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Capital Structure and Firm Performance: Did the Financial Crisis Matter?

- A cross-industry study

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Abstract

Previous research confirms the remarkable change in firms' capital structure when the financial crisis took place in 2008. This paper examines if the financial crisis affected the capital structure in various industries differently. In the context of a financial shock, this study further studies whether the industries' chosen capital structure even have an impact on firms' performance, a research area that yields inconsistent answers. Using two panel data regressions and long-term and short-term debt as proxies for capital structure, we study listed US firms within the industries Consumer Goods, Consumer Services, Healthcare, Industrials and Technology before and during the financial crisis in 2008. The findings show that the capital structure changed differently among the industries and we find a significant effect of the crisis in the Consumer Services and Healthcare industry. In addition, our results indicate that the impact of capital structure on firm performance is industry-specific as well. We find statistically supported relations in the Consumer Services, Healthcare and Technology industry. By proving that the financial crisis did matter differently in various industries, this study contributes to the existing literature within the area of capital structure and its impact on firm performance.

***Keywords**: Financial crises, Capital Structure, Firm Performance, Industries, Long-term debt, Short-term debt, Trade-off theory, Pecking order theory, Market timing theory*

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Definition list

Capital Structure

In this paper leverage is used as a proxy for capital structure in accordance with previous researches. It refers to the portion of a firm's assets that are financed by borrowed funds. The amounts of long-term and short-term debt are used as measurements of leverage.

Firm Performance

Firm performance refers to the financial performance of a firm, which signifies the result, profit or firm value. Firm performance can be measured in many ways, however in this study we use return on assets to reflect the profitability of a company.

Financial Crises

Mishkin (1992:117-118) describes financial crises as "A disruption of financial markets in which adverse selection and moral hazard problems become much worse, so that financial markets are unable to efficiently channel funds to those who have the most productive investment opportunities". This paper studies the effects of specifically the global financial crisis that took place in 2008 as a result of the collapse of the American housing market in 2007 and the bankruptcy of Lehman Brothers in 2008.

Long-term debt

Long-term debt or liabilities are loans, bonds or other securities with maturities greater than one year. They often involve long-term commitment of interest payments.

Short-term debt

Short-term debt or liabilities are loans, bonds or other securities that have a maturity date within a year.

Table of Contents

Tables & Figures

1. Introduction and problemformulation

'When the music stops, in terms of liquidity, things will be complicated. But as long as the music is playing, you've got to get up and dance. We're still dancing'
(Gapper, 2007)

The above infamous quotation by Chuck Prince, former CEO of Citigroup, was made in 2007 right before the global financial crisis took place (Gapper, 2007; Wilson, 2015:465). As we now know, the music stopped in 2008 in terms of economic activity and the economic collapse became a fact (Campello et al., 2010; Fox, 2013; Wilson, 2015:465). It is proved that global financial crises often have devastating consequences both in terms of their breadth and depth (European Economy, 2009:1-6; Crotty, 2009). Even though the world has witnessed several global crises, in 2008 there was a historical moment where the enormous damage of a global financial crisis led to overwhelming consequences, since no country has proved immune to the devastating effects (Foxley, 2009:7; Altman, 2009). Crotty (2009) explains that the crisis in 2008 is argued to be the worst crisis since the great depression in 1930's due to the fact that several economic sectors and many businesses across the globe ended up with liquidity issues and turned insolvent (Imbs, 2010; Ahn et al., 2011; Cetorelli and Goldberg, 2011). Campello et al. (2010) state that during the financial crisis the growth opportunities for many firms were affected negatively since it became harder to acquire external funding. According to Watson and Head (2010) this made the management more concerned about the relevant investment decisions as well as the appropriate level of debt and equity since it is proved to have an influence on firm performance (Fama and French, 1998; Gleason et al., 2000; Berger and Bonaccorsi di Patti, 2006; Margaritis and Psillaki, 2010; Fosu, 2013). Hence, since the financial crisis in 2008, increasing attention is paid towards companies' capital structure.

Since a higher level of debt is associated with more risk, the financial crisis is a great opportunity to capture the negative effects of an improper capital structure (MacKay and Phillips, 2005; Ross et al., 2013). Brealey et al. (2008) claim that the highly leveraged firms were the ones experiencing higher bankruptcy risk when the stock

market collapsed in 2008. Additionally, Cornett et al. (2011) state that banks experienced liquidity issues as well, which impacted firms' borrowing cost negatively since the credit supply was limited. Moreover, during the crisis the amount of securities issued by firms dropped remarkably while the flexibility in securities with short maturity made them preferable (Almeida et al., 2011; Federal Reserve, 2012; Custódio et al., 2013; Fosberg, 2013). Furthermore, Bhamra et al. (2010) describe that the possibility of unexpected financial crises has made firms more concerned about financial stability and more conservative in their financial policies. As a result, the debt to equity ratio has become an important survival indicator (Campello et al., 2010). In sum, the aforementioned reasoning clearly proves that the financial crisis did impact on firms' capital structure.

Despite the convincing evidence of the financial crisis' impact on capital structure the industry-specific effects are still not confirmed. It is reasonable to believe that the financial crisis' impact on specific industries' capital structure differs since several researchers prove that the capital structure differs between industries (Bradley et al., 1984; Frank and Goyal, 2009). Essentially, it is argued that firms operating in the same industry are similar to each other and face the similar challenges, risks, profitability, regulations etc., which affect their financial decisions (Bradley et al., 1984; Harris and Raviv, 1991; Kovenock and Phillips, 1995; Frank and Goyal, 2009; Morri and Cristanziani, 2009). The latter reasoning indicates that different industries should be characterized with different capital structures and therefore the effect of the financial crisis may have varied among the industries. Moreover, it is evident that theories on capital structure developed so far do not emphasize the direct relation between industry and capital structure (Abdullah et al., 2012). As such, this is an area that still can be considered to be vague and blurred.

Although there are a lot of researches around capital structure, the importance of the capital structure choice is still equivocal. Viviani (2008) emphasizes the importance to determine the proper amount of debt and equity capital since it enables a company to increase its market value and maximize its returns. However, the findings of capital structure's impact on firm performance are ambiguous. Researchers as Berger and Bonaccorsi di Patti, (2006) Margaritis and Psillaki (2010) and Fosu (2013) declare that financial leverage has a positive impact on firms' performance. The explanation

lies primarily in the fact that financing the operations with owners' capital is proven to be more expensive than financing through borrowing funds. The reason is that the owners' required rate of return on their invested capital often exceeds the interest rates on loans (Rajan and Zingales, 1995; Ong and Teh, 2011; Salim and Yadav, 2012). Modigliani and Miller (1963) further argue that companies can utilize debt financing and benefit from leverage since the tax regulations enables debt-financing firms to benefit from the interest deduction. In contrary, scholars as Fama and French (1998) and Gleason et al. (2000) find a negative impact of financial leverage on firms' performance. The underlying reason is the increased interest expenses on debt that in turn can reduce a firm's performance and thereby increase the financial risk in terms of bankruptcy (Kraus and Litzenberger, 1973; Scott Jr., 1977; Kim, 1978; Myers, 1984; MacKay and Phillips, 2005; Brealey et al., 2008; Ross et al., 2013). Also, firms that generate high earnings and are considered profitable are the ones in less need of debt since they can finance investments internally (Boadi et al., 2015). To conclude, previous researches on the relation between capital structure and firm performance yield contradictory results (Phillips and Sipahioglu, 2004; Singh and Faircloth, 2005; Chathoth and Olsen, 2007; Jermias, 2008). As such, this relation needs to be further examined in different industries and especially in the light of a financial shock.

In a world where firms are pressured by unexpected events such as financial crises, it becomes more crucial to decrease the probability of ending up in financial distress by managing the capital structure in its most effective way. Simultaneously, we understand that the capital structure decision is a crucial part of the equation due to the possibility of increasing the firm value and maximizing returns. Nevertheless, it is still not convincing how capital structure impacts on firms' performance in normal market conditions, which makes us, question how this relation presents itself during the crisis. Since it is proven that the capital structure differs between industries, there is reason to believe that the crisis' impact on industries' capital structure and its relation to firm performance differ as well. However, this is still a relatively unexplored area and the industry-specific effects must therefore be further examined. In sum, the aforementioned reasoning highlights that the links between financial crisis, capital structure and firm performance need to be clarified. Therefore we raise the question of how such financial shock affected different industries' capital

structure and the well studied but ambiguous relation between capital structure and firm performance.

1.1 Research question and purpose

How did the financial crisis in 2008 impact different industries' capital structure and its relation to firm performance?

This study is dedicated to further investigate the identified research void on two analysis levels. Firstly, the purpose of this study is to analyze whether and if so, how the financial crisis in 2008 affected firms' capital structure choice in different industries. Secondly, this study explores how the industries' chosen capital structure affects firm performance, before and during the crisis. In order to detect potential differences, the study examines the period before (2004-2007) and during (2008-2011) the financial crisis.

Although there is extensive research within the area of capital structure, much of the findings are not only inconsistent but also equivocal, and many aspects are still unexplored. To our knowledge, there is a lack of research about how the financial crisis affected the capital structure in specific industries. Also, we argue that the failure of research in providing a consistent and systematic relationship between capital structure and firm performance opens up for our empirical field. As such, the financial crisis in 2008 enables us to investigate and assess the impact of a financial shock on different industries' capitals structure and its relation to firm performance. Furthermore, from a wider perspective, we argue that our research area is highly relevant due to the fact that the business cycle is in a constant fluctuation of economic activities such as booms and recessions. Historically the world has experienced several global financial crises and will most likely face similar events in the future. As such, this paper provides knowledge about how future situations would potentially present themselves regarding capital structure changes when the economy is disrupted. Therefore, we argue that this paper should be of interest for a broad group of stakeholders, not only from a managerial point of view but also for scholars, potential investors, creditors as well as owners. The interest for the various groups lay in the importance of the capital structure decision and its effects on firm performance.

This is not only crucial during normal market conditions but also during an economic collapse where the capital structure plays an even more decisive role for companies' chances of survival.

1.2 Thesis Disposition

The remaining part of this study is organized as follows. Section two describes our literature review as well as theoretical benchmark where we present previous research within the area of financial crisis and different capital structure theories. We also present literature regarding industrial difference within capital structure. Section three describes our chosen statistical approach, data collection, test of OLS-assumptions, how to interpret the regression results and at last we discuss the quality of the study. In the following section, our results are presented as well as analyzed. Section five contains a discussion about our results where we provide possible explanation for both significant and insignificant results. In the final section we conclude the findings and provide suggestions for further research.

2. Literature Review and Theoretical Benchmark

This section is divided into three main areas consisting of a literature review, theoretical benchmark and a summary of both. All the parts are connected to the chosen context: the financial crisis.

2.1 Literature Review

This part firstly presents the literature review for the impact of the recent financial crisis on firms' capital structure, where the causes and effects of the crisis are described. The following part describes the industry differences in capital structure.

2.1.1 The financial crisis' impact on capital structure

It all began in the in the end of 2007, where the financial market in United States was in a midst of a credit crisis of historic proportions. As a result, the stock market collapsed in the fall of 2008 and due to its severe consequences, the crisis in 2008 is perceived as the worst crisis since the great depression in 1930's (Crotty, 2009). A financial crisis is defined as "A disruption of financial markets in which adverse selection and moral hazard problems become much worse, so that financial markets are unable to efficiently channel funds to those who have the most productive investment opportunities" (Mishkin, 1992:117-118). What is evident in this definition is that a crisis results in a downturn and decline in the aggregate economy (Carmassi et al., 2009). The underlying forces driving the crisis in 2008 were loose monetary policy driven by Federal Reserve. It is argued that the federal funds' interest rate was below the historical level some years before the crisis (Crotty, 2009). This resulted in a huge amount of mortgage sales and housing prices that took a swing-effect upwards. The overvalued assets and high debt level eventually ended up in a financial collapse of the housing market in 2007 (Crotty, 2009; Argandoña, 2012). On top of that, the investment bank Lehman Brothers went bankrupt in 2008, which lead to the collapse of the stock market. As such this had an enormous global effect on many financial institutions and businesses (Argandoña, 2012). The collapse of the housing and stock market caused the financial crisis that resulted in devastating consequences for several economic sectors across the globe and many businesses ended up with liquidity issues and some even turned insolvent (Imbs, 2010; Ahn et al., 2011; Cetorelli and Goldberg, 2011).

Cornett et al. (2011) show that the liquidity crisis that many banks experienced resulted in a decrease of their credit supply. As such, it became more expensive for firms to borrow. The lending volumes actually fell 47% in US during the last quarter in 2008 (Ivashina and Scharfstein, 2010). In fact, previous research by Campello et al. (2010) show that the majority of the businesses involved in the sample were highly affected by the limited access to credits. Empirical evidence also proves that 86% of constrained US firms avoided investment opportunities because of challenges with external financing. In turn, this disturbed many growth opportunities for businesses (Campello et al., 2010). Table 1 below illustrates a scenario between 2004 and 2011 of total value of securities issuance of US firms. What is seen is that between the period 2004 and 2007, it is evident that the total value of securities issued every year increased, from USD 2,070,679 million to 2,619,412. However, an opposite pattern is detected when the financial crisis took place in 2008, where the amount of securities dropped more than 50% between 2008 and 2011. The explanation, as can be seen in the table below, lies in significant decrease in bond issuance (Federal Reserve, 2012). The results indicate that the crisis affected the business preference for raising external capital through leverage.

