

UNIVERSITY OF VAASA
FACULTY OF BUSINESS STUDIES
ACCOUNTING AND FINANCE

Ernesta Karosaite w100889

ZERO LEVERAGE PHENOMENON AND FIRM'S INVESTMENT AROUND
FINANCIAL CRISIS

Master's Thesis in
Accounting and Finance

VAASA 2015

TABLE OF CONTENTS	page
LIST OF TABLES	5
LIST OF FIGURES	5
ABSTRACT	7
1. INTRODUCTION	9
1.1 Purpose of the study, intended contributions and limitations	9
1.2 Research hypothesis	10
1.3 Previous studies	11
1.4 Structure of the study	14
2. INTRODUCTION TO CAPITAL STRUCTURE	16
2.1 The concepts of the capital structure and its choices	16
2.1.1 Factors influencing capital structure	19
2.1.2 External investors effect firms' capital structure	22
3. STUDIES ABOUT LOW-LEVERAGE OR ZERO-LEVERAGE	25
3.1 Debt conservatism and its foundation	25
3.2 Understanding zero-leverage phenomenon	27
3.3 Zero-leverage phenomenon according to traditional capital structure theories	30
3.3.1 Modigliani & Miller theorem	31
3.3.2 Trade-off theory of capital structure	32
3.3.3 Pecking order theory of capital structure	33
3.4 The link between zero-leverage and investment	34
3.5 Financial crisis impact for firms' capital structure and investment	36

4. DATA AND METHODOLOGY	39
4.1 Data description	39
4.2 Methodology of previous empirical studies about zero leverage and investment	40
4.2.1 Zero-leverage phenomenon	40
4.2.2 Zero-leverage relationship with investment	44
4.3 Approach and model	46
5. EMPIRICAL RESULTS	51
5.1 Univariate analysis	51
5.2 Multivariate analysis	57
5.2.1 Logistic regression analysis of zero-levered firms	57
5.2.2 Zero-leverage and investment relationship analysis	61
6. CONCLUSION OF THE STUDY	64
6.1 Conclusion	64
6.2 Limitations	65
6.3 Suggestions for further studies	66
REFERENCES	67

LIST OF TABLES	page
Table 1. Main difference between debt and equity	17
Table 2. Determinants of capital structure	20
Table 3. Definition of variables in different studies about zero-leverage phenomenon	41
Table 4. Variables and calculations	47
Table 5. Number of zero-leverage and leveraged observations by different period	51
Table 6. Descriptive statistics of full sample	52
Table 7. Correlation matrix	54
Table 8. Difference of means test	55
Table 9. Logistic regression	58
Table 10. Investment decision of zero-leverage firms	62

LIST OF FIGURES	page
Figure 1. Value with debt	18

UNIVERSITY OF VAASA	
Faculty of Business Studies	
Author:	Ernesta Karosaitė
Topic of the Thesis:	Zero-leverage phenomenon and firm's investment around financial crisis
Name of the Supervisor:	Jussi Nikkinen
Degree:	Master of Science in Economics and Business Administration
Department:	Department of Accounting and Finance
Major Subject:	Accounting and Finance
Line:	Finance
Year of Entering the University:	2013
Year of Completing the Thesis:	2015
	Pages: 73

ABSTRACT

This thesis investigates the zero-leverage phenomenon and its relationship with investment before, during and after the latest financial crisis. The data used in this study contains industrial firms from USA. Financial and utility firms are omitted from the sample. The whole sample includes 992 firms. Sample period captures the years from 2003 to 2012 and is divided into three sub periods: pre crisis, crisis and post crisis. The first period contains years 2003-2006, the second 2007-2009 and the third 2010-2013.

Logistic model is used in order to test zero-leverage phenomenon around financial crisis. For analysis the traditional firm variables are used. For relationship between zero-leverage and investment fixed effects panel estimation with OLS estimator for variable coefficients is employed in order to execute empirical tests. This relationship is analysed using Tobin's Q investment model.

Low-leverage phenomenon is increasing in various countries. Some researchers presents that this phenomenon is related with IPO waves, shifts in industry compositions, increasing asset volatility and declining corporate tax rates. Additionally various scholars declare that firms which follow zero-leverage policy are smaller, have higher cash balances, and have higher market-to-book ratios and higher pay-out ratios.

Results for this study present that zero-levered firms in USA around financial crisis are financially constrained. They pay high taxes and achieve tax deduction from non-debt sources. Coefficients from pay-out dummy variable and pay-out ratio identify that there is one type of zero-levered firm. However, the significance of pay-out ratio is not consistent in various logistic regression models. Additionally, the zero-levered firms are riskier and tend to use more equity. And based by previous year's zero-leverage decision dummy variable, these firms are consistent, they maintain their decision to follow zero-leverage policies.

KEYWORDS: zero-leverage, low-leverage, financial crisis, investment.

1. INTRODUCTION

1.1 Purpose of the study, intended contributions and limitations

At this moment, various researchers try to answer why firms choose zero-leverage and what is its effect on a firm. Strebulaev and Yang (2013) suggest that studies about various factors which could affect firm's propensity to follow zero-leverage policy help to understand economic mechanisms of low levered firms. Therefore, it is easier to identify the dominating factors. It is important to emphasize, that there is an advantage to use debt, for instance tax shield. Additionally, Graham (2000) adds firms could increase their value by optimizing on tax benefits of debt. As a result, why there is a tendency for firms to follow zero-leverage policies?

One of the motivations of this study is to analyse the zero-leverage phenomenon around financial crisis. This is done by checking the relationship between zero-leverage firms and explanatory variables, using a logistic regression. The study about zero-leverage phenomenon could help to identify if firms choose such policy based on strategic motives or if it is simply a consequence of financial problems which firm has faced.

Second purpose of this study is to find association between zero-leverage and firm's investment. This association could help to explain zero-leverage phenomenon which is increasing during recent years. This analysis helps to identify if firms follow zero-leverage policies based on strategic motives or it is related with financial problems which firm faces.

The main contribution of this study is to investigate if the recent financial crisis has impact for the zero-leverage phenomenon in USA. Various researchers try to explain zero-leverage phenomenon in USA, but they have not studied if financial crisis has impact for firm's

decision to imply zero-leverage policy. However, this kind of study has already been carried out in UK by Dang (2013).

The main limitation of this study is that it will be hard to examine the effect of leverage on investment around the crisis. First, investments decreased for both leveraged and non-leveraged firms during the crisis. It is not about the demand for investments but rather the supply. There were not that many investments opportunities.

1.2 Research hypothesis

This study investigates the relationship between zero-levered firms and investment around the financial crisis. The first hypothesis of this study is that:

H1: The recent global financial crisis has generally affected the firm's decision to follow zero-leverage policy.

Academics presents controversial evidence how various financial crisis affect firm's capital structure or its' leverage policy. Dang (2013) states that during the periods when economic is in recession (low or negative GDP growth rate), firms should use less debt. The author emphasizes that GDP growth rate should have a negative impact for zero-levered firms, especially if these firms are financially constrained. The main variable in order to capture crisis impact for capital structure is the GDP growth rate.

The last three hypotheses are based by Dang (2013) and Bessler (2013) where they states that financial flexibility, financial constraints and underinvestment hypotheses could explain zero-leverage phenomenon.

H2: Financial flexibility hypothesis states that firms save cash or internal funds in order to save their borrowing strength for future investment possibilities.

The financial flexibility hypothesis could be tested by examining how *growth opportunities* and *cash holdings* affect firm's zero-leverage policy. DeAngelo and DeAngelo (2007) show that firms with many possible growth opportunities save money for instance eschew debt and accumulate cash. Bessler (2013) in his study also describes financial flexible firms which have higher level of internal funds; therefore the coefficients of *cash holdings* should be large and significant.

H3: Financial constraint hypothesis states that debt-free policy is the consequence of constrained firms being restricted by their lenders.

