_b)-c=(1+r)*I_b \rightarrow (1+y)=p_a*(1+r)/p_b>(1+r).$

Thus,

$(1+r)(I-K-I_b)\leq p_a(P-(b+c)/(p_a-p_b)).$

From the upper condition we can derive the lowest possible level for intermediary financing at a given required return level for a bank and individual investor:

$\boldsymbol{K_i}=I-I_b-(p_a(P-(b+c)/(p_a-p_b))/(1+r))>K$

Firm that has less capital than K_i is restricted from all kinds of external financing, since it is not able to convince neither the investors nor the banks to supply capital for the project.

2.1.3Implications of Loanable Funds Theory on SME Credit

The analysis of the model leaves us with three kinds of firms. Those whose capital is above the K_d which implies that they can get their financing without monitored capital. The ones whose capital is lower than K_i, leaves them without financing, therefore they cannot invest. And those whose level of capital is in between of K_d and K_i, so that they can get monitored capital to finance their projects. In the real world firms that fall into monitored capital financing category usually use direct financing mixed with monitored financing to supply capital for their projects. This has to be taken into account since later on we will discuss if other kind of financing (direct financing) substitutes for indirect financing if credit crunch occurs. Additional matter that must also be taken into consideration is the capital level of the intermediaries themselves $\mathbf{K_m}$ as described in the moral hazard section. The equations for capital level requirements were:

$K_d(r)=I-p_a(P-B/(p_a-p_b))/(1+r)$ *for direct financing*

$K_i(y, r)=I-I_b-(p_a(P-(b+c)/(p_a-p_b))/(1+r))$ *for indirect financing*

$K_m=[G(K_d)-G(K_i)]*I_b$

The last requirement suggests that banks' capital is equivalent to the financing it provides times the quantity of loans it has lent, which intuitionally can be considered right, since banks cannot loan more money than they have.

The equilibrium of demand (**D**) and supply for money is therefore:

$D=G(K_d)+G(K_i)+K_m$, where the first two density functions of firms different capital levels shows the amount of uninformed investor financing adding the amount of bank financing K_m. G is a distribution function of firms according to their capital levels. In addition, this shows the total amount of capital that exists in the economy.

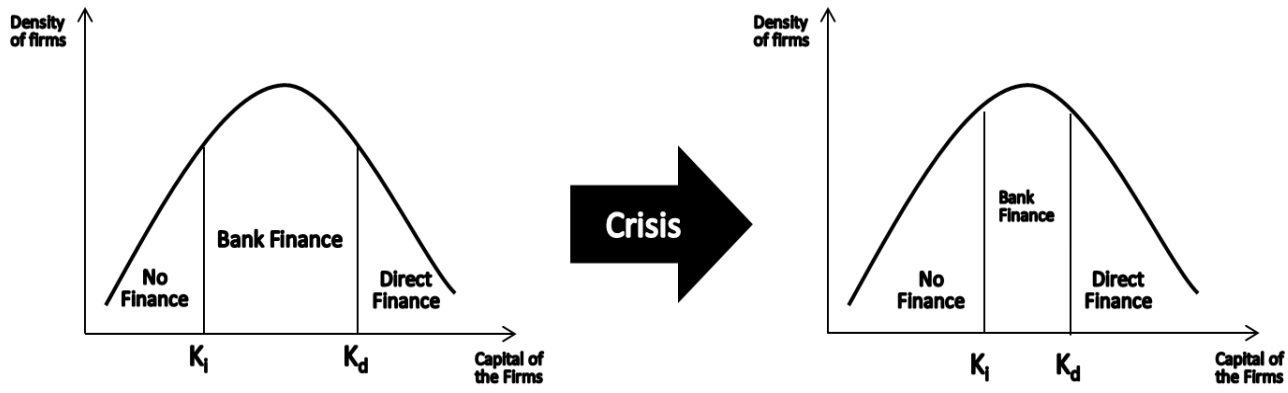

Figure 1. According to theory by Holmström and Tirole (1998) crisis lessens the amount of bank finance and increases the amount of firms left without external debt financing and companies that rely on direct finance from the markets.

Figure 1 presents how the external funding is spread between the different choices in equilibrium. As we discussed before, credit crunch occurs when banks' capital decreases, but the mathematical consequence would be that the K_m lowers. In addition, the capital level of almost all companies fall during recessions and times of financial distress, which lowers the capital level that the companies themselves have, due to the losses through assets values depreciation, which incur losses that decrease the firm's capital, this affects the equilibrium of loan markets. The lower capital level of the bank must be accompanied by the rise of 1+y, the required return on bank financing, which in turn leads to increase in $G(K_i)$ the minimum level of capital that the indirect financing can be obtained. That is because banks will be more careful with their investments because the liquidity of the markets has been reduced as explained above. In the picture, the gap between the K_d and K_i becomes smaller, thus decreasing the amount of firms that acquire bank financing from the banks. This leads to bigger amount of firms that do not get any finance at all, cuts investments of those firms and leads to reduction in total output of firms due to lack of financing and tightened credit conditions.

As seen in the figure 1, the low capital firms suffer the most from the credit crunch, since they are the ones that have the smallest capital to invest. When considering the effects of this in to the real economy and economic output Peek and Rosengren (1995) say that the loans that banks, financial intermediaries, provide are a service that is not given by alternative financial intermediaries.

In relation to the moral hazard problem explained earlier, the information about the industry, management skills of the company's managers, and local conditions for the firm may be critical to the lenders to define the creditworthiness of a firm. Due to the information asymmetry between SME and other possible sources of funds than banks, small and medium-sized businesses may find banks as the only source of debt financing for them. Thus, reduction of credit offered by the banks may seriously hinder the business of a firm that is dependent on bank loans and in the light of the loanable funds theory those businesses would be SMEs. Next section will cover more thoroughly the previously mentioned the aspect of information between SME and banks. The theories in this section, while they may be a little tedious, but offer a platform for understanding bank lending to SMEs and to present theories behind the effect of an exogenous shock on SME lending.

2.3 SME Finance

In this section, I am going to go through the basics behind SME financing. Topics such as transaction lending, relationship lending and lending channel will be covered to acknowledge the aspects behind the ways a SME can obtain funding for its operations and to understand the specialty of bank borrowing to SME compared to other sources of funding. I will also go through the recent developments and special features of SME financing in Finland such as the loan guarantee system for SME by the public sector. Lastly, I will briefly cover other ways of financing for SME and the state of those in Finland.

2.3.1 Transaction Lending, Relationship Lending and Lending Channel

In the literature on SME financing, relationship lending was the first to be emphasized as the defining characteristic of SME lending (Berger and Udell 1995). Afterwards SME research adopted the view that SME lending falls into two categories: relationship lending and transaction lending (Cole et Al. (2004)). Newest research offers a view according to which SME lending consists of different lending technologies. Udell and Berger (2006) show that in addition to the "relationship lending technology" there are other transaction lending technologies which are deployed globally in providing debt finance to SME. The balance between supply and demand on lending between SME and banks can also be affected by macroeconomic conditions and financial shocks such as changes in monetary policy, credit crunches, and financial crises (Taketa and Udell 2007).

In order to understand better the effects of exogenous shocks on SME lending, Taketa and Udell (2007) introduce a concept of "lending channel". Lending channel consists of a specific lending technology provided by a specific type of institution. According to Berger and Udell (2006) there exists at least nine lending technologies globally which may be used to underwrite SME lending: relationship lending, financial statement lending, trade credit, small business credit scoring, asset-based lending, equipment lending, real estate-based lending, leasing and factoring. Lending technologies are used to address to opacity problems related to SMEs (Berger and Udell 2006).The numbers of financial institutions which offer these technologies vary across countries (Taketa and Udell 2007). Therefore, I will go through the state of lending channel and usage of different lending techniques in Finland on the next section of this chapter. In this research I will not empirically go through the different technologies because I will concentrate on the overall changes in credit on SME in Finland

during financial crisis and thus not going deeper on the sources of the obtained credit. However, I would highlight that researching the lending technologies in Finland as a possible subject for further research.

Going through all the different technologies would not serve the purpose of this research therefore I will simplify lending channel as a two-way system presented by Cole et al (2004), which includes relationship lending and transaction lending as shown in Figure 2. According to Udell and Berger (2006) the credit supply and demand between SME and banks is derived from previously mentioned two paths and between those paths is the previously described lending channel that takes into account the shocks affecting the credit equilibrium between banks and SME. Figure 2 points out the ways that the credit can be dispersed from banks to SME. Relationship lending and transaction lending could be considered as opposite ways of carrying out lending, however both of them can also be used as a combination by the bank and SME to come up with credit agreements. In addition, SME can also obtain credit from other non-financial institutions as trade credit, which is not shown in the figure 2 because it is not relevant considering the topic of this discussion. However, trade credit can be very important in economies with weak financial systems, where industries with higher dependence on trade credit exhibit higher growth rates (Demirguc-Kunt and Maksimovic 2002). Because Finland has a developed financial system, trade credit will be considered trade as complementary to bank credit. I will go through the different aspects of relationship and transaction type of lending in order to offer a more comprehensive view on SME lending.

Relationship lending is used on the businesses that are more opaque than others and evaluation of their business prospects is based on soft information. Because of the lack of hard information or specialty of a certain business, lenders who do lending in relationship basis require a longer period for the lender to assess the information of the borrowing SME. As discussed earlier, the asymmetric information between the lender and borrower cause moral hazard. In the context of the mathematical model of financial intermediation the less capital the company has the higher the probability of moral hazard or at least the monitoring costs are higher for these kinds of SME, which will have negative effects on the credit conditions for those firms (Hernandez-Canovas and Martinez-Solano 2008). Consequently, in the European context, companies that have had long relationship with a bank had increased access to loans, but at the same time, they bore a higher cost for their debt (Hernandez-

Canovas and Martinez-Solano 2008). Holmström and Tirole (1997) linked the heightened cost of debt together with the risen monitoring costs in the previously introduced mathematical model, although it is not for certain. Despite the higher costs on debt, relationship lending can mitigate the problems with opacity-derived problems because it relies on soft information gathered by loan officer through continuous direct contact with SME, their owners and managers, and the local community in which they operate (Berger and Udell 2006). On a further note, Udell and Berger (2006) argue that country's ability to mitigate SME financing constraints by deploying relationship lending may depend crucially on the mix of large and small banks.

Because of its nature as personalized, closely followed and community-based, relationship lending seems to be more optimal for local small financial intermediaries rather than large and foreign banks. In the literature there is evidence that SME do in fact get most of their bank funding based on relationship lending from mainly small and niche banks and that the large and foreign banks lend less to SME (Berger et al 2001). At first glance, relationship lending might seem as something that banks want to avoid, because it requires extensive information gathering, time and labor investments. However, most banks do want to serve SME and that the business of SME lending can be quite profitable for the banks (De la Torre et Al. 2010). Another reason situation that favors for relationship lending is that when banks do only transaction based lending they might miss on the opportunity to properly evaluate SME managers. Therefore, they can lose the opportunity to lend to good SME that are capable and will put a lot of effort into repaying their debts but that are not "formally" performing as expected by the bank (Moro and Fink 2013).

Berger and Udell (2006) emphasize that the structure of financial institutions and lending structure within a country defines the power and usage of the formerly mentioned lending technologies. Structure of financial institutions within a country is defined by the combination of financial institutions and competition between them (Berger and Udell 2006). Lending infrastructure is defined by the laws, regulations and financial conditions which relate to banks' ability to carry out different lending techniques. As stated in the previous paragraph, the ability of smaller banks to be more efficient in relationship lending than their larger competitors can be viewed as an example (Cole et al. 2004). Therefore, the amount of small

banks can be viewed as an important indicator for the state of SME financing in a specific country.