Table 1: *Securities issuance of US firms*

Securities issuance of US firms ($mn)			
Year	*Bonds*	*Stocks*	*Total*
2004	1,923,094	147,585	2,070,679
2005	2,323,735	115,255	2,438,990
2006	2,590,863	119,165	2,710,028
2007	2,500,770	118,642	2,619,412
2008	2,220,530	168,571	2,389,101
2009	970,694	233,967	1,204,661
2010	893,717	131,135	1,024,852
2011	909,109	233,967	1,143,076

Source: www.federalreserve.gov

However, it is also evident that the crisis impacted the choice of different debt alternatives since the increase in uncertainty and risk affects the expected return (Almeida et al., 2011; Gürkaynak and Wright, 2012; Dick et al., 2013). Previous

researches confirm that the amount of short-term debt increased while a large drop in long-term debt is detected during the financial crisis in 2008 (Fosberg, 2013; Custódio et al., 2013). However, it is shown by Fosberg (2013) that even though short-term debt increased when the crisis took place in 2008, the increase was reversed by the end of 2009. Moreover, it is detected by Custódio et al. (2013) that the decrease in debt maturity, i.e. the increased desire for short-term debt, was mostly done by firms that were facing higher information asymmetry, which is reasonable since the crisis led to a higher degree of information asymmetry. As such, it is argued that one become more hesitant to invest in long-term securities during crises, which makes short-term debt more attractive since it can also be easily converted (Gürkaynak and Wright, 2012; Dick et al., 2013).

All in all, the financial crisis did result in a substantial impact on business capital structure, and focus has been directed towards the debt level as well as different debt alternatives since leverage is connected with risk (MacKay and Phillips, 2005; Brealey et al., 2008; Ross et al., 2013; Fosberg, 2013; Custódio et al., 2013). Nevertheless, it is still not confirmed how the crisis affected the debt level in specific industries since there are industry differences in capital structure. This is discussed in the next section.

2.1.2 Industry differences in capital structure

Bradley et al. (1984) provide evidence for the remarkable differences in capital structure among industries. This is also confirmed by Frank and Goyal (2009) who show how different factors affects the debt level in different industries. For instances, industries that need to make huge investments in fixed assets also face high fixed costs which often lead to higher level of leverage. In contrary, there are industries with lower fixed costs and thus lower level of leverage (Brigham and Houston, 2007:424). As such, empirical evidence from Guney et al. (2011) show that there are significant differences in debt ratios among industries. That is explained by the fact that companies operating in the same industry have many similarities and operate in the same environment where they face similar challenges, competition, risks, technology, profitability and regulations. Additionally, Balakrishnan and Fox (1993) argue that preconditions to access capital may differ among industries. All these industry-related factors have an impact on firms' financial decisions and their optimal

capital structure (Bradley et al., 1984; Harris and Raviv, 1991; Kovenock and Phillips, 1995; Frank and Goyal, 2009; Morri and Cristanziani, 2009). The aforementioned reasoning implies that different industries are characterized with various level of debt, which makes it relevant to argue that the industries were affected differently by the financial crisis. This gives us further reason to believe that the impact of capital structure on firm performance differ among industries as well, which is discussed in the section below where the capital structure theories are introduced.

2.2 Theoretical Benchmark

This section provides an introduction of the prominent theories of capital structure. The description of the theories includes predictions on how the theories relate to capital structure decisions during normal conditions versus times of financial crisis as well as their view on the relation between capital structure and firm performance. The section ends with a discussion about the criticism against the presented theories and how we position ourselves to the limitations.

2.2.1 Background – Modigliani and Miller theorem

The groundwork for capital structure theory stems from Modigliani and Miller (1958) theorem, which states that a firm's value is not influenced by its capital structure choices. They highlight the irrelevance of capital structure to determine firm's value and the cost of capital, given that management focuses on value maximization. However, the aforementioned reasoning is concluded when assuming perfect capital markets where for instance no taxes, no bankruptcy costs and no information asymmetries exist. Therefore, the assumptions by Modigliani and Miller (1958) are recognized to be too restrictive (Harrison and Wisnu Widjaja, 2014). Eventually the market imperfections are acknowledged by Modigliani and Miller (1963) and in 1963 they revise their previous work and include the tax benefits of debt as a possibility to increase firm value. In conjunction with the development of capital markets further weaknesses of the statements by Modigliani and Miller (1958, 1963) are discovered. That resulted in the emergence of capital structure theories as well as research with the purpose of finding evidence for the importance of capital structure choice.

2.2.2 Trade-off theory – A trade-off between debt benefits and debt costs

According to the trade-off theory every company should have an optimal capital structure. The reasoning behind the statement lies in the trade-off between the potential benefits and costs of debt financing (Kraus and Litzenberger, 1973; Scott, 1976; Myers, 1984). As Modigliani and Miller (1963) recognize, firms can benefit from leverage due to the interest deductibility of pre-tax income. In other words, there is a tax shield to take advantage of since interest expenses reduce the taxable income and allow firms to collect tax savings (Graham, 2003). A positive impact of leverage on firm value is further proved by Masulis (1980). However, Myers (1984) and Cornett and Travlos (1989) argue that although firms can benefit from tax deduction by increasing their debt level, each firm should move toward their own optimal capital structure, which can mean either increasing or decreasing debt. Furthermore, the negative effects of leverage on firm performance are recognized by the trade-off theory. Debt financing is associated with a commitment for upcoming cash outflow due to the required future interest payments on debt. Therefore, interest payments negatively affect firms' liquidity and financial performance, which increases the financial risk in terms of bankruptcy and insolvency (Kraus and Litzenberger, 1973; Scott Jr., 1977; Kim, 1978; Myers, 1984; MacKay and Phillips, 2005; Brealey et al., 2008; Ross et al., 2013). As illustrated in figure 1 below, the trade-off theory assumes that the optimal capital structure can be determined by finding the balance between the debt benefits of tax savings and the debt costs of higher risk for financial distress (Kraus and Litzenberger, 1973; Scott, 1976; Myers, 1984).

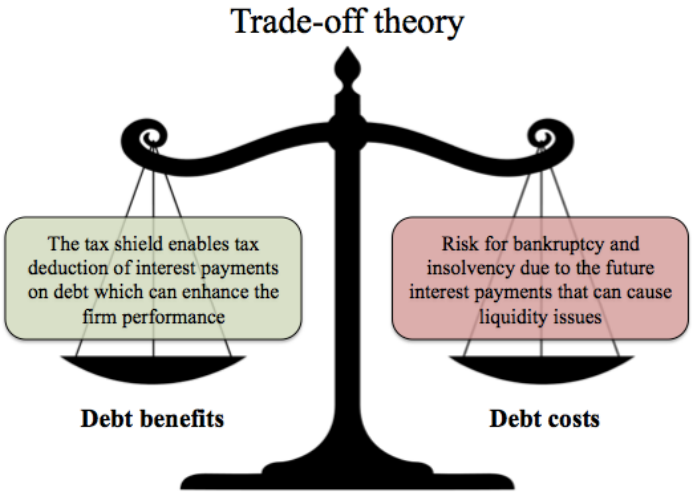

Figure 1: *Trade-off theory*

In line with the abovementioned reasoning, trade-off theory assumes that during normal market conditions firms should increase debt as long as the benefits of debt exceed the costs of bankruptcy risk. However, during crises the bankruptcy risk rises remarkably, which increases the probability that the debt costs instead exceeds the debt benefits. In other words, during times of crisis firms have incentives to decrease their debt level. Nevertheless, the trade-off theory provides support for the advantages of debt financing given that the firm manages the trade off between the debt benefits and debt costs. In other words, the tax advantages should increase the firm performance. Although bankruptcy costs exist, Gruber and Warner (1977) and Miller (1977) conclude that they are much smaller in relation to the tax savings. With that said, the trade-off theory argues for a positive relationship between leverage and firm performance. This positive relationship is further confirmed by many scholars such as Taub (1975), Roden and Lewellen (1995), Champion (1999), Berger and Bonaccorsi di Patti (2006), Margaritis and Psillaki (2010) and Fosu (2013).

2.2.3 Pecking order theory – Hierarchy of financing alternatives

Myers (1984) and Myers and Majluf (1984) developed the competitor theory to trade-off, named pecking order. The rational idea behind the theory is based on the notion of asymmetric information that exists between managers and the investors (Frank and Goyal, 2009; Baker and Martin, 2011). It is argued that managers have a better understanding and more information about the firm than outsiders about the firm's future and therefore they act in the best interest of the company (Harrison and Wisnu Widjaja, 2014; Boadi et al., 2015).

Pecking order theory does not take an optimal capital structure as a starting point. Instead the theory advocates the fact that firms prefer internal funds (i.e. retained earnings) and use external funds only when internal sourcing is insufficient, as illustrated in figure 2 below (Myers, 1984; Myers and Majluf, 1984). Pecking order theory assumes that this is the optimal way for firms to behave since if they issue equity to finance their operations, it signals to the outsiders that the company is lack of capital, which can result in falling stock price. In fact, empirical evidence proves that there is a relation between issuing new equity and decrease in stock price (Baker and Martin, 2011). However, when external financing is necessary, the theory

emphasizes that the choice of different finance opportunities rely heavily on the relative costs and the lowest risk for the investment (Myers, 1984; Boadi et al., 2015). As such, firms issue debt as a first option and then equity as a last (Myers, 1984; Graham and Harvey, 2001).

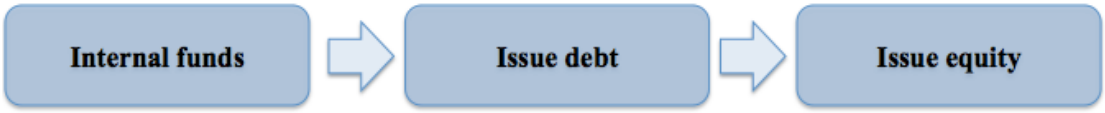

Figure 2: *Pecking order theory*

Due to the reasoning above, pecking order theory argues that firms that are profitable and generate high earnings are also the ones that are expected to use less debt. The reason is that these firms finance their investments with internal funds such as retained earnings (Boadi et al., 2015). Since firms are more likely to be profitable and generate earnings in normal market conditions or in booms, the pecking order theory assumes that firms have lower level of debt before a financial crisis takes place. However, during crises firms become less profitable and often face liquidity issues (Cetorelli and Goldberg, 2011), which make firms seek external funding. In other words, pecking order theory assumes a higher level of debt during financial crises where there is an increased probability that firms' internal funds are not sufficient. Additionally, since profitable firms are in less need of debt, pecking order theory assumes a negative relation between financial leverage and firm performance. This negative relationship is further concluded by researchers such as Kester (1986), Friend and Lang (1988), Titman and Wessels (1988), Rajan and Zingales (1995), Fama and French (1998), Wald (1999), Wiwattanakantang (1999), Gleason et al. (2000) and Abor (2007).

2.2.4 Market timing theory – Adapt to current market conditions

Market timing theory developed by Baker and Wurgler (2002) have lately challenged both trade-off and pecking order theory. Market timing theory is based on the assumption that the management selects the financing decision that is the most cost efficient and the most beneficial alternative due to current conditions in the credit and equity market (Huang and Ritter, 2009; Jahanzeb et al., 2013). The theory suggests that companies issue new shares when they believe the stock prices are overvalued

and repurchase the shares or issuing debt when the stock prices are undervalued or when the market interest rates are low (Graham and Harvey, 2001; Baker and Wurgler, 2002). Consequently, fluctuations in the market have an impact on firms' choice of capital structure.

The reasoning above illuminates that during booms when the assets are overvalued firms have the incentives to issue new equity. Hence, the market timing theory expects a low level of debt before a financial crisis takes place. However, before the market collapsed in 2008, the interest rates were abnormally low (Crotty, 2009), which obviously encourages companies to increase their debt. In other words, before the financial crisis took place firms had the incentives to both decrease and increase their leverage. Additionally, the market timing theory assumes that during recessions, i.e. during crises, when assets are undervalued or the cost of debt is low, firms increase their leverage (Frank and Goyal, 2003). As such, based on the market conditions the market timing theory assumes that the relation between leverage and firm performance is negative before the crisis and positive during the crisis.

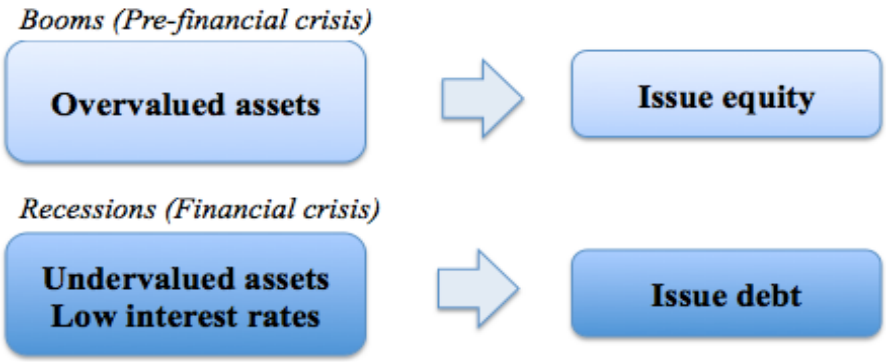

Figure 3: *Market timing theory*

2.2.5 Critique

Even though the capital structure theories have a wide support and validity (Kester, 1986; Fama and French, 1998; Baker and Wurgler, 2002; Abor, 2007; Margaritis and Psillaki, 2010; Fosu, 2013), they also receive some criticism due to flaws in the original assumptions.

One important aspect to rise regarding trade-off theory is the fact that the theory assumes that every company should have an optimal capital structure (Kraus and

Litzenberger, 1973; Scott, 1976; Myers, 1984). However, critics show that the theory does not explain the optimal level of debt and equity in detail. The statement is basically that one can reach the optimal level by balancing potential benefits and costs of debt financing, which can be considered as a vague reasoning. On these matters Nadeem Ahmed Sheikh and Zongjun Wang (2011) argue that even though there is huge amount of research within this field, still no specific method is developed for managers to determine the optimal capital structure.

Further criticism is directed towards pecking order theory's original arguments that information asymmetry can be reduced by following a certain 'hierarchy' when investing; using internal funds as the first priority, followed by issuing debt and lastly equity. Contradictory, Fama and French (2005) argue that one can still avoid the information asymmetry by issuing equities, by picking those who are less subject to information costs. However, researchers such as Baskin (1989) and Allen (1993) argue that there are other factors than only information asymmetry that discourage firms to use external funds. These additional factors are not taken into consideration by the pecking order theory.

Moreover, Fama and French (2002) argue that most studies within trade-off theory are based on small and medium sized companies while pecking-order theory is mostly based on small companies. Other relevant critics toward both trade-off and pecking order theory are that they lack the ability to explain temporary differences in terms of advantages and disadvantages in different investment opportunities. In fact, managers often make decisions based on the current and most beneficial opportunity (Baker and Wurgler, 2002), which is one of the main reasons why market timing theory became relevant.

