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Changes in investment and financing policies during the financial crisis in Northern Europe

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Abstract

Title:	Changes in investment and financing policies during the financial crisis in Northern Europe
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Authors:	Joakim Ericsson and Lina Khaled
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Key words:	Investments, Financing, Capital expenditures, Bank lending supply shock, Credit supply shock, Demand shock of services and goods, Amplification mechanism
Purpose:	The main purpose of this thesis is to investigate the financial crisis effects on financing- and investment activities by researching the changes in capital expenditures, net debt issuance, equity issuance and cash holdings in the light of demand and supply shock theories..
Theory:	The theoretical framework is based on the follwingg theories; Bank lending supply shock, Credit supply shock, Demand shock of services and goods, Amplification mechanism
Methodology:	Difference-in-Difference and Abadie and Imbens matching estimator method is conducted in order to study the changes in our dependent variables.
Empirical Foundation:	The study includes 591 firms listed on Nasdax OMX Nordic, ODAX and FTSE under the last financial crisis.
Conclusion:	The thesis support the credit supply shock theory that high leverage firms were more affected and high cash firms less affected, contradicts bank-lending shock theory by indicating that bank-dependent firms were less affected

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1. Introduction

The first chapter will provide a background of the financial crisis which will lead up to a problem discussion of the impacts the financing supply shocks had on firm's investment activities. This sets the foundation of the thesis. This is further narrowed down to a statement of purpose and research questions followed by delimitations.

1.1 Background

The financial crisis of 2007 and 2008, following the burst of the housing bubble in US, was the largest financial turmoil since the Great Depression. The crisis affected firms' ability to get financing, which is one of the key determinants of the investment activities. If a firm cannot finance its investment plans, it cannot proceed with the investments. To understand the depth of the crisis, it is important to understand the causes behind it. The years leading up to the crisis can be described as a low interest rate environment where capital inflows from Asian countries and lax interest rates policy pushed down the interest rate. The Asian countries used US securities to fix their exchange rate and hedge against a depreciation of their own currencies, a lesson from the late 1990s Southeast Asian crisis. The Federal Reserve Bank promoted the low interests and therefore did not restrain the raise of the housing bubble due to fears of deflation following the Internet bubble. The cheap debt financing allowed firms and individuals to purchase assets to a greater extent than compared to more normal times. (Brunnermeier, 2009)

Another factor in the build-up of the crisis is the innovation and transformation within the banking system. The traditional banking model got replaced by a new model where banks through securitization pooled, tranched and resold their issued loans. These structured finance securities such as collateralized debt obligations (CDO's) and mortgage backed securities (MBS's) were then resold to investors that supposedly were the best at handle the risk. But the statistical models underestimated the default risk on mortgages, since declining house prices were largely a regional phenomenon, where the US had not experienced a national decline in home prices since World War II. (Coval, Jurek and Stafford, 2009) To further enhance the creditworthiness of the structured finance securities, investors bought Credit Default Swaps (CDS) to offset the risk of default. This created a new demand for issuing of loans, where the

lending standards declined, resulting in lending to a new category of people who previously had too low credit scores to be granted loans. (Benmelech & Dlugosz, 2009; Demyanyk & van Hemert, 2008; Keys, Mukherjee, Seru and Vig, 2010) This facilitated tripled home prices between 1995 and 2006, but then prices fell roughly 30 % between 2007 and 2009 (Case, 2008; Mayer, Pence and Sherlund, 2009). The resold loans often ended up in the ownership of an investment bank, meaning that large parts of the credit risk actually never left the banking system (Duffie, 2008). Structured finance securities were often used by banks to overcome restricting capital regulations such as Basel I and Basel II (Brunnermeier, 2009).

A third factor behind the crisis was the trend towards financing with shorter maturities, which is cheaper because investors prefered shorter maturities and thus put a smaller maturity premium on shorter maturities (Bryant, 1980; Diamond & Dybvig, 1983; Allen & Gale, 2007). The off-balance-sheet investment vehicles, which were used when creating other CDO's, used financing with a maturity rate of an average of 90 days. This created a funding liquidity risk when investors suddenly stop financing. The new banking system and the low interest rate environment, facilitated the extensive lending and fuelled the housing bubble, and also the trend towards shorter maturities made the financial system more sensitive to shocks. In February of 2007, following a decline in housing prices, an increase of defaults of subprime mortgage took place. Furthermore in May of the same year UBS shut down the hedge fund Dillon, following the loss of $125 million. This lead rating firms to reviews and downgrade subprime securities, and later to problems for Bear Stearns and Countrywide Financial Corp. As the crisis unfolded, a large numbers of financial institutes around the world were in bankruptcy or near bankruptcy. As the uncertainty and losses spread through the financial system the liquidity in the financial market froze and a large contraction of debt issuance began. These lead to consequences where even the largest and well reputed had problems acquiring the financing they required. (Brunnermeier, 2009; Gorton, 2010; Acharya, Philippon, Richardson & Roubini (2009)

1.2 Problem Discussion

Firm's access to financing, with bank loans, credits, equity were all key determinants in the firm's investment activities, but also internal financing such as cash holdings played a major part. The financial crisis largely reduced firm's access to the financial markets, which was costly

if a firm could not pursue investments with positive net present value. A firm's access to financing was of relevance because it was one of the most frequently used explanations behind the recession. (Kahle & Stulz, 2013) There are some theories regarding impaired access to financing and their impacts on investment activities. The most applied are the credit supply shock, the bank lending supply shock and the amplification mechanisms intensifying the effects of a crisis. The bank lending supply shock is the most distinguished theory and describes how a negative shock in the supply of bank loans affect firm's capital expenditures. The theory predicts that firms dependent on their relationship with their bank will be more affected of the crisis and have to lower debt issuance and capital expenditures more than firms that are not dependent of their bank. (Kahle & Stulz, 2013) A broader theory is the credit supply shock, which is a theory that explains the impacts when firms cannot get the financing they require from the credit market. The theory of credit supply shocks predicts that a firm dependent of the credit market, will also be more affected in terms of debt issuance, equity issuance and capital expenditures. It is also important to include other theories that are not strictly related to the access of financing. This is necessary because firms' investments activities could be reduced because of a decrease in the value of their potential investment opportunities. The demand for services and goods are the most notable, where a shock could lead to sudden changes in firms investment activities. The amplifier mechanism describes how the effects of a breakdown spread and multiplies in the financial system.

There are a couple of articles which research the changes in investment activities during the financial crisis, Kahle & Stulz (2013), Almeida, Campello, Laranjeira and Weisbenner (2012) and Duchin, Ozbas and Sensoy (2010) these the ones that resemble our research the most. Almeida et al (2012) primary research focus is on firms with relatively large portions of long-term debt maturing during the period from 2007-12-31 to 2008-09-30, and proving that these firms invest less than comparable firms which would support the credit lending shock. Duchin et al (2010) compare the development in capital expenditures for firms with high cash holdings prior to the outbreak of the crisis with the first year of the financial crisis. Their findings support the theories of credit supply shock and show that high cash firms cut the capital expenditures less than comparable firms during the first year of the crisis. Though, after the Lehman crash, there were no significant difference between high cash firms and the rest of the sampled firms. Kahle

and Stulz (2013) concludes that the decrease in capital expenditures is not larger for bank dependent firms in the US than matching firms in the first year and the two quarters after the Lehman crises. Their research also showed contradictions to the theories since net debt issuance increased during the first year of the financial crisis for most of the firms and net equity issuance decreased until April 2009, this is not in alignment with the substitution effect.

Buca and Vermeulen (2012) use annual balance sheet data from Germany, France, Italy, Spain, Belgium and Portugal during 2000-2009. Their research shows that firms with high bank debt reduce their investment substantially more than firms with lower leverage. They also find that firms associated with bank-dependency, such as firms in geographical regions where relationship banking dominates or firms of smaller size are more affected in terms of decreasing investments. Holmberg (2013) use bank lending data, investment data and accounting data on Swedish firms to examine how the financial crisis affected corporate investments. But he did not find any strong statistical evidence that the decline in capital expenditures was enforced through a credit supply shock. The impact of the financial crisis appears to differ between geographical areas.

There are numerous articles investigating credit supply shock and demand shock in the context of the firm's investment activities during the financial crisis. But articles making the distinction between bank lending and credit shocks, and using the amplifier effect, is limited to Kahle and Stulz research on the American market. Our research is based upon the method used by Kahle and Stulz (2013) by extending it to Northern Europe. The thesis also expands on previous research of Northern European market by adding a new research approach.

1.3 Purpose and Research Questions

The purpose of this thesis is to study how the most recent financial crisis affected the investment activities of firms in Northern Europe. The research is based on theories of bank lending supply shocks, credit supply shocks, demand of goods and services shocks and the amplifier effect to investigate the impact on investment activities. The predictions of the theories are used to formulate categories of groups of firms to test the validity of the theories.

1. Are bank-dependent firm's investment activities more sensitive to a bank lending/credit supply shock?

2. Are high leverage firm's investment activities more sensitive to credit supply shock?

3. Are firms with higher cash holdings less sensitive to a credit supply shock?

4. Could a decline in investments be explained by a demand shock?

1.4 Delimitations

The thesis was originally planned to research three bank-relationship categories. But not gaining access to Thomson Reuters LPC's Dealscan, forced us to exclude one group out of the thesis. Since there still are two other groups measuring bank dependence, it is still possible to research bank-dependency. The use of this excluded firm category would have further enhanced the quality of our research.

1.5 Thesis Outline

The first chapter sets the foundation for the thesis with a background of the financial crisis, its impacts on financing- and investing activities and statement of the purpose of the thesis. The second section provides a comprehensive walkthrough of relevant theories and empirical research. The third chapter describes the methodology of the Abadie and Imbens bias-corrected matching estimator and the difference-in-difference estimator. The fourth section describes the empirical findings of the thesis, first in terms of mean values then the regression outputs. This is followed by the fifth chapter containing an analysis of the empirical findings based on the theoretical framework and previous research. In the last chapter we conclude the thesis by summarizing the findings and putting them in perspective.

2. Review of Previous Literature

The second chapter provides a comprehensive walkthrough of theories and empirical research of the impact of negative supply shock in bank lending, credit supply and demand shocks of services and goods. Thereto a section of the implication of amplification mechanisms is added.

A firm's investment policy is mainly depending of the financing policy, and if there are any valuable investment opportunities. During the financial crisis the financing policies were infected by a negative supply shock where firms had difficulties getting the financing they required. The financial crises eventually lead to a negative demand shock in goods and services, which means a decrease in valuable investment opportunities. (Kahle & Stulz, 2013) The literature review includes theories and previous empirical research of negative shock in supply of bank lending, in credit supply and in demand of services and goods in the context of firms investment activities. Thereto is added a section about the amplifier mechanisms that intensified the effects of the financial crisis. The predictions of the theories are straightforward, whereas the previous empirical research display mixed and inconclusive evidence.

2.1 Negative Shock in Supply of Bank Lending

A negative supply shock decreases the supply of debt, which, ceteris paribus, leads to a higher price on debt (Birch Sørensen & Whitta-Jacobsen, 2010). When bank lending started to fall in the middle of 2007 and then accelerated in the end of 2008 following the burst of the housing bubble, the market for structured finance securities such as *collateralized debt obligations* (CDOs) and *credit default swaps* (CDS) crashed (Ivashina & Scharfstein, 2010; Brunnermeier, 2009). Although other research shows that until October 2008, there was no decline in the bank lending (Chari, Christiano & Kehoe, 2008). This seemingly contradictory evidence can be explained by the different methodology used by researchers, where Ivashina & Scharfstein (2010) use lending agreements, which do not have to be fully utilized at the point of agreement.

Banks can be characterized as highly leveraged entities, and since they already initially are highly leveraged and thus extra sensitive to decreasing asset values on the balance sheet and

therefore cannot simply let the leverage ratio rise. This means that when a bank incurs large losses, they have two alternatives: issuing new equity or reducing assets, where a reduction in assets can be achieved by selling of current loans or not renewing loans or not accepting new loans. (Brunnermeier, 2009; Kahle & Stulz, 2013) This has implications for a firm's investment- and financing activities. A firm that cannot receive the financing required from their relationship bank might not be able to receive financing from other sources. Thus, they cannot obtain the same amount of debt in aggregated terms. This leads to the firm possibly having to reduce their investment activities in response. It also means that a firm with low leverage might not be as dependent of debt to be able to finance their capital expenditures. (Kahle & Stulz, 2013). History points out that firms relying on their relationship bank for financing, generally have to pay a premium when they look for financing elsewhere, which means they would be penalized on a much larger scale during a bank crisis (Slovin, Sushka & Polonchek, 1993).

The cost for banks to borrow money increased during the crisis. Santos (2011) shows that the bigger the losses a bank incurred, the greater the cost of its lending would be. The bank lending literature shows that there is a decrease in lending, however it does not tell the importance of the shock to the firms. Firms that cannot receive loans from banks can either cut investments or try to get financing from other sources (Kahle & Stulz, 2013). Buca and Vermeulen (2012) shows that firms with high bank debt reduce their investment substantially more during the financial crisis compared to firms with lower leverage. Their findings also prove that firms associated with bank-dependency, such as firms in geographical regions where relationship banking dominates, or where firms of smaller size, are more affected in terms of lower investments. Dewally and Shao (2013) contradicts Buca and Vermeulen (2012) when they prove that bank-dependent firms lowered their leverage less than firms with access to the public debt market, meaning they are less affected by a debt supply shock and therefore will handle the crisis better. Firms with access to bond markets are replacing bank loans with bond loans during the crisis, according to Adrain, Colla and Shin (2012) and Becker and Ivashina (2012). History also points out, that in times of reduced bank lending, firms instead issues equity (Leary, 2009). Recent research of the Portuguese data by Iver, Lopes, Peydró and Schoar (2010) demonstrates that firms substitute bank loans for other financing. Firms also more extensively utilized their line of credits, which curb the negative effects on investment. Although the higher than normal usage of credit lines,

could be due to that other financing sources became relatively more expensive (Ivashina & Scharfstein (2010).

Kahle and Stulz (2013) found that small bank dependent firms had a lower decrease in every period of the crisis compared to their control firms. This was a contradiction to what was predicted by the negative shock in bank lending but corresponded to the earlier findings of Kahle and Stulz (2010) and Iver, Lopes, Peydró and Schoar (2010). Their results did not support the prediction that high leverage and bank dependent firms should have been more affected in the first year of the crisis during a bank lending shock.

2.2 Negative Shock in Credit Supply

The banking system is just one of a numerous ways which a firm can obtain debt financing, where the credit market is another one (Kahle & Stulz, 2013). Gorton (2010) and Acharya et al (2009) describes how the development of the shock was not only a bank lending shock but in a wider sense a credit shock. The new banking system driven by innovation allows for traditional banking loans to be resold in a way that resemble the traditional credit market where bonds are issued and then traded on a market by investors.

When the shock struck and the market started to adjust the valuation of credit products, investors started a flight towards credit investments of higher quality, as modelled and described by Caballero & Krishnamurthy (2008) building on a foundation set by (Knight, 1921) and later developed by (Bewley, 2002). Their models show that when flights towards quality occur, the cost of capital for firm's increases and some firms might not be able to lend at all. In extension this might lead to a malfunctioning credit market where investors cannot estimate the probability of default and thus not the probability distributions of bond payoffs. This could lead to a market "freeze", where the uncertainty obstructs investor from trading and the liquidity dries out. The freeze also includes bank loans, since this would prevent banks from creating new structured products of newly issued loans. (Easley & O'Hara, 2010) Also, the flight towards quality has negative implications for equity issuance due to its risky nature. (Kahle & Stulz, 2013) The theories of credit supply shocks imply that a shock would generally lead to a decrease in capital expenditures for firms. Firms more heavily relying on debt should be the most impacted.

Almeida, Campello and Weisbach (2004) find that a large part of credit supply shocks are generally hedged by substitution from debt to usage of cash holdings. Fazzari and Pettersen (1993) and Lin & Paravisini (2010) shows in their article that firms dependent of external financing have precautionary benefits on hoarding up cash prior to a credit supply shock. Firms also hoard up cash in times of crisis, as a response to the higher uncertainty.

Almeida et al (2012) research firms with relatively large portions of long-term debt maturing during the period from Q4 2007 to Q3 2008 and prove that these firms invest less than comparable firms which would support a credit lending shock. The methodology with a sample of 86 firms did however not show if the decline in investments is due to inability to renew loans or due to declining business possibilities.

Duchin, Ozbas and Sensoy (2010) compare the development in capital expenditures for firms with high cash holdings prior to the outbreak of the crisis with the first year of the financial crisis. The reason for a focus on only the first year after the outbreak of the crisis is due to that it is more probable that the changes in investment policies is due to the credit supply shock as opposed to events created within the actual corporate sector. Their findings support the theories of a credit supply shock and show that high cash firms cut their capital expenditures less than comparable firms during the first year of the crisis. Though, after the Lehman crash, there were no significant difference between high cash firms and the rest of the sampled firms.

Campello, Graham and Harvey (2010) asked 1050 chief financial officers in a worldwide survey how their firm had been affected of the global financial crisis. The result of their survey is that constrained firms reduce their investments more than other firms. Constrained firms also used up more of their cash holdings than other firms. Over half of the CFO's in the sample state that they had to pass on attractive investment opportunities due to not being able to get the required external financing. Gertler and Gilchrist (1993) show that small producing firms are more affected than large producing firms in times of tighter credit. Kalemi-Ozxan and Kamil (2009) provide evidence that the reduction of credit supply was the key factor in constraining firms from investing and achieving growth in the aftermath of the financial crisis. This contradicts Bakke (2011) who showed that the credit crisis only have small effects on investments.