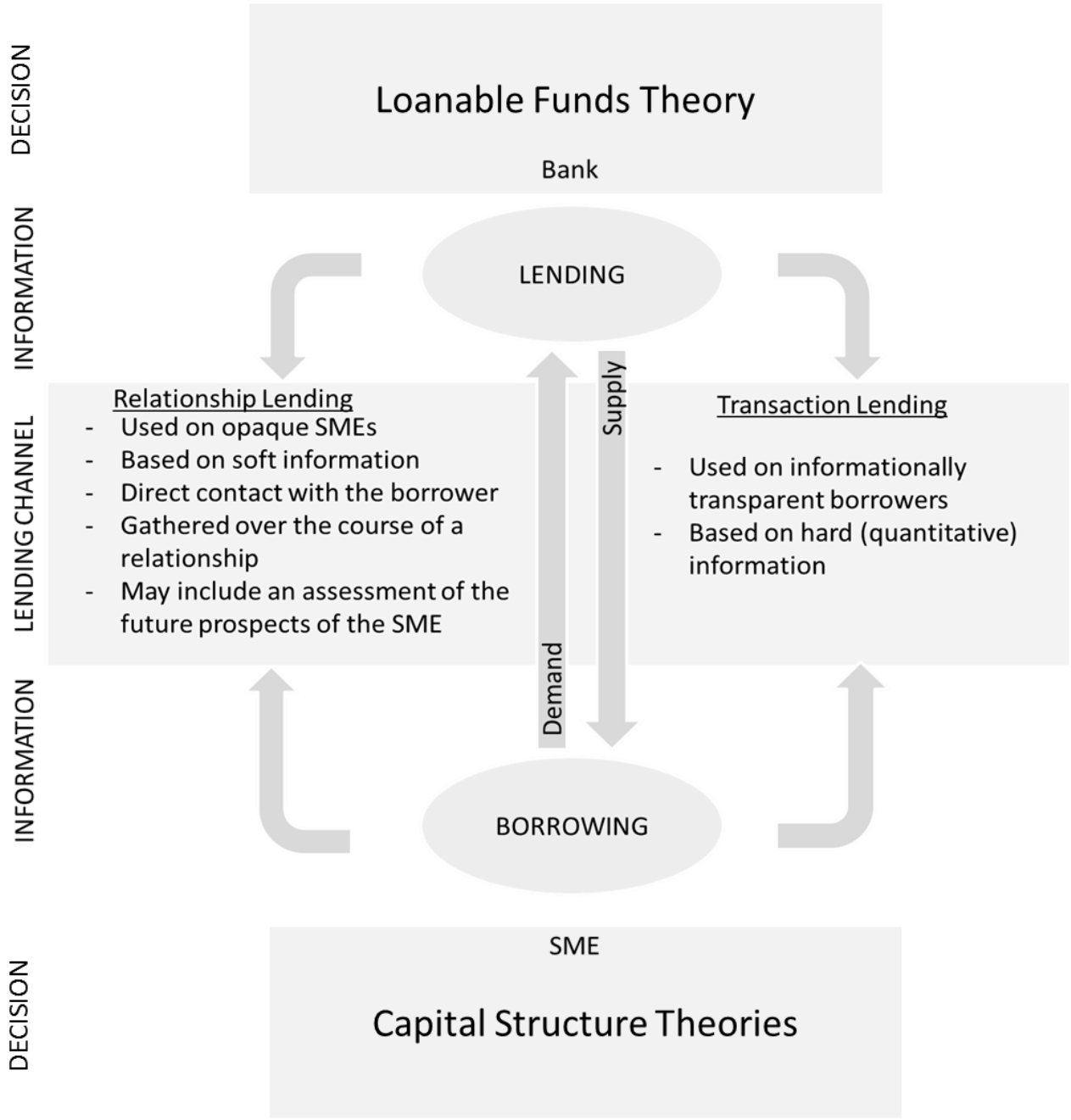

Figure 2. Theory Framework: Decision making processes are made according to shown theories and supply and demand for external debt capital is based on information inside the lending channel between lenders (Banks) and borrowers (SMEs).

In figure 2 the lending channel part characterizes the previously mentioned structure of the financial institution and the lending technology. As said, it captures the effect of outside events to SME lending. In a broader context, it reflects a unique combination of a lending institution and lending technology as described by (Taketa and Udell 2007). To conclude the figure for theory framework, demand side and supply side decisions are made according to their respective theories, capital structure theories and loanable funds theory, which produces the supply and demand for debt. The last part of the literature review will consider the SME financing in Finland in light of the literature we have covered to this point. I will also do a brief analysis on statistics available of the state of SME financing in Finland.

2.3.2 Financial Intermediaries and SMEs in Finland

In light of the literature that has been covered a picture of the SME financing and its special aspects can be drawn. I will cover the latest statistics on the loans given by banks to businesses and their interest rates. Information about the amount of loans and their interest rates can support the theory from the first chapter and give signs whether there was a reduction of credit supply by banks during financially troubled times. Another point that I will

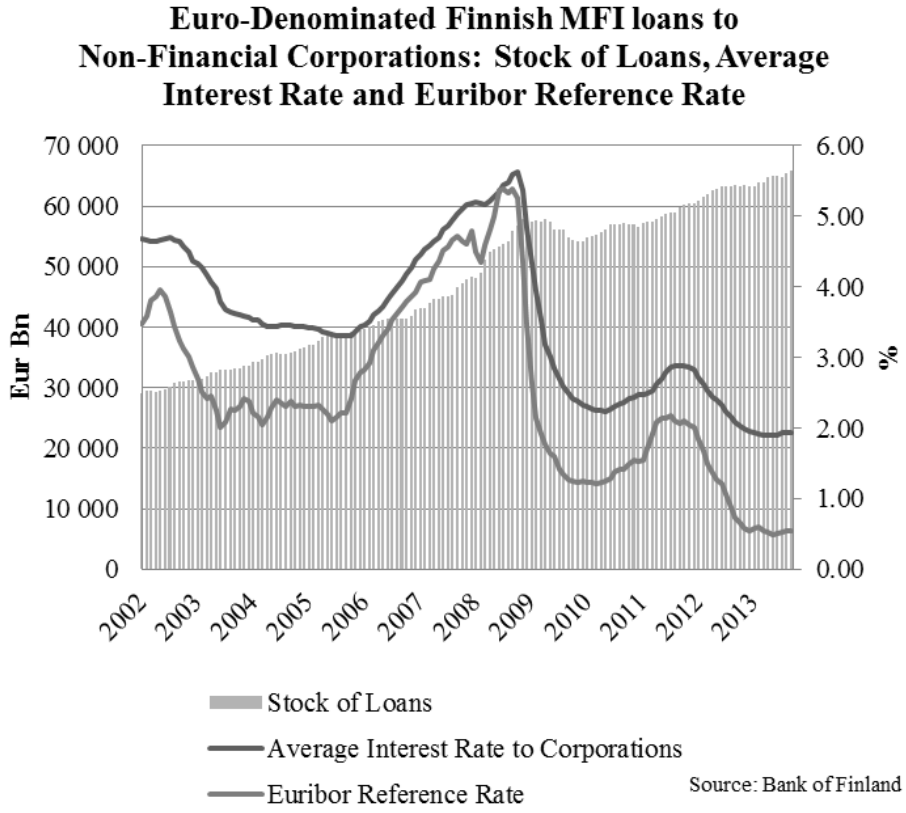

Figure 3. Stock of loans to non-financial companies in Finland is reduced during the year 2010 alongside with interest rates and reference rates. Left-axis represents the figure for interest rates and right-axis represents the total amount of stock of loans in billions.

briefly cover is the state of SME in Finland in general, in order to understand the special aspects of Finnish SME and their near history performance.

As can be seen from the figure 3 there is a buildup to crisis during years 2002-2013 where the interest prices and the amount of loans increased highly each year. However, during 2009 when the extent of damage caused by financial crisis started to unfold, there is a reduction noticeable reduction in stock of credit. Despite the monetary policy by European Central Bank by lowering the interest rates, which can be seen as large drop as 3,5% in Finnish MFI loans to non-financial corporations.

It is safe to say that the amount of loans was reduced highly during the worst period of the crisis as we can see from the figure above. Reduction in bank lending supports Holmström and Tirole's (1997) theory of reduced bank lending during crises.

Another point made in the Loanable Funds theory by Holmström and Tirole (1997) was that the required return on bank loans should increase, thus hindering the investment possibilities of businesses that are dependent on bank financing. As we can see from the figure 3, which describes the average 12-month interest rates to corporations in Finland, in the buildup to the crisis the interest rates were under the reference rate of 12-month Euribor. Euribor is the reference rate based on the average interest rates at which Eurozone banks offer to lend unsecured funds to other banks in the euro wholesale money market. After the start of the year 2009, the spread between reference rates and interest rates given by banks became larger. The fact that reference interest rates given by Finnish banks were above the reference level set by Euribor suggests higher required returns and risk aversion by the Finnish banks on their lending to corporations.

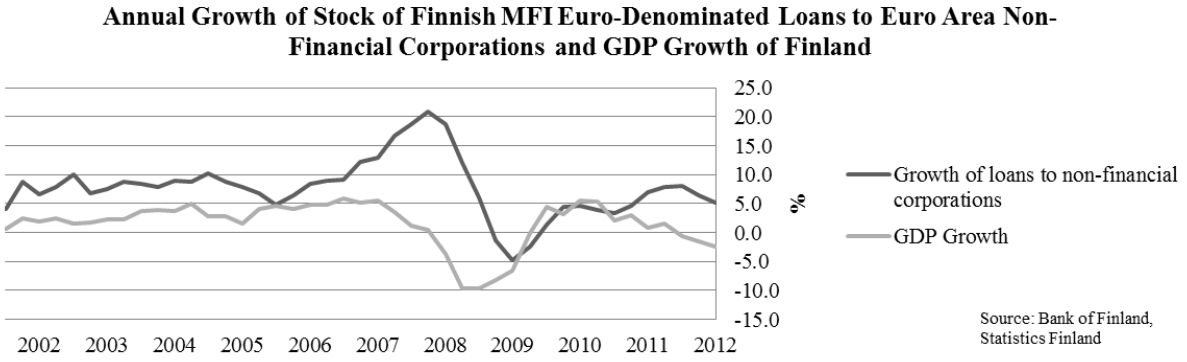

Figure 4. Statistics from Bank of Finland and Statistics Finland show that loans to non-financials corporations in Finland follow closely GDP growth with a slight lag.

While it is not certain that these reference rates would have straight relationship with higher required return on SME, it certainly gives an indication that there could be causality between the banks' lending patterns during financial crisis and SME' ability to acquire bank financing. Referring to Holmström and Tirole's (1997) theory in the first part of literature review they explained that heightened spread between reference rates, along with reduced bank lending from which can be seen as negative growth of bank lending to corporations on figure 4, supports the determinants of their theory. This indicates that there should be reduction in lending for SME despite the firm-specific factors. Whether there has really been reduction in credit to SME or not, will be tested by empirical methods on next chapter.

As can be seen from the figures above, there certainly was a major reduction in credit during the last financial crisis. Figure 4 shows that the growth of loans to private sector reduced from 10% to nearly 0% during the crisis period. We can expect to see the effect of this reduction in the 2009 balance sheets of the companies.