A rather frequent criticism toward the market timing theory is how one can be sure of the right timing of specific investments where the decision on how to finance can be very subjective (Chang et al., 2006). Moreover, Mahajan and Tartaroglu (2008) criticize the market timing theory because researches mostly focus on American firms whereby it is questioned if the theory is applicable in other countries as well (Baker and Wurgler, 2002; Bruinshoofd and Haan, 2012).

Being aware of the limitations mentioned above we choose to have these in mind while taking advantage of the fact that most evidence is from US firms which our sample also consist of and that we have a mixed sample of companies in different sizes. Also, by including several capital structure theories we can benefit to convey a deep understanding of the capital structure before and during times of financial crisis and its impact on firm performance.

2.3 Summary of the Literature Review and Theoretical Benchmark

Due to the extensive capital structure literature, this section covers a summary of the literature review and theoretical benchmark that is used to explain whether, and if so, how the financial crisis in 2008 affected firms' capital structure choice in different industries. The chosen literature further enables us to discuss how and why firms' chosen capital structure affects firm performance.

The macro economic conditions before and during the financial crisis in 2008 provide explanations for the potential differences in capital structure choices. Due to increased uncertainty and risk during the crisis, it is confirmed that short-term debt increased while long-term debt decreased (Almeida et al., 2011; Gürkaynak and Wright, 2012; Custódio et al., 2013; Dick et al., 2013; Fosberg, 2013). Furthermore, previous research confirms the industry differences in capital structure since there are industry-specific factors affecting firms' capital structure (Frank and Goyal, 2009; Guney et al., 2011). As such, it is reasonable to believe that industries were affected differently by the financial crisis.

The presented capital structure theories, trade-off, pecking order and market timing, are all developed out of the fact that market imperfections exist. The groundwork of Modigliani and Miller (1958) with the assumptions of perfect markets and irrelevance of capital structure choice for firm value therefore lacked credibility. The trade-off theory states that an optimal capital structure can be achieved by balancing the debt benefits with the debt costs (Kraus and Litzenberger, 1973; Myers, 1984). During times of financial crises, the bankruptcy risk arises which increases the debt costs. As such, the probability that the debt costs exceed the benefits of debt increases, which indicates that the trade-off theory argues for a decreased level of debt during times of

crisis. Moreover, since trade-off theory supports the benefits of debt, it also takes a standpoint that the tax advantages increase firm value and therefore assumes a positive relationship between leverage and firm performance.

In contrary, pecking order theory argues for this relationship between leverage and firm performance to be negative. This perspective emphasizes the internal funds as first priority for financing before raising external funds from debt and equity issuance (Myers, 1984; Myers and Majluf, 1984). In line with pecking order theory, a higher level of debt is highlighted during a financial crisis since firms become less profitable and tend to face liquidity issues which opens up for external financing (Cetorelli and Goldberg, 2011).

The market timing theory challenges both the previous theories by arguing that management bases their financial decisions upon the most beneficial alternative in the given situation. During crises, when the interest rates are low and the shares are undervalued, firm prefer debt (Crotty, 2009). Hence, during the crisis market timing argues for an increased level of leverage and assumes a positive relation between leverage and firm performance. However, before the crisis when the shares are overvalued equity issuance is preferable and a negative relation between leverage and firm performance is assumed (Huang and Ritter, 2009; Jahanzeb et al., 2013).

All in all, the presented capital structure theories and previous literature within this research area enable us to analyze and explain our empirical findings to fulfill the purpose of this paper. Table 2 illustrates how the capital structure theories and literature are linked to the research question.

Table 2: *Summary of the expected change in leverage and its relation to firm performance*

	During Crisis	Leverage's relation to Firm Performance
Trade-off	-	+
Pecking order	+	-
Market timing	+	-/+
Long-term debt	-	
Short-term debt	+	

This table shows how the leverage, as a proxy for capital structure, is expected to change during the crisis and what impact leverage has on firm performance. This is based on the assumptions about leverage in the trade-off, pecking order and market timing theory, as well as the previous research about the change in long-term and short-term debt.

3. Method

This section firstly describes the statistical approach used to answer the research question followed by deeper explanations of the regression models and the chosen variables. Furthermore, this section presents the data collection process as well as how we deal with the outliers and the tests of assumption to enhance the reliability in our sample and results. We also present a description of how we assess the regression results and end up with a part where we discuss the quality of this study.

3.1 Statistical approach

The aim of this study is to capture potential industry differences in capital structure changes as a result of the financial crisis in 2008 as well as explore whether firms' capital structure choice has an impact on firm performance, before and during the crisis. The financial crisis in 2008 is not only chosen due to the fact that it is perceived to be the worst economic collapse since the great depression in 1930 (Pendery, 2009) but also because this unexpected financial crisis brought attention to the importance of a proper capital structure and made firms more concerned about their financial stability (Bhamra et al., 2010). Since the financial crisis took place in 2008 this paper examines and compares the financial information from the period before the crisis in 2004-2007 and the period during the crisis in 2008-2011 in accordance with the study by Harrison and Wisnu Widjaja, (2014). Moreover, this paper uses the classification system Industry Classification Benchmark (ICB) by the FTSE group (FTSE International Limited, 2012) to separate and study different industries, which is in line with previous research by Fosu (2013).

A quantitative research method is used in order to collect sufficient amount of empirical data to be able to draw general conclusions. In line with previous researches within the area of capital structure and firm performance (Berger and Bonaccorsi di Patti, 2006; Margaritis and Psillaki, 2010), this study conducts an Ordinary least squares (OLS) regression. OLS regression is a widely used estimation technique in purpose of finding and analyzing relationships between different variables (Croci et al., 2011; Studenmund and Cassidy, 1997. More specifically, a panel data analysis is done since we aim to study specific variables in the same companies over two time periods (Antoniou et al., 2008; Harrison and Wisnu Widjaja, 2014). Moreover, when

using panel data it is argued that one needs to adjust for either the fixed or random effects. Since we already control for the industry-fixed effects, by separating the information for different industries in our regression models that are presented below, we do not use fixed nor random effect model.

In order to fulfill the aim of this paper and answer the research question two regression models are conducted:

- Regression model 1 for the purpose of studying the impact of the financial crisis on different industries' capital structure.
- Regression model 2 for the purpose of studying the impact of capital structure on firm performance in different industries, before and during the financial crisis.

3.2 Regression model 1 – Studying the change in capital structure

The purpose of regression model 1 is to study the impact of the financial crisis on different industries' capital structure. Leverage is the proxy for capital structure and set as dependent variable, measured as long-term and short-term debt. The independent variables are industries and financial crisis, and the control variables are profitability, liquidity, tangibility and firm size. Through a chi-test, we conclude that there are significant differences in the control variables between the industries and therefore the control variables are industry-specific. Thereby, we achieve more precise results in the independent variables. Below the regression model is presented and explained followed by a description of each included variable.

$$LTD_{ijt} \mid STD_{ijt} = \sum_{j=1}^{5} \beta_{1j} IND_{jt} + \sum_{j=1}^{5} \beta_{2j}(IND_{jt} * CRI_{ijt}) + \sum_{j=1}^{5} \beta_{3j}(IND_{jt} * ROA_{ijt}) + \sum_{j=1}^{5} \beta_{4j}(IND_{jt} * LIQ_{ijt}) + \sum_{j=1}^{5} \beta_{5j}(IND_{jt} * TANG_{ijt}) + \sum_{j=1}^{5} \beta_{6j}(IND_{jt} * SIZE_{ijt}) + \varepsilon_{ijt}$$

Where LTD_{ijt} is the long-term debt for firm i in industry j in year t and STD_{ijt} is the short-term debt for firm i in industry j in year t. IND_{jt} refers to the industry-specific intercept showing the average value of long-term debt and short-term debt

respectively before the financial crisis. These are the dummy variables for the industries where 1 denotes the specific industry and 0 otherwise. $(IND_{jt} * CRI_{ijt})$ is an interaction variable between the dummy variable for the industry and CRI_{ijt} which is a dummy variable for the crisis where 1 denotes financial crisis and 0 otherwise. This interaction variable intends to show the industry-specific effect of the financial crisis on the long-term debt and short-term debt that is captured by the intercept. $(IND_{jt} * ROA_{ijt})$, $(IND_{jt} * LIQ_{ijt})$, $(IND_{jt} * TANG_{ijt})$ and $(IND_{jt} * SIZE_{ijt})$ are interaction variables as well, displaying the industry-specific profitability, liquidity, tangibility and firm size for firm i in industry j in year t. ε_{ijt} is the component of the residual term for firm i in industry j in year t and β_j stands for the industry-specific coefficients showing the independent variables' relation to the dependent variable. The variables are further described in the following sections.

3.2.1 Dependent variable

Leverage

Since regression model 1 aims to capture how the financial crisis in 2008 affected firms' capital structure choice in different industries, the dependent variable is leverage as a proxy for firms' capital structure (Harrison and Wisnu Widjaja, 2014). It is evident that the financial crisis impacted the choice of different debt alternatives differently (Almeida et al., 2011; Fosberg, 2013; Custodio et al. 2013). Evidence from previous researches show that one becomes more hesitant to invest in long-term securities during crises, which makes short term-debt more attractive (Gürkaynak and Wright, 2012; Dick et al., 2013). Therefore, consistent with previous research by Abor (2005), this study measures leverage divided into two ratios: Long-term debt (LTD) and short-term debt (STD), both divided by the book value of total assets. Although there are several measures of leverage as discussed by Rajan and Zingales (1995) and Frank and Goyal (2009), we use the book value of total assets in line with Abor (2005), Croci et al. (2011) and Harrison and Wisnu Widjaja (2014) instead of the market value in order to avoid larger fluctuations in the denominator of these ratios. Otherwise, it would result in biased measures of the variables long-term and short-term debt, especially during times of financial crisis when the market value of assets drops. Additionally, Myers (1977) states that managers consider the book value

rather than the market value when making capital structure decisions. This reasoning applies to all variables that are divided with the book value of total assets.

$$LTD = \frac{Long-term\ debt}{Total\ assets} \qquad STD = \frac{Short-term\ debt}{Total\ assets}$$

3.2.2 Independent variables

Industries and financial crisis

The industry differences in capital structure and its relation to firm performance before and during the financial crisis are captured by including industries and financial crisis as independent variables. Since industries and financial crisis are non-metric values they must be quantified in order to be included in the regression model (Gujarati and Porter, 2009; Dougherty, 2011:224). Therefore dummy variables are used to quantify industries and financial crisis in the regression model.

The dummy variables work as such that the value of 1 for one dummy variable yields the value of 0 for the rest of the dummy variables, in this way distinguishing the industries from each other as well as the time periods before and during the crisis. This enables a comparison between the period before and during the crisis in different industries. The same applies for regression model 2 where industries and financial crisis also are included as independent variables. This method and interpretation is further described in section 3.7.

3.2.3 Control variables

Profitability

Previous research by Fosu (2013) highlights return on assets (ROA) as a suitable measure for firm performance and the measure is widely used in capital structure literature (Derayat, 2012; Singh, 2013). ROA takes the total assets into account and thereby the high leveraged firms are not receiving a high profitability ratio as in the case of return on equity (ROE) (Fosu, 2013). Hence, ROA is chosen as a measure of profitability and calculated as the net income divided by the book value of total assets. A more detailed explanation of the choice of ROA as a measurement is presented in section 3.3.1 where ROA is the dependent variable.

$$ROA = \frac{Net\ income}{Total\ assets}$$

Liquidity

Firms that have higher level of liquidity face a lower cost of borrowing since it might indicate that the firm has enough liquid assets to not default on its debt. Therefore these firms should utilize the low cost borrowing and increase their leverage (Graham, 2000; Antoniou et al., 2008; Lipson and Mortal, 2009). On the other hand, Lipson and Mortal (2009) argue that firms that have a high level of liquidity have less need to use leverage. Furthermore, in line with previous researchers, we use operating cash flow as a measure of liquidity (Beaver, 1966) and divide it by the book value of total assets.

$$LIQ = \frac{Cash\ flow\ from\ operations}{Total\ assets}$$

Tangibility

Since fixed assets can be used as collateral, Koksal et al. (2013) conclude that it is easier for firms with a high level of fixed assets to collect external funds. This is because collateral increases the lender's probability of receiving payment in case of a bankruptcy. In sum, firms with higher level of asset tangibility are expected to have higher level of leverage. In line with Frank and Goyal (2003), tangibility is measured as the property, plant and equipment, which are assets that can be set as collateral, divided by the book value of total assets.

$$TANG = \frac{Property, plant\ and\ equipment}{Total\ assets}$$

Firm size

Titman and Wessels (1988) argue that larger firms are exposed to a lower bankruptcy risk, which give them a greater possibility to access capital. Furthermore, larger firms are claimed to be better diversified, which makes them more resistant to financial distress (Rajan and Zingales, 1995). Therefore these firms are expected to have a higher debt level compared to small firms (Marsh, 1982). Even though a common way to measure firm size is to use log of total assets (Frank and Goyal, 2009), it

becomes problematic when the other variables in the regression are in relative terms. To avoid this, a relative ratio is used and therefore firm size is measured as the firm-specific assets divided by the book value of the total assets in the sample.

$$SIZE = \frac{Firm\ specific\ assets}{The\ sum\ of\ total\ assets\ in\ the\ sample}$$

3.3 Regression model 2 – Studying the relation between capital structure and firm performance

The purpose with regression model 2 is to study the impact of capital structure on firm performance in different industries, before and during the financial crisis. Profitability is the proxy for firm performance and set as dependent variable, measured as ROA. The independent variables are leverage and financial crisis, and the control variables are liquidity, tangibility, firm size and growth. Below the regression model is presented and explained followed by a description of each included variable.

$$ROA_{ijt} = \sum_{j=1}^{5} \beta_{1j}(IND_{jt} * LTD_{ijt}) + \sum_{j=1}^{5} \beta_{2j}(IND_{jt} * STD_{ijt}) + \sum_{j=1}^{5} \beta_{3j}(IND_{jt} * LTD_{ijt} * CRI_{ijt}) + \sum_{j=1}^{5} \beta_{4j}(IND_{jt} * STD_{ijt} * CRI_{ijt}) + \beta_5 LIQ_{ijt} + \beta_6 TANG_{ijt} + \beta_7 SIZE_{ijt} + \beta_8 GROW_{ijt} + \varepsilon_{ijt}$$

Where ROA_{ijt} is the profitability for firm i in industry j in year t. $(IND_{jt} * LTD_{ijt})$ and $(IND_{jt} * STD_{ijt})$ are industry-specific intercepts for long-term and short-term debt before the crisis. These are interaction variables where IND_{jt} refers to the dummy variables for industries where 1 denotes the specific industry and 0 otherwise, and LTD_{ijt} and STD_{ijt} is the long-term and short-term debt for firm i in industry j in year t. $(IND_{jt} * LTD_{ijt} * CRI_{ijt})$ and $(IND_{jt} * STD_{ijt} * CRI_{ijt})$ are interaction variables as well, adding CRI_{ijt} which is a dummy variable for the crisis where 1 denotes financial crisis and 0 otherwise. These interaction variables are displaying the effect of the financial crisis on the industry-specific long-term and short-term debt. LIQ_{ijt} is the liquidity for firm i in industry j in year t, $TANG_{ijt}$ is the asset tangibility

for firm i in industry j in year t, $SIZE_{ijt}$ is the firm size for firm i in industry j in year t, $GROW_{ijt}$ is the growth for firm i in industry j in year t, ε_{ijt} is the component of the residual term for firm i in industry j in year t. β_j stands for the industry-specific coefficients showing the independent variables' relation to the dependent variable. The variables are further described in the following sections.