Dang (2013) predict that constrained firms most of the time are small. Therefore the *size* variable could be used to test financial constraint hypothesis. Bessler et al. (2013) suggest that constrained firms should be smaller, riskier, and less profitable.

H4: Underinvestment hypothesis predicts that firms with high growth possibilities avoid debt.

This hypothesis is tested by Dang (2013) approach; he states that the more valuable the growth options, the higher level of agency cost are. In other words, there should be positive association between these variables: *growth opportunities* and *zero-leverage dummy variable*. Bessler et al. (2013) suggest that zero-leverage firms which face underinvestment problems should have high ratios of growth opportunities, high cash holdings and to rely on equity issuance.

1.3 Previous studies

The choice what capital structure firms choose is based by two components equity and debt. Moreover, academics are provided various evidence that debt could increase firm's

value and there is benefit from tax shield (Graham, 2000). Some scholar find that financing firm's projects with equity is also beneficial, for instance no maturity date or no repayment obligations.

In real market there are various factors, which affect firm's capital structure decisions. Various academics divided these factors in several groups: external and internal factors. Harris and Raviv (1988) summarize the main factors which have impact for firm's capital structure and authors find the relationship between factors and capital structure. The leverage increase when fixed assets, or company's size, or perspective of growth are rising. On other hand the leverage decrease when increase the volatility of the company, expenditures for advertising, research and development, the threat of bankruptcy, profitability and product authenticity. However, the results of the analysis for determining the exposure direction and strength, excluded industry factor, are different. This can be explained by differences in the choice of research methodology, studied period, data base or by choosing the variable factors.

During recent year, the percentage of zero-leverage firms has increased and the most interesting fact that profitable companies such as Apple, Yahoo, and Urban Outfitters are examples of the phenomenon of zero-leverage. Researchers found out that this increase is related with IPO waves, industry composition and increasing asset volatility. (Bessler, Drobetz, Haller & Meier 2013; Strebulaev & Yang 2013).

Strebulaev and Yang (2013) state that from 1962 to 2009, on average 10.2 per cent of large corporations in United States have zero debt and about 22 per cent have less than 5 per cent book leverage ratio. Bessler, Drobetz, Haller and Meier (2013) present more recent data and state that in US was 25.07 per cent of zero-leverage firms in 2011. Increasing number of firms is obvious and various studies which analyse this phenomenon may lead to the answer of zero-leverage phenomenon.

Many researchers try to answer why companies choose debt or equity, what the best capital structure composition is and how much debt firm should have. The main theories are Modigliani and Miller propositions (1958), trade-off theory by Kraus and Litzenberger (1973), and pecking order theory by Myers and Majluf (1984). But according to recent studies (Bessler, Drobetz, Haller & Meier 2013; Strebulaev & Yang 2013; Dang 2013) these traditional theories are not able to explain why companies choose not to have debt in their capital. Even though, the pecking order theory could explain zero-leverage phenomenon. According this theory, firms are more based on their internal funds and cash.

In addition to these traditional theories about capital structure, there are some academics who believe that higher debt ratios add more value for the firms. Graham (2000) reports that large and profitable corporation with high cash holdings and low expected distress costs could significantly increase their value if they increase the debt level. In practice, according to Graham (2000) firms tend to behave opposite, they act more conservative. Recently, Korteweg (2010) suggests that firms could increase their value by 5.5%, if they increase their debt ratios. He states that these results are more on account of zero leverage firms. These findings contradict with traditional theories by Myers (1977) and Modigliani and Miller (1958). Where they state that the value of the project or firm does not change if it is funded by equity or debt, the only difference is who going to realize the investments' cash flows.

In relationship between zero-leverage policy and investments, firms follow zero-leverage policy and want to keep flexibility in order to maintain investment in the future (Bessler, Drobetz, Haller & Meier 2013; Devos, Dhillon, Jagannathan & Krishnamurthy 2012; Strebulaev & Yang 2013). Minton and Wruck (2001) present that low leveraged firms increase their leverage when they come up against profitable investments.

However, some academics believe that not just financial flexibility hypothesis could explain zero-leverage phenomenon. Dang (2013) checks financial constraints hypothesis,

which state that debt-free policy is the consequence of constrained firms being restricted by their lenders.

Additionally, underinvestment hypothesis could explain zero-leverage phenomenon. Dang (2013) provides arguments why underinvestment and financial flexibility hypotheses are different from the financial constraint hypothesis. The main contrast is that firms follow zero-leverage policy for strategic reasons, for further investment opportunities. For underinvestment hypothesis Dang (2013) examine ratio of growth opportunities. The same applies for financial flexibility hypothesis, however Dang (2013) adds one more variable for this hypothesis. Additionally, author tests ratio of cash holdings.

Even though, academics put greater attention to the capital structure and investment decisions rather than recent financial crisis and its impact for capital structure and investment. However, academic literature suggests that financial crisis have impact for capital structure decisions and investment. The main macroeconomic factors which could show the financial crisis impact are GDP and inflation. Dang (2013) state that during the periods when economic is in recession (low or negative GDP growth rate), firms should use less debt. Kim and Wu (1988) in their study find out that inflation enhances the level of debt.

1.4 Structure of the study

This thesis consists of 6 chapters which investigate and explain topics about latest capital structure studies in a consecutive order. The firsts three chapters explains the main purposes of this study, summarizes previous research on the capital structure, low-leverage and zero-leverage policies, investment, and introduces the hypotheses to be verified through empirical tests. Section 2 exhibits concepts of capital structure theories, particularly Myers (1977) view about determents of capital structure. The third section presents traditional capital structure theories, such as Modigliani and Miller theory, Trade-off and Pecking

order theory of capital structure, and analyses them from zero leverage perspective. Additionally in the third section, the previous studies about the relationship between zero-leverage policy and investment around financial crisis are included. In the section 4, it is described the data and its characteristics, additionally this section includes main studies which have similar hypotheses with this paper and provides the basis for model establishment and the method adopted in the study. In the 5 section, it is described the main findings from both univariate analysis and multivariate analysis. Finally, section 6 presents a brief summary of the main points treated in the study, conclusions, limitations and suggestions for further research.

2. INTRODUCTION TO CAPITAL STRUCTURE

This section introduces the elemental background related to the underlying theories of the capital structure choices and leverage. Additionally, it describes factors which affect capital structure.

2.1 The concepts of the capital structure and its choices

Companies own assets that are produced by its operations and investment activities. In order to generate these processes the company should finance the assets. This could be done by acquiring funds from financial markets outside the company or by companies owned funds. Therefore, leverage could be described as the amount of borrowed funds that have been used to finance firm's activities. Devos et.al (2012) and Strebulaev and Yang (2013) describe leverage as the ratio of the sum of short-term and long-term liabilities to total assets.

The company has two types of liabilities debt or equity. Some researchers find out that companies also have some liabilities which are created by both of these financial instruments (Bodie et al., 2011; Megginson, 1997). When investor owns a company's share, he/she has a control right over the company. Debt must be completely paid for its provider. Even though, debt and equity provide funds for the companies, these financial instruments are different from each other by payment of profit or priority (Table 1).

Table 1 shows a basic idea of debt and equity as financial instruments. The first advantage of debt is that interest is tax deductible this means that it lowers the cost of debt. Second, debt-holders are limited to a fixed return, this shows that stockholders do not have to share profits. Third, debt holders do not have voting rights. Even though debt provide benefits to the company, but higher debt ratios lead to greater risk and higher required interest rates in

order to compensate for the additional risk (Bodie et al, 2011). This understanding of characteristics brings up a good basis for the present study.