The federation of Finnish Financial Services described Finnish banking in 2012[2] as a very challenging operating environment. This was due to historically low interest rate level, which causes stress to the banks' core profitability. As previously explained the effect of global financial crisis has weakened the Finnish economy by risen unemployment and decreased confidence to the Finnish economy by the households and companies. What is important to

[2] http://www.fkl.fi/en/material/publications/Publications/Finnish_Banking_in_2012.pdf

this study as a fundamental behind credit supply is the surveys note which shows that the banks' interest rate margin, which is the difference between loan and deposit portfolios and forms a bank's core operating income, has declined for over a decade now. This has made it difficult for smaller banks to operate in Finland, which in turn can be seen as a factor that influences the amount of credit supplied to SME, because they are reliant in relationship lending, which was discussed earlier to have been done by the relatively smaller banks.

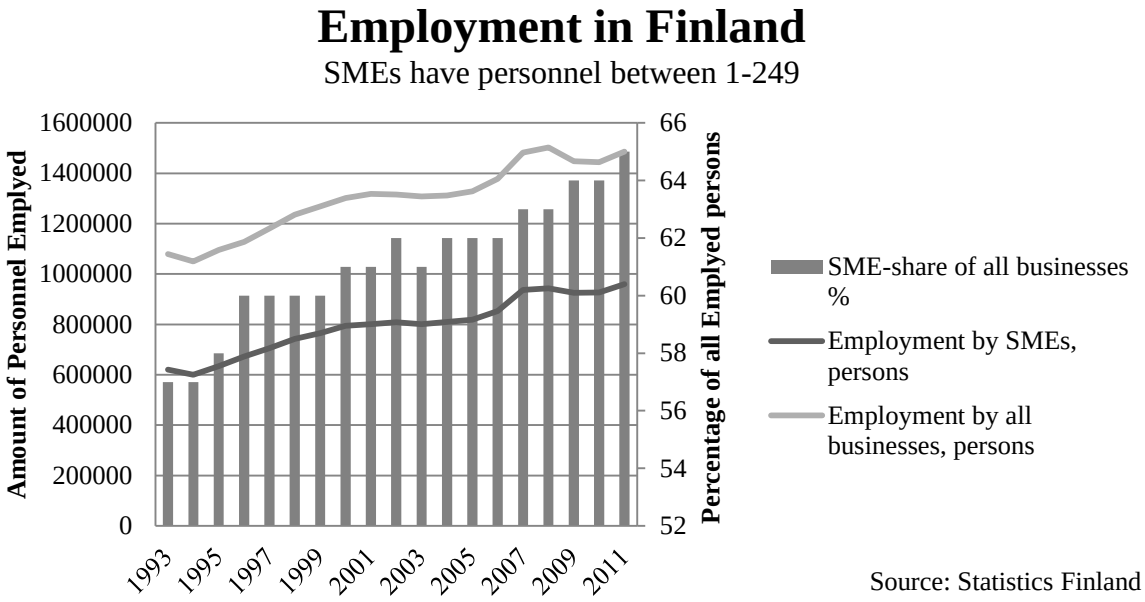

Figure 5. SMEs employ over 60% of working population in Finland. Therefore, the availability of funding might have large effects on Finnish Economy if Finnish SMEs does not have funds to employ.

The Small Business Act research produced by The Directorate General for Enterprise of the European Commission (DG ENTR) as part of the SME performance review 2011 on the state of Finnish SME gives quite a good picture on the situation of SME in Finland. The research can be accessed on European Commissions webpages through enterprise and industry sub-link. The picture above shows some general information about the size and formation of SME in Finland. Table 2 shows that SMEs employ over 64% of the working population of Finland on the on the year 2011 and the . SMEs play a big role in Finnish economy solely due to its effect on employment. The distribution of Finnish SME activities is different from EU average. Wholesale and retail activities are of less importance for Finnish SME and it is

compensated by higher share of all other sectors, i.e. manufacturing, services and most notably, construction (DG ENTR 2011). In addition, a notable specialty of Finnish SME is the high amount of high- and mid-tech SME compared to the European average (DG ENTR 2011). Manufacturing and high- to mid-tech SME have a tendency to be credit rationed more vigorously when banks allocate too large a share of funds to traditional, low-risk-low-return projects, since they can be too complic**a**ted to be understood by the financial intermediaries (Guiso 1998). Although there are no studies on whether business cycles have an effect on it, crisis circumstances might present previously described credit rationing even more strongly.

SME access to finance is considered to be above the EU average on many levels. Although the difference of interest rate levels between loans above €1 million and loans below that threshold is higher than EU average (DG ENTR 2011). This could support Holmström and Tirole's (1997) theory that due to the heightened required returns on loans some companies are left without financing, which I have referred to a couple of times. Another peculiar aspect of Finnish SME financing is the public-owned credit agency, Finnvera, which supports Finnish SME by offering loans, domestic guarantees, making venture capital investments and offering export credit guarantees. Finnvera's goal is to increase the number of starting enterprises; enabling financing for changes encountered by SME; and promotion of enterprise growth, internationalization and exports. Unique research on Finnvera by Saarinen (2012) shows that the operations of Finnvera fills the market gap of external financing which the SME are facing and helps them to grow. However, Saarinen (2012) notes that this cannot be generalized to affect the small and starting ventures, which make up most of Finnvera's customers.

Entrepreneurial firms are usually characterized by significant amount of intangible assets, they are expected to yield years of negative profits and they usually have very uncertain future prospects. Therefore, for some of the SME who are in the latterly mentioned state in their business are constrained of bank finance, because banks are unlikely to invest debt capital to these kind of firms. This can be verified with the analysis which we made earlier in this chapter, where the required return on debt increases to the extent that the SME with low amount of intangible amount of assets cannot satisfy the capital conditions expected by the private debt suppliers. An option for businesses, which witness an obstacle in obtaining banking finance, is to issue new equity or public debt for investors. As we discussed earlier

these two options are less likely to be used by the smallest companies due to their opacity and for some of the SME it is even inconvenient to opt for these funding methods. However, equity can be seen as a possible funding method at all times, since the owner itself or someone in the immediate relationship with the owner could inject equity capital in to the company or a risk-loving venture capitalist could jump in to finance the company's operations.

Consequently, Jensen and Meckling (1976) demonstrated that agency problems between managers and investors may cause conflicts between managers and investors thus having an impact on the willingness of both debt and equity holders to provide capital. As said before due to the personal ties related to relationship lending between banks and businesses the agency problem is partially reduced on the private debt capital part. As an example of agency problem, a manager could raise equity from outside investors to fund wasteful expenditures (luxury offices) because he would not bear the entire costs of these benefits. In the case of debt, if not carefully monitored, manager could raise the riskiness of the firm to levels that are not optimal to the investors. Due to this fact usually the required return on outside public debt, financing can be even higher than for the internally generated funds, often making it undesirable way of funding a business.

So when is optional finance needed? What are the possible circumstances where financial intermediaries cannot finance businesses? There are differences in the monitoring done by banks and private investors. Due to regulation limits, banks cannot hold shares and they are not able to use equity to fund projects. As we discussed earlier banks are not willing to invest in projects which have few collateralizable assets, low amount of own capital and significant uncertainty (Petersen and Rajan (1994)). In addition to that, Petersen and Rajan (1995) argue that banks in competitive markets will be unable to finance high-risk projects because they are unable to charge borrowers rates to compensate for the firm's riskiness. On the side of public financing venture capitalists have a stronger incentive to monitor closer the companies that they are investing in, since they have a stronger upside potential on the profits of the firm if it performs well.

3. Hypotheses

3.1 External Leverage and Financial Crisis

As figure 3 and figure 4 point out, there has been a major reduction in the stock of loans to Finnish non-financial corporations during the financial crisis. The growth of loans during that time dropped to -5% at its lowest during the year 2009. Interesting matter behind this development is the question whether the reductin in lending is caused by demand side factors, the firm-specific factors that affect firms capital structure, or supply side which can be illustrated by figure1 where an exogenous shock drops changes financial intermediaries. According to earlier results from studies by Michaleas et al (1999) and Wijst van Thurik (1993) can be a link between economic conditions and external leverage of companies. However, these studies have concentrated on the effect on level of leverage rather than the significant differences between leverage ratios of subsequent years. In addition, Van Der Wijst and Thurik (1993) argue that these level effects contribution to explanation of debt categories is limited. Researching the differences between subsequent years might yield more interesting results on the subject. As pointed out in the beginning ofthis paper, the main aim of this study is to shed some light between the effects of economic conditions, namely last financial crisis, and leverage.

The effect of recent financial crisis is captured with a dummy variable which captures the unexplained effect of other controlling variables from 2002-2012. A major reduction is expected to be seen close to year 2009, since the major reduction in corporate lending happened during that year as we saw earlier from figure 3 and figure 4, while going through the lending of Finnish banks during the financial crisis. Therefore, financial crisis is expected to be as an exogenous variable determing the amount of external debt capital and the capital structure of SMEs. I expect to see negative correlation to long-term debt, since the supply of loans can be seen to have decreased sharply during the financial crisis. Introduced dummy variables D02- D12 are used to account for changes in the loan supply in similar fashion to Michaelas et Al. (1999) and Van der Wijst and Thurik (1993). Along with the dummies, if credit reduction is witnessed in the preliminary results, new crisis dummies will be created in order to find out wether the crisis period has had significant effect on leverage, compared to the pre-crisis period. Main hypothesis consists of the relationship of the effects of adverse economic events on Finnish SME external leverage. More strict sub-hypotheses come from

the actual findings on literature review, in which the statistics gathered from the Bank of Finland showed a massive decrease in bank lending to businesses during the years when financial system was supposedly affected by the financial crisis.

H1: Adverse economic events have a negative relationship with leverage

H1.1: Year 2009 has negative relationship with leverage.

3.2 Capital Structure Determinants

The aim of the capital structure determinants is to offer control variables for the empirical analysis to study the exogenous effects of financial crisis on Finnish SME capital structure. Another aim of the determinants is to empirically research whether Finnish SMEs capital structure follows the expected relationship with leverage. These determinants follow the capital structure theories explained in literature review and they have been sorted by their respective theories. As a recap from literature review, asymmetric information costs are related to pecking order theory and agency costs along with taxes and bankruptcy costs are related to trade-off theory. The relationship between the determinant and leverage is presented at the end of each paragraph. Main hypothesis thus implies that Finnish SMEs follow their respective capital structure theories.

H2.1: Finnish SME's capital structure follows asymmetric information cost determinants

H2.2: Finnish SMEs' capital structure follows taxes and bankruptcy costs determinants

H2.3: Finnish SMEs' capital structure follows agency costs determinants

Asymmetric Information Cost Determinants

Because SME are not as transparent as bigger companies it is hard for the borrowers to assess the riskiness of them. During shocks to financial system, banks face a change in their loanable funds supply which may affect the availability and cost of loans. This could lead to credit rationing as described by Stiglitz and Weiss (1981). Subsequently banks may increase the degree of rationing for the marginal risk class of firms, while lending to safer classes would be unaffected. Good relationships between bank and SME could alleviate this effect because of trust bonds and generated knowledge through long-time lending relationships, as explained in the literature review. Petersen and Rajan (1994) presented that the availability of finance

from institutions increases as the firm spends more time in relationship with an institution as established banking relationships increase the availability of finance and reduce the cost of credit to firms. In their study Petersen and Rajan (1994) found out that leverage decreases with age, but increases with size. The reason for these results could be derived from the fact that young firms tend to be externally financced while older tend to accumulate retained earnings. Also the evidence from Michaelas et Al. (1999) supports previous result.