3.3.1 Dependent variable

Profitability

Since regression model 2 aims to study capital structure's impact on firm performance before and during the financial crisis in different industries, the dependent variable is profitability. As mentioned in the regression model 1, ROA is an appropriate measure for firm performance and frequently used in capital structure literature (Derayat, 2012; Singh, 2013). This due to the fact that it takes the total assets into account, including both debt and equity, which means that companies that use high level of debt do not receive a high profitability ratio as in the case of ROE (Fosu, 2013). Moreover, a report by the European Central Bank (2010) explains that ROA is a better measurement when the market conditions are not stable and when the environment is volatile. The report also shows a weak discrimination when using ROE before the crisis while a wider dispersion is seen during the crisis. As such, ROE would be an unfair measurement in our case and give a misrepresentative picture of the situation. Hence, ROA is chosen as a measure of profitability and calculated as the net income divided by the book value of total assets. Furthermore, using the net income is important since it accounts for the argued tax benefits of debt.

$$ROA = \frac{Net\ income}{Total\ assets}$$

3.3.2 Independent variables

Beside industries and financial crisis as independent variables explained in section 3.2.2, regression model 2 also includes leverage.

Leverage

Myers (1984) argue that firms benefit from tax deduction through leverage, which in turn increases the value of the firm. As such, a positive relation is detected between

leverage and profitability (Taub, 1975; Roden and Lewellen, 1995; Champion, 1999; Berger and Bonaccorsi di Patti, 2006; Margaritis and Psillaki, 2010; Fosu, 2013). On the other side, it is argued that it is more beneficial to use internal funds over leverage. Therefore researchers such as Kester (1986), Friend and Lang (1988) and Titman and Wessels (1988) prove a negative relation between leverage and profitability. Moreover, it is found by Abor (2005) that short-term debt has a positive relation to profitability while it is the opposite relation for long-term debt that has a negative association. Therefore, in line with Abor (2005) and Shubita and Alsawalhah (2012) leverage is measured as long-term and short-term debt when examining the impact on profitability, both divided by the book value of total assets.

$$LTD = \frac{Long-term\ debt}{Total\ assets} \qquad STD = \frac{Short-term\ debt}{Total\ assets}$$

3.3.3 Control variables

Liquidity

Companies with higher level of liquidity can decrease their cost of borrowing and thus increase their profitability, which indicates a positive relation between liquidity and profitability (Padachi, 2006; Narware, 2004). Contrary, it is argued that higher level of liquidity also provides an opportunity cost due to the low return compared to other assets which implies a negative relation between liquidity and profitability (Molyneux and Thornton, 1992; Goddard et al., 2004). Liquidity is measured as operating cash flow in line with Beaver (1966) and divided by the book value of total assets.

$$LIQ = \frac{Cash\ flow\ from\ operations}{Total\ assets}$$

Tangibility

Several researchers such as Rao et al., (2007), Zeitun and Tian (2007), Weill (2008) and Nunes et al. (2009) examine the relationship between asset tangibility and profitability. They conclude a negative impact of tangible assets on firm performance with the arguments that fixed assets are illiquid and hinder firms from pursuing

investment opportunities. Tangibility is measured as property, plant and equipment divided by the book value of total assets.

$$TANG = \frac{Property, plant\ and\ equipment}{Total\ assets}$$

Firm size

Previous research show that firm size has an influence on performance (Ferri and Jones, 1979; Myers and Majluf, 1984; Rajan and Zingales, 1995; Sadeghian et al., 2012). However, there is no consistent view on how firm size is related to a firm's profitability. The majority of the studies find a positive relation; that larger firms have a higher profitability compared to smaller firms (Ozgulbas et al., 2006; Jónsson, 2007; Vijayakumar and Tamizhselvan, 2010). On the opposite, Amato and Burson (2007) detect a negative influence of firm size on profitability. Additionally, no indicative relationship at all is found by (Niresh and Thirunavukkarasu, 2014). However, firm size is measured as the firm-specific assets divided by the book value of the total assets in the sample.

$$SIZE = \frac{Firm\ specific\ assets}{The\ sum\ of\ total\ assets\ in\ the\ sample}$$

Growth

Companies that have more growth opportunities are also the ones that have higher rate of return since they can generate more profit from their investments. Previous researches therefore show that growth is positively related to firm performance (Zeitun and Tian, 2007; Nunes et al., 2009; Margaritis and Psillaki, 2010). Growth is defined as the percentage change in sales and measured as:

$$Growth = \frac{Sales_t - Sales_{t-1}}{Sales_{t-1}}$$

3.4 Summary of chosen variables

Table 3: *Summary of chosen variables*

Variables	Measurements	Expected relation to dependent variable
Regression model 1		
Dependent variable		
Long-term debt (LTD)	Long-term debt/total assets	
Short-term debt (STD)	Short-term debt/total assets	
Independent variables		
Industries (IND)	The Industry Classification Benchmark	
Financial crisis (CRI)	Two time periods: 2004-2007 & 2008-2011	
Control variables		
Profitability (ROA)	Net income/total assets	Negative
Liquidity (LIQ)	Cash flow from operations/total assets	Positive/negative
Tangibility (TANG)	Property, plant and equipment/total assets	Positive
Firm size (SIZE)	Firm-specific assets/sum of total assets in the sample	Positive
Regression model 2		
Dependent variable		
Profitability (ROA)	Net income/total assets	
Independent variables		
Long-term debt (LTD)	Long-term debt/total assets	Positive/negative
Short-term debt (STD)	Short-term debt/total assets	Positive/negative
Industries (IND)	The Industry Classification Benchmark	
Financial crisis (CRI)	Two time periods: 2004-2007 & 2008-2011	
Control variables		
Liquidity (LIQ)	Cash flow from operations/total assets	Positive/negative
Tangibility (TANG)	Property, plant and equipment/total assets	Negative
Firm size (SIZE)	Firm-specific assets/sum of total assets in the sample	Positive/negative
Growth (GROW)	Sales (t) – Sales (t-1) /Sales (t-1)	Positive

This table is a summary of the chosen variables that are included in regression model 1 and 2. The dependent, independent and control variables are presented along with the calculation of their measurements. The independent and control variables' expected relations to the dependent variable are shown in the last column.

3.5 Data collection

The data included in this paper are taken from American firms listed on NASDAQ, NYSE and NYSE MKT. There are several reasons for studying the American market. Firstly, since we examine the effects of the financial crisis in 2008, it is reasonable to look at the American market where it all started with the collapse of the housing market and the bankruptcy of Lehman Brothers (Crotty, 2009; Argandoña, 2012). Secondly, American firms have a comprehensive list of financing alternatives and the

cost of capital structure adjustment is relatively low (Myers, 2001), which make the US the appropriate place for a research about capital structure.

In order to capture the effects of the financial crisis in 2008 the needed data for the chosen variables range from 2003-2011 and is collected on a yearly basis. Previous research within the area confirms that the crisis started in the last period of 2007 (Taylor, 2009). Although the housing bubble burst in 2007, it was not until the bankruptcy of Lehman Brothers in 2008 that the stock market collapsed (Crotty, 2009; Argandoña, 2012). Therefore, in order to make a comparable study of the crisis' impact, the data from the period 2004-2007 represent the situation before the crisis while the period 2008-2011 is the time during the crisis, which is in line with previous research by Harrison and Wisnu Widjaja (2014). Worth mentioning is that there are studies that use shorter time periods when trying to capture the effects of the financial crisis. For instance, there are researchers that study the two years before and after the crisis (Zarebski and Dimovski, 2012). However, the time period of four years is chosen to make sure we capture the total effects of the crisis and not only the instant effects. This gives a fairer picture of the situation and more reliable results. Starting the time period from 2004 also ensures that there are only minor effects left from the dot-com bubble that collapsed in 2000 (Mahajan et al., 2002). Moreover, information from 2003 is needed for the calculation of the variable growth for 2004. The data are downloaded from the well-used database Datastream that is used by many researches within business studies (D'Souza and Saxena, 1999; Al-Najjar and Hussainey, 2011; Abdullah et al., 2012).

The requirements for the sample follow:

- Financial firms and industries with insufficient amount of firms and observations are omitted.
- Newly listed and delisted firms during the research period are excluded.
- The studied firms need to have the required financial information available for the whole time range.

As mentioned earlier, the classification system Industry Classification Benchmark (ICB) by the FTSE group (FTSE International Limited, 2012) is used to separate

different industries. The original industries in this classification are; Basic Materials, Consumer Goods, Consumer Services, Financials, Healthcare, Industrials, Oil and Gas, Technology, Telecommunication and Utilities. However, the industry Financials is excluded due to the reason that financial firms and institutions are heavily regulated (banks' minimum capital requirements) and have different financial statements compared to other industries, which affect their capital structure and investment decisions (Frank and Goyal, 2009; Harrison and Wisnu Widjaja, 2014). That would make it difficult to draw general conclusions and discuss potential explanations of the results. Furthermore, we exclude those industries that consist of significantly fewer firms than the majority. The industries Basic Materials, Oil and Gas, Telecommunication and Utilities have sample sizes of less than 100 firms, which are considered as insufficient samples. Therefore, there is a risk that the findings are not representative for the whole industry (VanVoorhis and Morgan, 2007). The remaining five industries Consumer Goods, Consumer Services, Healthcare, Industrials and Technology have much larger sample sizes, which more accurately represent the characteristics of the industries (Marcoulides, 1993). A more detailed explanation of what kind of sectors that are included in these industries is found in appendix A.

Table 4 below presents the industry-specific samples as well as the full sample. Out of the original sample of 2608 firms and 20864 firm-year observations, we end up with a final sample of 1470 firms and 11760 firm-year observations. This is after excluding firms that do not have available data for the time range 2003-2011 for all the financial information needed to calculate the variables in the regression models. Thereby we ensure to only study companies that survived the financial crisis. It is of vital importance to examine the same companies throughout the whole research period since we aim to capture firms' potential differences in capital structure between two time periods. To clarify, newly listed or delisted firms during the research period are excluded to avoid biased and misleading results. For instance, the capital structure choices in newly listed firms are highly influenced by their current situation as a newcomer in the stock market. In addition, Datastream actually lacks the information from delisted companies and these constraints cause survivorship bias in the sample. This means that we miss out on firms that may have been delisted or gone bankrupt due to an improper capital structure. However, even if we would have access to the required information, the information would be highly influenced by the firm's

pressured situation as a delisted or bankrupt company. Consequently, the outcome of this paper would be biased and misrepresentative.

Table 4: *Number of firms and firm-year observations*

Industry	Consumer Goods	Consumer Services	Healthcare	Industrials	Technology	All industries
Original sample						
Firms	332	482	621	704	469	2608
Observations	2656	3856	4968	5632	3752	20864
Missing data						
Firms	101	201	393	226	217	1138
Observations	808	1608	3144	1808	1736	9104
Final sample						
Firms	**231**	**281**	**228**	**478**	**252**	**1470**
Observations	**1848**	**2248**	**1824**	**3824**	**2016**	**11760**

This table presents the number of firms and firm-year observations (8 years in total) included in the original sample, the missing data and the final sample for each studied industry as well as for all industries in total. The original sample refers to the sample before the firms consisting of missing values are excluded. Missing data refers to the firms that are omitted because they do not have all the needed data available. The final sample is the used sample in this study, which includes only firms with available data for the needed variables and years.

3.5.1 Outliers

Extreme values, or so-called outliers, in the sample can give biased results and should therefore be dealt with (Stevens, 1984; Pallant, 2010). We choose winsorizing over trimming because we believe the outliers to be valid data and therefore avoid to exclude them (Hawkins, 1980). A winsorization is conducted on a 2% level, which means that the 1st and the 99th percentile is winsorized or that each tail is winsorized at 1% (Kettaneh et al., 2005). The outliers, the ones below the 1st percentile and above the 99th percentile, are replaced with the values of those percentiles. Both the dependent and independent variables as well as the control variables are winsorized for each industry for both the period before the crisis and during the crisis. The winsorizing is done for each industry to keep the industry-specific differences unaffected. The reason for winsorizing each time period instead of an annual winsorization is because we are interested in the overall picture of the situation before the crisis and the situation during the crisis, rather than year-specific situations.

Winsorization further enhances the normal distribution in the sample, which is tested and explained in section 3.6.

3.6 Test of OLS-assumptions

In this section we present the tests and results for the assumptions that need to be fulfilled when conducting an OLS-regression in order for it to be the Best Linear Unbiased Estimator (Gujarati, 2003:65; Pallant, 2010). Below the test for autocorrelation, heteroskedasticity, multicollinearity and residuals normality is presented.