Table 1. Main difference between debt and equity

Characteristic	Debt	Equity
Security requirements	Demand of collateral	No security collaterals
Payment of profit	Fixed interest	Dividend
Payment priority	Primary priority	Residual claimant
Control allocation	No control rights	Managerial control rights
Tax deductibility	Tax deductible interests	No tax deductions allowed
Maturity	Predefined maturity	No maturity date
Repayment to investor	Obligated repayment	No repayment obligation

Both debt and equity have advantages and disadvantages, therefore the question arise how to choose between debt and equity? What is appropriate capital structure? Various academics try to look to these questions and provide some theories.

Myers (1977) provides theoretical framework how firm chooses between debt and equity. Author of this study believes that it is cheaper to finance a company with debt instead of equity. For instance, if T is a tax rate and firm is able to borrow or lend from investor the same amount of funds, F , at the same expected rate of return, r . Then, according to Myers (1977) debt financing is equal to:

$$(1) (E - rF)(1 - T) = E(1 - T) - rF + rFT$$

and equity financing is:

$$(2) E(1 - T) - rF$$

In these equations, the residual earnings of debt financing are greater compare with equity financing. The difference between equity and debt financing could be measured by rFT , which is called the debt tax shield. From theoretical point of view, firms should be financed

effectively with debt, however scholars do not observe in real world economy the firm which is fully funded by debt. Myers (1977) suggests that in order to finance positive net present value projects firms are not going to have more debt because of uncertainty whether or not they will be capable to pay the debt. Therefore, there should be certain level of debt, where the cost of uncertainty is greater than the gain of the tax shield.

Myers (1977) provides an example of how firms choose between debt and equity in order to invest in project with positive NPV. Consider the situation when the firm has some amount of money for investment (I) and the rest amount is borrowed before the situation about the future is revealed. Therefore firm should pay the principal and interest, P , and the debt matures after the investment procedure. Right now, if shareholders want to receive incomes of the project, $V(s)$ must be greater than $I+P$, because the debt must be paid first. The future uncertainties show that firms could not pay P . Therefore the investment should be done at this point when $V(s) \geq (I+P)$.

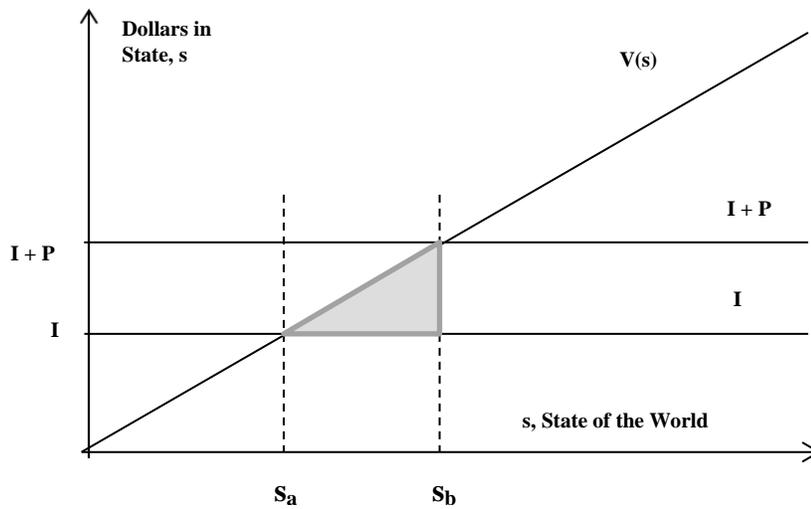


Figure 1. Value with debt

When $V(s)$ is lower than $I+P$, the shareholders are not interested in this project and prefer to refuse the ownership of the company. In this case the debt issuers acquire the control of the firm. Instead of all equity financing, shareholders are going to invest if $s_b \leq s$. (Figure 1).

After default the debt issuers are controlling the firm and if the debt issuers are still planning to continue the project after the shareholders default, the debt issuers invest if $V(s) \geq I$ or $s \geq s_a$. This means that the debt issuers will receive the benefits of the investment is $s_a \leq s \leq s_b$.

According to Myers (1977) the value of the project does not change if it is funded by equity or by debt, the only difference is who is going to realize the investments' cash flows. Modigliani and Miller (1958) also told that the value of the firm does not change if it is funded by equity or by debt. In general, the lower levels of debt are less costly to the firm compare with the debt tax shield, when firms are making investment decisions. Myers (1977) adds that debt level also is related to the type of assets in firm's portfolio, for instance growth assets support less debt, because there is still option to invest in the future.

In summary, debt provides some advantages. For instance, interest is tax deductible this means that it lowers the cost of debt. Further, debt-holders are limited to a fixed return. Finally, debt holders do not have voting rights. Even though debt provide benefits to the company, but higher debt ratios lead to greater risk and higher required interest rates in order to compensate for the additional risk (Bodie et al, 2011). However, traditional capital structure theories say that the value of the firm does not change if it is funded by equity or by debt (Modigliani & Miller, 1958; Myers, 1977).

2.1.1 Factors influencing capital structure

Various researchers tried to characterize companies by their choice of funding. For instance, the company's size, investment projects, agency problems have impact for the companies' funding choices. Table 2, represents the main determinants of capital structure.

In the three of these studies are described a negative relationship with the business risk level and the debt. However, Auerbach (1985) and Kim, Soernsen (1986) finds a positive

interdependence. In analyses of Titman and Wessels (1988), Mehran (1992) and Homifar, Zietz and Benkato (1994) there is no observed significant risk and debt relationship.

Table 2. Determinants of capital structure

	Profit	Growth opportunities	Size	Asset structure	Risk	Economic situation	Agent problems	Tax shield	Industry	Insolvency
Bowen et al. (1982)								X	X	
Marsh (1982)			X	X	X					
Bradley et al. (1984)					X			X	X	
Auerbach (1985)		X		X	X					
Kim & Sorensen (1986)		X			X					
Titman & Wessels (1988)	X		X						X	
Crutchley & Hansen (1989)			X		X					
Fischer et al. (1989)			X		X					X
Mehran (1992)		X					X			
Balakrishnan & Fox (1993)				X						
Chung (1993)				X	X					
Homaifar et al. (1994)	X		X			X		X		
Rajan & Zingales (1995)	X	X	X	X						
Cassar & Holmes (2003)	X	X		X						

Profitability was analysed just in four studies. Titman and Wessels (1988), Jorgensen and Terra (2003) confirms that when profitability grows the company's debt is decreasing. For instance, profitability factor is significant; however, it has a negative impact on the size of debt.

Studies provide controversial results about company's development. Auerbach (1985) states that when company is growing fast the debt level is also increasing more rapidly. Kim and Sorensen (1986) find the opposite relationship. However, Titman and Wessels (1988) do not exclude any of dependence. The recent study suggests that the growth has significant impact upon small and medium firms financing and capital structure (Cassar & Holmes, 2003).

Relationship between existing asset structure and level of the debt is studied by various scholars. Most of them find and identify that structure of assets is a significant criteria: Marsh (1982), Auerbach (1985), Balakrishnan and Fox (1993), Chung (1993), Cassar & Holmes (2003). Even though Titman and Wessels (1988) and Jorgensen and Terra (2003) argue that the material value of assets is not a significant factor in the capital structure. According to Gatchev et al. (2008) in order to finance fixed assets, firms with high asymmetric information choose more short-term debt versus long-term debt, also when firms have more agency problems use more equity and less long-term debt or cash.

Company size is defined as an insignificant factor by Mehran (1992) or as a significant factor with a positive association with the degree of debt by Crutchley and Hansen (1989), and Homaifar et al. (1994). Graham and Harvey (2001) suggest that the size of the firm is statistically significant in the practice of corporate finance. The most important difference between large and small firms that majority of large firms have a target debt ratio (Graham & Harvey, 2001). Most empirical studies which analyse the relationship between debt and industry identify that industry is a significant factor for the fluctuations in the debt.

Rajan and Zingales (1995) distinguish four factors which are related with leverage. For instance: fixed assets, the size of the company, profitability, market and book value ratio as an indicator of growth perspectives.