Age is negatively related to leverage

Positive relationship between size and leverage is expected. The larger the firm is the more information is provided to outside investors, which means lower information assymmetry between the company and investor (Huang and Song 2006). Rajan and Zingales (1995) state that size is likely to have an inverse relationship with the probability of default, thus enabling large firms to obtain larger amounts of leverage. Titman and Wessels (1988) state that large firms tolerate high debt ratios better because they tend to be more diversified and thus have lower variance of earnings. According to Esperance et Al. (2003) size seems to be one of the most significant factors for accessing financing, especially long term debt. However, in the case of SME where it is reported that because of the fixed transaction costs of securing long term debt, smaller firms would have problems in raising long term debt and thereby those firms would prefer short term debt (Hall et al. 2004). Positive relationship is also reported by majority of papers (Booth et Al. 2001; Guney et Al. 2011; Hirota 1999; Psillaki and Daskalakis 2008). However, there might be some exceptions between types of debt and their maturities as explained previously. As a proxy for size I will use the natural logarithm of firms turnover.

Firm size should be positively related to debt level

Trade credit for SME is a mix of soft information and mutual trust between suppliers and buyers, which is quite similar to relationship lending (Berger and Udell 2006). There are some suggestions that suppliers of trade credit might have informational advantage over other lenders in evaluating their customer's ability to pay, solving incentive problems effectively, reprosessing and reselling goods in the event of default, or witholding future supplies (Petersen and Rajan 1994). Furthermore, there is evidence that trade credit is more used when credit from financial institutions is unavailable and that suppliers of trade credit lend to

constrained firms because they have a comparative advantage in getting information about buyers, they can liquidate assets more efficiently, and they have an implicit equity stake in the firms (Petersen and Rajan 1997). According to Petersen and Rajan (1997), the firm's ability to generate cash internally strongly affects the firm's demand for trade credit. Consequently, it could be argued that internally generated funds precede trade credit in the pecking order, but trade credit precedes external leverage. Voutsinas and Werner (2011) found evidence on negative relation on leverage and accounts payable.

Trade credit is negatively related to leverage

Profitability of a company often acts as the main determinant in choosing between trade-off theory and pecking order theory behind the SME capital structure decisions. According to trade-off theory firms which have higher profitability would have more income to shield thus having higher leverage ratios to shield their income. On the other hand, pecking order theory hypothesis states that owners and managers would be more eager to use internal finance over external finance, therefore we would expect to see lower debt ratios associated with high earnings. Empirical studies have shown negative relationship between profitability and leverage (Aggrawal and Kyaw 2010; Harrison et al. 2011; Margaritis and Psillaki 2010). In addition, Michaelas et Al. (1999) showed evidence of profitability having an effect on changes in the companies' maturity structure of debt. As measures for profitability I have chosen EBIT scaled by total assets, in similar fashion to Sogorb-Mira (2005) and Michaelas et Al. (1999). I would expect these two variables to show the dominance of one of the theories behind company capital structure decisions.

Leverage ratio of a company should be negatively related to profits

Profitable companies prefer short-term leverage over long-term leverage

Taxes and Bankruptcy Costs Determinants

Related to the theory of taxes and bankruptcy costs, non-debt tax shields are seen as a way to shield income from taxation. This leads to the reasoning made by DeAngelo and Masulis (1980) that profitable firms with few non-debt tax shields should use more debt than less profitable firms. As stated in the case of profitability, trade-off theory suggests that in the existence of high profits companies have large amount of earnings to shield from taxes and

thus having high leverage ratios in order to do that. Non-debt tax shield variables have been used in number of studies to act as a determinant for debt ratios (Sogorb-Mira 2005; Michaelas et Al. 1999; Titman and Wessels 1988). An example of non-debt tax shield could be depreciations and amortization which are non-cash-flow based deductions from the taxable income. Along with the previous reasoning I will expect to find negative correlation between debt ratios and non-debt tax shields, because debt is expected to act as the preferred tax shielding tool for companies. This relationship has been witnessed in a number of studies (Bradley et al. 1984; Lord and McIntyre 2003; Taub 1975). I will use depreciation divided by total assets as a proxy for non-debt tax shields in similar manner to Sogorb-Mira (2005) and Michaelas et Al. (1999).

Non-debt tax shields should be negatively related to leverage

As a correction for their paper, Modigliani and Miller (1963) argued that firms would prefer debt to other sources of funds, due to tax deductibility of interest payments. Therefore, as the effective tax rate rises, firms would react to this by taking more leverage in order to reduce taxes.

Effective tax rate (ETR) is positively related to debt

However, Pettit and Singer (1985) pointed out that small firms might be indifferent of tax shield benefits of debt, because they are more likely to yield abundant benefit from debt tax shields. Therefore, small firms would not use debt tax shields because they would not need them.

There is no relationship between leverage and taxes

Agency Cost Determinants

Negative relation to short-term debt and positive relation to long-term debt is expected. Asset tangibility and their collateral value is a commonly used variable in capital structure research. Firms with tangible assets will be subject to less information asymmetries, since they have greater value than intangible assets in case of bankruptcy, thereby reducing the agency costs of debt. It has also been studied that firms which have more tangible assets have higher value in the event of liquidation (Harris and Raviv 1991). However, there are some differences on the effect of tangible fixed assets related to the maturities of the debt. Örtqvist et al. (2006)

state that positive relationship shows that fixed assets are financed with long-term financing, while there could be negative relation between short-term debt supports the pecking order theory, because company would be more eager to use own capital instead of debt capital to fund their short-term financing needs. However, there is no supportive evidence in the literature for the previous statement. There are numerous accounts of positive relationship between leverage and asset tangibility (Chittenden et al. 1996; Sogorb-Mira 2005; Hall et al. 2000).

Leverage should be positively related to asset tangibility

On number of studies business risk has played a role in determining the optimal leverage level for businesses (Titman and Wessels 1988; Michaelas et Al. 1999 amongst others). These studies have suggested a negative relation between volatility of earnings (which is used as a proxy for business risk) and leverage. However, Michaelas et Al. (1999) results showed an inverse counter-intuitive relation between these factors. This was explained by low liquidation costs of small firms, which implies that there were no connection between business risk and leverage. In addition, a study by Jordan et Al. (1998) showed a positive relation between risk and leverage, which was explained by "distress" borrowing during hostile economic environments. Long and Malitz (1985) observed also the positive relation between risk and leverage and it was explained by "moral hazard"-problem outweighing bankruptcy risks. In other words, when companies had enough funding, they could carry on their activities and invest in projects that yielded best returns, which in turn would continue the lending relationship and help the companies to get back to track with their businesses. However, Titman and Wessels (1988) and many others suggest that a firm's optimal level of gearing is a decreasing function of the volatility of earnings due to agency and bankruptcy costs. I will expect a negative relation between leverage and business risk.

Business risk is negatively related to gearing

Growth opportunities are projects, which are yet to be capitalized and are still in progress. As a proxy for growth opportunities, I will use the same determinant as suggested by Titman and Wessels (1988) and Chittenden (1999), which is balance sheet activated intangible assets such as research and development costs in relation to total assets. The relation to debt comes through the theory of agency costs, which was explained in the financial review section of this

study. Myers (1977) suggests that there is a negative relation between leverage and growth opportunities, due to high agency costs. Billett et Al. (2007) find that a negative relation between leverage and growth opportunities could be averted by covenants suggesting that covenants might avert high agency cost problems in high-growth companies. As another agency cost mitigating result, Myers (1977) suggests that firms could issue short-term debt rather than long-term debt to finance their growth rates. Therefore, there could be a positive relation between short-term lending and growth opportunities and negative relation between long-term leverage and growth opportunities.

Long-term debt ratios are negatively related to growth opportunities

Short-term debt ratios are positively related to growth opportunities

The reasoning behind past growth's relation to leverage is largely the same as with the growth opportunities. As agency cost theory suggests, high growth makes it more tempting for business managers to undergo projects that gives them benefit at the cost of bondholders (Myers (1977)). However, Myers (1977) also points out that the agency problem is mitigated if a firm issues short-term debt rather than long-term, which might show up as a positive relationship between growth and leverage in short-term external funding. Michaelas et al. (1999) emphasizes Myer's (1977) proposition more applicable for small business context where the trade-off between independence and availability of finance is likely to be highlighted and where much debt is of a short-term nature. As a proxy for past growth I will use available average growth during the period of 2002-2012.

Past growth is negatively related to long-term leverage

Past growth is positively related to short-term leverage

3.3 Trade-off theory vs. Pecking order theory

All of the previous capital structure determinant serve the purpose of defining the reasoning behind SME funding. If expected effects behind tax shields are supported, it would indicate that trade-off theory would be a defining factor behind SME capital structure and funding decisions in Finland. On the other hand, some determinants are seen as a supportive factor for the existence of informational assymetries between investors and managers, which would indicate that there exists a hierarcy in the financing funds of companies. Due to informational

asymmetries firms will prefer internal to external capital sources (Myers 1984; Myers and Majluf 1984). In SME context this suggests that highly profitable companies tend to finance their investments with retained earnings rather than using debt. SME managers, that are usually at the same time shareholders of these companies, do not like to lose their property and control over these firms (Holmes and Kent 1991; Hamilton and Fox 1998) and therefore the acceptance of new shareholders will be almost insignificant, preferring internal financing to external resources to finance firms activity. I will expect the combined results from determinants and calculations to shed some light on the facts behind SME capital structure and funding in Finland. Table 2 on page 45 shows each determinant, its proxy and expected signs of determinants relationship with leverage.

H3.1. Finnish SME follow Pecking Order Theory in their capital strcuture decisions

H3.2. Finnish SME follow Trade-Off theory in their capital structure decisions

4. Data, Summary statistics and Methodology

The data for the research is gathered from Voitto+ database over the years 2002-2012, which gave financial statements for Finnish companies. Results are gathered from companies that fit the SME[3] status during the years 2002-2012. Time-period is chosen based on analyzing pre-crisis period changes to crisis period. I also gathered age information for these SME from Orbis database. After searching the database for SME and formatting the data, it yielded 33903 observations from 4990 companies. Some of the methods used in empirical research might change the number of observations due to their nature. First part of the empirical study will concentrate on the yearly fluctuations in external debt, second part on the capital structure determinants derived from the hypotheses made and last part will research the funding decisions made by Finnish SMEs. Table 3 on the next page summarizes the descriptive numbers.

[3] For the definition of SME I will use the standard created by European Commission: Under 250 employees, turnover is under 50€ mil. and size of the balance sheet is under 43€ mil.