Autocorrelation

When conducting OLS-regressions it is important to confirm that no autocorrelation exists since it has the ability to affect the regression negatively and give a misleading effect on the result (Gujarati and Porter, 2009). That is because autocorrelation, or so-called lagged correlation, refers to the correlation between past and future values in a time series, which makes the time series predictable and can complicate the identification of significant correlations and covariance (Yaffee, 2003). A common test that is used to see if any autocorrelation exists is the Durbin-Watson test (Wooldridge, 2012; King and Giles, 1984). A value closer to 0 or 4 means that autocorrelation is detected, where 0 means positive and 4 negative autocorrelation. A value close to 2 implies that no autocorrelation exists (Wooldridge, 2012). For our sample, the test resulted in values between 1 and 2 for the dependent variables in both regression models, meaning that the sample appears to not be distributed by autocorrelation. See appendix B for the specific values.

Heteroscedasticity

OLS have the assumption that the observations of the error term are drawn from a distribution that has a constant variance (Studenmund and Cassidy, 1997:366). If the error terms do not have a constant variance, it is argued to be heteroscedastic, where the variance of the distribution of the error term depends on which observation that is being discussed. Moreover, it is detected that heteroscedasticity often occurs in data where there is a wide difference between the largest and smallest value. Studenmund and Cassidy (1997:369) argue that “the larger the disparity between the size of

observations in a sample, the larger the likelihood that the error term observations associated with them will have different variances and therefore be heteroskedastic. Therefore, when we run the regression we choose to control and adjust for heteroscedasticity in the statistical software that is used.

Multicollinearity

Another assumption that needs to be examined is whether any multicollinearity exists, which means that two or more independent variables are correlated to each other. This is important due to the fact that multicollinearity among the variables decreases the reliability of the results (Stock and Watson, 2007). Variance Inflation Factor (VIF) is a popular test to analyze the degree that the variables are correlated (Pallant, 2010; (O'brien, 2007). According to Wooldridge (2012) low VIF values are favored since a VIF value over 5 implies multicollinearity (Gujarati and Porter, 2009). The VIF values for the independent variables are all below 4, which means that multicollinearity is not a problem in this sample. See appendix B for the specific values.

Residuals normality

One assumption that needs to be evaluated is whether the residuals are normally distributed in order to achieve a valuable sample to analyze (Wooldridge, 2013). Residual is the gap between the actual dependent variable and the estimated dependent variable and this residual should be normally distributed. According to Studenmund and Cassidy (1997:101-102) the parameters that describe normal distributions are the mean and the variance that should have a value of 0 and 1 respectively. Our results show a distribution of a mean with value of approximately 0 and a variance of 1, which indicates that the residuals are normally distributed. The normal distribution of the residuals for the dependent variables is further visualized in PP-plots, which are seen in appendix C. Even though we do not find extremely well visualized results for normal distribution in our PP-plots, it is worth mentioning that according to the central limit theorem sufficiently large random samples from the population, i.e. larger than 30, are expected to be approximately normally distributed (Singh et al., 2013). Since our industry-specific samples consist of more than 200 firms each we can assume that the samples are close to be normally distributed (Ott and Longnecker, 2008:228; Singh et al., 2013).

3.7 How to assess the regression results

When running the regression we receive various measures and values that must be observed and considered in order to answer the research question. The coefficients are specified estimates for each independent variable that must be observed to understand the magnitude of influence of the independent variable on the dependent ones. The higher the value of the coefficient, the greater the impact of the variable on the dependent variable. A positive value of the coefficient indicates a positive relationship, i.e. a positive impact, between the variable and the dependent variable, while a negative value indicate a negative relationship, i.e. a negative impact (Harrison and Wisnu Widjaja, 2014).

The coefficients are given for the variables before the crisis as well as during the crisis. The information about a variable before the crisis, in 2004-2007, is expressed in the value of the coefficient of the industry's intercept. The intercept is the expected mean value of the dependent variable when all the independent variables have the value of zero (Studenmund and Cassidy, 1997:8-9). The information about a given variable during the crisis, in 2008-2011, is expressed through so-called interaction variables where the value of the coefficient is the change in relation to the specific industry's intercept. This means that the value of the coefficient of the interaction variable is either added on or subtracted from the coefficient of the industry's intercept, depending on if the interaction variable has a negative or positive value. We are also able to separate the information from the different industries since the intercepts, the interaction variables as well as the control variables in regression model 1 are industry-specific.

In order to assess the probability of an incorrect result we observe the so-called p-value. A p-value of 0.05 implies a 5% risk that the result, i.e. the value of the coefficient, is a random value and not true. The coefficient of a variable with a p-value exceeding the 5%-level, which is the most frequently used significance level (Studenmund and Cassidy, 1997:141-142), has an error probability of more than 5%. This is a result with a too high probability of not being correct and is referred to as not being statistically significant. For p-value below the 5%-level the risk for an incorrect result is so low that the result can be perceived as true and confirmed (Studenmund

and Cassidy, 1997:141-142). A significant value for an intercept basically tells that the intercept does not equal zero. In this study it is interesting to find out whether the results for the interaction variables are statistically significant. Thereby we are able to declare if the effect of the financial crisis on capital structure and its relation to firm performance is statistically significant and confirmed. Although there might have been a change in the variables after the crisis occurred, an insignificant result indicates that the financial crisis did not explain this change. Therefore, such result is interpreted as if the variable was not affected by the financial crisis.

3.8 Quality of the study

Since a quantitative approach is chosen, this study provides a general conclusion of how the financial crisis in 2008 affected firms' capital structure choice in different industries as well as its relation to firm performance, before and during the crisis. This study can also be done from a qualitative perspective, but the sample would be very limited and thus one cannot expect to portray general conclusions, but rather give examples of situations. However, we reflect upon the fact that a quantitative approach gives minimal space for individual explanations, which can result in a discussion that includes less understanding of the underlying causes, which also is discussed by Holme and Solvang (1997:78-83). However, we argue that our quantitative research give us room to investigate and get an overview in a specific market as US, something that can easily later be replicated in other markets as well.

Previous researchers within the area of capital structure and firm performance conclude a numerous of determinants other than only the chosen independent variables in this study (e.g. Myers and Majluf, 1984; Kester, 1986; Titman and Wessels, 1988; Rajan and Zingales, 1995; Graham, 2000; Goddard et al., 2004; Padachi, 2006; Margaritis and Psillaki, 2010). If the regression models do not account for these variables we face omitted variable bias and the outcome becomes highly misrepresentative. Consequently our results would drop credibility (Wooldridge, 2012:91). To mitigate the omitted variable bias, the regression models include the factors that previous researches prove to affect the chosen dependent variable. This enhances the reliability in this paper although we are aware that there are other, immeasurable, factors than only the chosen variables that can affect the dependent

variable in both regression models. These so-called control variables are added in both the regression models to achieve more reliable results (Pallant, 2010).

Furthermore, to increase the quality of the study we double-check randomly chosen firms in different years as well as different industries to ensure the validity in the numbers even though they are collected from a well-known database (D'Souza and Saxena, 1999; Al-Najjar and Hussainey, 2011; Abdullah et al., 2012). Moreover, after structuring the data, a third part, a statistical expert, gave us advice for how we can improve our way of structuring the data as well as provided us with valuable feedback before running the regressions. We argue that this is a valuable step in our compiling process; since we in the final step can ensure that the data is highly improved and that the risk of bias is mitigated.

4. Results

In this section the results of this study are presented and analyzed. The first part presents the results for the descriptive statistics for both regression model 1 and 2. Thereafter the regression results are presented and the results for regression model 1 and 2 are explained, analyzed and summarized separately.

4.1 Descriptive statistics

Table 5 below illustrates the descriptive statistics of all the variables before and during the financial crisis for all industries as well as divided by industry. The mean and the standard deviation are relevant measurements to display the overall situation during each time period. The mean captures the average values of the variables within the sample while the standard deviation enables us to capture the potential uncertainty and instability during the financial crisis. The descriptive statistics imply that there are differences in the variables within the industries, which give indications that they were affected differently by the financial crisis.

A general finding for all the observations from all the industries is that both *long-term* and *short-term debt* increased during the financial crisis, which is detected when comparing the mean before and during the crisis. Before the crisis, in average 16.34% of the assets were financed by *long-term debt* while the number increased to 17.63% during the crisis. For *short-term debt* the difference is minimal, an increase with 0.01% percentage point during the crisis. Another result seen in table 5 is the increased standard deviation for both *long-term and short-term debt* during the crisis. A further general finding is that *ROA* decreased during the financial crisis, which is seen when comparing the mean before and during the crisis. As seen in the table, *ROA* has in average decreased from 5% to -1.84%, meaning that the profitability in the studied industries have in average decreased with 6.84 percentage points. Also, the standard deviation for *ROA* increased in average, from 0.2705 to 0.3128, which is a clear evidence of a higher instability in the industries' profitability during the crisis.

However, the descriptive statistics for each industry differ. For Consumer Goods, Consumer Services, Healthcare and Industrials the mean for *long-term debt* increased during the crisis while it decreased in the Technology industry. On the other hand,

Table 5: *Descriptive statistics*

		Pre-financial crisis		Financial crisis	
Industries	**Variables**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
	LTD	0.1634	0.1931	0.1763	0.2089
	STD	0.0343	0.0699	0.0344	0.0738
All industries	**ROA**	0.0500	0.2705	-0.0184	0.3128
	SIZE	0.0001	0.0003	0.0001	0.0003
N = 5880	LIQ	0.0575	0.2030	0.0637	0.2238
	TANG	0.2161	0.1957	0.2152	0.1991
	GROW	0.1889	0.6279	0.1047	0.8036
	LTD	0.1818	0.1665	0.1985	0.1844
	STD	0.0417	0.0599	0.0432	0.0667
Consumer Goods	**ROA**	0.0567	0.1077	0.0297	0.1353
	SIZE	0.0002	0.0004	0.0001	0.0004
N = 924	LIQ	-0.0913	0.0977	0.0948	0.1043
	TANG	0.2078	0.1456	0.2075	0.1474
	GROW	-0.1065	0.3173	0.0543	0.2522
	LTD	0.2302	0.2399	0.2557	0.2657
	STD	0.0333	0.0698	0.0359	0.0733
Consumer Services	**ROA**	0.0491	0.0981	0.0254	0.1417
	SIZE	0.0002	0.0005	0.0002	0.0004
N = 1124	LIQ	0.1115	0.0889	0.1132	0.0936
	TANG	0.3367	0.2405	0.3377	0.2374
	GROW	0.1112	0.1951	0.0423	0.1507
	LTD	0.1400	0.2094	0.1642	0.2500
	STD	0.0371	0.1045	0.0039	0.1096
Healthcare	**ROA**	-0.1872	0.5626	-0.1795	0.6529
	SIZE	0.0000	0.0003	0.0000	0.0003
N = 912	LIQ	-0.0885	0.4001	-0.0784	0.4737
	TANG	0.1557	0.1447	0.1029	0.1457
	GROW	0.4683	1.4245	0.3492	1.9315
	LTD	0.1625	0.1665	0.1659	0.1653
	STD	0.0349	0.0583	0.0341	0.0630
Industrials	**ROA**	0.0327	0.1441	0.0093	0.1494
	SIZE	0.0000	0.0003	0.0000	0.0002
N = 1912	LIQ	0.0722	0.1195	0.0759	0.1148
	TANG	0.2332	0.2019	0.2316	0.2112
	GROW	0.1561	0.2932	0.0511	0.2451
	LTD	0.0950	0.1591	0.0983	0.1510
	STD	0.0253	0.0580	0.0238	0.0558
Technology	**ROA**	0.0111	0.2021	-0.0183	0.2736
	SIZE	0.0001	0.0003	0.0000	0.0003
N = 1008	LIQ	0.0705	0.1641	0.0853	0.1485
	TANG	0.1117	0.1105	0.1141	0.1163
	GROW	0.1603	0.2844	0.1007	0.3619

This table displays the mean and standard deviation of the variables included in both regression models. The values are shown for all observations as well as for each specific industry before (2004-2007) and during (2008-2011) the financial crisis. N stands for the amount of observations included in each period, i.e. four years (2004-2007 and 2008-2011). LTD stands for long-term debt, STD for short-term debt and ROA for return on assets. SIZE is the firm size, LIQ is liquidity, TANG stands for tangibility and GROW is growth. The dummy variables for industries and time periods that are included in the regression models are not seen here since they are non-numeric factors with values of either 1 or 0. Instead the descriptive statistics are shown for each industry and each time period. The variables in bold type are used as dependent variables in the regression models.

short-term debt increased for Consumer Goods and Consumer Services and decreased for Healthcare, Industrials and Technology during the financial crisis. Table 5 also shows an increase in standard deviation for both *short-term* and *long-term debt* for all the industries except for the *long-term debt* in the Industrials industry. Moreover, it is shown that *ROA* have in average decreased during the crisis for all the industries except for the Healthcare industry where it increased. What is evident though, is that the standard deviation for *ROA* increased for all the industries during the financial crisis, which is, as stated before, an indication of higher profit volatility during the crisis.

For the control variables the results varies among the industries. For instance, the mean for *liquidity* increased for all the industries except for the Healthcare industry. Regarding the *tangibility*, it increased for Consumer Services and Technology while a decrease is found for the Consumer Goods, Healthcare and Industrials. For all the industries, except Consumer Goods *growth* has on average decreased.

Additionally, the standard deviation for *liquidity* increased for all industries except for Industrials and Technology where it decreased. The standard deviation for *tangibility* did also increase for all the industries except for Consumer Services. The *growth* variable has a decrease in the standard deviation in all industries except for the industries Healthcare and Technology. Regarding the *firm size* variable the mean and the standard deviation is mostly similar before and during the crisis.

4.2 The financial crisis' impact on capital structure

This section explains and analyses the results in table 6 to fulfill the purpose of regression model 1. The aim is to understand whether the financial crisis had a statistically supported effect on the studied industries' capital structure, and if so, how it impacted their capital structure. Long-term and short-term debt are used as proxies for capital structure and studied separately followed by a description of the results for the control variables. In the last part, the results are summarized.