Lin & Paravisini (2010) show that firms increased their issuance of equity following the crisis whereas Lemmon & Roberts (2010) do not find any evidence of substitution from debt to alternative financing sources during the crisis. According to Kahle and Stulz (2010) the increased fears and uncertainty plays a big part in determining the level of firms financing, and potentially played as big part as the actual lending constraints itself. Kahle & Stulz's (2013) result contradict the expectations of a negative shock in credit supply. Their findings prove that the decrease in capital expenditures is lower for high leverage firms than the average for the whole sample.

2.3 Negative Shock in Demand of Services and Goods

The development of firms' investment policies is not only subject to adjustment due to shocks in credit supply and bank lending supply but also to a demand shock. A demand shock occurs when the demand of goods decrease and leads to a drop in capital expenditures because the value of investment opportunities decreases. A decrease in capital expenditures due to a demand shock, ceteris paribus, would also lead to a situation where firms need less financing for its operations, resulting in reduction in issuance of equity and debt, thus a lower price on debt. A demand shock entails reductions in turnover for firms, which leads to a declining market value of the firms, ultimately, leading to worsen lending terms. The aggregated demand is a function of private consumption, real private investment and real government demand for goods and services, where private consumption is the most sizable component. Private consumption is determined by disposable income, expected future income growth, interest rate and market value of private wealth. Real private investment is dependent of the real interest rate, predetermined capital stock and state of confidence. Real government demand for goods and services is the most stable input in the aggregated demand and is dependent on, for example, governmental debt accumulation and tax incomes. (Birch Sørensen & Whitta-Jacobsen, 2010)

There are many examples of phenomenon in the economic development during the crisis that supports the presence of a demand shock. The credit crunch imposed a large reduction in consumer lending, and this contraction lead to credit constraints where consumers could not lend as much as they wanted on the going market interest rate. (Birch Sørensen & Whitta-Jacobsen, 2010; Acharya et al, 2009) The crash of the housing bubble largely affected the market value of private wealth negatively. There was also a widespread uncertainty about the development of the

economic environment, which impacted the state of confident negatively. (Acharya, Philippon, Richardson & Roubini, 2009; Brunnermeier, 2009) The rise of uncertainty steer firms to increase their level of cash holdings to protect themselves from adverse changes in cash flow (Keynes, 1936; Baum, Caglayan, Ozkan, Talavera, 2006; Bates, Kahle, & Stulz, 2009; Hugonnier, Malamud, Morellec, 2014). This is especially true for financially constrained firms according to Han and Qiu (2008). Campello, Giambona, Graham and Harvey (2011) showed that lowered operational performance in 2008 and 2009 had negative effects on firms' ability to get bank financing. They also showed that firms that had problems with getting the financing they required invested less. The uncertainty of future cash flows also leads to a decrease in the optimal debt ratio through the increasing cost of financial distress (Kahle & Stulz, 2013). In case of a sharper increase in uncertainty, it would be more optimal to not exercise real option and postpone it, which would also result in a fall in capital expenditures (Bloom, 2009).

The price of credit increased as a response to the financial crisis, which could be seen as evidence for a supply shock in financing, as opposed to a demand shock in goods and services since a demand shock of implies a lower credit price. But the state of the interest rate market leading up to the crisis can be described as a low interest rate environment, making it difficult to infer what shock was actually the driving force in the debt market (Kahle & Stulz, 2013). After the Lehman Brothers crash the interest rates experienced explosive growth (Acharya et al, 2009), but at that point the worlds GDP had started declining, see figure 1 in appendix, indicating the presence of a demand shock of services and goods.

Mian and Sufi (2010), Mian, Rao and Sufi (2011) and Mian and Sufi (2012) prove that there was a demand shock of services and goods following the crisis which decreased the level of attractive investment opportunities for firms, which also decreased the required level of funding for investment activities. This means that the demand shock of services and goods also is an important explanation to the changes in investment activities during the financial crisis.

2.4 Amplification Mechanisms in the Financial Crisis

The magnitude of the effects of the crisis was amplified when the investors with the same exposures acted in a similar way simultaneously. The classic example of an amplification mechanism is the bank run. When depositors receive negative information about a bank (Gorton,

1988) where they are depositors, the depositors hurries to get their deposits out of the bank, and thus amplifying the negative effects the bank is subject to. A more recent amplification phenomenon is caused by the interconnectedness of banks (counterparty risk), where one bank is financing another bank that in turn is financing a third bank and so forth. When the first bank is hit by a shock, the effect will multiply when spread through the banking system creating a domino effect. (Brunnermeier, Oehmke, 2013)

The amplification effect can be observed by comparing the value of defaults on subprime mortgages and other defaulted loans and compared then compare with the much larger cost of the effects following the crisis (Gorton, 2008; Blanchard, 2009). Researcher have divided the amplification mechanisms into balance sheet amplifiers such as leverage, tight credit conditions and limited capital and information amplifiers including opacity, complexity and uncertainty (Krishnamurthy, 2009).

When the asset value of firms decline, it lowers the market value of equity and collateral. These are developments that lower a firm's debt capacity, making it hard to lend as much as they previously could. (Kiyotaki & More, 1997) A declining asset value also affect the effective leverage of the firm, which intensifies agency cost due to interest conflicts between shareholders and debt holders. This can be seen when firms heading towards bankruptcy has incentives to gamble for resurrection. (Jensen & Meckling, 1976; Holmström & Tirole, 1997) In a situation where the higher leverage leads to debt overhang, issuance of equity is unattractive for shareholders since part of such issuance would only contribute to the value of the debt holders (Myers, 1977).

Theories about amplification mechanisms predict that when asset values and equity values fall, so will debt, equity issuance and capital expenditures. These effects should be more pronounced for more leveraged firms compared to firms with lower leverage. (Stulz & Kahle, 2013)

Prior research about amplification mechanisms in the context of financial crisis and investment policies is limited. To our knowledge the only paper studying this is Kahle and Stulz, 2013. They investigate US firms including 48 202 firm-quarterly observations. Their result shows that there are no differences between highly levered firms and the rest of the sample in the context of decrease in capital expenditures. This contradicts the theories that firms with high leverage

would expect a larger decrease in capital expenditures. The results also contradict with the theory since unlevered firms had a higher decrease in capital expenditures in percentage than highly levered firms.

3. Method

The third chapter describes the methodical approach used to conduct the study. It provides a walkthrough of the sample, collection of the data, construction of groups of firms and time periods. It describes the use of dummies to structure the dataset after groups and time periods, and the regressions of the Abadie and Imbens bias-corrected matching estimator and the difference-in-difference treatment effect.

3.1 Research Method

The study researches the effects the financial crisis had on financing and investment decisions during the period from 2006-06-01 to 2010-03-31. The study is based on an statistical method originated by Abadie, Drukker, Herr and Imbens (2004) which has been further developed by Almeida, Campello, Laranjeira and Weisbenner (2012) and Kahle and Stulz (2013) to a methodology applicable for testing financing and investment decision under macroeconomic shocks such as a financial crisis. The main variable of interest is the changes in the firm's investment over the crisis in response to change of the financial environment. The thesis research how firms issue debt and equity and the development in cash holdings to create a framework for the analysis of the change in investment activities. The methodological process is deductive and has foundations in a literary review of theory and previous empirical studies (Bryman & Bell, 2011). The variables, time periods, and the different groups of firms were formulated so they are homogeneous to the methodology used by Kahle and Stulz (2013) in their research of the American market, this to enable comparisons between the impacts on financing and investing decision in the US and Northern Europe. The time period can be divided into four sub periods, pre-crisis (2006-09-30 to 2007-06-30), first year of crisis (2007-09-30 to 2008-06-30), post-Lehman (2008-09-30 to 2009-03-31), last year of crisis (2009-06-30 to 2010-03-31) in order to describe the evolution of the crisis.

3.2 The Data

3.2.1 Sample

The sample was created to research the Northern European market. In order to be sure to have access to all data needed it was further narrowed down to public firms. This method allowed the possibility to choose different stock indices to include in the sample. The indices included in our sample are the OMX Nordic index, the German CDAX index, and the English FTSE All-Share Index. When creating our sample it was important to include firms of a variety of different sizes and other characteristics, therefore firms from small cap to large cap is included. This inclusion of different kinds of firm-characteristics allows for testing of theories and previous empirical findings. When creating our sample it was important to include firms of a variety of different sizes and other characteristics in order to be able to create the different groups needed to test the different theories. Firms with Industry Classification Benchmark (ICB) as Utilities (7000-7999) and Financials (8000-8999) was excluded from the sample. This is done for two reasons. Utilities and financials have a business model that deviates from the rest of the industries to do business. The business model of financial companies implies a higher leverage than other firms, but this high leverage does not have the same effect as a high leverage would have for non-financial firms and utilities is less cyclical than the average industry. It is common practice to exclude these industries in quantitative financial research, so in order to enhance comparability it is reasonable to do so.

3.2.2 Data Collection

Data collection

Index	Total Constituents	Without financials and utilities adjusted for double listing and multiple stock classes	Sample after drop due to missing values
OMX Nordic	566	419	189
CDAX	492	342	198
FTSE All-Share	625	344	204
Total	1683	1105	591

Three different databases were used to collect the secondary data needed for our research; S&P Capital IQ, Thomson Reuters DataStream and Thomson Reuters Eikon. Capital IQ was used to collect the cash flow statement posts “capital expenditures” and “operating cash flow”, the income statement post “sales”, the balance sheet items “total assets”, “retained earnings”, “total

equity" and "cash & short term investments". Capital IQ was further used to check if firms have credit revolvers. There are some problems when trying to retrieve quarterly data since many of the items in Capital IQ only is provided in annual or semi-annual basis, and in less detail as quarterly. The ambition was to collect quarterly data, but in some instances only semi-annual data has been available. If only annual data have been available or where some quarterly data have been missing, the firm has been removed from the sample. This method of dropping firms has adverse effect on the reliability due to a survivor bias, because firms that have been delisted during our research period will not make the sample. Delisted firms are often financially distressed firms acquired by other firms or for other reasons are no longer seen as suitable for being listed on a stock exchange. This means that firms with severely declining results during our research period will be excluded from our sample, leading to a biased sample. Where Capital IQ only provides semi-annual data, for income statement and cash flow statement posts, they calculate an average by dividing the semi-annual number over the two underlying quarters. There is little to do about the availability of data; the decision of accepting semi-annual values is a trade-off in reliability of the impact that semi-annual data have, and the reduction in sample size the dropping of semi-annual data would lead to. When analysing our regression outputs, it has to be taken into account that the use of semi-annual data sometimes will lead to a delayed impact in or regression output. Further, firms with negative values in total assets, in sales, or in cash and short term investments have been dropped. We have also excluded also firms with cash and short term investments greater than total assets, and firms that have changed their fiscal year during the research.

To obtain credit ratings Eikon was used, where credit ratings existed, the latest rating was applied to the research. Finally DataStream was used to get Market-to-book ratios and Industry Classification Benchmarks.

3.3 Time Frame

The time period can be divided into four sub periods. The pre-crisis (2006-09-30 to 2007-06-30) starts before the unfolding of the crisis and ends at the peak of the credit boom. The first year of the crisis (2007-09-30 to 2008-06-30) is the period building up to Lehman crisis. The post-Lehman period (2008-09-30 to 2009-03-31) is created to be able to analyse a time period where

the credit market froze. The last year of crisis (2009-06-30 to 2010-03-31) accounts for a period where the worst part of financing supply shock had started to calm down. The use of periods enables an analysis of the crisis impacts as it unfolded. The period classification was established by Ivashina and Scharfstein (2010), and later used by Kahle and Stulz (2013).

3.4 Construction of the Groups

The groups were constructed to have the characteristics that are of theoretical relevance in our research. The groups are useful since it allows the testing of previous research and theories in the subject and evaluate if a particular characteristic seems to be impacted differently than other characteristics. To be able to compare our results with previous research all groups except for low leverage firms, as defined in Kahle and Stulz (2013). The reason for structuring a low leverage group instead of a no leverage group is made because there were too few firms that would qualify for a no leverage group.

3.4.1 High Leverage Firm

The first group is the high leverage firm which is defined as the highest quintile of leveraged firms. This is to test if leverage has an impact on capital expenditures. Highly levered firms are by nature either credit and/or debt dependent and should thus be more impacted. The amplifier effect also predicts that highly levered firms should be more impacted.

3.4.2 High Leverage, Bank Dependent Firm

The second group is high leverage and bank dependent firms which also contain the highest quintile of leveraged firms, but out of the these firms only the firms with either a bank loan or a credit revolver at the end of 2005 and 2006 were kept. A data collection problem is that gauge whether or not a bank loan or revolver is actually part of a bank relationship, to better the classification only firms that have had the bank loan or revolver in more than 2 consecutive years. Highly levered firms who are also bank dependent should be more impacted since they are highly levered and rely largely on bank debt as financing source and thus are sensitive to a bank lending supply shock. Again, the balance sheet multiplier effect also predicts that a highly levered firm should be more affected.

3.4.3 Small And Bank Dependent Firm

The small and bank dependent firm group is constructed by taking the bottom quintile of firms based on total assets. To make sure of the bank dependency it was checked that the firms do not have access to capital markets by deleting the firms with credit ratings. This group of firms rely strongly on bank debt and are thus predicted to be more sensitive to a bank lending supply shock.

3.4.4 Low Leverage Firm

Low leverage firms are firms that have had debt-to-total assets of below 10 % in each quarter for the three years leading up to the end of the second quarter of 2006. Firms with low leverage are of interest because during a credit supply shock, they are predicted to be less affected in terms of capital expenditure. This is because they were not as dependent on it in the first place. A firm with low leverage are according to the amplifier effect expected to be less affected than comparable firms.

3.4.5 High Cash Firm

The high cash firms are constructed by taking the firms that have been in the top quintile of cash holdings, for every quarter during the three years leading up to the second quarter of 2006. A firm with a large amount of cash could use their excess cash if they do not get the refinance they need, and thus are predicted to be less affected.

3.5 Variables

The variable that is measured and researched in this study is the dependent variable. The dependent variables are created to be homogeneous with previous research (Kahle & Stulz, 2013) and founded by the theoretical framework (Brooks, 2008). To fulfil the purpose of the study research had to be made on four different dependent variables: capital expenditures, debt issuance, and equity issuance and cash holdings which are defined as follows:

$$Capital\ expenditures = \frac{capital\ expenditures}{total\ assets}$$

$$Debt\ issuance = \frac{\Delta\ total\ debt}{total\ assets}$$

$$Equity\ Issuance = \frac{\Delta\ total\ common\ equity - \Delta\ retained\ earnings}{total\ assets}$$

$$Cash\ holdings = \frac{\Delta\ cash\ and\ short\ term\ investments}{total\ assets}$$

All the independent variables in the regressions are dummy variables. They are created to include the group dimension and the time period dimension in the regression. How the dummies were used is further specified in the description of respective regression model.

3.6 Descriptive statistics

The mean values of the dependent variables are used to present the empirical findings. The mean values are presented for the dependent variables for the entire sample as well as the subgroups for the four different time periods. To be able to use the mean values for more than only indication, the differences has to be of statistical significance.

3.6.2 T-test of the Significance of the Difference of the Means

T-tests are applied to infer if it is possible to make any statistical significant conclusions of the difference between the means values of the different time periods. Student's t-test assumes that the data has a normal distribution.

$$t = \frac{(\overline{x}_1 - \overline{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

The Students t-test was applied to test the majority of the differences in mean values. But for the dependent variables capital expenditures, debt issuance and cash holdings and the period between pre- and post-Lehman a paired two-sample t-statistic are used. The paired two sample t-statistic can only be applied for these differences because it required that the data had the same number of observations, one for the period before the bankruptcy of Lehman and one for the period after, thus a within-groups design. (Manly, 1994, Marcoulides & Hershberger, 1997).

For both student's t-test and paired t-test the hypotheses are:

H_0: There is no difference between mean values of the dependent variables between the periods.

H_1: there is a difference between mean values of the dependent variables between the periods.

3.7 Choice of Regression Models

The thesis uses both the Abadie and Imbens matching estimator method (2004) and a regular difference-in-difference method in order to triangulate the empirical results. Both methods investigate changes in investments, debt issuance, equity issuance and cash holding during the crisis.

3.7.1 Abadie and Imbens Bias-corrected Matching Estimator

The use of matching methods allows us to estimate counterfactual outcomes by pairing the group of firms (treatment firms) of with firms who has similar attributes (control firms) except for the variable of interest. This is a method with the ambition to isolate the observed effect to the variable of interest, where the model does not rely on a clear source of exogenous variation for identification. Matching methods can remedy asymptotic biases due to endogeneity or self-selection. (Roberts & Whited, 2012)

Using the Abadie and Imbens (2002) bias-corrected matching estimator for average treatment effect to match our treatment groups with control groups. This method allows for individual

observations to be used for matching more than once. Compared to other models that do not allow multiple matching this method lowers the bias but increases the variance. When allowing for multiple matching the requirements of observations declines, since one observation can be used more than once (Roberts & Whited, 2012). According to Rosenbaum (1995) this also mitigates the sensitivity to the order that the treatment observations are matched. The standard propensity score approach is a more commonly used method, but research in the subject of the thesis have often applied the Abadie and Imbens, as done by Almeida, Campello, Laranjeira and Weisbenner (2012) and Kahle and Stulz (2013). The Abadie-Imbens matching estimator minimizes the Mahalanobis distance between the vector of observed covariates of treated and non-treated firms (Abadie, Drukker, Herr & Imbens, 2004).