In general, previous researches have showed that in the market exist certain factors which influence the level of leverage in the company's capital structure. Harris and Raviv (1988)

summarize these factors and they find the relationship between factors and capital structure. The leverage increase when fixed assets, or company's size, or perspective of growth are rising. On other hand the leverage decrease when increase the volatility of the company, expenditures for advertising, research and development, the threat of bankruptcy, profitability and product authenticity.

Finally, it can be said that the results of the analysis for determining the exposure direction and strength, excluded industry factor, is different. This can be explained by differences in the choice of research methodology, studied period, data base or by choosing the variable factors.

2.1.2 External investors effect firms' capital structure

This part provides analysis about external factors, which have impact for the capital structure. Financial literature on capital structure considers the issue from the perspective of the company, which is facing competition in fully functioning financial markets. Borrowed capital and equity are available under acceptable risk. However, sometimes there is an opposite situation, where firm's financial leverage depends on the choice of an investor. The total debt ratio in the economy is determined by the total investor's debt to securities (Miller, 1977).

The most influential investors are banks, pension funds and insurance companies. Banks usually have more a short-term obligations, and therefore may have a comparative advantage for short-term loans. If compare banks to the pensions funds, which have more long-term liabilities, pension funds may tend to hold more long-term assets. On top of this result, it can be expected that in a country, with a large bank operating sector, firms may use more short-term financial instruments. The opposite situation is likely to be in the countries where a large number of pension funds and insurance companies are; therefore in these countries firms could use more long-term financial instruments.

Supply impact analysis increases the endogenous uncertainty that the financial intermediaries develop in such ways that meet the financing needs of companies as well as investors' preferences. Already are conducted studies (Demirguc-Kunt et al., 1999; De Jong et al., 2008) about the stock and bond market size effect on company's capital structure choice, also about the turnover and assets held by banks impact on capital structure choice. Additionally, these variables are also affected by the company's capital structure choice. For instance, in countries where there is high demand for external capital, the stock market is more developed.

According to Modigliani and Miller (1958) the company has an optimal capital structure. Faulkender and Petersen (2006) complement this theory in their study about the funding sources impact for the capital structure. Company reaches its optimal leverage level, when it estimates tax advantage, financial expenses, price and incentives for the use of debt compared to equity. Empirical studies have sought to clarify a theory of a capital structure, using leverages as function of the characteristics of the company. Companies, with the higher tax shield from the debt, have lower financial costs and the mistaken pricing of debt compared to equity is less common. Therefore is expected that companies will have greater leverage. When a company finds that the benefits of debt is positive, then the company's optimal capital structure is adjusted by issuing more debt or by purchasing shares.

The most common assumption is that a company's financial leverage is the company's demand function. In other words, the supply of capital is perfectly price elastic; cost of capital depends on the risk assumed by the company (Faulkender & Petersen, 2006). Although most of the empirical studies confirm the existence of variables dependence of leverage, some authors state that there are some companies below their optimal leverage. Graham (2000) argues that the companies incorrectly assess the opportunities to create a higher value by increasing financial leverage and reducing the payment of income tax, making an assumption that the other debt costs are constant; the company has a possibility to get a loan.

In economic literature, banks and private investors are described as relatively reliable and transparent in order to identify valuable debtors (Faulkender & Petersen, 2006). Company's source of capital may be linked with the company's ability to enter the debt markets. Lack of transparency in the company (it is difficult to assess its financial situation) or companies, which have more flexibility in their investment decisions (with more internal resources, it is difficult for lenders to restrict such companies with contracts) are likely to borrow more from active lenders. In theory, these companies should be more constrained, because it is more difficult for such companies to borrow. When company do not have an access to the debt markets, there are limited amount of opportunities for lenders to give them credit. It should mean that such company has a lower credit rating. In perfect market, companies receiving financing if the project net present value is positive.

Regardless external investors, various studies suggest that the Gross Domestic Product (GDP) is one of the most applied external determinants of capital structure (Bastos et al., 2009). Market imperfections (information asymmetry and investment distortions) can affect the capital structure choices; it could mean that the firms' decisions partly depend on the lenders (Stiglitz & Weiss, 1981). In order to calculate the financial leverage of the company, it is important to assess not only leverage factors (demand) but also external factors that allow assessing constraints of the company which wants to increase leverage (supply) (Titman & Wessels, 1988).

External investors and macroeconomic factors, as well as internal factors have an impact on the capital structure. One of the noticeable lacks of external investors is a limited opportunity for companies to choose the desired investor. In this case, freedom of choice depends by the investor's policy and later by the company's financial need.

3. STUDIES ABOUT LOW-LEVERAGE OR ZERO-LEVERAGE

This chapter identifies one of the extreme cases of capital structure. Firstly, the foundation of low leveraged firm is analysed, the main academic studies about the debt conservatism is presented. Further is studied the zero-leverage phenomenon, the extreme case of capital structure, when firm does not have a debt in its capital structure. Accordingly, various traditional capital structure theories were examined related with zero-leverage phenomenon. Third, investment and capital structure relationship is examined. Considering that investment could explain why firms tend to eschew debt. Additionally the recent financial crisis is studied in relationship with investment and capital structure.

3.1 Debt conservatism and its foundation

During recent years increased the popularity of academic literature about debt conservatism and zero-leverage phenomenon. It is know from previous chapters that there is a tax advantage to issuing debt in comparison to equity. Graham (2000) suggests that large and profitable firms with high cash holdings and low expected distress costs could significantly increase their value if these firms increase the debt level. In practice, according to Graham (2000) firms tend to behave opposite, they act more conservative. Recently, Korteweg (2010) suggests that firms could increase their value by 5.5%, if they increase their debt ratios. He states that these results are more on account of zero leverage firms.

Minton and Wruck (2001) study the low leverage or financial conservatism phenomenon and show that firms which follow low leverage policy are following a pecking order theory. These companies have a high movement of funds and substantial cash balances, which helps to fund unexpected expenses internally. Additionally, Minton and Wruck (2001) present that financial conservatism is more temporary, because 70% of low leverage firms

change their financial policies. Moreover, nearly 50% of these firms perform so in a period of five years.

According to Minton and Wruck (2001) financial conservatism is not based by specific industry. However, they find out that conservative firms tend to have high market-to-book ratios, operate constantly in industries although firms are more sensitive to financial difficulties. In addition, firms with low leverage policies do not have low tax rates or high non-debt tax shields.

DeAngelo and Roll (2015) in their study define what is firm which follows low leverage policy, and they suggest that debt-to-assets ratio is close to 0.500. Similarly to Minton and Wruck (2001), DeAngelo and Roll (2015) report that firms temporarily holds low leverage policies. Moreover, they present that the growth of low leverage firms is related with increasing number of young firms during recent years.

Park et al. (2013) study various leverage policies of multinational corporations and domestic corporations in USA. They find that leverage levels of multinational corporations are not significantly lower compare with domestic corporations, when authors of the study control key firm characteristics related to leverage levels. Park et al. (2013) accept the conclusion that multinational corporations' capital structure policies are not significantly affected by their greater risk to market insufficiency such as taxes and regulations.

Some researches identify that internal corporate governance have impact for adopting conservative debt policy. Iona et al. (2007) state that managerial ownership, board composition and ownership concentration are one of the main determinants. For instance, authors identify that there is a positive association between conservative policies and ownership concentration. Authors in their study find that there is a negative correlation of conservative debt policy and the number of shares held by non-executive directors. The last determinant, the percentage of non-executive directors in the board, has negative relationship with debt conservatism. Additionally, Iona et al. (2007) state that firms which

have adopted low leverage policies tend consistently hold larger than target internal funds and lower than target leverage ratios in comparison with traditional capital structure theories.