Table 6: *Results for regression model 1*

Regression model 1		**LTD**			**STD**		
		Coefficients	**Std.E**	**P**	**Coefficients**	**Std.E**	**P**
Consumer Goods	(Intercept)	0.188***	0.021	0.000	0.032***	0.003	0.000
	CRISIS	0.011*	0.006	0.067	0.000	0.003	0.972
	ROA	-0.243***	0.067	0.000	-0.075***	0.016	0.000
	SIZE	58.430***	19.120	0.002	33.558***	4.440	0.000
	LIQ	-0.059	0.062	0.343	-0.030	0.020	0.126
	TANG	0.017	0.058	0.765	0.055***	0.011	0.000
Consumer Services	(Intercept)	0.195***	0.025	0.000	0.055***	0.004	0.000
	CRISIS	0.196***	0.007	0.004	0.003	0.003	0.329
	ROA	-0.261**	0.103	0.011	-0.007	0.015	0.663
	SIZE	28.533	18.534	0.124	-8.670**	3.415	0.011
	LIQ	-0.220	0.142	0.122	-0.127***	0.021	0.000
	TANG	0.340***	0.089	0.000	-0.015**	0.006	0.011
Healthcare	(Intercept)	0.050***	0.018	0.005	0.011***	0.003	0.000
	CRISIS	0.028**	0.012	0.020	-0.001	0.003	0.672
	ROA	-0.067**	0.031	0.029	-0.092***	0.006	0.000
	SIZE	52.878**	21.450	0.014	14.804***	5.388	0.006
	LIQ	0.016	0.049	0.747	0.033***	0.009	0.000
	TANG	0.470***	0.089	0.000	0.061***	0.011	0.000
Industrials	(Intercept)	0.096***	0.010	0.000	0.029***	0.002	0.000
	CRISIS	0.005	0.005	0.337	-0.001	0.002	0.559
	ROA	-0.019	0.041	0.647	-0.044***	0.011	0.000
	SIZE	106.793***	25.967	0.000	26.043***	4.795	0.000
	LIQ	-0.017	0.048	0.724	-0.032**	0.014	0.027
	TANG	0.242***	0.034	0.000	0.028***	0.005	0.000
Technology	(Intercept)	0.058***	0.011	0.000	0.029***	0.003	0.000
	CRISIS	-0.001	0.007	0.985	-0.001	0.003	0.874
	ROA	-0.097***	0.029	0.001	-0.009	0.009	0.332
	SIZE	8.268	14.927	0.580	7.927***	4.870	0.000
	LIQ	-0.016	0.047	0.730	-0.100***	0.014	0.000
	TANG	0.340***	0.089	0.000	0.021	0.014	0.133
Adjusted R^2		0.13			0.09		

This table displays the results for regression model 1 where long-term debt (LTD) and short-term debt (STD) are dependent variables. The coefficients, standard error and the p-value as a measure of significance are presented. The table is divided in two to separate the results for long-term and short-term debt. All the variables are industry-specific. The intercepts demonstrate the information for LTD and STD before the crisis. The CRISIS variables show the change in relation to the specific industry's intercept, i.e. the effect of the crisis on LTD and STD. ROA, firm size (SIZE), liquidity (LIQ) and tangibility (TANG) are the control variables. One significance star (*) equals a p-value of ≤ 0.10, (**) $P \leq 0.05$ and (***) ≤ 0.01. We discuss the statistically significant results at a 5%-level, those with at least two significance stars. The adjusted R^2 shows how much of the variation in the dependent variable that is explained by the independent variables.

4.2.1 Long-term debt

Out of all the five industries, the industries Consumer Services and Healthcare have an effect of the crisis that is statistically significant and thus confirmed. That is seen

in table 6 in their p-values of 0.04 and 0.020 respectively, which are below the significance level of 5%. The abovementioned industries increased their *long-term debt* since their coefficients show a value of 0.020 and 0.028 respectively, meaning that these industries increased their *long-term debt* with 2.0 and 2.8 percentage points due to the crisis. Regarding the industries Consumer Goods, Industrials and Technology the effect of the financial crisis on *long-term debt* cannot be confirmed because their p-values 0.067, 0.337 and 0.985 exceed the 5%-level and hence their results are not statistically significant.

These significant results for Consumer Services and Healthcare industry is contradicting the results from prior researches that show that *long-term debt* dropped remarkably during the crisis (Fosberg, 2013; Custódio et al., 2013). Empirical evidence from previous research prove that firms tend to avoid *long-term debt* due to higher uncertainty and risk that comes with a financial crisis (Fosberg, 2013; Custódio et al., 2013), which is not the case for these two industries that instead raised their level of *long-term debt*. This is however aligned with the pecking order theory, explaining that firms that usually prefer retained earnings to fund their investment seek external funding during crisis. The reason is that firms become less profitable and have a tendency to face liquidity issues during crises, which result in limited retained earnings (Cetorelli and Goldberg, 2011; Boadi et al., 2015). The increase in *long-term debt* can be further aligned with the market timing theory, arguing that assets are undervalued and the cost of debt is low during crises, which enhance firms' incentives to raise their debt (Graham and Harvey, 2001; Baker and Wurgler, 2002; Frank and Goyal, 2003). To conclude, the behavior of the Consumer Services and Healthcare industry regarding their *long-term debt* when the crisis occurred are in accordance with both pecking order and market timing theory. However, the insignificant findings for Consumer Goods, Industrials and Technology are not in accordance with the evidence by Fosberg (2013) and Custódio et al. (2013) regarding the decrease in *long-term debt* and increase in *short-term debt* as an effect of the crisis. We therefore find no support for trade-off, pecking order or market timing theory in these three industries.

4.2.2 Short-term debt

As seen in table 6 none of the industries have statistically significant effect of the financial crisis on *short-term debt.* The results show that the p-values for the industries are 0.972, 0.329, 0.672, 0.559 and 0.874, which are values that exceed the significance level of 5%. In other words, the effect of the crisis on *short-term debt* in the studied industries cannot be confirmed. In fact, the adjusted R^2 of 0.09, indicate that the variables included in the regression only manage to explain 9% of the variation in *short-term debt.*

Our results indicate that the financial crisis did not have an effect on *short-term debt* since neither of the industries have statistically significant results. The results are not in line with prior research by Fosberg (2013) and Custódio et al. (2013) which provide support for the significant increase in *short-term debt* as an effect of the crisis. Therefore we cannot either confirm any evidence of the trade-off, pecking order or market timing theory regarding the change in *short-term debt* because of the crisis. Considering the relatively low value of the adjusted R^2, it indicates that there are other factors, beside the chosen ones, explaining the level of *short-term debt.*

4.2.3 Control variables

Table 6 also displays the industry-specific control variables *ROA, firm size, liquidity and tangibility*. Firstly, the results for the control variables for *long-term debt* are presented followed by the corresponding results for *short-term debt*. At last, an analysis of the findings is presented for each control variable separately.

Control variables for long-term debt

Table 6 displays the industry-specific control variables as well. Regarding *long-term debt,* the p-values for *ROA* are below the 5%-level in all industries except for the Industrials industry where this relation thus cannot be confirmed. The coefficients for *ROA* indicate that a negative relation exists in all industries. This means that more profitable firms tend to take on less *long-term debt*. The impact of *firm size* on the amount of *long-term debt* is statistically significant for the industries Consumer Goods, Healthcare and Industrials since their p-values do not exceed 0.05. The coefficients show positive relations between *firm size* and *long-term debt.* However, with a coefficient of 106.793 the *firm size* in the Industrials industry has twice as

much impact on *long-term debt* as in the Consumer Goods and Healthcare. The relation between *liquidity* and *long-term debt* is not statistically confirmed in neither of the industries, while we find statistical support for the impact of *tangibility* for all industries except for the Consumer Goods. A positive relationship is found.

Control variables for short-term debt

The control variables for *short-term debt* demonstrate a different result. The impact of *ROA* on *short-term debt* is negative and statistically significant for Consumer Goods, Healthcare and Industrials. The value of coefficients however show that the negative impact on *short-term debt* is not as strong as on *long-term debt,* meaning that more profitable firms avoid *long-term debt* to a higher degree than *short-term debt.* Furthermore, the impact of *firm size* on *short-term debt* is statistically significant for all industries except for the Technology industry. The coefficients for *firm size* show a positive impact in all industries except for the Consumer Services where the result indicate that the larger the firm is, the less *short-term debt* it will take on. *Liquidity* did, *unlike long-term debt*, have a statistically supported relation to *short-term debt* in four industries: Consumer Services, Healthcare, Industrials and Technology. A negative impact is found except for the Healthcare industry where a higher level of *liquidity* would in fact make firms take on more *short-term debt*. Moreover, we find statistically significant relation between *tangibility* and *short-term debt* in all industries except for Technology. The detected impact is positive in all industries except for Consumer Services where a higher amount of *tangible* assets would surprisingly influence firms to take on less *short-term debt*.

Analysis of each control variable for long-term and short-term debt

The negative relation that is found between *ROA* and *long-term debt* in the Consumer Goods, Consumer Services, Healthcare and Technology industry is in line with the arguments by Myers and Majluf (1984) and Titman and Wessels (1988) that profitable firms tend to finance investments with internal funds. Therefore these firms are associated with lower level of debt (Frank and Goyal, 2003). This also applies on the negative relation that is found between *ROA* and *short-term debt* in the Consumer Goods, Healthcare and Industrials industry.

Furthermore, the detected positive relation between *firm size* and *long-term debt* in the industries Consumer Goods, Healthcare and Industrials is consistent with the findings by Titman and Wessels (1988), Rajan and Zingales (1995) and Marsh (1982) that larger firms have easier access to capital since they face lower bankruptcy risk. This is also supported by the positive relation that is found between *firm size* and *short-term debt* in Consumer Goods, Healthcare and Industrials industry. Although the Consumer Services has a negative relation between *firm size* and *short-term debt* that is statistically significant, it contradicts the previous research.

Moreover, the insignificant relation we find between *liquidity* and *long-term debt* in all industries contradicts the previous research proving that a relationship exist (Graham, 2000; Antoniou et al., 2008; Lipson and Mortal, 2009). However, these previous researches are supported by the found relation between *liquidity* and *short-term debt* in four industries. The negative relation that is found in Consumer Services, Industrials and Technology is consistent with the findings by Lipson and Mortal (2009) that argue that high-liquidity firms have less need for external financing, while the positive relation that is detected in the Healthcare industry provides support for the argument that high-liquidity firms utilize the low cost of borrowing (Graham, 2000; Antoniou et al., 2008; Lipson and Mortal, 2009).

The detected positive impact of *tangibility* on *long-term debt* in Consumer Services, Healthcare, Industrials and Technology is aligned with the statements by Koksal et al. (2013) that tangible assets can be set as collateral and facilitate the access to external capital. This applies for the positive relation between *tangibility* and *short-term debt* as well, which is found in Consumer Goods, Healthcare and Industrials. The statistical significant negative relation between *tangibility* and *short-term debt* that is detected in the Consumer Services industry is a contradiction of the findings by Koksal et al. (2013).

4.2.4 Summary

Regression model 1 has the purpose of studying the impact of the financial crisis on different industries' capital structure. Considering *long-term* and *short-term debt* as measures for capital structure we end up with several findings about how these two

debt alternatives changed during the crisis and if the crisis is a statistically supported explanation for the change.

The regression results prove that the financial crisis affected the *long-term debt* in the Consumer Services and Healthcare industry but did not have statistically supported effect on *short-term debt* in neither of the industries. The change in *long-term debt* in the Consumer Services and Healthcare industry involves an increase of 2.0 and 2.8 percentage points respectively. Although these findings are not in line with the statements by Fosberg (2013) and Custódio et al. (2013) about the drop in *long-term debt* and increase in *short-term debt* as an effect of the crisis, we find support for the pecking order and market timing theory regarding the increase in *long-term debt.*

In sum, the Consumer Services and Healthcare industry increased their *long-term debt* due to the crisis while the crisis had no statistically supported effect on their *short-term debt*. Regarding the industries Consumer Goods, Industrials and Technology we find no support for the effect of the financial crisis on neither *long-term* nor *short-term debt.* All findings are presented in table 7 below.

Table 7: *Summary of the change in debt and the connection to the given theories*

Industry	Change in LTD	Change in STD	Trade-off	Pecking order	Market timing
Consumer Goods	+	+		Support	Support
Consumer Services	+	+		Support	Support
Health Care	+	−		Support	Support
Industrials	+	−			
Technology	−	−	Support		

This table intends to display the results for how the long-term debt (LTD) and short-term debt (STD) changed in the different industries when the crisis occurred. A positive sign implies an increase and a negative sign means a decrease. The bigger black signs show the significant results whereas the small red signs are insignificant values. "Support" refers the detected connection between the significant results, i.e. the big black signs, and the given theories.

4.3 The financial crisis' impact on the relation between capital structure & firm performance

This section provides an explanation and analysis of the regression results in table 8. The aim is to fulfill the purpose of regression model 2, which is to find out whether there exists a statistically supported relation between capital structure and firm performance in the different industries, before as well as during the crisis. We further analyze how these relationships present themselves. We study the findings for the potential impact of long-term and short-term debt separately followed by a part where the results for the control variables are presented. In the last part of this section we provide a summary where we conclude the findings.