The Abadie and Imbens bias-corrected matching estimator allows only for the difference between treated and non-treated firms in one dimension, if there is a difference between the firms in the subsample compared to control groups. Since the aim is to make this approach comparable with a regular difference-in-difference regression some adjustments were made in order to include both the group dimension and the time dimension in the model. Firstly a group dummy was created to indicate which firms were parts of the different treatment groups. Firms included in a treatment group took the value of "1" whereas the rest of the sample took the value "0", indicating that they are potential matching firms. Then the averages for each and every period and for all the firms were calculated. Calculations of the averages followed for all groups and all the periods, which includes; first year of crisis compared to pre-crisis, post-Lehman period compared to pre-crisis and then last year of crisis compared to pre-crisis. Using the differences calculated in the previous step the dimension problem is solved, thus the model was made two-dimensional. The model now allows for comparisons in the changes of the dependent variable across the groups and across the different time-periods.

When using the function "nnmatch" in Stata to calculate the Abadie and Imbens average matching estimator there are a few different treatment effects that could be used for estimation. Because our intention is to examine how the firms in the subsample groups were affected in relation to control groups, not to the population, the sample average treatment effect (SATT) is the most relevant.

$$SATT: \tau^{sample,t} = \frac{1}{N_1} \sum_{(i|W_i=1)} \{Y_i(1) - Y_i(0)\}$$

Wi specifies if the firm receives treatment or not, the number of treated firms equal N_1.

When running the regressions two additional options, "biasadj" and "robusth", are added. The "biasadj"-option is the bias-corrected matching estimator, which uses the same set of matching covariates linearly in the function. The "robusth"-option creates heteroskedasticity consistent standard errors by using matches in the second matching stage across observations of the same treatment level. (Abadie, Drukker, Herr & Imbens, 2004) The number of matches per firm for both matching procedures was set to one.

For SATT the average biased estimator is:

$$\hat{\tau}_M^{bcm,t} = \frac{1}{N_1} \sum_{i:W_i=1} \{Y_i - \tilde{Y}_i(0)\}$$

The firm specific information that was applied to match the control firms with our treatment groups are market to book ratio, operating cash flow, size, cash holdings, leverage ratio, two digit industry code and credit rating. These matching variables are widely understood to capture large part of otherwise unobserved firm heterogeneity and are the same matching variables as Kahle and Stulz (2013) and Almeida, Campello, Laranjeira and Weisbenner (2012) applied. However we have not normalized size, which previous researchers did by using the natural logarithm of total assets. Cash holdings are not used as matching variable when cash holding is the dependent variable. The matching is structured as to pair firms within same industries, and

close credit ratings so that diversity between firms in terms of their creditworthiness and the shocks in demand of their products should not impact the regression output.

The matching variables if formulated as flows:

$$Market\ to\ book\ ratio = \frac{Market\ value\ of\ equity}{Book\ value\ of\ equity}$$

$$Operating\ cash\ flow = cash\ flow\ from\ operational\ activities$$

$$Size = Book\ value\ total\ assets$$

$$Cash\ holdings = \frac{Cash\ and\ short\ term\ investments}{Book\ value\ of\ total\ assets}$$

$$Leverage\ ratio = \frac{Book\ value\ of\ total\ debt}{Book\ value\ of\ equity}$$

$$Two\ digit\ industry\ code = first\ digits\ of\ the\ Industry\ Classification\ Benchmark$$

$$Credit\ rating = \ Credit\ rates\ are\ categorized\ after\ the\ Moody's\ 5 - grade\ scale$$

(1) no Credit rating

(2) in default, very little chance of recovery

(3) very high credit risk to in or near default with possibility of recovery

(4) moderate credit risk to high credit risk

(5) minimal credit risk to low credit risk

Cash flow from operational activities, book value of total assets, cash and short-term investment, book value total debt, book value of total equity are retrieved from Capital IQ without further calculations. The market value of equity is collected from Datastream, as is the Industry Classification Benchmark whereas credit ratings are provided by Eikon. A more detailed description of the data collection process if found under 3.2.2.

When matching with industrial classification benchmark all numbers except for the two first were deleted. Except for credit ratings the matching variables are denoted in numerical values making the matching process easier. The credit ratings were not denoted in numerical values, but in grades. To smooth the matching process the credit ratings were divided into five subgroups with numerical values using the Moody's description. (Ganguin & Bilardello, 2005) A 5-grade scale was applied to improve the precision of the matching, whereas previous research often only used a 3-grade scale as in Almeida, Campello, Laranjeira and Weisbenner (2012).

3.7.2 Difference-in-Difference

Difference-in-Difference treatment effects technique is used to examine causal consequences of distinct changes in economic environment, as in the case of the thesis; the credit supply shocks effect on firms' investment activates ("natural experiments"). Treatment and Control groups are useful since it creates an understanding of what effects are due to the treatment (for example high leverage) and what effects would have occurred anyway. This kind of cross-sectional comparison of two differences helps mitigating potential problems of omitted trends. Difference-in-difference estimator compares both the difference between groups and difference between time-periods simultaneously: by using this method instead of only a single difference estimator the problem with omitted trends can be avoided. In the difference-in-difference comparison the same firms are treated pre and post the financial crisis, using all firms in the whole sample which is not included in the subsample as untreated firms, which mitigates problems with unobserved differences. (Roberts & Whited, 2012)

The key assumption to achieve consistency of the regression outputs in the difference-in-difference estimates is that of "parallel trends" or the zero correlation assumption. This means that if comparing a treatment group and a control group, but where the treatment group did not actually receive any treatment, the change in the dependent variable should be equal for both groups. Figure 1 shows the realized average control outcome for the control group, which is independent of whether or not the treatment group actually gets the treatment. The realized average treatment outcome shows the effect when the treatment group gets the treatment, which changes the trend of the outcome, whereas the counterfactual average treatment outcome line describes the outcome if the treatment-group does not receive any treatment. This methodology enabled an analysis of the average values of the dependent variable of treatment and control group pre-crisis (before treatment), how difference in trend changed in the first year of crisis (after treatment) and the following periods Post-Lehman period and Last year of crisis (as the treatment continues).

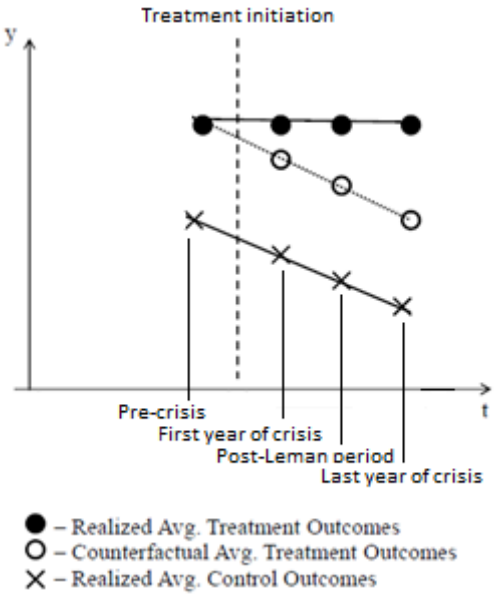

Figure 1: Parallell trends assumption (Roberts & Whited, 2012, p.42) edited by authers

The regression model for the applied difference-in-difference estimator is:

$$y = \beta_0 + \beta_1 d_1 + \beta_2 d_2 + \beta_3 * d_1 * d_2 + \mu$$

Where, d_1, d_2 and $d_1 * d_2$ are dummies.

$d_1$is a group dummy that was created to indicate which firms were parts of the different treatment groups

$d_2$is a time-period dummy. The time-period dummies are used to indicate which time-periods are compared to with each other. The first time dummy is the *prevsfirst,* which indicate that it is the first year of crisis that is compared to the pre-cresis period. The second time dummy is the *prevspostlehman* which means it is the post-lehman period that is compared to the pre-crisis period. The last time-period dummy is the *prevslast* which compares the last year of crisis with the pre-crisis period.

$d_1 * d_2$is a combination of the group dummy and the time-period dummy and is named *DGT* which is the difference-in-difference dummy. The dummy is created to capture, β_3, the variation that is created due to the treatment effect.

There are some limitations when using the difference-in-difference method. There are concerns about the validity of the difference-in-difference estimate due to possible endogeneity problem. Bertrand, Duflo, and Mullainathan, (2004) argue that the regression could have serial correlation problem which is often ignored, but there are three reasons for why this is a problem when using the difference in difference method. The first reason is about the length of the time series used, but due to the use quarterly data, this should be less of a problem since up to 14 observations per firm and variable is included when comparing between different time-periods. The second reason is that the dependent variable used in the regression is often highly positively serially correlated. The third aspect, which often is an inherent part of the model, is that there is usually only a small change in within the firm over time in the treatment variable. These concerns could lead to that an under estimation of the variance of the beta, which could negatively impact the inference of the regression output.

3.8 Assumptions of Regression Model

The difference-in-difference is estimated with a pooled Panel Least Square regression. This regression type is based on the commonly used OLS-regression, which requires a variety of different assumptions should be fulfilled to achieve unbiased coefficients and inferences. Because of the large number of regression performed, only random spot tests was carried out on the different performed regressions, this due to the limitation of time to execute this thesis.

3.8.1 The Errors Have Zero Mean

The first assumption is that the mean of the error term equals zero. Since an error term is included in the regression this assumption cannot be violated and thus no further testing is required. (Brooks, 2008)

3.8.2 Homoscedasticity

The second assumption is that of homoscedasticity, which means that the variance of the errors is constant. To test for if heteroskedasticity is present a Breusch-Pagan-Godfrey test is manually performed. The output of the F-tests show that the null hypothesis of homoscedasticity cannot be rejected for any of the tests, thus there is no evidence of heteroskedasticity. This means that heteroskedasticity will not negatively affect the standard errors and thus not the inference of the coefficients. The Abadie and Imbens matching estimator regression (2004) is designed to control for heteroskedasticity. (Brooks, 2008)

3.8.3 Autocorrelation

We used the Durbin-Watson to test for autocorrelation. The Durbin-Watson tests for first order autocorrelation. If the test statistic is close to 2, the null hypothesis of no autocorrelation should not be rejected. The tests show varying results where autocorrelation could be present in some regressions. This could be due to seasonal patterns in firm's investment patterns. In the cases where autocorrelation is present, the coefficients would still be unbiased but they would be inefficient even as the sample grows. (Brooks, 2008)

3.8.4 Non Stochastic

The fourth assumption is that the OLS estimator is non-stochastic, which means that the error term should not be correlated with the independent variables. The endogeneity problem is relevant since the impact of debt supply shocks as explanatory tool for a firm's investment is associated with a variety of firm-specific variables. In the Abadie and Imbens matching estimator some of these variables that could potentially create endogeneity are mitigated through the matching process where firms of similar characteristics are matched. This is however not the case in the difference-in-difference regression where the treatment group is matched with the rest

of the whole sample. Since a pre-crisis period was included, the endogeneity problem is less crucial compared to if only a crisis period were tested. This is because endogeneity would only be prevalent if there is a relation between the pre-crisis periods investment limitations and unobservable changes in investment opportunities the in the upcoming period. To assess the correlation a couple of correlation matrices are created. The performed tests did not indicate any large correlation, so the assumption that the OLS estimates are non-stochastic can be made. (Brooks, 2008; Gujarati & Porter, 2010; Almeida, Campello, Laranjeira &Weisbenner, 2012)

3.8.5 Normal distribution

The fifth and last assumption is that the disturbances are normally distributed. The most common test for normality is the Jarque-Bera test. The Jarque-Bera tests if the coefficients of skewness and excess kurtosis are jointly zero. The tests performed showed that the data is not normally distributed. But Brooks (2008) argue that a violation of the normality assumption is minor if the sample is large. This phenomenon is referred to the law of large numbers or the central limit theorem, where a large numbers of mean values have a tendency to converge to a normal distribution. The choice was made not to winsorize, or remove outliers, as not to manipulate the data. (Brooks, 2008)

3.8.6 No Multicollinearity

Multicollinearity or near Multicollinearity is present when the independent variables are to highly correlated with each other. If present, the coefficients would not be estimated correctly due to the lack of variance between the variables. The rule of thumb is that multicollinearity is problematic when the correlation exceeds 0,8. A few correlation matrices were created to check the correlation between the independent variables, where the result indicated no sign of multicollinearity. (Brooks, 2008; Gujarati & Porter, 2010)

3.9 Validity & Reliability

Validity of a study ascertains that the research methodology is designed to measure what it is intended to measure. This is a key for making sure that the analysis and conclusions of the material is correct. (Bryman & Bell, 2011) When choosing methodology previous research articles in the subject have been examined, to make sure that our methodology is appropriate in

our fields of studies. Our study is based on a dataset including England, Germany, Sweden, Finland, Denmark and Iceland, all located in the northern region of Europe. When conducting research it is important to account for the external validity, meaning weather the results of research can be generalized is applicable for markets outside of our research scope. In general, different regions have different types of economies and are interlinked in different ways, implying that generalization should be done with great consideration for the different environmental features. The generalization problem is addressed by comparing the results of the thesis with previous research in other markets. Another important factor is the internal validity, that there is a causal relation between independent variable and the dependent variables. This is addressed by using inference of statistical significance on the mean values of the dependent variables as well as for the regression outputs. (Bryman & Bell, 2011)

Another important aspect when conducting research is to assure the reliability of the study. The results of the study should be independent of the researcher (Ryan, Scapens & Theobald, 2002), meaning that a repetition of the study will yield the same results (Bryman & Bell, 2011). Well-established and well-reputed databases such as S&P Capital IQ, Thomson Reuters DataStream and Thomson Reuters Eikon have been used to retrieve data. These data providers have access to primary information about the companies and thereto all the countries in the study are subject to IFRS where annual reports are audited. Though, the scarcity of availability in terms of databases makes it impossible to triangulate the data collected. This makes it harder to assess the quality of our dataset, which impacts the reliability of the methodology negatively. Dropping of firms from the sample is solely based on missing data or theoretical assumption, as in the case of excluding financials and utilities. For running the regressions well-established statistical software such as Stata and Eviews were used.

When retrieving data from Capital IQ for cash flow statements, income statement and balance sheets an extensive amount of data has been manually extracted between different excel spreadsheets, which is subject to the human error. To minimize the risk of errors the data have been double checked numerous times to make sure of the correctness of the data.

4. Empirical Findings

This chapter contain the empirical outcome of the study. First, descriptive statistics is presented for the subgroups as well as for the whole sample. Second, the results from difference-in-difference test and Abadie and Imbens matching estimator test for the subgroups are presented.

4.1 Descriptive Statistics

The total sample includes 591 companies including 8274 observations per variable. The descriptive statistics is presented both for the whole sample as well as for the five subgroups: high leverage, high leverage bank dependent, small bank dependent, low leverage and high cash.

4.1.1 Changes in Capital Expenditures During the Financial Crisis, Q3 2006 - Q1 2010.

Table 1: Quartely capital expenditures during the crisis

The averages value for capital expenditures in relation to assets for the different periods of the crisis and for all subgroups as well as for the whole sample. The p-values from regular t-tests are also presented.

	Whole sample	High leverage	High leverage bank dependent	Small bank dependent	Low leverage	High cash
Crisis period averages						
1. Precrisis (2006Q3-2007Q2	0,01456	0,01613	0,01588	0,01229	0,01294	0,01165
2. First year of crisis (2007Q3-2008Q2)	0,01450	0,01587	0,01573	0,01371	0,01052	0,01071
3. Post-Lehman (2008Q3-2009Q1)	0,01205	0,01233	0,01217	0,01242	0,01044	0,00983
4. Last year of crisis (2009Q2-2010Q1)	0,00962	0,00913	0,00876	0,00754	0,01052	0,01048
Difference (2-1)	-0,00007	-0,00026	-0,00015	0,00142	-0,00243	-0,00093
P-value for t-test	0,90887	0,83727	0,90690	0,39973	0,20301	0,66605
Diffeerence (4-1)	-0,00494	-0,00700	-0,00712	-0,00475	-0,00242	-0,00116
P-value for t-test	0,00000	0,00000	0,00000	0,00005	0,33839	0,71784
Post-Lehman versus pre-Lehman						
2009 Q1	0,01038	0,01069	0,01050	0,00943	0,00950	0,00838
2008 Q3	0,01428	0,01352	0,01375	0,01445	0,01219	0,01113
Difference (2009Q1-2008Q3)	-0,00390	-0,00283	-0,00325	-0,00503	-0,00269	-0,00275
p-value for t-test	0,00000	0,00370	0,00118	0,06845	0,02223	0,03603

Firstly the changes in capital expenditures during the whole crisis were examined, thus the values from the last year of crisis compared to the values of the pre-crisis. For the whole sample the total decrease in capital expenditures from pre-crisis level to last year of crisis was -33.9% (-0,494 % of total assets). The high leverage category shows a decrease of – 43.4% (-0.700 % of

total assets) and the high leverage bank dependent had a decrease of -44.8% (-0.712 % of total assets). For small bank dependent the change decrease is -38.5% (-0.475 % of total assets). The low leverage category shows a decrease of – 18.7% (-0.242 % of total assets) whereas the high cash firms shows a decrease of -10% (-0.116 of total assets). The first four groups have strong statistical significance (1 % level), whereas the low leverage and high cash is insignificant.