Table 2. This table shows the proxys for each variable u sed in the calculations and the expected effects for both short- and long-term leverage according to Trade-Off Theory. If these expected results hold, then the empirical results support related theory on the last column of the table

Variable/Proxy	Variable Definition	Expected Effect (Short/Long)	Related Theory
2012, 2011, 2010... 2003	Dummy variables for the year effect on leverage		
2012-2009, 2012-2008 and 2012-2007	Compunded crisis dummies between 2012-2007	-	
Age	The time between year of incorporation and observation year	-	Asymmetric Information
Size	Natural logarithm of turnover	+	Asymmetric Information
Accounts Payable	Accounts Payable / Total Assets	-	Asymmetric Information
Profitability	Net Profit / Total Assets	-	Asymmetric Information
NDTS (Non-Debt Tax Sield)	Depreciation and Amortization / Total Assets	-	Taxex and Bankruptcy Costs
ETR (Effective Tax Rate)	Total Taxes / Net Profit	+	Taxes And Bankruptcy Costs
FTA	Fixed Tangible Assets / Total Assets	+	Agency Costs
Inventory	Inventory / Total Assets	+	Agency Costs
RISK (Business Risk)	Coefficient of Variance during the survaillance period	-	Agency Costs
Growth Opportunities	Research and development + Patents / Total Assets	+/-	Agency Costs
Past Growth	Average Growth Rate during the survaillance period	+/-	Agency Costs
Debt Issuance (Long/Short/Total)	Dummy variable, 1 if share of mentioned debt grows more than 1% of book assets, 0 otherwise	N/A	
Equity Issuance	Dummy variable, 1 if share capital grows more than 1% of book assets, 0 otherwise	N/A	

Table 3. Data for the summary statistics is from two Voitto+ Datasets which covers data of Finnish SMEs for the years 2002-2012 is gathered. Age component is from Orbis databased which is then matched with company names from Voitto+ dataset. The dataset witnesses a loss of data on the year 2006, which is due to unavailability of data through the reliant databases (Voitto+). However, the most important aspect is to compare years 2002-2006 to 2007-2012 and the amount of data is comparable between the two periods despite the lack of data on year 2006. Total amount of data could be expected to yield relevant results compared to earlier studies. Missing variables from risk and past growth are due to the nature of five year minimum period of existence in the study. The differing values over the risk and past growth are mitigated by the FE-Model, which scales those numbers against the years of occurrance in the dataset.

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	**Total**	Variable
ln(Turnover)	7.613401	7.228519	6.709481	6.733251	6.91155	7.162977	7.013345	6.844657	6.857522	6.933299	6.786388	**6.938161**	Size
Depreciation/Total Assets	.0607066	.064824	.06961	.0685302	.0693033	.0596861	.0618646	.0618111	.0589366	.0570423	.0604752	**.0623251**	NDTS
Net Income/Total Assets	.1391095	.1496087	.1542578	.1558326	.1697778	.1476202	.1405726	.1024577	.1014314	.1079781	.1086576	**.1281332**	Profitability
Net Income/Taxes	.2355816	.2303512	.227314	.2120293	.2187687	.2081311	.204794	.1867239	.1793929	.185923	.181782	**.2017563**	Effective Tax Rate
Activated R&D+Patents/Total Assets	.0044131	.0041782	.0046877	.0039226	.002389	.0042422	.0035617	.0032818	.0032126	.0035191	.0027657	**.003682**	Growth Opportuntites
Fixed Tangible Assets/Total Assets	.283373	.2951182	.2947929	.2903154	.2933144	.2708715	.2745711	.2781473	.2719111	.2646735	.2705697	**.2787176**	FTA
Inventory/Total Assets	.2014624	.1820768	.1704729	.1752652	.1943645	.1734823	.1719867	.1743318	.1730547	.1756455	.1810636	**.1764664**	Inventory
Accounts Payable/Total Assets	.1310087	.1221746	.1194927	.1175725	.1260783	.1062938	.1053748	.0967378	.1001782	.1005913	.1036312	**.1083826**	Accounts Payable
Age (Years since incorporation)	16.80517	15.90671	15.00431	15.43802	16.11318	17.6421	18.18149	19.01889	20.06204	21.01905	21.7958	**18.26094**	Age
Long-Term Debt/Total Assets	.1313655	.127702	.1242619	.1185952	.1300837	.1118118	.1129798	.1116765	.1055056	.1035812	.1026462	**.1137865**	LTD
Short-term Debt/Total Assets	.0534009	.0601729	.062691	.0685717	.0672018	.0692388	.0670558	.0654499	.0638953	.0631795	.0592199	**.0640357**	STD
Total Debt/Total Assets	.1847664	.1878749	.1869528	.1871668	.1972855	.1810506	.1800356	.1771265	.1694009	.1667607	.1618661	**.1778222**	TD
Coefficient of Variation for Net Income	1.793455	.9381259	.8437402	.342178	.1091752	.2152807	.088756	0	0	0	0	**.3079779**	Business Risk
Average growth during the period	.2679122	.1279635	.1142679	.0396502	.0214921	.0237859	.0123289	0	0	0	0	**.0422611**	Past Growth
Observations	1858	2219	3482	3509	592	2157	4193	4552	4626	4566	2189	**33943**	
Amount of Firms												**4990**	

4.1. Methods

I have adopted methods from a few different sources. As for the first part of the empirical study I will use the methods used in researches by Michaelas et Al. (1999), Voutsinas and Werner (2011), Leary (2009) and amongst other studies about capital structure. I will use the variables defined earlier to control for the SME capital structure decisions. Furthermore, evidence for preferences between debt and equity is researched. While controlling for the company-specific factors I will try to find out whether there has been a reduction in credit for the companies despite the controlling variables. The data above allows the use of panel data for this research. Regression model for the empirical study will be in a general form:

$$y_{it} = az'_i + \beta x'_{it} + \varepsilon_{it} \quad \text{// Level model} \qquad (1)$$

$$y_{it} - y_{i(t-1)} = az'_i + \beta(x'_{it} - x'_{i(t-1)}) + \varepsilon_{it} - \varepsilon_{i(t-1)} \quad \text{// Difference model} \qquad (2)$$

x_{it} consists of all the explanatory variables which I described earlier and it is a 1xK matrix. Beta is the vector for those individual parameters. z_i includes the individual effect which is not observed by the set of explanatory vectors explaining the correlation between the model and SME leverage. Previously mentioned effect could take effects from industry, individual or group specific characteristics. The correlation between z_i and x_{it} is the main driver behind choosing the optimal model for estimation.

Panel data is seen as most suitable way doing analysis over conventional cross-sectional or time-series data sets (Hsiao 1986). According to Baltagi's (1995) study panel data is a better way to study the dynamics of adjustment and is able to identify and measure effects which are not detectable in pure cross-sections ore pure time-series data. Panel data makes it possible to introduce time specific effects in to the regression. As this study is aiming to study the fluctuation of external debt for Finnish SME and effect on capital structure decisions, panel data model is suitable model for studying time-effects. Moreover, adding time-specific effects as dummies in to the equation reduce or avoid omitted variable bias (Hsiao 1986). Settling with panel data format will leave a question whether to use fixed effects model or random effects model. Hausman test is run in order to specify the right model from the nature of the data gathered for the research. If the value of Hausman test is under 0,05, fixed effects estimator is used. Test results are shown at the

end of the results tables. Also Wooldridge test is run to detect presence of first order autocorrelation.

As with most of the studies of capital structure, I will investigate the various aspects of corporate capital structure. The variables to be studied are related to company leverage. The explanatory variables are considered as external debt, so there are no convertible debts taken into account in this research. Thus, explanatory variables are:

STD=Short-Term Debt/Total Assets

LTD=Long-Term Debt/Total Assets

TD=Total-Debt/Total Assets

Second model used in this study is the fixed-effects logit model, which is used to determine the probabilities of different characteristics on the funding decisions of a Finnish SME during the financial crisis. This is done in the same manner as Voutsinas and Werner (2011) and Leary (2009). Model specification are presented in their respective results tables.

5. Results

Results chapter is divided into three parts: First, going through the effect of financial crisis on external debt in order to find supportive evidence for H1. Then, comparing capital structure determinant results to hypotheses and existing literature and finally seek answers to the pecking order versus trade-off theory with the help of logit model for funding decisions of Finnish SMEs. With all the results derived I will try to picture a view of financial perspectives for Finnish SMEs and reveal whether the financial crisis has any significant effect on their capital structures.

5.1 External Leverage and Financial Crisis

Table 4. Results for panel data regression on yearly dummies for the years 2012-2003 compared to benchmark year 2002. Sample is the same as defined in table 3. Firm-specific control variables are taken into account but excluded from the table but can be seen from Table 7, Table A. Rest of the results for the regression can be seen from table 7.

Explanatory Variables	LTD	STD	TD	
2012	-0.0488*** (-8.83)	0.0595*** (14.14)	0.0106	(1.66)
2011	-0.0428*** (-8.76)	0.0529*** (14.23)	0.0101	(1.78)
2010	-0.0427*** (-9.59)	0.0519*** (15.30)	0.0091	(1.77)
2009	-0.0382*** (-9.34)	0.0481*** (15.47)	0.00990*	(2.09)
2008	-0.0273*** (-7.17)	0.0467*** (16.10)	0.0194***	(4.39)
2007	-0.0213*** (-5.35)	0.0447*** (14.81)	0.0235***	(5.10)
2006	-0.0362*** (-8.09)	0.0765*** (22.50)	0.0403***	(7.80)
2005	-0.0213*** (-6.87)	0.0455*** (19.36)	0.0243***	(6.78)
2004	-0.0161*** (-5.36)	0.0405*** (17.74)	0.0244***	(7.02)
2003	-0.0327*** (-12.03)	0.0833*** (40.32)	0.0506***	(16.10)

t statistics in parentheses

* p<0.05, **p<0.01, *** p<0.001

[#]The ratio of the variable effect on short term debt ratio to the variable effect on the long-term debt ratio (i.e. regression coefficient in short term debt model to regression coefficient in the long term model).

Table 4 is a part of the larger regression table for level model, the rest of the regression results are shown in table 7. These values show the coefficients of yearly dummy determinants relative to the reference year 2002. By looking at the values it can be naievly said that the amount of LTD seems to be decreasing and the amount of STD seems to be growing building up to the crisis years. Yearly effects on TD are unsignificant for the most part of the crisis years.

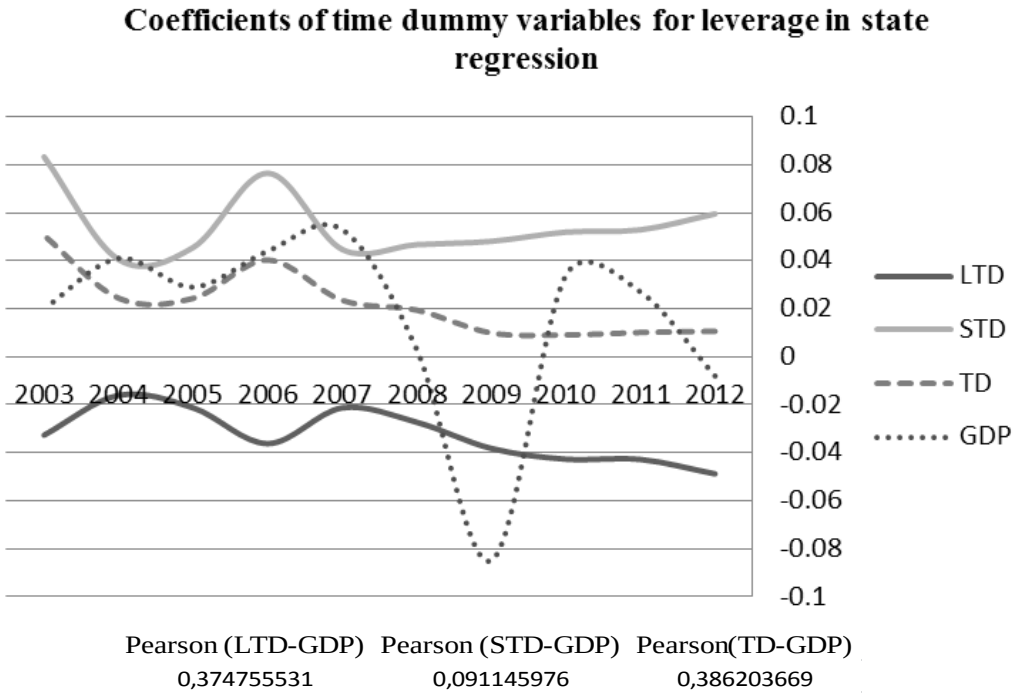

Figure 6. Results for yearly leverage dummies from Table 4 drawn in a timeline and compared against GDP growth. Left-axis shows percentages in decimals.