Table 8: *Results for regression model 2*

Regression model 2		**LTD**			**STD**		
		Coefficients	**Std.E**	**P**	**Coefficients**	**Std.E**	**P**
Consumer Goods	(Intercept)	-0.019	0.034	0.574	-0.098	0.115	0.396
	CRISIS	-0.053	0.056	0.338	-0.042	0.129	0.744
Consumer Services	(Intercept)	-0.009	0.010	0.358	0.117***	0.028	0.000
	CRISIS	-0.018	0.033	0.588	-0.136	0.086	0.114
Healthcare	(Intercept)	-0.053	0.049	0.271	-0.639***	0.126	0.000
	CRISIS	-0.036	0.082	0.664	-0.129	0.388	0.740
Industrials	(Intercept)	-0.008	0.012	0.502	-0.011	0.037	0.773
	CRISIS	-0.003	0.015	0.854	-0.109	0.070	0.121
Technology	(Intercept)	-0.109***	0.016	0.000	0.186	0.117	0.114
	CRISIS	-0.057	0.066	0.386	-0.456***	0.119	0.000
		Coefficients		**Std.E**		**P**	
All industries	SIZE	18.961***		5.711		0.001	
	LIQ	1.121***		0.026		0.000	
	TANG	-0.047***		0.008		0.000	
	GROW	-0.010**		0.004		0.017	
Adjusted R^2 = 0.75							

This table displays the results for regression model 2 where firm performance (ROA) is the dependent variable. It presents the coefficients, standard error and the p-value as a measure of significance. The table is divided in two to separate the long-term and short-term debt's relation to ROA. The intercepts are industry-specific and demonstrate the information before the crisis. The CRISIS variables are industry-specific as well and show the change in relation to the specific industry's intercept. The control variables firm size (SIZE), liquidity (LIQ), tangibility (TANG) and growth (GROW) consist of the information from all the industries. One significance star (*) equals a p-value of ≤ 0.10, (**) P ≤ 0.05 and (***) ≤ 0.01. We discuss the statistically significant results at a 5%-level, those with at least two significance stars. The adjusted R^2 shows how much of the variation in the dependent variable that is explained by the independent variables.

4.3.1 Long-term debt's impact on firm performance

In table 8 we see that only the Technology industry, with a p-value of 0.000, has a statistically significant relation between *long-term debt* and *ROA* before the financial crisis. The detected relation is negative with a value of -0.109, meaning that before the crisis occurred *long-term debt* had a negative impact on the performance of Technology firms. Nevertheless, considering the period during the crisis none of the industries have p-values below 5%. This demonstrates that the relation between *long-term debt* and *ROA* is not statistically significant during the crisis and can thus not be confirmed.

The negative relation that is detected and statistically supported in the Technology industry demonstrates that *long-term debt* has a negative impact on *firm performance* before the crisis. This is in line with the pecking order and market timing theory. The pecking order theory emphasizes that profitable firms are in less need of debt since they prefer to use internal funds as a primarily source of financing (Boadi et al., 2015). In other words, firms with low level of debt have a higher probability of being profitable, which is seen in the Technology industry. Considering the market conditions before the crisis took place, market timing theory argue that firms can benefit from the overvalued assets by issuing equity over debt (Graham and Harvey, 2001; Baker and Wurgler, 2002), which is further support for the negative relation between *long-term debt* and *firm performance* in the Technology industry.

4.3.2 Short-term debt's impact on firm performance

Considering the relation between *short-term* debt and *ROA*, table 8 shows that the industries Consumer Services and Healthcare, with the p-values of 0.000, have statistically significant relation before the crisis. For Consumer Services we find a positive relation between short-term debt and *ROA* with a coefficient of 0.117, while the Healthcare industry has a stronger and negative relation with the value of -0.639. However, during the crisis only the Technology industry has a statistically significant relation, since the p-value is 0.000. The effect on the confirmed relation is negative with the value of -0.456, which means that during the crisis the relation between *short-term debt* and *ROA* in the Technology industry gets a negative value of -0.270 (0.186-0.456). Regarding the effect of the crisis for the remaining industries, their p-

values exceed the 5%-level, which demonstrates that their results are not significant and cannot be confirmed.

The findings for the positive relation between *short-term debt* and *firm performance* in the Consumer Services are in line with the trade-off theory. This is due to the fact that firms can benefit from leverage by taking advantage of the tax shield since interest expenses reduce the taxable income (Graham, 2003). That creates tax savings that positively affects firms' profitability, which is a potential case in the Consumer Services industry before the crisis. The negative impact that *short-term debt* has on *firm performance* in the Healthcare industry before the crisis is supported by the pecking order and market timing theory since they assume that profitable firms are in less need of debt and that the overvalued assets encourage equity issuance over debt (Graham and Harvey, 2001; Baker and Wurgler, 2002; Boadi et al., 2015). Furthermore, our findings indicate that there was an effect of the crisis on the relation between *short-term debt* and *firm performance* in the Technology industry. The financial crisis led to a negative and significant relationship, which means that *short-term debt* had a negative impact on *ROA* in the Technology industry during the crisis. This means that we find support for the pecking order theory during the crisis as well, which argues that firms prefer to use retained funds instead of financing through external capital (Boadi et al., 2015).

4.3.3 Control variables

In table 8 we also find the results for the control variables *firm size, liquidity*, *tangibility* and *growth.* Based on their p-values we confirm that all these control variables have a statistical significant relation to *ROA*, meaning that we find support that they are determinants of firm performance. The coefficients demonstrate positive relations for *firm size* and *liquidity* while *tangibility* and *growth* seem to have negative relations to *ROA*. This means that larger firms and firms with higher level of liquidity positively influence firm performance, whereas a higher amount of tangible assets and a higher growth rate imply a deterioration of firm performance.

The positive impact of *firm size* on *firm performance* is in line with previous researchers that state that larger firms have higher profitability (Ozgulbas et al., 2006;

Jónsson, 2007; Vijayakumar and Tamizhselvan, 2010). The positive relation between *liquidity* on *firm performance* is also consistent with the previous findings that firms with a higher level of *liquidity* have lower cost of borrowing which increase their *profitability* (Padachi, 2006; Narware, 2004). The negative effect of *tangibility* is in line with the argument by the researchers that claim that tangible assets are tied-up capital that hinders firms from pursuing investment opportunities (Rao et al., 2007; Zeitun and Tian, 2007; Weill, 2008; Nunes et al., 2009). Lastly, the detected negative impact of *growth* on *firm performance* is contradicting previous findings regarding the fact that companies with more growth opportunities have higher rate of return and are more profitable (Zeitun and Tian, 2007; Nunes et al., 2009; Margaritis and Psillaki, 2010).

4.3.4 Summary

Regression model 2 has the purpose of studying the impact of capital structure on firm performance in different industries, before and during the financial crisis. *Long-term* and *short-term debt* is used as measures for capital structure. The results display whether there exists a relationship between *long-term debt* and *firm performance* as well as *short-term debt* and *firm performance* before and during the crisis. Additionally, the results show how these relationships present themselves.

We find a statistically supported relationship between *long-term debt* and *firm performance* in the Technology industry before the crisis but no support for this relationship in neither of the studied industries during the crisis. The detected negative relation in the in Technology industry is supported by the pecking order and market timing theory. Furthermore, our results indicate that the relation between *short-term debt* and *firm performance* is statistically confirmed in the industries Consumer Services and Healthcare before the crisis and in the Technology industry during the crisis. The found relation in the Consumer Services demonstrates a positive impact of *short-term debt* on *firm performance,* which is in line with the arguments that are included in the trade-off theory. For the Healthcare industry the found negative relation before the crisis is supported by the pecking order and market timing theory while the found negative relation during the crisis is in line with only the pecking order theory.

To conclude, in the Technology industry the *long-term debt* had a negative impact on *firm performance* before the crisis while no relationship is detected during the crisis. Additionally, in this industry the *short-term debt* had no confirmed impact on *firm performance* before the crisis but a confirmed negative impact during a crisis. In the Consumer Services and Healthcare industry there is no supported impact of *long-term debt* on *firm performance*, neither before nor during the financial crisis. However, these industries have statistically confirmed relations, positive and negative respectively, between *short-term debt* and *firm performance* before the crisis but no significant relation is found during the crisis. Lastly, we find no evidence for any of these relationships in neither of the time periods in the industries Consumer Goods and Industrials. All findings are presented in table 9 below.

Table 9: *Summary of the relations between leverage and firm performance, and the connection to the given theories*

	Pre-financial crisis					**Financial crisis**				
Industry	**LTD**	**STD**	**T-O**	**P-O**	**M-T**	**LTD**	**STD**	**T-O**	**P-O**	**M-T**
Consumer Goods	−	−				−	−			
Consumer Services	−	+	S			−	−			
Health Care	−	–		S	S	−	−			
Industrials	−	−				−	−			
Technology	–	+		S	S	−	–		S	

This table intends to display the relation between long-term (LTD) and short-term (STD) debt and firm performance, before (2004-2007) and during (2008-2011) the financial crisis. The results are separated by industry. A positive sign implies a positive relation and a negative sign means a negative relation. The bigger black signs show the significant results whereas the small red signs are insignificant values. The black letter (S) stands for support and displays the detected connection between the significant results, i.e. the big black signs, and the given theories. T-O stands for trade-off theory, P-O for pecking order theory and M-T refers to the market timing theory.

5. Discussion

In this section the results for each regression model are discussed and potential reasons behind the results are presented. We provide possible explanations not only for the significant results but also for the insignificant ones. The insignificant findings can be explained by the possibility that the coefficient for the crisis variable is affected by factors that are not controlled for in the regression models. These factors, that can be both numeric and non-numeric factors, correlate with the crisis variable and can have explanatory power to the dependent variable. In the last part of this section we discuss how the findings from the two regression models can be connected and interpreted.

5.1 The financial crisis' impact on capital structure

The purpose of regression model 1 is to study the impact of the financial crisis on different industries' capital structure. Since it is evident that the choice of different debt alternatives was affected differently by the financial crisis, this study incorporates two measurements of leverage: *long-term* and *short-term debt.* The findings show that the studied industries' capital structure decisions, i.e. the financing through *long-term* and *short-term debt*, were affected differently by the financial crisis.

5.1.1 Long-term debt

Our findings show that the *long-term debt* increased in Consumer Services and Healthcare industry due to the financial crisis. The findings are interesting even though we expected the opposite result since prior researches detect a decreased level of *long-term debt* during the crisis. The results open up for further discussion within the area of why we find an increase in *long-term debt.* Even though Fosberg (2013) and Custódio et al. (2013) prove that *long-term debt* decreased during the crisis, these researchers study the years 2008 and 2009 to measure the effects of the crisis. Since we argue that these researches only manage to capture the instant effects of the crisis, our study incorporates four years (2008-2011) in order to capture the total effects. Hence, it is possible that we find an increase in *long-term debt* for the industries Consumer Services and Healthcare because we capture the potential increase that is

made in the latter year, i.e. the years that are not studied by Fosberg (2013) and Custódio et al. (2013).

Furthermore, during times of recessions, the interest rates are often adjusted to a lower level to increase the economic activity. As such, firms have the incentive to utilize the low cost of borrowing and thereby increase *long-term debt* during crises. Another possible explanation for the increased *long-term debt* is the potential change in regulations, which is a common way of enhancing the market stability when an economic collapse has taken place. The change in regulations may include tax benefits of *long-term debt*, which make them more preferable securities.

However, from an investor's point of view, firms have incentives to increase *long-term debt* during crisis since it might signal that the business is not affected by the crisis and can still handle its operations and maintain its stability despite the increased degree of uncertainty and risk. The increase in *long-term debt* in Consumer Services and Healthcare can also depend on the specific industry, meaning that the demand for the products or services offered by the specific industry may have risen during the crisis. This improves the firm performance and lowers the bankruptcy risk, which facilitate the access to external capital.

Nevertheless, it is worth mentioning that there is a possibility that the change in *long-term debt* is not an actual increase since previous evidence from Federal Reserve (2012) show that the total capital, i.e. total assets, dropped in US firms during the crisis. A potential explanation for this increase can therefore be that the total assets in these two industries, Consumer Services and Healthcare, dropped more in proportion to the decrease in debt, which can result in an increase in our long-term debt ratio.

Our results also indicate that the change in *long-term debt* in the industries Consumer Goods, Industrials and Technology are not explained by the financial crisis since the results are not statistically significant. However, the findings are still interesting, indicating that Consumer Goods and Industrials increased their level of *long-term debt* while Technology decreased. Since the financial crisis cannot explain the changes in *long-term debt*, we reflect upon other potential reasons in the following parts.

For instance, Consumer Goods and Industrials industry might have preferred a funding for their investment that is structured and stable, in terms of interest rate that often remains constant over the payment period, compared to *short-term debt.* Other reasons can be that these industries continues with their expansion plans for the future, which makes *long-term debt* a reasonable option to finance its growth and may not see the crisis as a disruption. In fact, the demand for their products or services may not have been affected by the crisis.

Furthermore, an explanation for the Technology industry that decreased their level of *long-term debt,* with an unconfirmed effect of the crisis, can be that this industry might think that carrying a higher level of debt involves risks and becomes challenging over time. Carrying *long-term debt* also affects the monthly cash flow negatively, since debt involves interest payments. Instead these payments can be saved for investments or unexpected events, which can be the reason for a decrease in *long-term debt* in the Technology industry.

5.1.2 Short-term debt

The findings also show that none of the industries have statistically significant results regarding *short-term debt*, meaning that the financial crisis did not explain the change in their *short-term debt.* The results are unexpected since Fosberg (2013) and Custódio et al. (2013) clearly state that *short-term debt* increased due to its flexibility character during the crisis. As mentioned before, these researchers study a different time period when measuring the crisis, which can be a reason for why the outcome differs. However, it is evident from the results that Consumer Goods and Consumer Services increased their *short-term debt* while a decrease is detected in the Healthcare, Industrials and Technology during the period of the crisis.

Overlooking the crisis as a potential explanation, a possible argument for increasing *short-term debt* is that both Consumer Goods and Consumer Services were in need of short-term financing, which make *short-term debt* an optimal alternative since it does not involve a long-term interest payment commitment. Furthermore, it is possible that the interest rates on *short-term debt* are lower and therefore more desirable since a

longer repayment period involves higher risk of default. On the other hand, the decrease in *short-term debt* in the Healthcare, Industrials and Technology industry can possibly be explained by a lower need of short-term financing. The reason may lie in the industry-specific characteristics, since these industries' products and services are more long-term oriented, and research and capital intensive. As such, *short-term debt* may be less desirable in these industries, which is also supported by their increase in *long-term debt* as discussed above.

5.2 The financial crisis' impact on the relation between capital structure & firm performance

The purpose of regression model 2 is to study the impact of capital structure on firm performance in different industries, before and during the financial crisis. Capital structure is studied in terms of *long-term* and *short-term debt*. The takeaway from these results is the common dilemma management and investors face; if and how various capital structure decisions, including both *long-term and short-term debt*, affect *firm performance*. The findings clearly show the industry-specific differences, meaning that long-term and short-term debt affect business performance differently in the various industries.