The period between Q3 2008 to Q1 2009 is of extra interest since it can be seen as the epicentre of the crisis following the Lehman crash. The impact on investment during this period is noticeable high, where the whole samples capital expenditures dropped -27.3% (-0.390 % of total assets) during a period of 9 months. The high leverage firm cut their investment with -20.9% (-0.283% of total assets) and high leverage bank dependent with -23.6% (-0.325% of total assets). The small bank dependent firm cut their capital expenditure the most with -34.7% (-0.503% of total assets). For low leverage firms the investment decreased -22,1% (-0.269% of total assets) whereas the high cash firms investments dropped -24.7% (-0.275% percentage units). All of these findings are statistically significant on levels between 1% and 10%.

The changes between the first year of crisis and pre-crisis years had no statistical significance and with small changes in investments.

4.1.2 Changes in Net Debt Issuance During the Financial Crisis, Q3 2006 - Q1 2010.

Table 2: Quarterly net debt issuance during the crisis

The averages value for net debt issuance in relation to assets for the different periods of the crisis and for all subgroups as well as for the whole sample. The p-values from regular t-tests are also presented.

	Whole sample	High leverage	High leverage bank dependent	Small bank dependent	Low leverage	High cash
Crisis period averages						
1. Precrisis (2006Q3-2007Q2	0,00975	0,00783	0,00750	0,00299	0,01487	0,00105
2. First year of crisis (2007Q3-2008Q2)	0,00653	0,00587	0,00724	0,00623	0,00259	0,00074
3. Post-Lehman (2008Q3-2009Q1)	-0,00229	-0,01642	-0,01841	-0,01073	0,00410	0,00072
4. Last year of crisis (2009Q2-2010Q1)	-0,00593	-0,01196	-0,01161	-0,00283	-0,00090	0,00159
Difference (2-1)	-0,00322	-0,00196	-0,00026	0,00323	-0,01229	-0,00031
P-value for t-test	0,20504	0,69063	0,95851	0,51042	0,08302	0,94349
Diffeerence (4-1)	-0,01568	-0,01979	-0,01911	-0,00582	-0,01577	0,00054
P-value for t-test	0,00000	0,00000	0,00000	0,22089	0,03892	0,88574
Post-Lehman versus pre-Lehman						
2009 Q1	-0,01199	-0,03644	-0,03925	-0,04485	-0,00196	-0,00234
2008 Q3	0,00735	0,01841	0,01896	-0,00330	0,00486	0,00336
Difference (2009Q1-2008Q3)	-0,01933	-0,05485	-0,05821	-0,04155	-0,00682	-0,00570
p-value for t-test	0,00060	0,01919	0,01864	0,19538	0,33230	0,12173

Examining how debt issuance changes during the crisis, thus the values from the last year of crisis compared to the values of the pre-crisis. For the whole sample the total decrease in debt issuance during the period was -169% (-1.568% of total assets). The high leverage category shows a decrease of – 253% (-1.979% of total assets) and the high leverage bank dependent shows a decrease of -255% (-1.911 % of total assets). For small bank dependent the decrease is -196% (.0,582% of total assets). The low leverage category shows a decrease of – 106% (-1.577% of total assets) whereas the high cash firms have an increase of 20% (0,054% of total assets). The whole sample, high leverage and high leverage bank dependent were significant at 1 % level, low leverage at 5 %, whereas the small bank dependent and high cash are statistically insignificant.

The period between Q3 2008 to Q1 2009 is of extra interest since it can be seen as one of the most critical periods of the crisis following the Lehman crash. The impact on debt issuance during this period was strikingly high, where the whole samples debt issuance dropped -263% (-1.933% of total assets) during this 9 month period. The high leverage decreased their debt issuance with -298% (-5.485% of total assets) and high leverage bank dependent with -307% (-

5.821% of total assets). The small bank dependent firms decreased lendings with –1259% (-4.155% of total assets). For low leverage firm the lendings decreased -140% (-0.682% of total assets) whereas the high cash firms investments dropped -170 % (-0.570 % of total assets). The changes in net debt issuance for in this period was significant at the 1% level for the whole sample, the 5% level for high leverage and high leverage bank dependent, but was insignificant for the rest of the groups.

The change between first year of crisis and pre-crisis shows a general small decline in debt issuance, but these values are insignificant except for the low leverage firms.

4.1.3 Changes in Net Equity Issuance During the Financial Crisis, Q3 2006 - Q1 2010.

Table 3: Quartely net equity issuance during the crisis

The averages value for equity issuance in relation to assets for the different periods of the crisis and for all subgroups as well as for the whole sample. The p-values from regular t-tests are also presented.

	Whole sample	High leverage	High leverage bank dependent	Small bank dependent	Low leverage	High cash
Crisis period averages						
1. Precrisis (2006Q3-2007Q2	0,00552	0,00471	0,00318	0,01164	0,00576	0,00894
2. First year of crisis (2007Q3-2008Q2)	-0,00072	0,00660	0,00766	0,00386	0,00201	0,00565
3. Post-Lehman (2008Q3-2009Q1)	-0,00290	-0,00064	-0,00067	-0,01396	-0,00203	0,00066
4. Last year of crisis (2009Q2-2010Q1)	0,00513	0,00845	0,00304	0,01246	0,00303	0,00928
Difference (2-1)	-0,00624	0,00189	0,00448	-0,00779	-0,00374	-0,00328
P-value for t-test	0,00749	0,75454	0,47765	0,09834	0,52297	0,65161
Difference (3-1)	-0,00842	-0,00535	-0,00385	-0,02561	-0,00779	-0,00828
P-value for t-test	0,00270	0,42845	0,70781	0,00020	0,27957	0,34156
Diffeerence (4-1)	-0,00039	0,00373	-0,00014	0,00082	-0,00272	0,00034
P-value for t-test	0,86074	0,53206	0,33746	0,86931	0,66401	0,96258

Examining how net equity issuance changes during the crisis, thus the values from the last year of crisis compared to the values of the pre-crisis. For the whole sample the total decrease in net equity issuance during the period was -7.07% (-0.039% of total assets). The high leverage category shows an increase of 79.4% (0.373% of total assets) and the high leverage bank dependent had a decrease of -4.4% (-0.014% of total assets). For small bank dependent the increase was 7.04% (0.082% of total assets). The low leverage category showed a decrease of -47.4% (-0.272% of total assets) whereas the high cash firms had an increase of 3,80%

(0,00034% of total assets). No changes in the last year versus pre-crisis period show a statistical significance.

The post-Lehman period shows a statistical significance for changes in net equity issuance for the whole group and small bank dependent. The impact on net equity issuance during this period was high, where the whole samples net equity issuance dropped -152.54% (-0.842% of total assets). The high leverage firm cut their net equity issuance with -135,88% (-0.535% of total assets) and high leverage bank dependent with -4.40% (-0.00385% of total assets). The small bank dependent firm cut their net equity issuance the most with -219,93% (-2.561% of total assets). For low leverage firm the equity issuance decreased -135,24 % (-0.779% of total assets) whereas the high cash firms equity issuance dropped -92.62% (-0.828% of total assets). The results indicate that equity issuance was highly affected by the Lehman bankruptcy period and started to reach the same levels of equity issuance during the last year as they was before the crisis, but due to the missing significance this indication should be observed with caution.

The changes between the first year of crisis and pre-crisis years were only significance for the whole sample and small bank dependent firms. The whole sample had a drop in equity issuance of -113.04% (-0.624% of total assets) and small bank dependent firms had a decrease of -66.84% (-0.779% of total assets).

4.1.4 Changes in Cash Holdings During the Financial Crisis, Q3 2006 - Q1 2010.

Table 4: Quartely cash holdings during the crisis

The averages value for cash holdings in relation to assets for the different periods of the crisis and for all subgroups as well as for the whole sample. The p-values from regular t-tests are also presented.

	Whole sample	High leverage	High leverage bank dependent	Small bank dependent	Low leverage	High cash
Crisis period averages						
1. Precrisis (2006Q3-2007Q2	0,15617	0,08015	0,08149	0,23476	0,28586	0,38956
2. First year of crisis (2007Q3-2008Q2)	0,14504	0,07206	0,07332	0,22072	0,26638	0,36721
3. Post-Lehman (2008Q3-2009Q1)	0,13706	0,06470	0,05757	0,20594	0,26139	0,35601
4. Last year of crisis (2009Q2-2010Q1)	0,14061	0,07366	0,07246	0,20616	0,24900	0,32873
Difference (2-1)	-0,01113	-0,00809	-0,00817	-0,01404	-0,01948	-0,02235
P-value for t-test	0,08875	0,27138	0,28974	0,42761	0,30523	0,30840
Diffeerence (4-1)	-0,01557	-0,00649	-0,00902	-0,02860	-0,03686	-0,06083
P-value for t-test	0,00989	0,34282	0,20263	0,09541	0,05431	0,00329
Post-Lehman versus pre-Lehman						
2009 Q1	0,13673	0,06493	0,05742	0,20673	0,25729	0,35871
2008 Q3	0,13475	0,06759	0,05929	0,19585	0,25055	0,35678
Difference (2009Q1-2008Q3)	0,00198	-0,00266	-0,00187	0,01089	0,00674	0,00193
p-value for t-test	0,48521	0,58078	0,71134	0,16307	0,37992	0,87359

Examining how cash holdings changes during the crisis, thus the values from the last year of crisis compared to the values of the pre-crisis. For the whole sample the total decrease in cash holdings during the period was -10% (-1.557% of total assets). The high leverage category had a decrease of -9% (-0.649% of total assets) and the high leverage bank dependent had a decrease of -11% (-0.902% of total assets). For small bank dependent the change decrease is -12% (-2.860 % of total assets). The low leverage category shows a decrease of -13% (-3.686% of total assets) whereas the high cash firms show a decrease -16% (-6.083% of total assets). The whole sample and the high cash firms were significant at the 1% level, the small bank dependent and low leverage on 10% level and whereas the high leverage and high leverage bank dependent shows insignificant results. Comparing the first year of the crisis and the pre-crisis there is a small decrease in cash holdings, but these changes are only statistically significant for the whole sample and that on the 1% level.

4.2 Regressions

In this section the results from the two regression models used. The Abadie and Imbens matching estimators and the difference-in-difference estimators have been created to create corresponding results. The difference is that the Abadie and Imbens matching estimators is matched against a control group created by matching variables whereas the difference-in-difference uses the rest of the whole sample as the control group which should account for the difference in the output estimates. When making references to the two different methods, the treatment group will be the same for both methods, both the control group for the difference-in-difference group will be referred to as "rest of whole sample" whereas the matching estimators control group will be referred to as "matching firms" The regressions on equity issuance is not tabulated, this because no of the regression outputs were significant and thus not fit for use in the analysis. Instead all analysis is made of out of the mean values of equity issuance. The statistical significance of each test is stated after the number in the tables, where 3 stars indicate a significance of 1 % level, 2 stars indicate a significance of 5 %, 1 indicate a significance of 10 %, and no stars indicate no statistical significance. In general the significance rises as later periods was compared against the pre-crisis period. [1]

[1] All of the subgroups are not presented for all of the dependent variables (capital expenditures, debt issuance and cash holdings). We only choose to present the subgroups that are relevant in order to be able to answer our research questions.

4.2.1 Capital Expenditures

Table 5: Quartely Capital expenditures during the crisis

Estimates of the changes is average quarterly capital expenditures divided by total assets. The difference-in-difference results of the matching approach used by Almeida, Campello, Laranjeira and Weisbenner (2012). Matching estimator (ATT) is the Abadie-Imbens bias corrected average treatment effects.

	High leverage	High leverage bank dependent	Small bank dependent	Low leverage	High cash
Precrisis (2006Q3-2007Q2) versus first year (2007Q3-2008Q2)					
DiD	-0,00024	-0,00024	0,00172	-0,00267	-0,00094
Matching estimators	-0,00005	-0,00060	0,00229	-0,00064	-0,00008
Nr of firms	591	591	591	591	591
Precrisis (2006Q3-2007Q2) versus post-Lehman (2008Q4-2009Q1)					
DiD	-0,00159	-0,00165	0,003050*	-0,00010	0,00075
Matching estimator	-0,00090	-0,00155	0,00206	0,00180	-0,00083
Nr of firms	591	591	591	591	591
Precrisis (2006Q3-2007Q2) versus last year (2009Q2-2010Q1)					
DID	-0,002775**	-0,002743**	0,00021	0,002732*	0,004102**
Matching estimator	-0,0625217**	-0,00231	-0,00336	0,00236	0,00255
Nr of firms	591	591	591	591	591

The regression-analysis shows no statistical significance for the first year of crisis compared to the pre-crisis level. But both regression models indicate movements in the same direction. High leverage, high leverage bank dependent, low leverage and high cash cuts investments compared to matching firms and the rest of whole sample. Whereas the small bank dependent invested more than both the whole sample and matching firms.

To capture the development of the crisis further regressions were made for the post-Lehman period, compared to pre-crisis period. The regression indicate that high leverage and high leverage bank dependent firms further cut their capital expenditures compared to the rest of the whole sample and the matching firms as the crisis progressed, but this is not statistically significant. Surprisingly the small bank dependent firms continued to cut their investment less than matching firms and statistically significantly less than the rest of whole sample. Low leverage firm cut investments little more than the rest of the whole sample but less than matching firms whereas high cash firms cut less than rest of whole sample and more than matching firms.

During the last year of crisis, compared to pre-crisis, there are more significant regressions. High leverage firms cut investment more statistically, more than both the rest of whole sample and matching firms. This is true also for high leverage bank dependent firms, but it is not statistically significant for the comparison against matching estimators. The small bank dependent firms have

no statistically significant differences. The difference between small bank dependent firms and the rest of the whole sample is economically insignificant whereas when comparing to the matching firms they cut investments more. Both the low leverage and high leverage firms lowered their capital expenditure statistically significantly less than whole sample and there is also an indication that they cut capital expenditures less than matching firms.

4.2.2 Net Debt Issuance

Table 6: Quarterly net debt issuance during the crisis

Estimates of the changes is average net debt issuance divided by total assets. The difference-in-difference results of the matching approach used by Almeida, Campello, Laranjeira and Weisbenner (2012). Matching estimator (ATT) is the Abadie-Imbens bias corrected average treatment effects.

	High leverage	High leverage bank dependent	Small bank dependent	Low leverage
Precrisis (2006Q3-2007Q2) versus first year (2007Q3-2008Q2)				
DiD	0,001557	0,003616	0,007459	-0,009592
Matching estimators	-0,002471	0,0257304*	0,010024	0,0026513
Nr of firms	591	591	591	591
Precrisis (2006Q3-2007Q2) versus post-Lehman (2008Q4-2009Q1)				
DiD	-0,015061	-0,017338*	-0,001932	0,007201
Matching estimator	-0,0113343	0,0514433**	0,0139812	-0,0156136*
Nr of firms	591	591	591	591
Precrisis (2006Q3-2007Q2) versus last year (2009Q2-2010Q1)				
DID	-0,005069	-0,00416	0,011400	0,0044
Matching estimator	-0,0036402	0,071565***	0,0098336	-0,0042633
Nr of observations	591	591	591	591

The regressions indicate that high leverage firms issue less debt than the rest of whole sample, and matching firms except for the first year of crisis compared to pre-crisis where they issue more debt than matching firms. High leverage bank dependent firms issue more debt than both the rest of the whole sample and statistically significant (10 % level) for matching firms for the first year of crisis compared to pre-crisis. For the post-Lehman and the last year of crisis, compared to pre-crisis level, high leverage bank dependent firms issue more than matching firm with significance of 5 % respectively 1 %. Although the regressions also indicate that they issue less than then rest of whole sample for these two periods. The regressions indicate that small bank dependent firms issue more than both the rest of the whole sample and matching firms

except for the post-Lehman period compared to pre-crisis where they issue less than rest of the sample. Low leverage firms only have significant results for post-Lehman period, compared to pre-crisis where they issue significantly less than matching firms, otherwise they show mixed results.

4.2.3 Cash Holdings

Table 7: Quartely cash holdings during the crisis

Estimates of the changes is average quarterly cash holdings divided by total assets. The difference-in-difference results of the matching approach used by Almeida, Campello, Laranjeira and Weisbenner (2012). Matching estimator (ATT) is the Abadie-Imbens bias corrected average treatment effects.

	High leverage	High leverage bank dependent	Small bank dependent	Low leverage	High cash
Precrisis (2006Q3-2007Q2) versus first year (2007Q3-2008Q2)					
DiD	0,003749	0,003612	-0,003361	-0,003059	-0,012189
Matching estimators	0,0373659	0,031258	0,0072541	0,0241251	-0,0257218
Nr of firms	591	591	591	591	591
Precrisis (2006Q3-2007Q2) versus post-Lehman (2008Q4-2009Q1)					
DiD	0,004524	0,003731	-0,01121	-0,006028	-0,015686
Matching estimator	0,060916	0,0629625	-0,0086526	0,0550313**	-0,049017
Nr of firms	591	591	591	591	591
Precrisis (2006Q3-2007Q2) versus last year (2009Q2-2010Q1)					
DID	0,011155	0,004565	-0,01456	-0,022627	-0,052854**
Matching estimator	0,0719514	0,0736748	-0,0302454	0,0608474**	-0,093601***
Nr of observations	591	591	591	591	591

The regressions indicate, but show no statistical significance, that high leverage and high leverage bank dependent use less cash than both whole sample and matching firms for all periods compared to both the rest of the whole sample and matching firms. The small bank dependent firms use less cash than both the rest of the sample and the matching firms for all periods except for pre-crisis to first year of crisis where matching firms use more cash, though these findings are not significant. Low leverage firm use less cash for all periods than the rest of the whole sample, but less than the matching firms. These findings are significant on the 5 % level for the matching estimator regressions of last year of crisis compared to pre-crisis and for post-Lehman compared to pre-crisis. High cash firms use more cash than the both rest of whole sample and matching firm, these findings are for the last year of crisis compared with pre-crisis significant on 5 % level for the difference-in-difference and 1 % level for matching estimators.