Lemmon et al. (2001) study about the main determinants of two extreme debt policies, one of them is related with debt conservatism. Authors identify that firm with conservative debt policy is larger, more profitable and have constant cash flows in comparison with firm which have a high level of debt. As various studies about debt conservatism, authors also supports that high level of internal funds is one of the main determinants of debt conservatism. Moreover, they state that the level of investment is more sensitive to present situation of cash flows. Additionally Lemmon et al. (2001) suggest that firms with conservative debt policy are less likely to become acquisition targets.

According to various authors, companies follow low-leverage temporally and they have high market-to-book ratios; they operate constantly, even though firms are more sensitive to financial problems. In addition, low tax rates or regulations do not explain why firms follow low leverage policies. Furthermore, various researchers state that traditional capital structure theories are not capable to explain why firms choose to follow conservative debt policy. However, some researches identify determinants of firms with conservative debt policies. It could be related with corporate government or related with firms' characteristics, for instance high level of internal funds, size and profitability.

3.2 Understanding zero-leverage phenomenon

During recent years the percentage of zero-leverage firms has increased and the most interesting fact that profitable companies such as Apple, Yahoo, and Urban Outfitters are examples of the phenomenon of zero-leverage. Researchers find out that this increase is related with IPO waves, industry composition and increasing asset volatility (Bessler, Drobetz, Haller & Meier 2013; Strebulaev & Yang 2013). Bessler et al. (2013) add that

zero-leverage puzzle is international phenomenon and it is more familiar in countries with common law origin and higher creditor protection. This statement is confirmed by Dang (2013), he analyses sample of UK firms and author finds that zero-leverage firms are not homogeneous.

Strebulaev and Yang (2013) state that from 1962 to 2009, on average 10.2 per cent of large corporations in United States have zero debt and about 22 per cent have less than 5 per cent book leverage ratio. Bessler, Drobetz, Haller and Meier (2013) present more recent data and state that in US was 25.07 per cent of zero-leverage firms in 2011. Increasing number of firms is obvious and various studies which analyses this phenomenon may lead to the answer of zero-leverage phenomenon.

Strebulaev and Yang (2013) try to explain why firms choose not to have debt in their capital. They state that zero-leverage policy is persistent, because firms seek financial flexibility. For instance, 30 per cent of zero-leveraged companies, which have been around for five years, do not raise any debt in the next four years (Strebulaev & Yang, 2013). Authors also find out that a third of zero-leverage firms pay dividends and moreover firms effectively restore interest payments to dividends and share repurchases; therefore the total pay-out ratio is approximately low across the whole spectrum of leverage. Further, Strebulaev and Yang (2013) identify the main characteristics of the firms that follow zero-leverage policy. These firms have higher market-to-book ratios and greater cash balances, are more profitable and successful and pay more dividends and taxes.

One of the explanations of zero-leverage phenomenon is related to the corporate governance, since the manager's choices vary with shareholders. According to Strebulaev and Young (2013) if managers own stocks or firms with longer-tenured Chief Executive Officer and smaller and more independent boards than firms are more likely to follow low leverage policy. Authors add that the findings are more significant for the dividend-paying firms. Additionally family owned firms are also more zero-levered (Strebulaev & Young, 2013).

Devos et al. (2012) findings are more controversial compare with Strebulaev and Yang (2013), even though both studies investigate zero-leverage phenomenon in USA. As it was mentioned before, Strebulaev and Yang (2013) state that certain corporate governance characteristics (board size, CEO tenure and family ownership) and managerial elements have associations with the firms' zero-leverage policies. Although, Devos et al. (2012) rejected hypothesis that corporate governance features have impact to firm's low leverage policy. For instance, authors believe that firms are not capable to get a debt from the market. Therefore, the entrenched managers, internal or external governance are not likely to explain why firms follow zero-leverage policies.

Most of the researchers present two types of companies which follow zero-leverage concept: constrained and unconstrained companies (Strebulaev & Yang, 2013; Dang, 2013). Although, Devos et al. (2012) identify the one group of companies and state that these companies implement zero-leverage policy because of market frictions. In general, low or negative GDP, high interest rates have impact for firm's decision to borrow in order to finance positive net present value projects.

Bessler et al. (2013) analyse the time-series dynamics of leverage and investment behaviour. First in their work, Bessler et al. (2013) show the increasing number of firms which follow zero-leverage policy. Second, authors are the first ones who observed that firms outside United States also implemented zero-leverage policies.

Similarly to Strebulaev and Yang (2013), Bessler et al. (2013) also state that firms which implement a zero-leverage policy only for a short period of time seek financial flexibility. Authors divided zero-leveraged firms in two groups: constrained and unconstrained firms. For instance, as soon as firm leave zero-leverage concept, firm starts to choose higher leverage ratios, reduce cash holdings and make higher investments. Authors call such companies unconstrained, because firms are waiting for the profitable investment opportunities in the future. Other group of the zero-leveraged firms is called constrained, because they follow zero-leverage approach in the long term, are more depended on

internal funds, and most important for this study that these companies are less flexible to make investment decisions.

Dang (2013) also try to answer why firms have zero leverage and he made a significant contribution analysing zero-leveraged firms in United Kingdom. Author presents two types of firms: dividend payers and non-payers. The non-payers follow zero-leveraged policy because of financial constraints; these companies are young, small in size with negative profits and low tangibility. The payers are unlevered in order to improve investment opportunities. Such firms are more develop and profitable, larger in size and with approximately higher dividend pay-out ratios.

It is important to mention that some researchers state that macroeconomic conditions have impact for zero leverage (Dang, 2013; Devos et al, 2012). The macroeconomic conditions could be described by the GDP growth rate and for firms it is more important the interest rate. Low or negative GDP growth rate have association with firms' zero-leverage policies and zero-leverage firms' choice to issue debt. Although, this association is only significant for firms who are less constrained and they are paying dividends. (Dang, 2013).

In general, zero-leverage phenomenon is increasing in various countries. Some researchers presents that this phenomenon is related with IPO waves, shifts in industry compositions, increasing asset volatility and declining corporate tax rates. Additionally, firms which follow zero-leverage policy are smaller, have higher cash balances, and have higher market-to-book ratios and higher pay-out ratios. Other researches analyse the corporate governance mechanisms and managerial work in order to explain zero-leverage policy.

3.3 Zero-leverage phenomenon according to traditional capital structure theories

The main goal of the company is to maximize stockholders wealth. Every decision should be made in accordance with this subject. Researchers studied how a company should choose a capital structure in order to meet the goal of stockholders wealth maximization. The main theories which try to answer how capital structure affects company is Modigliani and Miller propositions (1958), trade-off theory by Kraus and Litzenberger (1973), and pecking order theory by Myers and Majluf (1984). These theories suggest using debt because of the tax benefits, although according to Bessler et al. (2013) recent studies still uncertain which traditional theory better describes firms' capital structure.

3.3.1 Modigliani & Miller theorem

If we assume that market is perfect: no transaction cost, no bankruptcy cost, no taxes, all agents are rational and have the same information, and the borrowing costs for both firms and investors are equivalent, then according to Modigliani and Miller (1958) a firm's value is independent of its financial policy. The structure between debt and equity does not affect the firm's value. In other words, the value of the levered firm is the same as the value of unlevered firm. But if we take into an account a corporate tax then according to Modigliani and Miller theory (1958) the company has more benefits for instance in terms of lower tax payments.

The Modigliani and Miller (1958) compare two different companies, one is unlevered and the second one is levered and it is known that the value of these companies is the same. In order to explain this statement, suppose that an investor is buying shares of these two companies. He could invest in the shares of the levered company, or invest in the shares of the unlevered company, but borrow the same sum of money compare to levered company. Return on investment in both scenarios would be indistinguishable. It was mentioned before, the authors of this theory created assumptions in order that the investor's cost of borrowing is the same as that of the company with debt. When market is inefficient, these assumptions do not hold, therefore for a company, with riskier debt, is higher required return of equity. Later, Modigliani and Miller (1963) add to their theory a second

proposition, which states that required return to stockholders rises with leverage. For instance, leveraged equity has greater risk and it should have a greater expected return in order to compensate such risk. In general Modigliani and Miller theory shows that firm's value will not change by repacking the firm's securities.