5.2.1 Long-term debt's impact on firm performance

Regarding the impact of *long-term debt* on *firm performance*, we find a relation only in the Technology industry before the crisis. We find a negative impact, meaning that a higher level of *long-term debt* led to a lower *firm performance*. This can be explained by the fact that the Technology industry is research and capital intensive as well as long-term oriented, which means that these firms often need huge amount of external capital but the return on their borrowed funds are paid off many years later. Since we study a period of four years we are not able to capture this long-term and potentially positive impact of debt on firm performance. Instead there is a huge possibility that our short time period captures the debt levels but no payoffs, and therefore a negative relation is detected. However, the effect of the crisis made this relationship insignificant. A potential reason can be that during times of crisis when much is uncertain and volatile it is hard to determine the optimal capital structure as well as finding the benefits of debt, whereby a significant pattern is hard to detect.

5.2.2 Short-term debt's impact on firm performance

Considering the impact of *short-term debt* on *firm performance* the findings differ from those of *long-term debt*. Here we find a statistically confirmed relation in the industries Consumer Services, Healthcare and Technology. For Consumer Services and Healthcare a relationship is found before the crisis, positive and negative respectively, while a negative relation is detected for the Technology industry during the crisis.

We argue that the positive relation between *short-term debt* and *firm performance* that we find in the Consumer Services industry can be due to the fact that this industry manages to take advantage of the benefits that are associated with leverage. Additionally, the firms that are included in this industry are known to have high turnover on their products, which means that the return on their borrowed funds are paid off relatively quick. This can also be a possible explanation for the positive relation in this specific industry.

On the other hand, the negative relations that are found in the Technology and Healthcare industry can be explained by the industry-specific characteristics since these industries are research and capital intensive and also long-term oriented. As explained before, this means that they often need to raise a large amount of external funding that pays off many years later. Our studied time period is too short since it may only capture the high debt levels but no payoffs, which can result in the negative relations that we detect.

Interestingly, the industries Consumer Services and Healthcare did not longer have confirmed relationships between *short-term debt* and *firm performance* during the crisis. The increased uncertainty and volatility during times of crisis can make it difficult for firms to capture the benefits of debt and for us to detect a significant pattern. Furthermore, the found negative relation in the Technology industry during the crisis is not confirmed before the crisis, which means that the impact of the crisis made this relationship negative and more apparent. This can be explained by the fact the profitability often is deteriorated during crises whereby a significant pattern is detected.

5.3 Connecting the change in capital structure to the relation to firm performance

The results from both our regression models bring interesting findings when connecting them together. The research question about the change in the capital structure as well as the relation to firm performance can naturally be seen as two separate fields of study. In fact, it becomes highly interesting when connecting these together. An industry's potential relation between leverage and firm performance tell us if an increase in debt implies an increase or decrease in profitability. Therefore we can discuss if the firms in an industry changed its capital structure in accordance with what is beneficial for their profitability, given that the relationship is statistically significant.

The Technology industry is the only industry among the studied ones with a statistically significant relation between *long-term debt* and *firm performance* before the crisis. The result implies that the *long-term debt* has a negative impact on firm performance. However, what is found in the results from regression model 1 is that the firms in the Technology industry in fact decreased its *long-term debt* during the crisis. As such, one can discuss whether the decrease in their debt level can be perceived as a way of boosting their performance although we are aware that there are other factors that can motivate the decreased level of *long-term debt.*

Regarding the *short-term debt's* impact on firm performance, we find that the Consumer Services and Health Care industry have statistically significant relations before the crisis while a relation during the crisis is found in the Technology industry. A positive relation is found for Consumer Services while a negative relation is found for Healthcare and Technology. Interesting is that our results from regression model 1 indicate that the short-term debt slightly increased in the Consumer Services industry during the crisis while it decreased a bit in the Healthcare and Technology industry. This perspective brings an interesting reflection that the change in *short-term debt* in these industries can be perceived as actions that positively influenced the profitability.

6. Conclusion

The purpose of this study is to examine whether and if so, how the financial crisis in 2008 affected firms' capital structure choice in different industries and how the industries' chosen capital structure affects firm performance. To answer the research question we conduct two panel data regressions. We separate among industries as well as the periods before (2004-2007) and during (2008-2011) the financial crisis. This study is based on 1572 US firms within the industries Consumer Goods, Consumer Services, Healthcare, Industrials and Technology listed on the NASDAQ, NYSE and NYSE MKT. To conclude the identified research findings void on two analysis levels, this study finds that the financial crisis impacted industries' capital structure differently as well as the impact of capital structure on firm performance differed in the studied industries.

The findings indicate that capital structure changed differently among the industries where two out of the five industries showed an impact of the crisis on long-term debt, while no effect is detected on short-term debt for neither of the industries. In the Consumer Services and Healthcare industry the long-term debt increased as a result of the crisis. Since our research points out an increase in these industries' level of long-term debt we argue that we contribute to the existing literature. This is due to the fact that prior researches within the area show a decrease in long-term debt and an increase in short-term debt due to the higher uncertainty and risk that financial crises involve. The capital structure decision to increase the long-term debt during crises provide support for the pecking order and market timing theory, arguing that during crises firms seek external sources to fund their investments and take advantage of the market conditions of low interest rates and undervalued assets. Hence, the effect of the financial shock on capital structure decisions is industry-specific.

Furthermore, we find that the importance of capital structure for firm performance is industry-specific as well. Statistically significant relations are detected for the Consumer Services, Healthcare and Technology industry. The supported relationship for Consumer Services is found before the crisis and is proved to be positive, which is in line with the arguments included in the trade-off theory that tax benefits of debt increase firm value. Also, a confirmed negative relation is found before the crisis for

Healthcare and during the crisis for Technology. This gives support for the pecking order and market timing theory since they assume that profitable firms are in less need of debt and that the overvalued assets before crises encourage equity issuance over debt. Additionally, our findings further prove that these industries changed their capital structure during the crisis in line with what is beneficial for their firm performance according to the detected relationships.

To conclude, this study reveals that the capital structure changed differently among the industries and a confirmed effect of the crisis is found in the Consumer Services and Healthcare industry. Additionally, the results imply that the impact of capital structure on firm performance differed in the studied industries where we detect statistically supported relations in the Consumer Services, Healthcare and Technology industry. As such, this study proves that the financial crisis did matter in these industries. At last, we argue that our findings would also be of interest and have implications for firms' management, scholars, potential investors, creditors and owners. A great dilemma today is whether there exists an optimal capital structure and if the capital structure even has an impact on firms' performance during normal market conditions. Our research takes one step further and challenges the dilemma during an economic collapse where the capital structure plays a vital role for firms' chance of survival. By contributing to the existing literature, we argue that our findings have a decisive role since our longer studied period captures the total effect of the crisis and gives a fairer overview of the situation compared to previous researches within this area. By that, we believe that our findings can give implications for future financial shocks of how the relations may present themselves in different industries.

7. Future research

Through this study we provide compelling evidence that industries in the US market have reacted differently to the financial crisis regarding their capital structure choices, and that the impact of these choices on firm performance differ. We argue that we contribute to the existing literature where our specific findings for each industry, which contradict previous research, open up an area to dig deeper into to seek answers for these outcomes. Thereof, future studies should construct in-depth analyses on the specific industries in order to find explanations for their capital structure decisions. This would probably require some sort of qualitative research where the perspective of the actual decision makers is illuminated.

A further important aspect to consider in future research and that can affect the capital structure decision is the characteristics of firms' debt and securities. For instance, callable bonds enable firms to redeem the security prior to its maturity. In such, firms that issues large amount of callable bonds can easier make grater changes in their capital structure.

Moreover, in the chosen Industry Classification Benchmark we discover that the sectors within each industry are quite different. For instance, the Consumer Services includes the sectors Food and Drug Retailers, General Retailers and Media, and Travel and Leisure. Since we capture the holistic view of the industry, future studies should use a more narrowed industry classification to understand the capital structure choices of specific sectors and thereby find the determinant of capital structure within the industries and provide more precise findings.

To further validate our findings and find out if they apply to other countries than US, cross-national studies should be conducted to examine the financial crisis' effects on various industries in other Anglo-Saxon markets that have comparable events and financial markets with similar rules and regulations. If future studies yield similar findings, the industry-specific patterns can be identified.

Furthermore, future studies should incorporate more than one measure for profitability since different industries focus on different performance ratios. We use

ROA in line with previous research in capital structure and avoid ROE as a measure to prevent biased results. However, other measures, such as the more frequently used EBIDTA, are worth discussing to improve the findings in this area of research. Additionally, Future research should also use and discuss other measurements for capital structure. Although we motivate to choice of book value of total assets, we fail to capture the decline in stock prices during the financial crisis. For instance, if one argues that decreased profitability for firms during the crisis is heavily connected to the stock prices, then the market value of total assets should be used when calculating ROA.

8. Reference list

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Appendix A - Industry definitions

Consumer Goods

The industry Consumer Goods includes Automobiles & Parts, Beverage, Food Producers, Household Goods & Home Construction, Leisure Goods, Personal Goods and Tobacco.

Consumer Services

The industry Consumer Services includes Food & Drug Retailers, General Retailers, Media and Travel & Leisure.

Healthcare

The industry Healthcare includes Healthcare Equipment & Services, Pharmaceuticals & Biotechnology.

Industrials

The industry Industrials includes Construction & Materials, Aerospace & Defense, General Industrials, Electronic & Electrical Equipment, Industrial Engineering, Industrial Transportation and Support Services.

Technology

The industry Technology includes Software & Computer Services and Technology Hardware & Equipment.

Appendix B – Multicollinearity and Autocorrelation

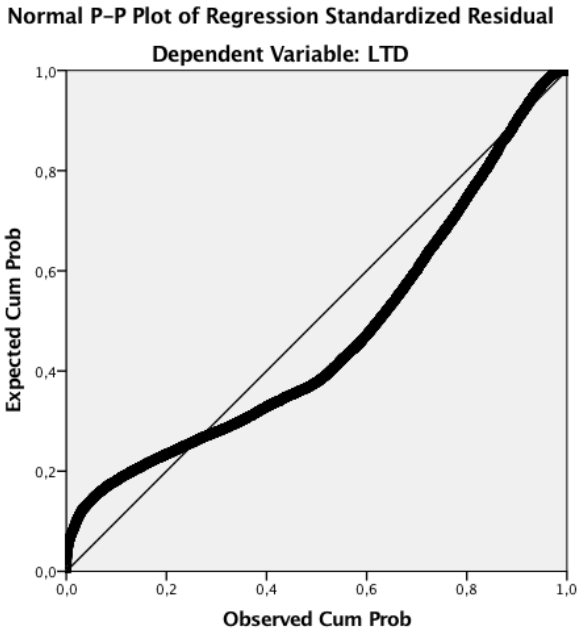
Independent variables	Multicollinearity (VIF)												
	CG	**CS**	**HC**	**IND**	**TEC**	**Crisis**	**ROA**	**LTD**	**STD**	**SIZE**	**TANG**	**LIQ**	**GROW**
CG	X	1.9	1.8	2.1	1.8	1.0	3.8	1.1	1.1	1.0	1.2	3.9	1.1
CS	1.6	X	1.8	1.9	1.8	1.0	3.8	1.1	1.1	1.0	1.2	3.9	1.1
HC	1.8	2.1	X	2.3	1.9	1.0	3.8	1.1	1.1	1.0	1.2	3.9	1.1
IND	1.3	1.4	1.4	X	1.3	1.0	3.8	1.1	1.1	1.0	1.2	3.9	1.1
TEC	1.7	2.0	1.7	2.1	X	1.0	3.8	1.1	1.1	1.0	1.2	3.9	1.1
Crisis	1.3	1.4	1.4	1.0	1.3	X	3.8	1.1	1.1	1.0	1.2	3.9	1.1
ROA	1.3	1.4	1.3	1.9	1.3	1.0	X	X	X	1.0	1.2	1.1	X
LTD	1.3	1.4	1.4	1.9	1.3	1.0	X	X	1.1	1.0	1.2	1.2	1.1
STD	1.6	1.5	1.8	1.9	1.8	1.0	X	1.1	X	1.0	1.2	1.2	1.1
SIZE	1.6	1.4	1.8	1.9	1.8	1.0	3.8	1.1	1.1	X	1.2	3.9	1.1
TANG	1.3	1.3	1.3	1.9	1.3	1.0	3.8	1.1	1.1	1.0	X	3.8	1.1
LIQ	1.3	1.4	1.4	1.9	1.3	1.0	1.2	1.1	1.1	1.0	1.2	X	1.1
GROW	1.3	1.4	1.3	1.8	1.3	1.0	X	1.1	1.1	1.0	1.2	1.2	X

Autocorrelation (Durbin-Watson)

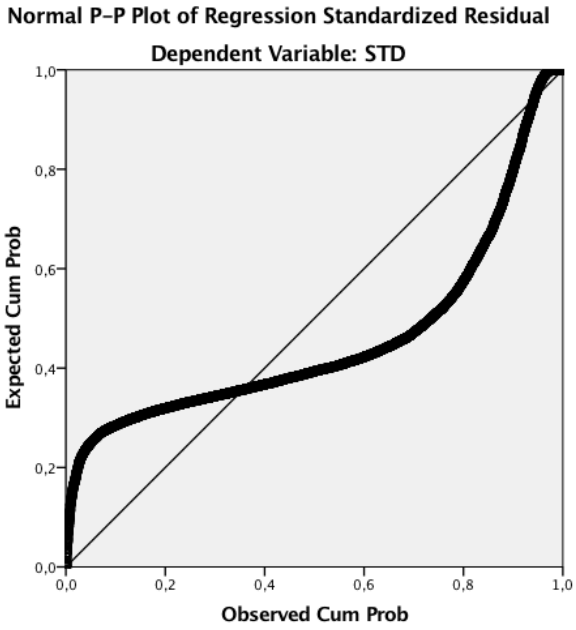
Dependent variables	**LTD**	**STD**	**ROA**
	1.470	1.589	1.577

Appendix C – Distribution of residuals

LTD



STD



ROA