Figure 6 presents the same effect on the graph. The little kink on the year 2006 is likely to be caused by the missing observations due to the lack ok information on the database. There was no other reliant database from which this data could have been salvaged. However, leverage of the companies seem to somewhat follow general output of the economy during the pre-crisis period and that link seems to be broken during the crisis, where we can see a huge drop in GDP. Pearson correlations between leverages shows us that LTD has medium positive correlation between GDP and STD has low positive correlation with GDP. This indicates the previously stated relation between exogenous factors effect on Finnish SME leverage. Same kind of correlation was also found on Michaelas et Al. (1999). At the time of the recession it seems that long-term leverage is on the decline as short-term leverage is increasing, as data indicated. However, these regression results do not cover the yearly changes on external debt. The level of debt is dependent on the amount of leverage and total assets, thus the yerly changes on external leverage are not uncovered in this model.

To study further the yearly fluctuations on leverage during the economic downturn I will create three sub-set dummies for crisis years. These dummies are regressed in the same manner as the yearly dummies referenced to year 2002, but in this case I will compare the compiled set of crisis year dummies to pre-crisis years and look for a significant change in lerage ratios, while taking controlling variables into account. These control variables are the same as defined in the hypotheses section and those will be analysed further in the next section, therefore they are not included in this part of the analysis.

Table 5. Consolidated Crisis Dummies

Explanatory	LTD	STD	TD
2012-2009	-0.0143***	0.00378*	-0.0105***
2012-2008	-0.00956***	0.000299	-0.00926***
2012-2008	-0.00318	-0.00353	-0.00670*

Table 5 shows the results for these dummy regressions. The table shows a significant change while comparing sub-sets of crisis years is the Crisis3 dummy which yields 1,43 percent decline

in long-term leverage, increase of 0,378 percent in short-term leverage and decrease of 1,05 percent in total leverage comparing crisis years of 2012-2009 to pre-crisis period of 2008-2002. This shows us that there has been a slight change in the maturities of debt on Finnish SME from long-term leverage to short-term leverage but not enough to offset the reduction in total leverages by 1,05 percent. While controlling for firm-specific factors these show us that there has been fluctuations in Finnish SME leverage during the crisis years. This suggest that financial crisis might have had an effect on the ability of Finnish SME to obtain external debt financing but in order to obtain more definitive answers we must take the analysis further.

To approach for the problem in more detail. A difference model is introduced which uses yearly changes in leverage as an explanatory variable and the changes of the capital structure determinants as variables in the regression:

$$dLeverage = Leverage_{t} - Leverage_{t-1}$$

Leverage types are the same as before: LTD, STD and TD. Control variables will be formed also as differences between years in order to find out if the results for capital structure determinants change when the effects on difference scores are studied rather than the level effects. In this model the dummies for yearly effects determine whether there is a significant difference between the baseline year and dummy year. However, this method will result in loss of data, since there are gaps in some of the data. The difference data consists of 4977 companies with minimum amount of observations of 1 per dataset. In addition variables for business risk and past growth are excluded because they are time-frame dependent variables which cannot be transferred into difference format for the new regression. If there is evidence for significant changes in the yearly patterns for external leverage a sub-dummy for those years are created in order to find out whether the effect of the financial crisis is significant compared to other years in the dataset. I will only consider total debt for this matter, since that is the most important indicator of overall external leverage for the businesses in this study.

Table 6. Difference level model calculates the yearly changes in each variable, rather than the level changes between th different observations. dLTD, dSTD and dTD are the respective yearly changes between year t and t-1. All the variabl are also changed to differences between their values at t and t-1. Subset of crisis year dummy effects are shown in parentheses after the dTD explanatory variable. For example, dTD(X) includes only the dummy for the year X. Firm-specific determinants are not shown in this table but are taken into account. Regression model validation statistics are shown in Table 7.

Panel A: Yearly Dummies for Difference Model Regressions			
Explanatory Variables	dLTD	dSTD	dTD
2012	0.000519 (0.12)	0.00855* (2.17)	0.00907* (2.06)
2011	0.000708 (0.19)	-0.00236 (-0.68)	-0.00165 (-0.43)
2010	0.000186 (0.05)	-0.00258 (-0.74)	-0.00240 (-0.62)
2009	-0.00143 (-0.37)	-0.0131*** (-3.65)	-0.0145*** (-3.63)
2008	0.00706 (1.57)	-0.0225*** (-5.37)	-0.0155*** (-3.31)
2007	-0.0204 (-1.60)	0.0254* (2.15)	0.00502 (0.38)
2006	-0.0211*** (-3.70)	0.0233*** (4.41)	0.00228 (0.39)
2005	0.00221 (0.54)	-0.00713 (-1.88)	-0.00493 (-1.17)
2004	-0.00167 (-0.39)	-0.00944* (-2.37)	-0.0111* (-2.50)
Panel B: Compounded crisis year dummies			
Explanatory Variables	dTD(2008)	dTD(2009)	dTD(2008-2009)
2008	-0.00999** (-2.96)		
2009		-0.0117*** (-4.98)	
2008-2009			-0.0130*** (-6.24)

Fixed effects model is used because Hausman test is under 0.05 as can be seen from Table 7 therefore fixed effects model is used in the panel data ragressions. The difference model in Table 6 suggests that there has been a reduction in credit during the years 2008 and 2009. These years are then regressed against all other years in order to find whether the yearly effect is significant against rest of the years in the dataset. Also, an own dummy variable is created for combined effect of both years, which is also shown at table 6.

Crisis dummies yields a significant reduction for total external leverage during the years 2008 and 2009 with respective reductions of -0.99 percentage points for the previous and -1,17 percentage points for the latter time period. Results suggests that financial crisis might have had an effect on Finnish SME by decreasing the amount of total external leverage of the SMEs by previously mentioned amounts. As a vague example, the -1,17 percentage points reduction in external leverage during the year 2009 would mean a decrease of 23000 euros of debt for an

average-sized Finnish SME which has total assets worth 2 million euros[4]. If this was multiplied by the amount of companies in the dataset, 4990, this would indicate an aggregate loss of 116 million euros worth of external leverage. Moreover, the real amount of SMEs in Finland is about 200000 (DG ENTR 2011) if the result was extended to account for all of the Finnish SMEs the absolute reduction would be 4,68 milliards euro. Furthermore, the combined effect of both 2008 and 2009 would be even larger with the respective dummy variable indicating a reduction of -1,3 percentage points. Shown figures can be speculative when taking into account all of the SMEs in Finland. However, the aim of these examples was to highlight the possible magnitude of the effects of adverse financial shocks on Finnish SMEs.

Obtained results from the difference model provides further evidence on the effect which we saw on the level model. The level model indicated a reduction in the ratio of external debt to total assets during the crisis period and the difference model showed a decrease in debt on Finnish SMEs during the years 2008 and 2009. *Therefore, the results support a negative relation between external leverage and crisis year of 2009.Thus, H1.1 is accepted. This result also provides suggests that financial crisis had a negative effect on Finnish SMEs leverage.* In addition to the hypotheses, the results show a significant negative relationship between year 2008 and leverage. This could be due to pre-emptive rationing of credit of SME credit before the major reduction of bank lending in 2009.

5.2. Capital Structure Determinants

The results of firms specific capital structure determinants can be seen from table 7 on page 54, which are a part of the previously used regressions on yearly dummies. These results are combined from the regressions that were run for the time-effects on debt on the previous section for level and difference regressions. These determinants are the same as the used control variables in determing the exogenous factors' effect on external leverage. Most important independent variables, which are shown in Panel A, there are the results for level model regressions. On Panel B of table 7, there are the results for difference model regressions. As can be seen from the table, both regression methods give the same relationship sign for their

[4] (Total Leverage-Total Leverage$_{t-1}$)/Assets=D09 →(Total Leverage$_t$-Total Leverage$_{t-1}$)=Assets*D09=23000 // Assets are assumed to stay at 2mil. for both time periods.

respective determinants. Level model results provide results on the relationship between characteristic and external leverage, while difference model results from dTD provide a determinant's magnitude of effect on external leverage. Some of the determinants were left out of the difference model due to mathematical practicalities. These variables will be analysed based solely on the level regressions.Table 8 at the end of the chapter summarizes the relationships between leverage and capital structure determinant.

Hausman test is done for each regression to determine whether to use fixed effects model or random effects model. If the result of Hausman test is under 0.05 then fixed effects model will be used for the regression, along with the lines of Voutsinas and Werner (2011). Low and negative adjusted r squares on difference model might be due to loss of data coupled with high amount of fixed effect dummies which leads to poor adjusted r squared values. However, this might not indicate that the model does not have explanatory power, it shows that finding out the goodness of fit for these FE-models might be hard to determine through these tests. On the other hand, while the adjusted square value are low, it might mean that the model itself does not explain the overall leverage leves, or leverage differences between years but it will quite accurately tell the effect of firm-specific factors and yearly fluctuations on leverage. High F-values and zero p-values of F for all of the models shows that the regressions fit the data well, which indicates that these methods represent meaningful relationships between the input factors. FE-models have been used by Sogorb-Mira (2008) and Michaelas et Al. (1999) and Voutsinas and Werner (2011) in their capital structure studies.

Results present support for negative relationship between age and leverage. This could be because young start-up firms are externally financed, thus they face higher leverage ratios than older companies, which finance their operations with internally generated profits.The same result was found also on Michaelas et Al. (1999) and Vigren (2009).

Table 7. Results for panel data regressions on capital structure determinants for the level and difference regressions. Explanatory variable is leverage type divided by total assets. Yearly effects have been taken into account but excluded from this table but can be seen from table 4 and table 6 . Data sample and variable definitions for the regressions can be seen from table 3. Level model regresses the yearly level of leverage against firm-specific factors and difference model regresses the differences between consequtive year's leverage against consequtive year development of firm-specific factor.