As we know, debt lowers tax payments, but at the same time firm is obligated to pay interest and principal payments. If firm does not execute these obligations, than firm may face some financial difficulties. The main drawback in Modigliani and Miller (1958) theory is that it has many assumptions that do not help to predict firms' behaviour in the real life. According to Aivazian, Ge, and Qiu (2005) Modigliani and Miller theory tries to show how finance influence real investment decisions, but authors of this theory assume that market is perfect and that could create underinvestment or overinvestment motivation.

Although, Modigliani and Miller theory is difficult to apply to real market situation, it is useful to apply the theorem to find the determinants of optimal capital structure. Even though in practice, the theory suggests to use financial leverage and it could have been used to increase financial activities. As a result is an increased complexity, and uncertainty in financial activities and higher risk. For instance, during resent global financial crisis a lot of highly leveraged banks collapse, because of enormous leverage ratios.

3.3.2 Trade-off theory of capital structure

The closer look to reality could be expressed by the trade-off theory, because it takes into an account bankruptcy costs. Kraus and Litzenberger (1973) find out that there is an advantage for firms to have more debt until the optimal capital structure is reached. For instance, the benefit of having debt is tax advantages. Even though, several researchers suggest that debt could have harm for the company compared with the equity funding (Megginson, 1997). Authors suggest that a firm's capital structure involves adjustment between the tax benefits of debt and the bankruptcy cost (Kraus, Litzenberger 1973). This

cost contributes to lower company's value. Degryse, de Goeij and Kappert (2012) state that increase in leverage level have impact on cost of debt.

It was mentioned before, that according to trade-off theory one of the advantage of being in debt is tax advantage. Various researchers (Kraus & Litzenberger, 1973; DeAngelo & Masulis, 1980) suggest that firms prefer to finance their activities with debt rather with equity. DeAngelo and Masulis (1980) present that companies instead of debt tax shield could use non-debt tax shield. It could be used as depreciation in order to lower the corporate taxes. De Jong (2002) observe that the non-debt tax shield have an impact for the leverage of Dutch listed firms. Various studies about the association between non-debt tax shield and leverage could help to answer why more firms follow zero-leverage or low-leverage policy.

3.3.3 Pecking order theory of capital structure

According to Myers and Majluf (1984) the pecking order theory provides two rules: use internal financing and issue the safest securities first. The first rule simplifies the decisions in order to choose between the debt and equity. Though, not always is enough to use internal fund to cover the financial shortage. Therefore, the firm should use external funds. The second rule suggests choosing corporate debt instead of equity, because it has relatively little risk. However, sometimes the debt could not cover all financial deficits, then firm should consider about riskier financing, for instance new equity issuing.

Various researchers have controversy results, one of them supports the pecking order theory (Shyam-Sunder & Myers, 1999; De Jong, Verbeek & Verwijmeren, 2012; De Haan & Hinloopen, 2003; Brounen, de Jong & Koedijk, 2006) and other ones disapprove it (Frank & Goyal, 2008). However, the pecking order theory is more practical in making financial decisions. It is known that the announcement of equity issues have a negative impact on stock prices (Lucas & McDonald, 1990). Though, riskless securities for instance

internal cash flow do not influence stock prices changes. Therefore the investment projects first would be financed by internal funds.

In summary, trade-off and pecking order theories could be better adapted to the real world. If we compare pecking order theory and trade-off theory, according to Myers and Majluf (1984) that it is not necessary for companies to have a target amount of leverage. But Kraus and Litzenberger (1973) believe that each firm balance between the benefits of debt with the cost of debt until firms have an optimal amount of leverage. Both capital structure theories suggest the use of debt because of the tax shield. Thought, these theories are not able to explain why so many firms across countries follow a zero-leverage policy (Bessler, Drobetz, Haller & Meier 2013; Devos, Dhillon, Jagannathan & Krishnamurthy 2012; Strebulaev & Yang 2013). Even though, Jahanzeb et al. (2013) state that profitable firms would presumably use internal funds and therefore the level of debt ratio would be lower. Moreover, authors suggest that according to the trade-off theory there is a positive association between leverage and profitability. For instance, more profitable firms would finance their investments with equity or debt, because of the tax benefits.

3.4 The link between zero-leverage and investment

It is already known that firms are following low leverage or zero leverage financial policies just for a short period of time. Therefore it is relevant to study zero-leverage policies as a component of firms' temporal investment decisions. Dang's (2013) results suggest that zero-leverage policies could have associations with corporate investment and performance.

Additionally in the previous chapters is discussed that traditional capital structure theories could not explain zero-leverage phenomenon. However, some researches find associations with pecking order theory and its relationship with low-leverage and investment. Other researcher results show that capital structure choice and its relationship with investment could be explained by trade-off theory.

Pecking order theory could explain zero-leverage phenomenon and its association with investment. According to Myers and Majluf (1984) firms prefer to use securities which are less risky. For instance, retained earnings will be more preferred compared to equity. Dang (2013) assumes that firms with large cash flows do need to raise debt, these companies could use retained earnings to finance new investment opportunities. Therefore the cash flow variable could help to capture the predictions of the pecking order theory.

Duddley (2012) study's results about capital structure and large investment support trade-off theory. Author states that firms tend to move to their target capital structure related to firms' investment. Additionally, Duddley (2002) states that firms tend to choose first equity, then debt during the financing period of their investment. Author divided investment project is several periods and he finds out that during the first stage of the project the target leverage ratios are low. This shows that in the beginning of investment firms tend to choose more equity compare with debt.

Marchica and Mura (2010) support idea that if debt conservatism is focused in order to keep financial flexibility, then it could increase investment capability. Also, in their study authors present that higher capital expenditures and higher abnormal investments are related with firms' period of low leverage. Marchica and Mura (2010) complete the long-run performance tests, which shows that financially flexible firms tend to invest more and qualitatively.

Furthermore, De Jong et al. (2012) study firms in USA about their future investments. They find out that firms which have high unused debt capability and are more financial flexible, they tend to establish higher future investment projects. More importantly, De Jong et al. (2012) state that financial flexibility allows firms to weaken investment distortions during uncertain times.

Dang (2013) presents that some firms are facing financial problems, as a result it is demanding to obtain sufficient external financing to fund investment projects. These problems could arise by asymmetric information (Stiglitz & Weiss, 1981) or maybe companies are too risky to get a bank loan (Bolton & Feixas, 2000).

The relationship between zero-leverage and investment could be studied differently. For instance, what benefits are from investing in low-levered firms? Muradoglu and Sivaprasad (2012) study this problem and identify that investment projects based on low-leverage firms can create abnormal earnings of 4.43% per year. Additionally, authors identify that earnings could be higher by 11.75% if investors invest simultaneously to firms with low-market-to-book-ratio.

According to various researchers, firms, which follow zero-leverage policy, want to keep flexibility in order to maintain investment in the future (Bessler, Drobetz, Haller & Meier, 2013; Devos, Dhillon, Jagannathan & Krishnamurthy, 2012; Strebulaev & Yang, 2013). Minton and Wruck (2001) present that low leveraged firms increase their leverage when they come up against profitable investments. One of the hypotheses is that firms follow zero-leverage policy in order to build financial flexibility. In contrast, the financial constrain hypothesis shows that firms face financial problems and therefore obtain zero-leverage policy.