5. Analysis

The empirical findings from last chapter will be discussed and analysed. An analysis of if there is evidence for the different theories presented in chapter 2. There will also be a comparison between our results and earlier research.

5.1 Are Bank-dependent Firm's Investment Activities More Sensitive to a Bank Lending and Credit Supply Shock?

In the context of bank dependency, two groups were investigated, high leverage bank dependent firms and small bank dependent firms. The high leverage bank dependent group is similar to the high leverage group, but for the bank dependency factor as distinction. Since the high leverage bank dependent group is affected both because it is highly leverage and because of it is bank dependent, this distinction between the groups is useful. But the difference between the two groups are economically as well as statistically insignificant, which means it is hard to derive any conclusion from the material. The only conclusion possible to make is that it seems to be no difference between bank-dependent firms and non-bank dependent firms.

The other bank dependent group is the small bank dependent firms which decreased their capital expenditures with -38.5% (-0.475% of total assets) comparing the last year of crisis to the pre-crisis level, whereas the whole sample had a lower decline from pre-crisis level of -33.9% (-0.494% of total assets). The small bank dependent also lowered their debt issuance more than the whole firm with -196% (-0.582% of total assets) compared to -169% (-1.568% of total assets). The regressions indicate that small bank dependent firms where less impacted than both matching firms and rest of the whole sample, although this is only significant against the rest of the whole sample for the post-Lehman period compared to pre-crisis level. These empirical findings contradict the bank-lending theory, in which firms with bank-dependency should be more affected. This is in conflict with the research of Buca and Vermeulen (2012) which shows that bank-lending firms were more affected during the crisis. It is also in conflict with Slovin, Sushka and Polonchek, (1993) which implies that bank dependent firms should be more affected, because a substitution of debt from the relationship bank to an alternative source would lead to a

premium paid on the new financing source. This is because firms with no previous credit rating, and thus access to public market, should have difficulties to substitute bank loans to bond loans, as firms with access to bond markets did during the crisis according to Iver, Lopes, Peydró and Schoar (2010), Adrain, Colla and Shin (2012) and Becker and Ivashina (2012). Previous research also show that small firms are more affected in times of tighter credit, meaning that the small factor characteristic of the group should not be the explanatory factor why small bank dependent firm seems to be less affected (Gertler & Gilchrist, 1993).

According to the bank lending supply shock theory, a bank dependent firm should be more affected than a non-bank dependent firm, this is however not true, which has been established in previous empirical research. Dewally and Shao (2013) shows that bank dependent firm actually lower debt less than other firms, which is in line with the indications of our empirical findings, where the regressions indicate that small bank dependent firms actually cut debt issuance less than both matching firms and the rest of the sample for all three investigated periods. Neither the studies by Kahle and Stulz (2010) or Kahle and Stulz (2013) could prove that bank dependent firms are more affected than other firms.

A review of the descriptive statistics indicate that equity issuance actually declined during the period post-Lehman compared to pre-crisis level, which is in conflict with the research of Leary (2009) which states firms substitutes reduced bank lending for equity issuance

5.2 Are High Leverage Firms Investment Activities More Sensitive to Credit Supply Shock?

The two categories of highly levered firms are high leverage and the high leverage bank dependent. But since the high leverage bank dependent only is a refined version of the high leverage, where firms without bank-dependency have been excluded, there is of no analytical value to assess the both of them under this research question.

Comparing the last year of crisis to the pre-crisis level, the high leverage firms experienced a, on the 1% significance level, decrease in capital expenditures compared of -43.4% (-0.700% of total assets). This was greater than the whole sample which had a decline of -33.9% (-0.494% of total assets), and also greater than all the non-high leverage categories. These descriptive statistics

indicates that high leverage firms cut their investments more than other firms. The regressions further show that high leverage firms, on the 5 % significance level, lowered investment more than both the rest of whole sample and the matching firms when looking at the last year of crisis compared to the pre-crisis period. The first period and the post-Lehman period compared to pre-crisis period the regressions also indicate that high leverage firms invest less, but this is not statistically significant. These findings are coherent with the credit supply shock theory where highly leveraged firms were predicted to be more affected than other firms. This is also in line with what Buca and Vermeulen (2012) found in their studies of European firms, where they showed that high leverage firms reduced their capital expenditures significantly more than firms with lower leverage. Kahle and Stulz's (2013) empirical findings on the US market surprisingly contradict a supply shock when they showed that highly leverage firms where actually less impacted than matching firms. The thesis findings combined with the previous research implies that there could be a difference in how leverage firms in US and European market reacts to credit supply shocks, but this is out of the scope because the thesis provides no analytical framework to explain why these geographical differences occur. The results are also corresponding to the prediction of the amplifier effect, where more leveraged firms where predicted to be more affected, (Kahle & Stulz, 2013).

If the changes in capital expenditure is actually due to a credit supply shock, the empirical findings should first and foremost show that a credit supply shock was present and secondly that high leverage firms were more affected than other firms.

The descriptive statistics show that there was a large credit supply shock, where the mean values of debt issuance for the highly leveraged firms decreased with -253% (-1.979% of total assets) compared to pre-crisis level, which was significant on the on 1 % level. This is considerably greater than for the whole sample of -169% (-1.567% of total assets) which is a clear indication that high leverage firms were more affected than the whole sample. However the regressions cannot with statistical significance confirm this. The regressions can though indicate that higher leveraged firms are more affected when compared to both the rest of whole sample and matching firms for all periods, except for matching when comparing first year of crisis to pre-crisis levels. Research from the US also indicate that highly leveraged firms had a higher decrease in debt

issuance than other firms, but this is only significant when comparing post-Lehman period to pre-crisis period (Kahle & Stulz, 2013)

The highly leverage firms also have lower cash holdings than other firms prior to the crisis, implying that that they are less able to use cash holdings to finance investments. Both the mean values and regressions indicate that high leverage firms substitute debt for exhaustion of cash to a lesser extent than other types of firms. This indicate that high leverage firms cannot, to the same extent, use cash holdings as a hedge for credit supply shocks as Almeida, Campello and Weisbach (2004) show that firms in general do in order to mitigate a credit supply crisis.

The characteristics of the high leverage group where firms also have low cash holdings according to our descriptive statistics is the group where it is most likely to find financially constrained firms during a credit supply shock. Since high leverage firms are the firms which experience the largest cut in capital expenditures, these findings are homogeneous with the survey of Campello, Graham and Harvey (2010) which showed that financial constraint firms cut their investment the most.

5.3 Are Firms with Higher Cash Holdings Less Sensitive to a Credit Supply Shock?

High cash firms had a decrease in capital expenditures of -10% (-0.116% of total assets) when comparing the last year of crisis to pre-crisis level, which is the smallest drop of all groups. In relation to the whole sample, the decrease was considerably smaller. The decrease for the average firm during the financial crisis was -33.9% (-0. 494% of total assets). The changes in mean values are not significant, except for post-Lehman compared to pre-Lehman, which is related to the fact that the changes in capital expenditures for high cash firms were so small. The regression output indicate, without significance, that high cash firms invested slightly less than the rest of the sample and matching firms for the first year of crisis in comparison to pre-crisis level. For post-Lehman period compared to pre-crisis, the high cash firms started to invest more than the rest of the sample but still less than matching firms. For the full period, last year of crisis compared to the pre-crisis year the findings were fully in line with the credit supply shocks prediction, where high cash invested more than matching firms and significantly more than the

rest of whole sample . The overall findings indicate that high cash firms cut their investments less than other firms as predicted by credit supply theories, but not with any statistical significance. These results are also similar to what Kahle and Stulz (2013) found in the US, where high cash firms were less affected than other firms.

The empirical findings tend to correspond to the empirical findings of Duchin, Ozbas and Sensoy (2010), but without statistically significance, which also show that high cash firms generally cut expenditures less than other firms. The finding that cash holdings matters is a breakdown of one of the assumptions of the Modigliani and Miller (1958) theorem. Their assumption states that markets are frictionless, which could only be true if cash holdings would not matter.

As seen in table 4, the high cash firms burned through the most cash during the crisis where their cash holdings of total assets declined, statistically significant, with 6,083 of percentage units, which is four times the average amount of the whole sample. This supports Almeida, Campello and Weisbach (2004) research that firms use cash holdings as a hedge in the presence of a credit supply chock. Also, if firms, thanks to its cash holdings can make investments in valuable investment opportunities, which they could not do otherwise, hoarding up on cash prior to crisis can be beneficial as shown by Fazzari and Pettersen (1993) and Lin & Paravisini (2010).

The results of the empirical study also indicate that high cash firm actually increased their debt issuance when comparing pre-crisis average with the last year of crisis averages, though these findings are not statistically significant. This is a small indication that firms, as earlier shown by Keynes (1936), Bates, Kahle, and Stulz (2009), Hugonnier, Malamud and Morellec (2014), hoards up on cash under uncertainty, because when struck by a crisis high cash firms decided to issue more debt than usual instead of burning through more of its high cash holdings, and that in times when debt is costly.

5.4 Could Decline in Investments Be Explained by a Demand Shock?

The level of investment is determined by access to finance as well as possibility to invest in valuable investment opportunities. The net debt issuance fell 33 % for the whole sample for the first year of crisis prior to pre-crisis level, but the fall was not statistically significant for this period. Comparing post-Lehman to pre-Lehman shows a statistically significant fall, and

comparing last year of crisis to pre-crisis level shows a significant decrease of 169 %. These empirical findings clearly are proof for a negative shock in credit supply. There are plenty of research that proves the presence of a credit supply shock where Almeida, Campello, Laranjeira and Weisbenner (2012), Ivashina and Scharfstein (2010), Brunnermeier (2009), Kahle and Stulz, (2013), Buca and Vermeulen (2012), Gorton (2010), Acharya, Philippon, Richardson and Roubini (2009) are among few. Kalemi-Ozxan and Kamil (2009) provide evidence that the reduction of credit supply was actually the key factor in constraining firms from investing and achieving growth in the aftermath of the financial crisis.

The decrease in investment for the whole sample was economically and statistically insignificant for the first year of crisis compared to pre-crisis levels. During the post-Leman period compared to pre-Lehman the capital expenditures drop is statistically significant and comparing the last year of crisis to pre-crisis levels yields a statistically significant drop in investments of -33,9 %. The acceleration of the decrease in debt issuance and capital expenditures fit well, which indicates that a credit supply shock could be the leading factor driving the decrease in capital expenditures.

The gross domestic product (GDP) is a good indicator of a negative demand shock of services and goods, since it is largely determined by the demand of services and goods (Birch Sørensen & Whitta-Jacobsen, 2010). The GDP started according to Eurostat decline in Eurozone in 2008 and continued in recession for over a year. The problem is to gauge what came first, the chicken or the egg? In general large credit supply shock is followed by a negative shock in credit supply. But the methodological framework did not yield any results of statistical significance which enables any analysis of the effect that the different shocks had on GDP.

But there is a clear indication that not only a credit supply shock was present, but also a demand shock of services and goods. This is also proved by articles of Mian and Sufi (2010), Mian, Rao and Sufi (2011), and Mian and Sufi (2012) which shows that a demand shock of services and goods were present, and also describes it in the context of investment activities. Bakke (2009) implies that the credit supply shock only had a small part of the effect on investment activities, leaving space for other factors such as a negative demand shock of services and goods.

The empirical findings and the previous empirical research shows that both a negative credit supply shock and a negative shock in demand of goods and services were present during the period studied. This means that firms investment activities were impacted both by access to finance which prevented them from pursuing profitable investment opportunities, but there was also a negative demand shock of services and goods which made the investment opportunities less profitable.

6. Conclusions

6.1 Summary and discussion

The purpose of this study was to research how the financial crisis of 2007 and 2008 affected firms financing and investing activities. The thesis applies a methodology using a difference-in-differences estimator and the Abadie and Imbens bias-corrected matching estimator. The aim of the study was further specified to four research questions, created to test theories and previous empirical findings: Are bank-dependent firm's investment activities more Sensitive to a bank lending and credit supply shock? Are highly leverage firms investment activities more sensitive to credit supply shock? Are firms with higher cash holdings less sensitive to a credit supply shock? Could the decline in investments be explained by a demand shock of services and goods?

The thesis found that bank-dependent firms were not more sensitive to a bank lending and credit supply shock compared to other firms, if anything, they are less affected. This is in conflict with the bank-lending theory which predicted that bank dependent firms should be more affected than other firms. Previous research display varying results, on one hand some research show that bank dependent firms are more affected, and on the other hand that they are less affected, leading to contradictory evidence. The results are in line with what Dewally and Shao (2013), Kahle and Stulz (2010) and Kahle and Stulz (2013) found. A possible explanation as to why the predictions of the bank lending supply could be misleading is the fact that it could be beneficial to be part of a bank relationship. The relationship could have countercyclical properties, where the banks extensive knowledge about a firm might lead them to support the firm financial, beyond what the current form of bank lending supply shock predicts.

The empirical findings of the high leverage are homogeneous with the credit supply shock, and show with 5 % statistical significance, that high leverage firms cut investments more than the rest of the whole sample and matching firms when comparing the last year of crisis to pre-crisis levels. These findings are in line with research of Buca and Vermeulen (2012) but contradicts that high leverage firm were less affected, which Kahle and Stulz (2013) surprisingly found in their research.

The empirical findings indicate that high cash firms overall were less affected during the crisis. Comparing the last year of crisis to pre-crisis level the high cash firms are significant less

affected than the rest of the sample, which is in line with the predictions of credit supply shock. This finding is coherent with other researchers, such as Duchin, Ozbas and Sensoy (2010), Kahle and Stulz (2013) find. This means that holding excess cash for precautionary reasons are valuable, since it prolongs the real options. Where firms with high cash holdings can choose to pursuit valuable investment opportunities to a larger extent than firms without precautionary cash holdings.

The statistically significance reduction in capital expenditure during the crisis could be explained by a combination of credit supply shock and a demand shock of services and goods. The empirical findings clearly show the presence of credit supply shock, which also have been proven by numerous other academics. The data of the thesis do not have any findings proving that a demand shock of services and goods occurred. But the negative development of the gross domestic product in Eurozone indicate a demand shock, which is also proven by researcher such as Mian and Sufi (2010), Mian, Rao and Sufi (2011), and Mian and Sufi (2012).

6.2 Suggestion for future research

The incoherent empirical findings in the subject of investing activities during credit supply shocks create an unmet demand, which can be clarified by further research. The subject of access to financing and its effect on investment activities would benefit from a methodical framework which can gauge the casual effects of credit supply shock and the demand shock of goods and services and its affect gross domestic product. This would enable a more accurate analysis of the actual effect of the credit supply shock, which would be valuable for regulators and politicians when structuring bailout programs and quantitative easing. A study using similar methodology as this thesis, but with a larger sample, could also be contributing, if it can achieve greater statistical significance and therefore derive conclusions that this thesis only could point out as indications.

There is a possibility that the discrepancy in previous research in some instances can be explained by geographical differences, which also could be a point of departure for future research. The previous research is often based on a dataset only consisting of public firms, which might not be representative for the corporate sector. Further research on non-public firms could add an extra dimension to the previous body of research.

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8. Appendix

Due to the large number of tests performed there are only around one third of them that are presented in the appendix. Focuses are on the tests performed on capital expenditures and the rest of the tests presented are randomly chosen.