Panel A: Results for Level Models			
Explanatory Variables	TD	LTD	STD
Size	0.0220***	0.0142***	0.00778***
Age	-0.00491***	-0.000783	-0.00413***
Profitability	-0.192***	-0.127***	-0.0650***
NDTS	-0.181***	-0.211***	0.0302
ETR	-0.0713***	-0.0526***	-0.0188***
Business Risk	-0.00203***	-0.000808*	-0.00123***
Growth Opportunities	0.319***	0.281***	0.0385
Past Growth	-0.00495	-0.00726**	0.0023
FTA	0.356***	0.266***	0.0903***
Inventory	0.0896***	0.0149	0.0747***
Accounts Payable	-0.279***	-0.177***	-0.102***
cons	0.0830***	0.0297*	0.0533***
N	33714	33714	33714
Adj. R^2	0.635	0.55	0.442
F-Statistic	75.23	283.45	195.4
Prob > F	0	0	0
Hausman	0	0	0
Fixed Effects	OK	OK	OK
Panel B: Results for Difference Models			
Explanatory Variables	dTD	dLTD	dSTD
Size	0.0154***	0.00784***	0.00756***
Profitability	-0.141***	-0.0825***	-0.0587***
NDTS	-0.160***	-0.109***	-0.0511
ETR	-0.0169**	-0.0173**	0.000415
Growth Opportunities	0.122*	0.144**	-0.0217
FTA	0.257***	0.182***	0.0750***
Inventory	0.0304**	0.00262	0.0278**
Accounts Payable	-0.264***	-0.150***	-0.114***
cons	-0.00234	-0.00498	0.00264
N	22612	22612	22612
Adj. R^2	0.06	-0.034	-0.083
F-Statistic	132.17	59.11	29.24
Prob > F	0	0	0
Hausman	0	0.019	0.0027
Fixed Effects	OK	OK	OK

t statistics in parentheses

* p<0.05, **p<0.01, *** p<0.001

As we can see from results for size, there is a positive relationship between long- and short term leverage with size. This means that the bigger the company is the more leverage it can bear and manage. This shows some support for the fact that smaller firms face financial constraints due to their size. This was analysed earlier in the literature review and it is a defined concept in Holmström and Tirole's (1997) paper on loanable funds theory and on Stiglitz and Weiss (1981) paper on Credit Rationing. Same result is shown in papers by Michaelas et Al. (1999), Vigren (2009) and Sogorb-Mira (2005). As the first defined variable on the differencial regression the effect of age can be read as following; increase of 1 natural logarithm in size will result in 1,54% increase in leverage level of the company.

Leverage has a negative relationship with accounts payable, as expected. This shows us that accounts payable is seen as a substitute for private external debt. Also, as Petersen and Rajan (1994) point out, the suppliers of accounts payable might find it easier to liquidate companies which are not able to meet the financial obligations to the trade credit suppliers. Thus, trade credit increases the amount of bankruptcy risk.

Lastly, asymmetric information cost determinants revolve around the relationship between profitability and leverage. The results show that profitability has a strong negative relationship with leverage. This goes in line with most of the results shown in literature and in Michaelas et Al. (1999) it is suggested that it provides some evidence for Myer's pecking order theory. This is because SME will make use of internally generated funds as a first option for financing and uses external financing only when it is mandatory in order to finance essential investments. Therefore, SME who yield high profit margins have more internal funds available and thus, they will not need as much debt financing as less profitable firms. In addition, the results show us that profitability of a business affects the maturity structure of the company. The negative relations between long-term and short-term ratios show us that for more profitable firms there is a larger decreasing effect on long-term leverage. Table 7 shows that the ratio between long-term and short-term coefficients is 0,44, which suggests that in the event where internal profits become apparent, long-term financing will be substituted first.. In addition the logit model in next section supports the fact that profitable companies favor issuing short-term debt over longt-term debt.

These results are in line with earlier research by Chittenden et. Al (1999), Van der Wijst and Thurik (1993) and Jordan et al. (1998).

Results show support for H2.1.

Non-debt tax shields have negative relationship with long-term debt and total debt, which are significant and non-significant positive relation with short-term debt. *This provides support for H6.* This follows the results of Sogor-Mira (2005), which are the results expected by trade-off theory (DeAngelo and Masulis 1980).

Effective tax rate has negative relationship with leverage, which is on the contrary to what was expected by DeAngelo and Masulis (1980) and the results are similar with the studies of Sogorb-Mira (2005) and Michaelas et Al. (1999). Sogorb-Mira (2005) state that this could be because of reverse causation between taxes and the firm leverage variable. In this case, companies which have higher debt level would pay fewer taxes. Alternatively, Sogorb-Mira (2005) argues that it might also be due to SME managers would use other means to decrease their debt levels, such as non-debt tax shields as explained earlier.

Results do not support H2.2.

First hypothesis considering agency cost determinants is asset tangibility. Both tangible fixed assets and inventory are expected to yield positive relationship with leverage. Michaelas et Al. (1999) had the same result and they explained it with information assymetries and agency problems in the small business sector. Moreover, lenders might be unwilling to lend for them due to the danger of asset substitution, which means that small companies are more prone to exchange low-risk assets of a company for high-risk investments. To encourage lending, small firms offer collateral as a security of bank loans. Sogorb-Mira (2005) state that SME are more likely to suffer from moral hazard and adverse selection problems, therefore the collateral value of their assets could help to reduce borrowing problems. Therefore, FE-model suggests that Finnish SME which have high amount of fixed tangible assets and high inventories are more able to raise higher levels of leverage ratios.

In addition, the results show a quite similar pattern in the leverage maturities for different collaterals as in Chittenden et Al's (1999) study for UK SME. When Finnish companies use fixed tangible assets as collaterals they have about 3 times more chance to ask for long-term financing. As for inventory as a collateral, Finnish SME have 5 times more chance to ask short-term financing than long-term financing. These figures can be seen from the last column on Table X. However, inventory is not a significant determinant for long-term leverage. The results follow the same results as Chittenden et Al (1999) and Sogorb-Mira (2005). Altough the results shown in this paper present a positive relationship with leverage for all maturities Vigren (2009) finds a negative relationship with fixed tangible assets and short-term debt.

According to Pettit and Singer (1985) bankruptcy costs would be higher for small companies, and thus negative relationship is expected between leverage and businesss risk. In addition, Bradley et al. (1984) pointed out that in order to ensure a negative relationship between risk and gearing very significant costs of financial distresses are necessary. Michaelas et Al. (1999) yielded non-significant results for small firm risk relationship with leverage. Therefore, they argued that the bankruptcy costs were not significant enough to ensure a relationship between risk and gearing. However, the results show that for Finnish firms bankruptcy costs seem to be significant since the relationship between risk and leverage is negative for all maturities of leverage.

Growth opportuntities are connected to leverage via positive relationship for all maturities, yielding a significant relationship between long-term and total debt and a non-significant relationship with short-term finance. However, results contradict the expected effect. Past growth variable is expected to yield same relationship with leverage as growth opportunities. As can be see from table 7**,** the relation between past growth and leverage is as expected. The results for growth opportunties might indicate that small firms are likely to have insufficient internal funds to finance their investments, thus they resort to long-term debt as a way to finance their growth opportunties. This supports pecking order theory, because it shows that SME managers are reluctant to issue equity and lose control of their company. Past growth results indicate the same support for pecking order theory, since growing companies want to decrease their long-term leverage and increase their short-term leverage in order to lessen the debt suppliers control over the firm.

There is strong support for H2.3 even though one determinant yields non-expected result all of the others are supported.

Table 8. This table shows whether the results support the hypothesised theories by their respective firm-specific determinants

Variable/Proxy	Expected Effect (Short/Long)	Related Theory	Supported by Results?
2012-2009, 2012-2008 and 2012-2007	-		YES
Age	-	Asymmetric Information	YES
Size	+	Asymmetric Information	YES
Accounts Payable	-	Asymmetric Information	YES
Profitability	-	Asymmetric Information	YES
NDTS (Non-Debt Tax Sield)	-	Taxex and Bankruptcy Costs	YES
ETR (Effective Tax Rate)	+	Taxes And Bankruptcy Costs	NO
FTA	+	Agency Costs	YES
Inventory	+	Agency Costs	YES
RISK (Business Risk)	-	Agency Costs	YES
Growth Opportunities	+/-	Agency Costs	NO
Past Growth	+/-	Agency Costs	YES

5.3 Trade-off Theory vs. Pecking Order Theory

The last hypothesis needs to be examined by going through all the obtained results in this research. According to the expected effects, there are some determinants which yielded results that differed from them. The differences showed that effective tax rate has the opposite efffect which was expected by the theory of DeAngelo and Masulis (1980) about tax benefits and bankruptcy costs as main drivers behind capital structure. Another interesting results was from growth related determinants, which proved that companies which are seeking for funding prefer to use long-term external debt financing for their growth investments. However, the realized growth in the past indicates that growing firms like to decrease their long-term lending and opt for short-term lending, which would indicate support for pecking order thery on the basis of company managers not wanting to give up the control of their company to the external fund suppliers. Sogorb-Mira (2005) pointed out that for Spanish SME financing relies on internal resources instead of external means and I expect the same in case of Finnish SME. Naive assumptions from the capital structure determinants can be fortified by analysing the funding choices of Finnish SME during the surveillance period. However, the results might not offer a broad generalizable results since capital structure studies have been going for over 60 years without consensus for the theory. Therefore, the aim of this part of the study is to shed some light on the funding patterns that specify Finnish SME, since they have not been studied before and

look for support from the major capital structure theories, pecking order theory and trade-off theory, for the financing choices of this specific group.

Table 9. Logit Model for Finnish SME Funding Decisions. Debt Issuance = Debtt-Debtt-1 > 0,01*Total assetst-1, 1 if true and 0 if false. LTD vs. STD = 1 if LTD-issuance =1 and 0 if STD-issuance=0, dual issuances are not taken into account. Equity Issuance = Equity Capitalt-Equity Capitalt-1>0,01*Total Assetst-1. Sample is gathered from the initial data sample described in Table 3 according to aforementioned sorting methods for capital issuances. Variables are also defined in table 3. LTD = Long-term Debt, STD = Short-term Debt and TD = Total Debt.

Panel A. Fixed-Effects Logit models for external funds issuances.

Explanatory Variables	LTD-Issuance	STD-Issuance	LTD vs. STD	TD-Issuance	Equity-Issuance
2012-2008 (d)	-0.238*** (-4.17)	-0.166* (-2.54)	-0.00201 (-0.02)	-0.274*** (-4.93)	-0.0780 (-0.64)
Size	0.424*** (10.13)	0.382*** (8.33)	0.396*** (5.04)	0.400*** (10.47)	0.279** (2.93)
Age	-0.0378*** (-3.67)	-0.0111 (-0.98)	-0.0855*** (-5.30)	-0.0145 (-1.50)	-0.132*** (-5.50)
Profitability	-2.381*** (-16.88)	-1.943*** (-12.64)	-2.008*** (-8.51)	-2.312*** (-17.44)	-1.337*** (-4.49)
NDTS	-3.212*** (-4.77)	-2.795*** (-3.66)	-1.071 (-0.99)	-2.927*** (-4.44)	0.702 (0.48)
ETR	-0.336* (-2.38)	-0.266 (-1.77)	-0.0892 (-0.37)	-0.450*** (-3.44)	-0.259 (-0.79)
Business Risk	-0.00704 (-0.41)	-0.0115 (-0.61)	-0.0416 (-1.48)	-0.0646*** (-3.68)	-0.0278 (-0.44)
Growth Opportunities	3.256*** (3.46)	1.129 (1.07)	2.684 (1.60)	2.636** (2.92)	0.982 (0.58)
Past Growth	-0.0794 (-0.57)	0.188 (1.46)	-0.799** (-2.88)	-0.104 (-0.88)	-0.932 (-1.75)
FTA	2.560*** (12.64)	2.238*** (10.00)	1.550*** (4.56)	2.574*** (13.15)	1.248** (2.77)
Inventory	0.881*** (3.98)	1.343*** (5.65)	0.527 (1.44)	1.606*** (7.82)	0.677 (1.38)
Accounts Payable	-1.375*** (-5.73)	-1.621*** (-6.26)	-1.147** (-3.05)	-1.426*** (-6.42)	-0.734 (-1.39)
Fixed Effects	OK	OK	OK	OK	OK
N	21571	17701	6364	23386	3754
χ^2	754.28	443.43	173.55	868.02	108.4
p-value	0	0	0	0	0

Panel B. Marginal effects results for Fixed-Effects Logit models for external funds issuances.