3.5 Financial crisis impact for firms' capital structure and investment

Company's financial policy was affected by the credit contraction of the financial crisis, but the greater impact was from future uncertainty and lower growth opportunities. Since the financial crisis began (in 2007, third quarter) to the peak (in 2009, first quarter) companies do not indicate any change regarding the systemic credit contraction. Instead of reducing the amount of cash available, companies significantly increased its cash levels (17.8 per

cent increase in investment-grade companies) after the collapse of Lehman Brothers (Kahle, Stulz, 2010).

Mokhova and Zinecker (2014) studies' results show that macroeconomic factors have impact for firm's decision making regarding its' capital structure. Authors divided macroeconomic factors into two groups: monetary factors and fiscal factors. Monetary factors are presented as inflation rate, long-term and short-term interest rates. Fiscal factors - for instance, tax rates and government expenditure. However, the most important determinants of capital structure are GDP and inflation rate (Mokhova & Zinecker, 2014).

There is a study about the effect of inflation on capital structure by Kim and Wu (1988). They in study present controversial view about inflation impact on capital structure. First, they present idea that during high inflation times firms tend to use more debt, because the real cost of debt decrease. Further, they emphasize that during inflationary periods net return on stocks is higher in comparison with bonds. This leads to situation when investors will sell bonds and buy more stocks, therefore the accumulated debt ratio tend to decline. However, Kim and Wu (1988) find that inflation enhances the level of debt. This result is found by linked effects of inflation and depreciation on the relative yields of securities.

Some academics advise that financial crisis impact could vary beyond firms with various financial problems (Gertler & Gilchrist, 1993). Authors identify two groups of firms constrained and unconstrained. First group of firms are riskier and earn higher expected returns, second group of firms are opposite and they can borrow a larger amount of debt. Therefore, when the unconstrained firms face the economic or financial shocks, it is easier for these firms to recover or to reduce the impact of shocks. The consequences for constrained firms are more severe, these firms have limitations for borrowing. Therefore the economic shock could affect constrained firms decision to follow a more conservative debt policy.

Other researchers find that financial crisis has impact for firms' capital structure in UK, France and Germany (Iqbal & Kume, 2014). They analyse how leverage ratios change through financial crisis. Leverage ratios rise during pre-crisis period until 2008 and 2009 years and after this period leverage ratios decline until 2011. Some researchers present a controversial view from not such recent studies. For instance, Korajczyk et al. (1990) and Choe et al. (1993) state that during periods of economic growth firms tend to finance their projects by equity in comparison with debt. According these authors, the leverage ratios should be lower during expansionary phases.

From investment and financial crisis relations point of view, is not so much research done. Bancel and Mittoo (2011) study what impact financial crisis has for firm's financial flexibility in France? The most important result from their study is that firms with high financial flexibility are affected less by recent financial crisis. Additionally, they indicate financial flexible firms' characteristics such as low leverage, high cash ratios. Bancel and Mittoo (2011) conclude that financial flexibility has a great impact for firms' capital structure decisions.

A similar study is made about Asian firms by Ayaydin et al. (2014). However, they analyse two separate crises, the Asian crisis and recent financial crisis. They find that firms sustain financial flexibility through conservative leverage policies and by high cash balances. From the perspective of investment, financial flexibility is one of most important element (Ayaydin et al., 2014). Firms that are financial flexible before the crisis tend to have more opportunities to invest, investment is based on internal funds, and financial flexible firms tend to perform better during the crisis.

In general, prior literature suggests that financial crisis have impact for capital structure decisions and investment. The main macroeconomic factors which could show the financial crisis impact are GDP and inflation.

4. DATA AND METHODOLOGY

The current section introduces in detail the characteristics of the sample and data utilized for the zero-leverage capital structure and its relationship with investment. The features of the data sample are revised, such as sample period, periodicity of the observations, the focused market and source from where it was obtained, are all described in the current section. Second part of this chapter is aimed to highlight how the main hypothesis may be tested. In order to make more comprehensive and accurate hypothesis test it is necessary to analyse previous empirical studies which examine these hypotheses. Result from this analysis it is accessible to identify the main variables and models.

4.1 Data description

The data is collected by annual balance sheet and market data of exchange-listed firms in USA from the Worldscope database over the period from 2003 to 2013. For this study data is used from the NASDAQ stock market index. It is one of the largest exchanges in the USA and world by market capitalization and trading volume. Addition, the most common NASDAQ traded firms are in technology sector.

All variables are denominated in US dollars. Sample contains just all active and inactive traded industrial firms. All financial companies, utilities, and non-publicly traded firms and subsidiaries are excluded from the sample. It is very important that the observations should have all available balance-sheet data. Otherwise, firms are excluded from the study. Moreover, firm-year observations with missing information on total assets, total debt, or market value are omitted from data sample. Also firms which do not have information about industrial sector or firms with non-consolidated balance sheet are excluded. Additionally, for these variables: preferred stock – total, deferred taxes, research and

development, missing observations are replaced by zero. Final panel data set includes 992 industrial firms with a total 10912 firm year observations.

The information about USA macroeconomic variables is taken from World DataBank. The period is from 2003 to 2013. The most important variable which could show financial crisis is GDP.

4.2 Methodology of previous empirical studies about zero leverage and investment

4.2.1 Zero-leverage phenomenon

The main studies about zero-leverage policy are written by Bessler, Drobetz Haller & Meier (2013); Dang (2013); Strebulaev & Yang (2013). Table 3 provides an overview of variables from the main studies about zero-leverage phenomenon.

Following Strebulaev and Yang (2013) and Bessler et al. (2013) book leverage is defined as the ratio of the sum of short-term and long-term liabilities to total assets. Zero leverage observations are presented if their outstanding amount of book leverage is equal to zero in a given years. Many researches in the models used a binary variable taking the value 1 if the firm has zero leverage in a given year and 0 otherwise (Bessler, Drobetz, Haller & Meier 2013; Devos, Dhillon, Jagannathan & Krishnamurthy 2012; Strebulaev & Yang 2013; Dang 2013).

Bessler et al. (2013) present various hypothesis related with zero-leverage phenomenon. However, one of the main hypotheses checks the tendency that individual stock returns have become more volatile within a certain period. Authors expect that increased business risk could explain the tendency why firms tend to be debt-free. In order to test this hypothesis they used approach by Fama and French (2001) and Denis and Osobov (2008).

This includes two steps; first, Bessler et al. (2013) run annual logistic regressions where they use data of full sample. The dependent variable is a zero-leverage dummy variable and explanatory variables are profitability, market-to-book ratio, size and tangibility. Regression includes fixed effects for countries and industries in order to avoid an omitted variables problem. In the second step, Bessler et al. (2013) estimate the probability for each firm to retain zero-leverage policy.

Table 3. Definition of variables in different studies about zero-leverage phenomenon