8.1 GDP-Eurozone

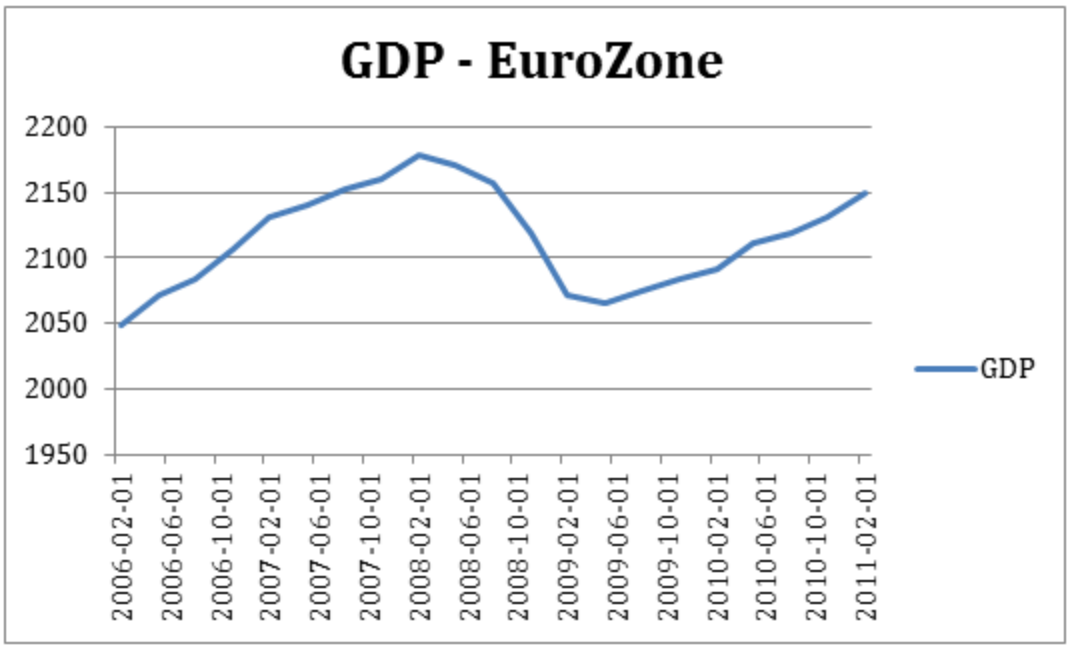


Figure 1: GDP Eurozone (Source: Datastream)

8.2 Difference-in-Difference

8.2.1 Pre-crisis versus first year

Investments

High leverage

Dependent Variable: INVESTMENTS
Method: Panel Least Squares
Date: 05/09/14 Time: 16:47
Sample: 2006Q3 2008Q2
Periods included: 8
Cross-sections included: 590
Total panel (balanced) observations: 4720

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-0.001931	0.001026	-1.882576	0.0598
DUMMY_PREVSFIRST	2.04E-05	0.000632	0.032219	0.9743
DGT	0.000236	0.001451	0.162652	0.8708
C	-0.014196	0.000447	-31.76575	0.0000

R-squared	0.001332	Mean dependent var	-0.014530
Adjusted R-squared	0.000696	S.D. dependent var	0.019548
S.E. of regression	0.019541	Akaike info criterion	-5.031711
Sum squared resid	1.800891	Schwarz criterion	-5.026236
Log likelihood	11878.84	Hannan-Quinn criter.	-5.029786
F-statistic	2.096045	Durbin-Watson stat	1.125796
Prob(F-statistic)	0.098555		

High leverage bank dependent

Dependent Variable: INVESTMENTS
Method: Panel Least Squares
Date: 05/09/14 Time: 16:51
Sample: 2006Q3 2008Q2
Periods included: 8
Cross-sections included: 590

Total panel (balanced) observations: 4720

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-0.001607	0.001048	-1.533828	0.1251
DUMMY_PREVSFIRST	4.69E-05	0.000628	0.074609	0.9405
DGT	0.000102	0.001482	0.068657	0.9453
C	-0.014274	0.000444	-32.13326	0.0000

R-squared	0.000938	Mean dependent var	-0.014530
Adjusted R-squared	0.000303	S.D. dependent var	0.019548
S.E. of regression	0.019545	Akaike info criterion	-5.031317
Sum squared resid	1.801600	Schwarz criterion	-5.025843
Log likelihood	11877.91	Hannan-Quinn criter.	-5.029393
F-statistic	1.476646	Durbin-Watson stat	1.125584
Prob(F-statistic)	0.218773		

Small bank dependent

Dependent Variable: INVESTMENTS

Method: Panel Least Squares

Date: 05/09/14 Time: 16:52

Sample: 2006Q3 2008Q2

Periods included: 8

Cross-sections included: 590

Total panel (balanced) observations: 4720

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	0.002622	0.001181	2.219872	0.0265
DUMMY_PREVSFIRST	0.000295	0.000611	0.482407	0.6295
DGT	-0.001716	0.001671	-1.027081	0.3044
C	-0.014914	0.000432	-34.50163	0.0000

R-squared	0.001171	Mean dependent var	-0.014530
Adjusted R-squared	0.000536	S.D. dependent var	0.019548
S.E. of regression	0.019543	Akaike info criterion	-5.031550
Sum squared resid	1.801180	Schwarz criterion	-5.026076
Log likelihood	11878.46	Hannan-Quinn criter.	-5.029626

F-statistic	1.843262	Durbin-Watson stat	1.126705
Prob(F-statistic)	0.137025		

Debt Issuance

High leverage

Dependent Variable: DEBT_ISSUANCE

Method: Panel Least Squares

Date: 05/09/14 Time: 16:56

Sample: 2006Q3 2008Q2

Periods included: 8

Cross-sections included: 590

Total panel (unbalanced) observations: 4714

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-0.002387	0.004583	-0.520811	0.6025
DUMMY_PREVSFIRST	-0.003520	0.002826	-1.245512	0.2130
DGT	0.001557	0.006482	0.240224	0.8102
C	0.010221	0.001998	5.114952	0.0000

R-squared	0.000406	Mean dependent var	0.008155
Adjusted R-squared	-0.000231	S.D. dependent var	0.087295
S.E. of regression	0.087305	Akaike info criterion	-2.037968
Sum squared resid	35.90044	Schwarz criterion	-2.032488
Log likelihood	4807.491	Hannan-Quinn criter.	-2.036042
F-statistic	0.636940	Durbin-Watson stat	2.109790
Prob(F-statistic)	0.591160		

High leverage bank dependent

Dependent Variable: DEBT_ISSUANCE

Method: Panel Least Squares

Date: 05/09/14 Time: 16:57

Sample: 2006Q3 2008Q2

Periods included: 8

Cross-sections included: 590

Total panel (unbalanced) observations: 4714

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-0.002765	0.004682	-0.590668	0.5548
DUMMY_PREVSFIRST	-0.003874	0.002808	-1.379593	0.1678
DGT	0.003616	0.006621	0.546181	0.5850
C	0.010264	0.001986	5.169085	0.0000

R-squared	0.000422	Mean dependent var	0.008155
Adjusted R-squared	-0.000215	S.D. dependent var	0.087295
S.E. of regression	0.087304	Akaike info criterion	-2.037985
Sum squared resid	35.89985	Schwarz criterion	-2.032505
Log likelihood	4807.530	Hannan-Quinn criter.	-2.036058
F-statistic	0.662911	Durbin-Watson stat	2.109552
Prob(F-statistic)	0.574792		

Small bank dependent

Dependent Variable: DEBT_ISSUANCE

Method: Panel Least Squares

Date: 05/09/14 Time: 16:58

Sample: 2006Q3 2008Q2

Periods included: 8

Cross-sections included: 590

Total panel (unbalanced) observations: 4714

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-0.007822	0.005277	-1.482423	0.1383
DUMMY_PREVSFIRST	-0.004224	0.002732	-1.545767	0.1222
DGT	0.007459	0.007462	0.999489	0.3176
C	0.010816	0.001932	5.597871	0.0000

R-squared	0.000808	Mean dependent var	0.008155
Adjusted R-squared	0.000172	S.D. dependent var	0.087295
S.E. of regression	0.087287	Akaike info criterion	-2.038371
Sum squared resid	35.88598	Schwarz criterion	-2.032891

Log likelihood	4808.441	Hannan-Quinn criter.	-2.036445
F-statistic	1.269921	Durbin-Watson stat	2.109927
Prob(F-statistic)	0.282884		

8.2.2 Pre-crisis versus post-Lehman

Investments

High leverage

Dependent Variable: INVESTMENTS

Method: Panel Least Squares

Date: 05/09/14 Time: 21:02

Sample: 2006Q3 2009Q1

Periods included: 6

Cross-sections included: 590

Total panel (balanced) observations: 3540

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-0.001931	0.000921	-2.097034	0.0361
DUMMY_PREVSLEHMAN	0.002205	0.000695	3.173378	0.0015
DGT	0.001594	0.001595	0.999435	0.3177
C	-0.014196	0.000401	-35.38441	0.0000

R-squared	0.005775	Mean dependent var	-0.013727
Adjusted R-squared	0.004932	S.D. dependent var	0.017586
S.E. of regression	0.017543	Akaike info criterion	-5.247194
Sum squared resid	1.088228	Schwarz criterion	-5.240220
Log likelihood	9291.534	Hannan-Quinn criter.	-5.244707
F-statistic	6.846569	Durbin-Watson stat	1.176777
Prob(F-statistic)	0.000135		

High leverage bank dependent

Dependent Variable: INVESTMENTS

Method: Panel Least Squares

Date: 05/09/14 Time: 21:05

Sample: 2006Q3 2009Q1

Periods included: 6

Cross-sections included: 590

Total panel (balanced) observations: 3540

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-0.001782	0.000944	-1.887661	0.0592
DUMMY_PREVSLEHMAN	0.002215	0.000690	3.209728	0.0013
DGT	0.001648	0.001635	1.007370	0.3138
C	-0.014246	0.000398	-35.76197	0.0000

R-squared	0.005525	Mean dependent var	-0.013727
Adjusted R-squared	0.004681	S.D. dependent var	0.017586
S.E. of regression	0.017545	Akaike info criterion	-5.246942
Sum squared resid	1.088502	Schwarz criterion	-5.239969
Log likelihood	9291.088	Hannan-Quinn criter.	-5.244455
F-statistic	6.548205	Durbin-Watson stat	1.176556
Prob(F-statistic)	0.000206		

Small bank dependent

Dependent Variable: INVESTMENTS

Method: Panel Least Squares

Date: 05/09/14 Time: 21:06

Sample: 2006Q3 2009Q1

Periods included: 6

Cross-sections included: 590

Total panel (balanced) observations: 3540

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	0.002622	0.001060	2.473558	0.0134
DUMMY_PREVSLEHMAN	0.002916	0.000672	4.339938	0.0000
DGT	-0.003050	0.001836	-1.660750	0.0969

C	-0.014914	0.000388	-38.44446	0.0000

R-squared	0.006262	Mean dependent var	-0.013727
Adjusted R-squared	0.005419	S.D. dependent var	0.017586
S.E. of regression	0.017539	Akaike info criterion	-5.247684
Sum squared resid	1.087695	Schwarz criterion	-5.240710
Log likelihood	9292.401	Hannan-Quinn criter.	-5.245197
F-statistic	7.427582	Durbin-Watson stat	1.176874
Prob(F-statistic)	0.000059		

Debt issuance

High leverage

Dependent Variable: DEBT_ISSUANCE

Method: Panel Least Squares

Date: 05/09/14 Time: 21:13

Sample: 2006Q3 2009Q1

Periods included: 6

Cross-sections included: 590

Total panel (unbalanced) observations: 3537

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-0.002387	0.005426	-0.439886	0.6600
DUMMY_PREVSLEHMAN	-0.009195	0.004096	-2.245044	0.0248
DGT	-0.015061	0.009398	-1.602571	0.1091
C	0.010221	0.002366	4.320182	0.0000

R-squared	0.004524	Mean dependent var	0.005746
Adjusted R-squared	0.003679	S.D. dependent var	0.103557
S.E. of regression	0.103366	Akaike info criterion	-1.699945
Sum squared resid	37.74866	Schwarz criterion	-1.692966
Log likelihood	3010.353	Hannan-Quinn criter.	-1.697456
F-statistic	5.351970	Durbin-Watson stat	2.060101
Prob(F-statistic)	0.001122		

High leverage bank dependent

Dependent Variable: DEBT_ISSUANCE

Method: Panel Least Squares

Date: 05/09/14 Time: 21:14

Sample: 2006Q3 2009Q1

Periods included: 6

Cross-sections included: 590

Total panel (unbalanced) observations: 3537

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-0.002272	0.005563	-0.408384	0.6830
DUMMY_PREVSLEHMAN	-0.008968	0.004065	-2.206031	0.0274
DGT	-0.017338	0.009634	-1.799536	0.0720
C	0.010172	0.002348	4.331558	0.0000

R-squared	0.004810	Mean dependent var	0.005746
Adjusted R-squared	0.003965	S.D. dependent var	0.103557
S.E. of regression	0.103351	Akaike info criterion	-1.700233
Sum squared resid	37.73782	Schwarz criterion	-1.693254
Log likelihood	3010.861	Hannan-Quinn criter.	-1.697743
F-statistic	5.691989	Durbin-Watson stat	2.060309
Prob(F-statistic)	0.000694		

Small bank dependent

Dependent Variable: DEBT_ISSUANCE

Method: Panel Least Squares

Date: 05/09/14 Time: 21:18

Sample: 2006Q3 2009Q1

Periods included: 6

Cross-sections included: 590

Total panel (unbalanced) observations: 3537

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-0.007822	0.006251	-1.251373	0.2109

DUMMY_PREVSLEHMAN	-0.011796	0.003962	-2.976873	0.0029
DGT	-0.001932	0.010826	-0.178456	0.8584
C	0.010816	0.002289	4.725388	0.0000

R-squared	0.003797	Mean dependent var	0.005746
Adjusted R-squared	0.002952	S.D. dependent var	0.103557
S.E. of regression	0.103404	Akaike info criterion	-1.699216
Sum squared resid	37.77621	Schwarz criterion	-1.692237
Log likelihood	3009.063	Hannan-Quinn criter.	-1.696726
F-statistic	4.489172	Durbin-Watson stat	2.056647
Prob(F-statistic)	0.003769		

Low leverage

Dependent Variable: DEBT_ISSUANCE

Method: Panel Least Squares

Date: 05/09/14 Time: 21:28

Sample: 2006Q3 2009Q1

Periods included: 6

Cross-sections included: 589

Total panel (unbalanced) observations: 3531

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	0.001398	0.004143	0.337413	0.7358
DUMMY_PREVSLEHMAN	-0.013006	0.003808	-3.415329	0.0006
DGT	0.007201	0.007173	1.003884	0.3155
C	0.009606	0.002199	4.367748	0.0000

R-squared	0.003660	Mean dependent var	0.005757
Adjusted R-squared	0.002813	S.D. dependent var	0.103645
S.E. of regression	0.103499	Akaike info criterion	-1.697385
Sum squared resid	37.78111	Schwarz criterion	-1.690396
Log likelihood	3000.732	Hannan-Quinn criter.	-1.694891
F-statistic	4.319188	Durbin-Watson stat	2.058833
Prob(F-statistic)	0.004778		

High Cash

Dependent Variable: DEBT_ISSUANCE

Method: Panel Least Squares

Date: 05/09/14 Time: 21:31

Sample: 2006Q3 2009Q1

Periods included: 6

Cross-sections included: 590

Total panel (unbalanced) observations: 3537

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMYCOMPANY	-0.009474	0.007863	-1.204841	0.2283
DUMMY_PREVSLEHMAN	-0.013069	0.003845	-3.399322	0.0007
DGT	0.012739	0.013619	0.935420	0.3496
C	0.010523	0.002221	4.738464	0.0000

R-squared	0.003446	Mean dependent var	0.005746
Adjusted R-squared	0.002600	S.D. dependent var	0.103557
S.E. of regression	0.103422	Akaike info criterion	-1.698863
Sum squared resid	37.78953	Schwarz criterion	-1.691884
Log likelihood	3008.440	Hannan-Quinn criter.	-1.696374
F-statistic	4.072656	Durbin-Watson stat	2.057693
Prob(F-statistic)	0.006733		

Cash holdings

High leverage

Dependent Variable: CASHHOLDINGS

Method: Panel Least Squares

Date: 05/09/14 Time: 21:43

Sample: 2006Q3 2009Q1

Periods included: 6

Cross-sections included: 590

Total panel (balanced) observations: 3540

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-0.093839	0.011650	-8.055173	0.0000
DUMMY_PREVSLEHMAN	-0.019976	0.008791	-2.272267	0.0231
DGT	0.004524	0.020178	0.224206	0.8226
C	0.173988	0.005076	34.27895	0.0000

R-squared	0.027533	Mean dependent var	0.149802
Adjusted R-squared	0.026708	S.D. dependent var	0.224964
S.E. of regression	0.221940	Akaike info criterion	-0.171694
Sum squared resid	174.1733	Schwarz criterion	-0.164720
Log likelihood	307.8985	Hannan-Quinn criter.	-0.169207
F-statistic	33.37094	Durbin-Watson stat	0.422234
Prob(F-statistic)	0.000000		

High leverage bank dependent

Dependent Variable: CASHHOLDINGS

Method: Panel Least Squares

Date: 05/09/14 Time: 21:45

Sample: 2006Q3 2009Q1

Periods included: 6

Cross-sections included: 590

Total panel (balanced) observations: 3540

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-0.100428	0.011929	-8.418906	0.0000
DUMMY_PREVSLEHMAN	-0.019781	0.008716	-2.269485	0.0233
DGT	0.003731	0.020661	0.180599	0.8567
C	0.174047	0.005032	34.58577	0.0000

R-squared	0.030059	Mean dependent var	0.149802
Adjusted R-squared	0.029237	S.D. dependent var	0.224964
S.E. of regression	0.221651	Akaike info criterion	-0.174296

Sum squared resid	173.7208	Schwarz criterion	-0.167322
Log likelihood	312.5032	Hannan-Quinn criter.	-0.171808
F-statistic	36.52814	Durbin-Watson stat	0.421480
Prob(F-statistic)	0.000000		

8.2.3 Pre-crisis versus last year

Investments

High leverage

Dependent Variable: INVESTMENT

Method: Panel Least Squares

Date: 05/09/14 Time: 22:56

Sample: 2006Q3 2010Q1

Periods included: 8

Cross-sections included: 590

Total panel (unbalanced) observations: 4718

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-0.001931	0.000906	-2.132358	0.0330
DUMMYPREVSLAST	0.004406	0.000558	7.894730	0.0000
DGT	0.002775	0.001281	2.166512	0.0303
C	-0.014196	0.000395	-35.98039	0.0000

R-squared	0.021149	Mean dependent var	-0.012097
Adjusted R-squared	0.020526	S.D. dependent var	0.017432
S.E. of regression	0.017252	Akaike info criterion	-5.280882
Sum squared resid	1.403102	Schwarz criterion	-5.275406
Log likelihood	12461.60	Hannan-Quinn criter.	-5.278957
F-statistic	33.95074	Durbin-Watson stat	1.363302
Prob(F-statistic)	0.000000		