Explanatory Variables	LTD-Issuance	STD-Issuance	LTD vs. STD	TD-Issuance	Equity-Issuance
2012-2008 (d)	-0.0186***	-0.00943**	-0.000269	-0.0156***	-0.0184
Size	0.0340***	0.0221***	0.0530***	0.0235***	0.0661***
Age	-0.00303*	-0.000640	-0.0114*	-0.000854	-0.0312***
Profitability	-0.191***	-0.112**	-0.269**	-0.136***	-0.316***
NDTS	-0.258**	-0.162*	-0.143	-0.172**	0.166
ETR	-0.0270*	-0.0154	-0.0119	-0.0264*	-0.0612
Business Risk	-0.000564	-0.000667	-0.00557	-0.00380**	-0.00658
Growth Opportunities	0.261**	0.0654	0.359	0.155*	0.232
Past Growth	-0.00637	0.0109	-0.107	-0.00614	-0.221
FTA	0.205***	0.130**	0.207**	0.151***	0.295**
Inventory	0.0706**	0.0777**	0.0704	0.0944***	0.160
Accounts Payable	-0.110**	-0.0938**	-0.153*	-0.0838***	-0.174
Fixed Effects	OK	OK	OK	OK	OK
N	21571	17701	6364	23386	3754

Marginal effects; t statistics in parentheses
(d) for discrete change of dummy variable from 0 to 1
* p<0.05, ** p<0.01, *** p<0.001

The calculations for the results on Table 9 follow the study by Leary (2009) to find relationships between capital structure determinants and the funding decisions of Finnish SMEs. The results on

the tables are divided between logit results and marginal effect results. The latter can be viewed as percentage probabilities, therefore marginal effect results from Panel B will be referred at the text. are formed in percentage probabilities. The aim of the fixed-effects logistc regression is to find out whether Finnish SME funding decisions follow a certain capital structure theory. Explanatory variables are divided into different types of issuances which are explained in the row for explanatory variables. Most important explanatory variables for this research are Total Debt issuance (TD-Issuance) and Equity Issuance. In addition to the most relevant results considering this paper, there are also some interesting results consider Finnish SME financing. which I will cover shortly.

Table 10. The effect of changes in base case profitability on probability of external funding issuance in table 9.

Panel A. Debt issuance							
ΔProfitability	-3 %	-2 %	-1 %	Base at mean	1 %	2 %	3 %
ΔProbability	0.74 %	0.50 %	0.25 %	-13.06 %	-0.25 %	-0.51 %	-0.77 %
Panel B. Equity issuance							
ΔProfitability	-3 %	-2 %	-1 %	Base at mean	1 %	2 %	3 %
ΔProbability	0.27 %	0.18 %	0.09 %	-30.16 %	-0.09 %	-0.17 %	-0.26 %

The most important factor to follow in table 9 is profitability, because profitable companies are the ones that have options in choosing their way of financing their operations. From the table it can be seen that highly profitable firms prefer other sources of funding over external debt. Table 10 shows how the relative changes go if the base mean value for the marginal effects changes. Finnish SMEs preference for internal funding is explained by the negative effect of profitability on their issuance. According to table 9, if a SME has profitability ratio of 10% it would mean -1.36% reduction in the propability on issuing external debt. In addition, the more profitable the company becomes the more it will shy away from external funds as we can see from table 10. A 1% increase in profitability would decrease the probability of external debt issuance by 0.25%. Equity issuance decisions are not as much influenced by changes in profitability but thei exhibit the same relationship as debt. Interestingly, profitable companies also opt for short-term debt which can be seen from the results for LTD vs. STD where the negative coefficient on profitability shows preferrence on short-term external debt over long-term external debt. Another

interesting result is the probability of a profitable company to issue external equity. Reduction in the probability of issuing external equity for a SME which has a profitability ratio of 10% is -3.16%, which is a lot higher reduction than in the case of external debt (-1.36%). On a further note, table 10 shows that probability of equity issuances reaction to profitability changes is smaller than its effect on the probability on debt issuance.

Non-debt tax shields are also a major negative factor considering the probability of a debt issuance for a business. Either the company already has such an amount of investments on non-tax shield yielding assets that they do not seek for additional investments nor additional external financing, or that the company already has enough tax averting shields to justify taking additional debt. Long-term leverage issuing probability is negatively related to age.

However, growth opportunities and fixed tangible assets have an equal or even stronger opposite effect on leverage from profitability. Not including short-term leverage, tangible assets favor using external debt capital in order to finance these investments. This also suggests that tangible assets are seen as a collateral for a loan and thus financial intermediaries lend to companies which have collaterals to offer. This is in line with the theory of loanable funds by Holmström and Tirole (1997) from the literature review. Other factors increasing the probability of debt issuance is growth opportunities. This fortifies the result from agency cost capital structure determinants which suggested that Finnish SME prefer to use external debt to finance their growth opportunities. As explained in previous section, businesses might be short on cash to invest in these projects, thus opting for external debt. In addition, growth opportunities seem to have no relation with equity issuance, which suggests following: Finnish SME prefer to use debt over equity to finance growth investments, equity investors consider financing growth investments too risky or there is friction in the equity financing markets for Finnish SME. However, this subject goes off the boundaries of this study. Size has a positive relationship with leverage. An average sized company in the dataset has turnover of about 1 million (ln 7), which indicates that those companies have about 14% more chance to issue debt.

The amount of observations show that external debt is used significantly more frequently as a source of funding for Finnish SMEs. By nature of fixed effects regression, companies which have

had atleast one issuance of either equity or debt are included in their respective issuance category. Therefore, the observation amount of 23386 for debt compared to 3754 for equity indicates debt preferance by a large margin. However, it has to be adressed that SMEs have by definition worse entrance to external equity markets and most of the external debt funding for these SMEs might be from their existing owners. Therefore, this result is just suggestive rather than definitive.

In this case it is safe to say that Finnish SME which are profitable, thus potentially have internal funds at their disposal, prefer to use them over debt issuance and if they issue debt, they prefer short-term leverage over long-term leverage. The aim of the logit model was to fortify the results of capital structure determinants and gain further views on funding choices of Finnish SME. As an result, outcome of the model suggests support for pecking order theory.

Equity issuance has same propereties as debt issuance, profitable companies restrain from issuing equity and use other sources of financing instead of equity. Subsequently, we got negative results from both debt issuance and equity issuance probability when a company is profitable, which suggests that internal funds are preferred over external sources of funding when a company has available internal funds. These results are in line with the earlier results from the earlier fixed effects regression model.

Table 9 also shows the amount of external fund choices during the time period by comparing the amount of equity issues and debt issues. As can be seen from the table, debt issues represent most of the external funds issued. This suggests that debt is preferred method of external financing for Finnish SME and that equity issuances are rarely used. This would indicate four points supporting the pecking order theory hypothesis:

1. Profitable companies favor internal funds over external funds.

2. Profitable companies favor debt over equity.

3. Debt is used significantly more frequently as an external source of funds than equity.

Results above are supported in both fixed-effects regression model and fixed-effects logit model. *Therefore, the results support H12.1.*

However, most of the results seem to follow the hypothesized results on trade-off theory. The fact that effective tax rate shows an opposite results to hypothesised it indicates that Finnish SME do not adjust their leverage in order to lower their effective tax rate. This indicates that tax decisions related to capital structure are not as expected by theory, thus it weakens the trade-off theory proposition for Finnish SME. *H12.2 is rejected.*

Furthermore, financial crisis severly decreases the propability of Finnish SME issuing external debt in order to fund their operations. Dummy for years 2012-2008 is introduced to reveal the effect of financial crisis on credit supply. The reasoning for choosing the previous dummy variable is based on the significant results from level and difference regression on the yearly credit fluctuation results. During the crisis period long-term debt issuance was decreased by 1,86%, short-term debt issuance is decreased by 0,943% and total debt issuances by 1,56%. While the equity issuance seems to have insignificant negative propability of 1,84%. This suggests that, while controlling for company specific factors, the supply of external debt was significantly hindered during financial crisis. Werner and Voutsinas (2011) and Leary (2009) also saw the same effect in their studies considering the effects of financial shocks on capital structures and credit supply. The negative values on crisis determinants suggests that Finnish SME are even more reliant on internal financing during financial shocks, thus forcing them to finance their operations by internal funds.

6. Conclusions

The capital structure of SMEs has been the source on a number of studies and the results have been varying. Subsequently, this might be because these results are depended on the subject various factors considering the chosen group of companies and characteristics of those companies alongside with geographical and legislative matters. These studies have been concentrated on the demand side of the capital structure decisions. However, expanding the theory framework to supply side, where financial intermediaries are expected to have an effect on the capital structures of the companies is not as studied subject. This study is conducted by combining time and firm-specific factors in panel data in order to study the aforementioned supply and demand side dynamics and shed some light on the funding choices of Finnish SMEs.

According to the results of this paper, the 2007 financial crisis had a significant effect on capital structures of Finnish SMEs. Worsened economic conditions made it harder for Finnish SMEs to obtain external financing from financial intermediaries. Drawing conclusions from the loanable funds theory (Holmström and Tirole 1997) this could be the result of banks requiring more return on their debts, expecting the borrowers to place more of their own capital in stake to obtain the loans or banks inabilities to lend due to lowered bank capital. Another explanation might be rationing of credit to Finnish SMEs. Problems in obtaining the most preferred method of financing, internal funds, due to worsened economic conditions and worsened ability to obtain credit due to reduced supply of external debt might leave many Finnish SMEs with financing problems although their operations might be on a stale basis.

Capital structure determinants follow quite closely expected results with a few exceptions. Size and asset tangibility increases the leverage of the companies. Unexpectedly, effective tax rate shows a positive relationship with leverage which hurts the validity of trade-off theory as the basis of Finnish SME capital structure decisions. Age, profitability, non-debt tax shields and business risk show a negative relation to debt as was expected by their respective capital structure theories. However, growth opportunities show a positive relationship between leverage which is against the underlying agency costs theory. The results indicate support for pecking order theory hypotheses, since none of related hypotheses were rejected. Two of the hypotheses considering trade-off theory were rejected. However, literature shows a lot of variability in the results of capital structure determinants. Therefore, these results do not offer an explicit answer for the funding decisions behind Finnish SMEs.

Regressions for funding choices showed three main results for Finnish SMEs. First, Finnish SMEs favor internal funding over external financing. Second, debt is preferred method of external financing. Lastly, debt is more frequently used method of external financing compared to equity financing. These results indicate a stronger support for pecking order theory as the underlying theory behind Finnish SME funding choices, than the results for capital structure determinant in the earlier section. In addition, crisis period seems to have negative relationship with external funds issuance that might indicate, with the support from earlier results of the

thesis, that Finnish SMEs face supply side constraint on their financing during adverse economic events.

There have not been earlier studies in Finnish SME context. Thus, this study provides new information on the financial environment of small to mid-sized businesses in Finland. This study reveals a reduction in supply of loans to Finnish SMEs but does not address where these problems arise. As explained in the text, this might be due to credit rationing or weakened financial strength of banks. Researching the earlier crises and comparing the indicated results to these might present interesting dynamics between capital structures and financial crises of Finnish SMEs. This study also has its restrictions since the available data was not as perfect as one would want. Although, the results indicate significant relationship with aforementioned variables, picking a larger amount of gapless data might yield some changes in the variables. Due to the high significance of my results, I would not expect the signs of the relationships to change even if the chosen data was more extensive.

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