High leverage bank dependent

Dependent Variable: INVESTMENT

Method: Panel Least Squares

Date: 05/09/14 Time: 22:59

Sample: 2006Q3 2010Q1

Periods included: 8

Cross-sections included: 589

Total panel (unbalanced) observations: 4710

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-0.001754	0.000929	-1.887745	0.0591
DUMMYPREVSLAST	0.004453	0.000555	8.024020	0.0000
DGT	0.002743	0.001314	2.087534	0.0369
C	-0.014274	0.000392	-36.38449	0.0000

R-squared	0.021056	Mean dependent var	-0.012117
Adjusted R-squared	0.020432	S.D. dependent var	0.017441
S.E. of regression	0.017262	Akaike info criterion	-5.279817
Sum squared resid	1.402211	Schwarz criterion	-5.274333
Log likelihood	12437.97	Hannan-Quinn criter.	-5.277889
F-statistic	33.73959	Durbin-Watson stat	1.363593
Prob(F-statistic)	0.000000		

Small bank dependent

Dependent Variable: INVESTMENT

Method: Panel Least Squares

Date: 05/09/14 Time: 23:00

Sample: 2006Q3 2010Q1

Periods included: 8

Cross-sections included: 590

Total panel (unbalanced) observations: 4718

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	0.002622	0.001042	2.516277	0.0119
DUMMYPREVSLAST	0.004961	0.000539	9.195728	0.0000
DGT	-0.000207	0.001474	-0.140146	0.8886
C	-0.014914	0.000381	-39.10844	0.0000

R-squared	0.022452	Mean dependent var	-0.012097
Adjusted R-squared	0.021830	S.D. dependent var	0.017432
S.E. of regression	0.017241	Akaike info criterion	-5.282214
Sum squared resid	1.401235	Schwarz criterion	-5.276737
Log likelihood	12464.74	Hannan-Quinn criter.	-5.280289
F-statistic	36.09010	Durbin-Watson stat	1.365838
Prob(F-statistic)	0.000000		

Low leverage

Dependent Variable: INVESTMENT
Method: Panel Least Squares
Date: 05/09/14 Time: 23:01
Sample: 2006Q3 2010Q1
Periods included: 8
Cross-sections included: 589
Total panel (unbalanced) observations: 4710

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	0.001731	0.001128	1.534285	0.1250
DUMMYPREVSLAST	0.005246	0.000534	9.821805	0.0000
DGT	-0.002732	0.001595	-1.712330	0.0869
C	-0.014766	0.000378	-39.10799	0.0000

R-squared	0.020701	Mean dependent var	-0.012104
Adjusted R-squared	0.020076	S.D. dependent var	0.017446
S.E. of regression	0.017270	Akaike info criterion	-5.278849
Sum squared resid	1.403569	Schwarz criterion	-5.273365
Log likelihood	12435.69	Hannan-Quinn criter.	-5.276921
F-statistic	33.15884	Durbin-Watson stat	1.359804
Prob(F-statistic)	0.000000		

High cash

Dependent Variable: INVESTMENT

Method: Panel Least Squares

Date: 05/09/14 Time: 23:03

Sample: 2006Q3 2010Q1

Periods included: 8

Cross-sections included: 590

Total panel (balanced) observations: 4720

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMYCOMPANY	0.003167	0.001311	2.415000	0.0158
DUMMYPREVSLAST	0.005266	0.000523	10.06107	0.0000
DGT	-0.004102	0.001854	-2.212008	0.0270
C	-0.014815	0.000370	-40.03144	0.0000

R-squared	0.021394	Mean dependent var	-0.012093
Adjusted R-squared	0.020772	S.D. dependent var	0.017430
S.E. of regression	0.017248	Akaike info criterion	-5.281431
Sum squared resid	1.402927	Schwarz criterion	-5.275957
Log likelihood	12468.18	Hannan-Quinn criter.	-5.279507
F-statistic	34.36703	Durbin-Watson stat	1.364380
Prob(F-statistic)	0.000000		

Debt issuance

High leverage

Dependent Variable: DEBT_ISSUANCE

Method: Panel Least Squares

Date: 05/09/14 Time: 23:04

Sample: 2006Q3 2010Q1

Periods included: 8

Cross-sections included: 590

Total panel (unbalanced) observations: 4716

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-0.002387	0.004291	-0.556317	0.5780

DUMMYPREVSLAST	-0.014726	0.002645	-5.567733	0.0000
DGT	-0.005069	0.006068	-0.835454	0.4035
C	0.010221	0.001871	5.463666	0.0000

R-squared	0.009827	Mean dependent var	0.001920
Adjusted R-squared	0.009197	S.D. dependent var	0.082111
S.E. of regression	0.081733	Akaike info criterion	-2.169873
Sum squared resid	31.47741	Schwarz criterion	-2.164395
Log likelihood	5120.560	Hannan-Quinn criter.	-2.167947
F-statistic	15.58874	Durbin-Watson stat	2.084383
Prob(F-statistic)	0.000000		

High leverage bank dependent

Dependent Variable: DEBT_ISSUANCE

Method: Panel Least Squares

Date: 05/09/14 Time: 23:05

Sample: 2006Q3 2010Q1

Periods included: 8

Cross-sections included: 590

Total panel (unbalanced) observations: 4717

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-0.002765	0.004383	-0.630966	0.5281
DUMMYPREVSLAST	-0.014949	0.002628	-5.688631	0.0000
DGT	-0.004160	0.006198	-0.671240	0.5021
C	0.010264	0.001859	5.521746	0.0000

R-squared	0.009747	Mean dependent var	0.001914
Adjusted R-squared	0.009117	S.D. dependent var	0.082104
S.E. of regression	0.081728	Akaike info criterion	-2.169982
Sum squared resid	31.48065	Schwarz criterion	-2.164505
Log likelihood	5121.903	Hannan-Quinn criter.	-2.168057
F-statistic	15.46312	Durbin-Watson stat	2.083663
Prob(F-statistic)	0.000000		

8.3 Matching estimator

8.3.1 Pre-crisis versus first year

Investments

High leverage

```
. nnmatch hlprevsfirst Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1

------------------------------------------------------------------------------
hlprevsfirst |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        SATT |   .0000494   .0014345     0.03   0.973    -.0027621    .0028609
------------------------------------------------------------------------------

Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

High leverage bank dependent

```
. nnmatch hlbdprevsfirst Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1

------------------------------------------------------------------------------
hlbdprevsf~t |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        SATT |   .0005988   .0015028     0.40   0.690    -.0023466    .0035443
------------------------------------------------------------------------------

Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

Small bank dependent

```
. nnmatch sbdprevsfirst Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1

------------------------------------------------------------------------------
sbdprevsfi~t |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        SATT |   -.002286   .0024162    -0.95   0.344    -.0070216    .0024497
------------------------------------------------------------------------------

Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

Low leverage

```
. nnmatch nlprevsfirst Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1

------------------------------------------------------------------------------
nlprevsfirst |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        SATT |   .0006426   .0021594     0.30   0.766    -.0035898     .004875
------------------------------------------------------------------------------

Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

High cash

```
. nnmatch hcprevsfirst Dummy M1 M2 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1
```

hcprevsfirst	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SATT	.000075	.0026993	0.03	0.978	-.0052156	.0053656

```
Matching variables:  M1 M2 M4 M5 M6
Bias-adj variables:  M1 M2 M4 M5 M6
```

Debt Issuance

High leverage

```
. nnmatch hlprevsfirst Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1
```

hlprevsfirst	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SATT	-.0002471	.0079228	-0.03	0.975	-.0157755	.0152814

```
Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

High leverage bank dependent

```
. nnmatch hlbdprevsfirst Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1
```

hlbdprevsf~t	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SATT	.0257304	.0142651	1.80	0.071	-.0022286	.0536895

```
Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

Small bank dependent

```
.  nnmatch sbdprevsfirst Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1
```

sbdprevsfi~t	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SATT	.010024	.013905	0.72	0.471	-.0172293	.0372772

```
Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

Low leverage

```
. nnmatch nlprevsfirst Dummy M1 M2 M3 M4 M5 M6, tc(att) robust(1) bias(bias)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1

------------------------------------------------------------------------------
nlprevsfirst |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        SATT |   .0026513   .0076952     0.34   0.730    -.0124311    .0177336
------------------------------------------------------------------------------

Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

8.3.2 Pre-crisis versus post-Lehman

Investments

High leverage

```
. nnmatch hlprevslehman Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1

------------------------------------------------------------------------------
hlprevsleh~n |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        SATT |   .0009014   .0018379     0.49   0.624    -.0027007    .0045036
------------------------------------------------------------------------------

Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

High leverage bank dependent

```
. nnmatch hlbdprevslehman Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1
```

hlbdprevsl~n	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SATT	.001545	.0019034	0.81	0.417	-.0021857	.0052756

```
Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

Small bank dependent

```
. nnmatch sbdprevslehman Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1
```

sbdprevsle~n	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SATT	-.0020585	.002796	-0.74	0.462	-.0075386	.0034216

```
Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

Low leverage

```
. nnmatch nlprevslehman Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1
```

nlprevsleh~n	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SATT	-.0017982	.0025012	-0.72	0.472	-.0067005	.0031041

```
Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

High Cash

```
. nnmatch hcprevspostlehman Dummy M1 M2 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1
```

hcprevspos~n	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SATT	.000826	.0032259	0.26	0.798	-.0054967	.0071487

```
Matching variables:  M1 M2 M4 M5 M6
Bias-adj variables:  M1 M2 M4 M5 M6
```

Debt issuance

High leverage

```
. nnmatch hlprevslehman Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1

------------------------------------------------------------------------------
hlprevsleh~n |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        SATT |  -.0113343   .0126333    -0.90   0.370    -.0360951    .0134266
------------------------------------------------------------------------------

Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

High leverage bank dependent

```
. nnmatch hlbdprevslehman Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1

------------------------------------------------------------------------------
hlbdprevsl~n |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        SATT |   .0514433   .0250906     2.05   0.040     .0022666      .10062
------------------------------------------------------------------------------

Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

Small bank dependent

```
. nnmatch sbdprevslehman Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1
```

sbdprevsle~n	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SATT	.0139812	.0198279	0.71	0.481	-.0248807	.052843

```
Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

8.3.3 Pre-crisis versus last year

Investments

High leverage

```
. nnmatch hlprevslast Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1
```

hlprevslast	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SATT	.0625217	.0262976	2.38	0.017	.0109795	.114064

```
Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

High leverage

```
.  nnmatch hlbdprevslast Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1

------------------------------------------------------------------------------
hlbdprevsl~t |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        SATT |   .0023053    .001699     1.36   0.175    -.0010248    .0056353
------------------------------------------------------------------------------

Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

Small bank dependent

```
. nnmatch sbdprevslast Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1

------------------------------------------------------------------------------
sbdprevslast |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        SATT |   .0033594   .0033019     1.02   0.309    -.0031122    .0098309
------------------------------------------------------------------------------

Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

Low leverage

```
. nnmatch nlprevslast Dummy M1 M2 M3 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1
```

nlprevslast	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SATT	-.0023568	.0026455	-0.89	0.373	-.0075419	.0028283

```
Matching variables:  M1 M2 M3 M4 M5 M6
Bias-adj variables:  M1 M2 M3 M4 M5 M6
```

High cash

```
. nnmatch hcprevslast Dummy M1 M2 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1
```

hcprevslast	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SATT	-.0025527	.003071	-0.83	0.406	-.0085717	.0034664

```
Matching variables:  M1 M2 M4 M5 M6
Bias-adj variables:  M1 M2 M4 M5 M6
```

Cash holdings

High leverage

```
. nnmatch hlprevslast Dummy M1 M2 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1
```

hlprevslast	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SATT	.0719514	.0535449	1.34	0.179	-.0329948	.1768976

```
Matching variables:  M1 M2 M4 M5 M6
Bias-adj variables:  M1 M2 M4 M5 M6
```

High leverage bank dependent

```
. nnmatch hlbdprevslast Dummy M1 M2 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1
```

hlbdprevsl~t	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SATT	.0736748	.0520137	1.42	0.157	-.0282701	.1756198

```
Matching variables:  M1 M2 M4 M5 M6
Bias-adj variables:  M1 M2 M4 M5 M6
```

Small bank dependent

```
. nnmatch sbdprevslast Dummy rating sales icb mb Operatingcf, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1
```

sbdprevslast	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SATT	-.0302454	.0398436	-0.76	0.448	-.1083373	.0478466

```
Matching variables:  rating sales icb mb Operatingcf
Bias-adj variables:  rating sales icb mb Operatingcf
```

Low leverage

```
. nnmatch nlprevslast Dummy M1 M2 M4 M5 M6, tc(att) bias(bias) robust(1)

Matching estimator:  Average Treatment Effect for the Treated

Weighting matrix: inverse variance          Number of obs          =       591
                                            Number of matches  (m) =         1
                                            Number of matches,
                                              robust std. err. (h) =         1
```

nlprevslast	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SATT	.0608474	.0285701	2.13	0.033	.004851	.1168438

```
Matching variables:  M1 M2 M4 M5 M6
Bias-adj variables:  M1 M2 M4 M5 M6
```

8.4 T-test

8.4.1 Pre-crisis versus first year

Investments

Whole sample

T-test whole sample

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,014562757	-0,014497605
Variance	0,000355422	0,000409007
Observations	2360	2360
Hypothesized Mean Difference	0	
df	4695	
t Stat	-0,11447595	
P(T<=t) one-tail	0,454432702	
t Critical one-tail	1,645178243	
P(T<=t) two-tail	0,908865405	
t Critical two-tail	1,960469389	

High leverage

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,016127194	-0,01587089
Variance	0,000350718	0,000346542
Observations	448	448
Hypothesized Mean Difference	0	
df	894	
t Stat	-0,205445812	

P(T<=t) one-tail	0,4186353
t Critical one-tail	1,646559845
P(T<=t) two-tail	0,837270601
t Critical two-tail	1,962621067

High leverage bank dependent

T-test

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,015881413	-0,015732787
Variance	0,000338834	0,000345576
Observations	424	424
Hypothesized Mean Difference	0	
df	846	
t Stat	-0,11698242	
P(T<=t) one-tail	0,453450875	
t Critical one-tail	1,646656758	
P(T<=t) two-tail	0,906901749	
t Critical two-tail	1,962772035	

Small bank dependent

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,01229153	-0,013712493
Variance	0,000325746	0,0005727
Observations	316	316
Hypothesized Mean Difference	0	
df	586	

t Stat	0,842714397
P(T<=t) one-tail	0,199866005
t Critical one-tail	1,647458056
P(T<=t) two-tail	0,399732011
t Critical two-tail	1,964020461

Low leverage

T-test

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,012944073	-0,010516305
Variance	0,000740191	0,000231486
Observations	268	268
Hypothesized Mean Difference	0	
df	419	
t Stat	-1,275009925	
P(T<=t) one-tail	0,101506134	
t Critical one-tail	1,64849841	
P(T<=t) two-tail	0,203012267	
t Critical two-tail	1,965641842	

High cash

T-test High cash

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,011648397	-0,010714093
Variance	0,000719942	0,000159159
Observations	188	188

Hypothesized Mean Difference	0
df	266
t Stat	-0,432063653
P(T<=t) one-tail	0,33302259
t Critical one-tail	1,650602207
P(T<=t) two-tail	0,666045179
t Critical two-tail	1,968922324

Equity issuance

Whole sample

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	0,005518443	-0,0007171
Variance	0,004783883	0,0050599
Observations	1793	18
Hypothesized Mean Difference	0	
df	3623	
t Stat	2,675943802	
P(T<=t) one-tail	0,003742725	
t Critical one-tail	1,645274317	
P(T<=t) two-tail	0,007485451	
t Critical two-tail	1,960618981	

High leverage

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	0,004711512	0,00660186
Variance	0,00610567	0,00612896
Observations	331	33
Hypothesized Mean Difference	0	
df	668	
t Stat	-0,31278317	
P(T<=t) one-tail	0,377271514	
t Critical one-tail	1,647137905	
P(T<=t) two-tail	0,754543027	
t Critical two-tail	1,963521623	

High leverage bank dependent

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	0,003181199	0,00766149
Variance	0,006006793	0,00638118
Observations	309	31
Hypothesized Mean Difference	0	
df	621	
t Stat	-0,71051655	
P(T<=t) one-tail	0,238825309	
t Critical one-tail	1,647311048	
P(T<=t) two-tail	0,477650618	
t Critical two-tail	1,963791397	

Small bank dependent

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	0,011644951	0,00385775
Variance	0,003383591	0,00264200
Observations	272	27
Hypothesized Mean Difference	0	
df	534	
t Stat	1,655825511	
P(T<=t) one-tail	0,049172321	
t Critical one-tail	1,647712114	
P(T<=t) two-tail	0,098344643	
t Critical two-tail	1,964416355	

Low leverage

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	0,005757321	0,00201294
Variance	0,003972285	0,00352002
Observations	217	22
Hypothesized Mean Difference	0	
df	433	
t Stat	0,639288338	
P(T<=t) one-tail	0,261486711	
t Critical one-tail	1,648380311	
P(T<=t) two-tail	0,522973423	
t Critical two-tail	1,965457757	

High cash

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	0,008937297	0,00565336
Variance	0,004830987	0,00374476
Observations	162	16
Hypothesized Mean Difference	0	
df	317	
t Stat	0,451957497	
P(T<=t) one-tail	0,325804345	
t Critical one-tail	1,649674634	
P(T<=t) two-tail	0,65160869	
t Critical two-tail	1,967475658	

8.4.2 Pre-crisis versus post-Lehman

Investments

Whole sample

t-test

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,014562757	-0,012054993
Variance	0,000355422	0,00021303
Observations	2360	1180
Hypothesized Mean Difference	0	
df	2943	
t Stat	-4,357959543	
P(T<=t) one-tail	6,78877E-06	
t Critical one-tail	1,645371551	
P(T<=t) two-tail	1,35775E-05	
t Critical two-tail	1,960770383	

High leverage

t-test

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,016127194	-0,012328009
Variance	0,000350718	0,000199094
Observations	448	224
Hypothesized Mean Difference	0	
df	569	
t Stat	-2,938432833	
P(T<=t) one-tail	0,001716248	
t Critical one-tail	1,647535996	
P(T<=t) two-tail	0,003432496	
t Critical two-tail	1,96414191	

High leverage bank dependent

t-test

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,016027977	-0,012165871
Variance	0,000339785	0,000200427
Observations	420	210
Hypothesized Mean Difference	0	
df	525	
t Stat	-2,908341677	
P(T<=t) one-tail	0,001893672	
t Critical one-tail	1,647761204	
P(T<=t) two-tail	0,003787345	

t Critical two-tail	1,964492854

Small bank dependent

t-test

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,01229153	-0,012424978
Variance	0,000325746	0,000393748
Observations	316	158
Hypothesized Mean Difference	0	
df	289	
t Stat	0,071098552	
P(T<=t) one-tail	0,471684248	
t Critical one-tail	1,650143229	
P(T<=t) two-tail	0,943368495	
t Critical two-tail	1,968206436	

Low leverage

t-test

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,013035813	-0,0104371
Variance	0,000750872	0,000232918
Observations	264	132
Hypothesized Mean Difference	0	
df	390	
t Stat	-1,210506383	
P(T<=t) one-tail	0,113408873	

t Critical one-tail	1,648770081
P(T<=t) two-tail	0,226817747
t Critical two-tail	1,966065331

High cash

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,011648397	-0,00982868
Variance	0,000719942	0,000193843
Observations	188	94
Hypothesized Mean Difference	0	
df	280	
t Stat	-0,749697221	
P(T<=t) one-tail	0,227033254	
t Critical one-tail	1,650313819	
P(T<=t) two-tail	0,454066507	
t Critical two-tail	1,9684725	

8.4.3 Pre-crisis versus last period

Investments

Whole sample

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,014562754	-0,009623767
Variance	0,000355422	0,00024009
Observations	2360	2360
Hypothesized Mean Difference	0	

df	4547
t Stat	-9,832151056
P(T<=t) one-tail	6,86401E-23
t Critical one-tail	1,645188811
P(T<=t) two-tail	1,3728E-22
t Critical two-tail	1,960485843

High leverage

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,016127194	-0,009129686
Variance	0,000350718	0,000130356
Observations	448	424
Hypothesized Mean Difference	0	
df	746	
t Stat	-6,701484932	
P(T<=t) one-tail	2,03392E-11	
t Critical one-tail	1,646898767	
P(T<=t) two-tail	4,06784E-11	
t Critical two-tail	1,963149051	

High leverage bank dependent

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,015881413	-0,008756573
Variance	0,000338834	0,000124605
Observations	424	424
Hypothesized Mean Difference	0	
df	697	
t Stat	-6,814936271	
P(T<=t) one-tail	1,02133E-11	
t Critical one-tail	1,647042736	
P(T<=t) two-tail	2,04265E-11	
t Critical two-tail	1,963373348	

Small bank dependent

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,01229153	-0,007537562
Variance	0,000325746	9,87246E-05
Observations	316	316
Hypothesized Mean Difference	0	
df	490	
t Stat	-4,101815196	
P(T<=t) one-tail	2,39981E-05	
t Critical one-tail	1,647969283	
P(T<=t) two-tail	4,79962E-05	

t Critical two-tail	1,964817132

Low leverage

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,013035813	-0,010521464
Variance	0,000750872	0,001066712
Observations	264	264
Hypothesized Mean Difference	0	
df	511	
t Stat	-0,958253211	
P(T<=t) one-tail	0,169194121	
t Critical one-tail	1,647841009	
P(T<=t) two-tail	0,338388242	
t Critical two-tail	1,964617222	

High cash

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	-0,011648397	-0,010484501
Variance	0,000719942	0,001227382
Observations	188	188
Hypothesized Mean Difference	0	
df	350	

t Stat	-0,361638039
P(T<=t) one-tail	0,358920377
t Critical one-tail	1,64921887
P(T<=t) two-tail	0,717840754
t Critical two-tail	1,966765003

Equity issuance

Whole sample

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	0,005518443	0,00512673
Variance	0,004783883	0,004255761
Observations	1793	1837
Hypothesized Mean Difference	0	
df	3603	
t Stat	0,175446593	
P(T<=t) one-tail	0,430369296	
t Critical one-tail	1,645276653	
P(T<=t) two-tail	0,860738592	
t Critical two-tail	1,960622618	

High leverage

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	0,004711512	0,008445857
Variance	0,00610567	0,005703959
Observations	331	331
Hypothesized Mean Difference	0	
df	659	
t Stat	-0,6251875	
P(T<=t) one-tail	0,266032213	
t Critical one-tail	1,647169145	
P(T<=t) two-tail	0,532064425	
t Critical two-tail	1,963570297	

8.4.4 Paired t-Test

Investment

Whole sample

t-Test: Paired Two Sample for Means

	Variable 1	*Variable 2*
Mean	-0,010380944	-0,014281336
Variance	0,000138328	0,000312633
Observations	591	591
Pearson Correlation	0,654342478	
Hypothesized Mean Difference	0	
df	590	
t Stat	7,090943576	
P(T<=t) one-tail	1,91196E-12	
t Critical one-tail	1,647440371	
P(T<=t) two-tail	3,82391E-12	
t Critical two-tail	1,963992904	

High leverage

t-Test: Paired Two Sample for Means

	Variable 1	*Variable 2*
Mean	-0,010694413	-0,013521232
Variance	0,00017689	0,000256756
Observations	111	111
Pearson Correlation	0,780803497	
Hypothesized Mean Difference	0	
df	110	

t Stat	2,965726902
P(T<=t) one-tail	0,001852058
t Critical one-tail	1,658824187
P(T<=t) two-tail	0,003704115
t Critical two-tail	1,981765282

High leverage bank dependent

t-Test: Paired Two Sample for Means

	Variable 1	*Variable 2*
Mean	-0,010503519	-0,013752761
Variance	0,000172084	0,000252577
Observations	105	105
Pearson Correlation	0,779624629	
Hypothesized Mean Difference	0	
df	104	
t Stat	3,336385329	
P(T<=t) one-tail	0,000588908	
t Critical one-tail	1,659637437	
P(T<=t) two-tail	0,001177817	
t Critical two-tail	1,983037526	

Small bank dependent

t-Test: Paired Two Sample for Means

	Variable 1	*Variable 2*
Mean	-0,009426232	-0,014452334
Variance	0,000132622	0,00077461

Observations	79	79
Pearson Correlation	0,503282834	
Hypothesized Mean Difference	0	
df	78	
t Stat	1,847613227	
P(T<=t) one-tail	0,034224797	
t Critical one-tail	1,664624645	
P(T<=t) two-tail	0,068449594	
t Critical two-tail	1,990847069	

Low leverage

t-Test: Paired Two Sample for Means

	Variable 1	*Variable 2*
Mean	-0,009501419	-0,012187821
Variance	0,000211636	0,000245418
Observations	67	67
Pearson Correlation	0,809272237	
Hypothesized Mean Difference	0	
df	66	
t Stat	2,341597542	
P(T<=t) one-tail	0,011114877	
t Critical one-tail	1,668270514	
P(T<=t) two-tail	0,022229755	
t Critical two-tail	1,996564419	

High cash

t-Test: Paired Two Sample for Means

	Variable 1	*Variable 2*
Mean	-0,008381434	-0,011130057
Variance	0,000102572	0,000158316
Observations	47	47
Pearson Correlation	0,724989683	
Hypothesized Mean Difference	0	
df	46	
t Stat	2,159878236	
P(T<=t) one-tail	0,018014361	
t Critical one-tail	1,678660414	
P(T<=t) two-tail	0,036028723	
t Critical two-tail	2,012895599	

8.5 Test for OLS assumptions

8.5.1 Correlation matrix – independent variables

Pre-crisis vs first year

	DUMMY	DUMMY_PREVSFIRST	DGT
DUMMY	1.000000	-2.75E-19	0.696490
DUMMY_PREVSFIRST	-2.75E-19	1.000000	0.172633
DGT	0.696490	0.172633	1.000000

Pre-crisis vs post-Lehman period

	DGT	DUMMYCOMPANY	DUMMY_PREVSLEHMAN
DGT	1.000000	0.561380	0.233572
DUMMYCOMPANY	0.561380	1.000000	-4.05E-18
DUMMY_PREVSLEHMAN	0.233572	-4.05E-18	1.000000

Pre-crisis vs last year

	DUMMY	DUMMYPREVSLAST	DGT

DUMMY	1.000000	0.000000	0.696509
DUMMYPR EVSLAST	0.000000	1.000000	0.172482
DGT	0.696509	0.172482	1.000000

8.5.2 Correlation matrix – independent variables and the error term

Pre-crisis vs first year

	RESID01	DGT	DUMMY	DUMMY_PR EVSFIRST
RESID01	1.000000	-1.92E-16	-1.45E-16	-4.45E-16
DGT	-1.92E-16	1.000000	0.696490	0.172633
DUMMY	-1.45E-16	0.696490	1.000000	-9.29E-19
DUMMY_PR EVSFIRST	-4.45E-16	0.172633	-9.29E-19	1.000000

Pre-crisis vs post-Lehman period

	DGT	DUMMY_PR EVSLEHMAN	DUMMYCOMPANY	RESID01
DGT	1.000000	0.233572	0.561380	-1.34E-16
DUMMY_PR EVSLEHMAN	0.233572	1.000000	-5.31E-18	-4.79E-16
DUMMYCOMPANY	0.561380	-5.31E-18	1.000000	-2.66E-16

RESID01	-1.34E-16	-4.79E-16	-2.66E-16	1.000000

Pre-crisis vs last year

	DGT	DUMMY	DUMMYPREVSLAST	RESID01
DGT	1.000000	0.696782	0.172429	2.89E-17
DUMMY	0.696782	1.000000	0.000256	3.14E-17
DUMMYPREVSLAST	0.172429	0.000256	1.000000	3.98E-17
RESID01	2.89E-17	3.14E-17	3.98E-17	1.000000

8.5.3 Test for heteroscedaticity

Pre-crisis vs first year, cash holdings, low leverage

Dependent Variable: RESIDSQ

Method: Panel Least Squares

Date: 05/22/14 Time: 13:28

Sample: 2006Q3 2008Q2

Periods included: 8

Cross-sections included: 589

Total panel (balanced) observations: 4712

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	0.014900	0.024116	0.617864	0.5367
DGT	0.009677	0.034105	0.283741	0.7766
DUMMY_PREVSFIRST	-0.023319	0.018051	-1.291840	0.1965
C	0.059029	0.012764	4.624708	0.0000

R-squared	0.000639	Mean dependent var	0.049883
Adjusted R-squared	0.000002	S.D. dependent var	0.601346
S.E. of regression	0.601345	Akaike info criterion	1.821553
Sum squared resid	1702.488	Schwarz criterion	1.827035
Log likelihood	-4287.579	Hannan-Quinn criter.	1.823480

F-statistic	1.003169	Durbin-Watson stat	0.332968
Prob(F-statistic)	0.390260		

Pre-crisis vs post-Lehman, capital expenditures, high leverage firms

Dependent Variable: RESIDSQ

Method: Panel Least Squares

Date: 05/22/14 Time: 13:48

Sample: 2006Q3 2009Q1

Periods included: 6

Cross-sections included: 590

Total panel (balanced) observations: 3540

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-5.88E-06	0.000110	-0.053246	0.9575
DUMMY_PREVSLEHMAN	-0.000140	8.33E-05	-1.675160	0.0940
DGT	-1.22E-05	0.000191	-0.063680	0.9492
C	0.000356	4.81E-05	7.397690	0.0000

R-squared	0.001016	Mean dependent var	0.000307
Adjusted R-squared	0.000168	S.D. dependent var	0.002103
S.E. of regression	0.002103	Akaike info criterion	-9.489632
Sum squared resid	0.015641	Schwarz criterion	-9.482658
Log likelihood	16800.65	Hannan-Quinn criter.	-9.487144
F-statistic	1.198521	Durbin-Watson stat	1.819394
Prob(F-statistic)	0.308743		

Pre-crisis vs last year, capital expenditures, high leverage dependent

Dependent Variable: RESIDSQ

Method: Panel Least Squares

Date: 05/22/14 Time: 13:50

Sample: 2006Q3 2010Q1

Periods included: 8

Cross-sections included: 589

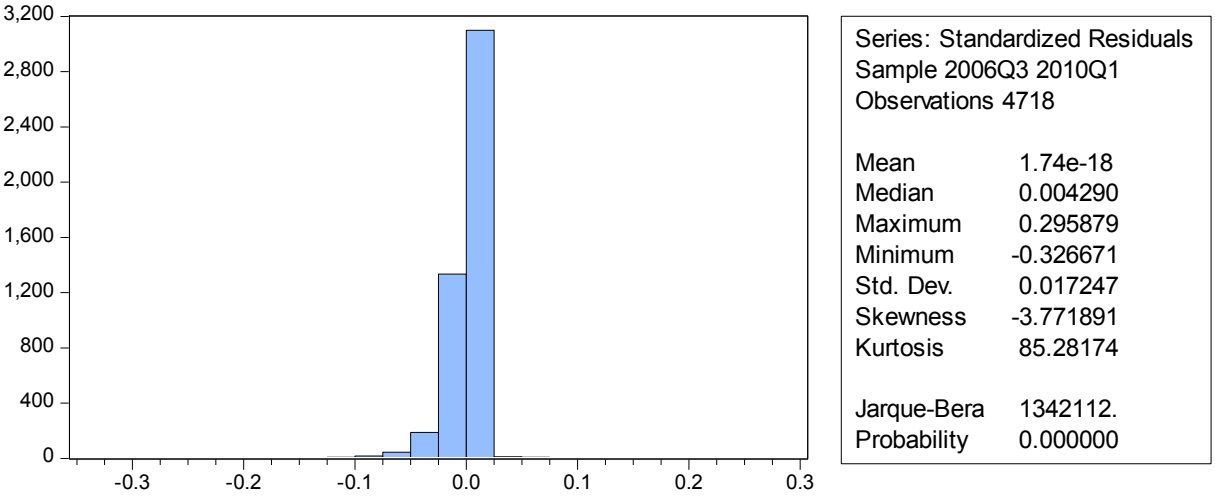
Total panel (unbalanced) observations: 4710

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-1.96E-05	0.000147	-0.133306	0.8940
DUMMYPREVSLAST	-9.32E-05	8.78E-05	-1.061436	0.2885
DGT	-0.000121	0.000208	-0.580966	0.5613
C	0.000359	6.21E-05	5.774437	0.0000

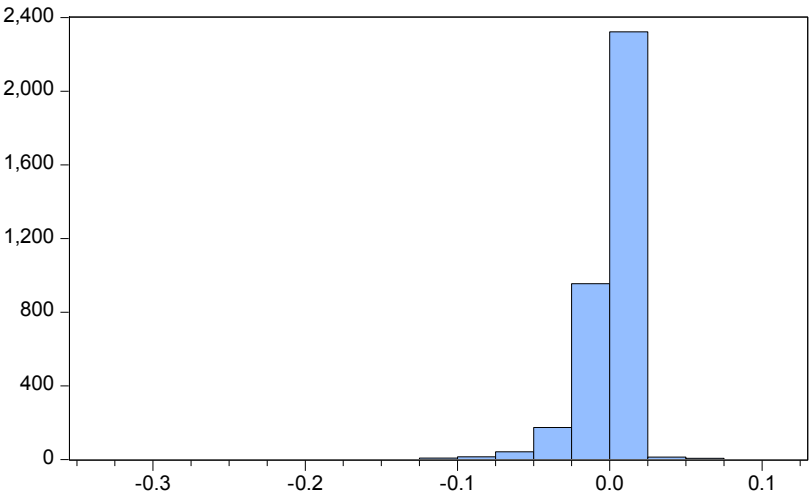
R-squared	0.000639	Mean dependent var	0.000298
Adjusted R-squared	0.000002	S.D. dependent var	0.002732
S.E. of regression	0.002732	Akaike info criterion	-8.966483
Sum squared resid	0.035133	Schwarz criterion	-8.960999
Log likelihood	21120.07	Hannan-Quinn criter.	-8.964555
F-statistic	1.002773	Durbin-Watson stat	1.376868
Prob(F-statistic)	0.390443		

8.5.4 Jarque-Bera Normality test

Pre-crisis vs last year, high leverage investments



Pre-crisis vs post-Lehman, Capital expenditures, High leverage bank dependent



Series: Standardized Residuals
Sample 2006Q3 2009Q1
Observations 3540

Mean	1.46e-17
Median	0.004897
Maximum	0.111296
Minimum	-0.326622
Std. Dev.	0.017538
Skewness	-3.988832
Kurtosis	47.76441
Jarque-Bera	304955.6
Probability	0.000000