Variable	Definition	Authors
<i>Size</i>	Natural logarithm of total book assets.	Bessler, Drobetz Haller & Meier (2013); Dang (2013); Strebulaev & Yang (2013).
<i>Market-to-book</i>	Market-to-book ratio	Bessler, Drobetz Haller & Meier (2013); Dang (2013); Strebulaev & Yang (2013).
<i>Tangibility</i>	Ratio of fixed assets to book assets.	Bessler, Drobetz Haller & Meier (2013); Dang (2013); Strebulaev & Yang (2013).
<i>Profitability</i>	Ratio of operating income before depreciation to book assets.	Bessler, Drobetz Haller & Meier (2013); Strebulaev & Yang (2013).
<i>Abnormal earnings</i>	Ratio of difference between the income before extraordinary items for time t and t-1 to the market value of equity.	Bessler, Drobetz Haller & Meier (2013).
<i>Retained earnings</i>	Ratio of retained earnings to book assets	Bessler, Drobetz Haller & Meier (2013).
<i>Asset growth</i>	Ratio of assets in event year t minus assets in year t-1 divided by assets in t-1.	Bessler, Drobetz Haller & Meier (2013).
<i>Capital expenditure/ Investment</i>	Ratio of capital expenditures to books assets.	Bessler, Drobetz Haller & Meier (2013); Strebulaev & Yang (2013).
<i>R&D</i>	Ratio of research and development expenses to book assets.	Bessler, Drobetz Haller & Meier (2013); Strebulaev & Yang (2013).
<i>Payout dummy</i>	Dummy variable that takes value of 1 if a firm has a payout ratio greater than zero in a given year (and 0 otherwise).	Bessler, Drobetz Haller & Meier (2013).
<i>Payout ratio</i>	Ratio of the sum of cash dividends and share repurchases to book assets.	Bessler, Drobetz Haller & Meier (2013); Dang (2013); Strebulaev & Yang (2013).
<i>Equity issuance</i>	Ratio of total equity issuances to book assets.	Bessler, Drobetz Haller & Meier (2013);
<i>Taxes</i>	Ratio of income taxes paid to total book assets.	Bessler, Drobetz Haller & Meier (2013); Dang (2013).
<i>Non-debt tax shield</i>	Ratio of depreciation to book assets.	Bessler, Drobetz Haller & Meier (2013); Dang (2013).
<i>Cash holdings</i>	Ratio of cash holdings to book assets.	Bessler, Drobetz Haller & Meier (2013); Dang (2013).
<i>Asset risk</i>	Unlevered annualized volatility of logarithmic monthly stock returns (r_t).	Bessler, Drobetz Haller & Meier (2013).
<i>Debt capacity</i>	Dummy variable for estimated debt capacity of a firm in a given year.	Bessler, Drobetz Haller & Meier (2013).

<i>Earnings volatility</i>	The absolute value of the difference between the annual % change in net income and the (time-series) average of this change.	Dang (2013); Strebulaev & Yang (2013).
<i>Z-score</i>	Predicting the bankruptcy of firm.	Dang (2013).
<i>Cash flow</i>	Net income used to calculate basic Earnings Per Share plus depreciation, all divided by total assets.	Dang (2013).
<i>Growth opportunities</i>	The firm's market value (the market value of equity plus the book value of debt) divided by total assets.	Dang (2013).
<i>Abnormal Cap. Ex.</i>	Abnormal capital expenditure by Titman, Wei and Xie (2004).	Strebulaev & Yang (2013).
<i>Asset Sale</i>	Ratio of assets sales to book assets.	Strebulaev & Yang (2013).
<i>Operating Leases</i>	Sum of current rental payment and the discounted present value of future rental commitments (up to five years).	Strebulaev & Yang (2013).

The second most important hypothesis states that proxy variables for asymmetric information are positively associated with tendency to keep a zero-leverage policy. Bessler et al. (2013) hypothesize that firm-specific variables could help to explain the increasing tendency of zero-leverage policy. First, tax arrangement could explain capital structure choices (De Jong et al., 2008; Fan et al., 2012). For instance, firms which pay high taxes should have low leverage or even zero-leverage. Second, according to pecking order theory more profitable firms which do not have debt should rely more on internal funds.

Third, according to Myers (1977) firms who follow low leverage policy reduce the agency costs of debt, for instance underinvestment. Hackbarth and Mauer (2012) present results that firms will have lower leverage in cases where firms confront agency conflict over the timing of future investments and over the amount of additional debt in order to finance future investments. Therefore, Bessler et al. (2013) suggest that firms will have lower level of debt in order to reduce the underinvestment problem, then firms should have high growth options, high cash holdings and should depend on new equity financing to maintain firms growth options. Additional to Barclay et al. (1995) findings, firms with more assure debt have higher abnormal earnings. Accordingly, the firms with lower debt should present low abnormal earnings.

For the second hypothesis, Bessler et al. (2013) use the logistic regression model. The dependent variable is a dummy variable of zero debt. Additionally all explanatory variables

in the study are lagged by one year. Authors use year dummy variables in their study, therefore their use Wald-test which checks the hypothesis that all year dummy coefficients are simultaneously equal to zero.

Additionally, Bessler et al. (2013) analyse supply-side and demand-side effects. For this study is concentrated more on demand side, especially financial flexibility. This is presented in the next chapter, zero-leverage phenomenon and investment.

In next article Dang (2013) uses two hypotheses: underinvestment and financial flexibility. First one predicts that firms with high growth possibilities should avoid debt. Second, firms save cash or internal funds in order to save their borrowing strength for future investment possibilities. Both these hypotheses predict that firms follow zero-leverage policy just because they want to avoid investment bias.

Additionally Dang (2013) checks financial constraints hypothesis, which state that debt-free policy is the consequence of constrained firms being restricted by their lenders. The main variables are firm size and age, which could describe that firms are constrained.

For the underinvestment and financial flexibility hypotheses Dang (2013) provides arguments why it is different from the financial constraint hypothesis. The main contrast is that firms follow zero-leverage policy for strategic reasons, for further investment opportunities. For underinvestment hypothesis Dang (2013) examine ratio of growth opportunities. The same applies for financial flexibility hypothesis, however Dang (2013) adds one more variable for this hypothesis. Additionally, author tests ratio of cash holdings.

Dang (2013) in his article examines how macroeconomic conditions could impact firms financial decision to be debt-free. He relates macroeconomic conditions with constrained hypothesis, that firms are more sensitive to asymmetric information (for instance, credit market imperfections). Dang (2013) uses GDP growth rate and predict that during the

periods when economic is in recession (low or negative GDP growth rate), firms should use less debt, and opposite otherwise.

In order to check these hypotheses Dang (2013) performs a logistic regression analysis, the model is presented below:

$$(3) \Pr\{ZL = 1|\mathbf{X}\} = \frac{1}{1+e^{-(\alpha+\mathbf{X}\beta)'}}$$

where ZL is a dummy variable of leverage (1 if the firms has zero leverage in a given year, and 0 otherwise, \mathbf{X} is a vector which represents the firm level and macroeconomic variables, β is vector of coefficients and α is a constant. The main firm-specific variables are presented in the Table 3.

Strebulaev and Yang (2013) study that corporate governance has impact for low debt levels. They predict that firms follow zero leverage because managers have contrasting preferences compare with shareholders. Also, Strebulaev and Yang (2013) predicts that family owned firms tend to follow low debt policies.

4.2.2 Zero-leverage relationship with investment

Various authors argue that financial flexibility, financial constraints and underinvestment hypotheses could explain zero-leverage phenomenon. This part analyses how academics have tested these hypotheses related with zero-leverage phenomenon and investment.

Bessler et al. (2013) test financial flexibility hypothesis, which states that firms tend to follow zero-leverage policy in order to prepare for future investment opportunities. They divide these analyses into two parts. First, is a time-series analysis of leverage and investment behaviour, where it is used these variables: cash holdings, capital expenditure and the change of property, plant and equipment. This analysis is based by DeAngelo and

Roll (2012). In order to create this time-series analysis and capture the time-series characteristics it is necessary to have the data longer than 15 years. The IPO firms are mostly excluded from the data, it is important to mention that growth of the IPO firms is one of possible explanations of zero-leverage phenomenon.

Second analysis, is based by dynamic panel framework and (3) equation.

$$(4) \text{Capex}_{i,t} = \alpha * \text{Capex}_{i,t-1} + \beta_1 * \text{cashflow}_{it-1} + \beta_2 * Q_{it} + \beta_3 * \text{ZLduration}_{it} + \beta_4 * (\text{cashflow}_{it-1} - \text{ZLduration}_{it}) + \gamma_i + \gamma_t + \varepsilon_{it}$$

where $\text{Capex}_{i,t}$ is a capital expenditures; Q_{it} is the value of Tobin's Q (calculated as the ratio of market value to book value of assets); cashflow_{it-1} the one period lagged cash flow; and $\text{ZL} - \text{duration}_{it}$ is a zero-leverage duration dummy variable. $\text{cashflow}_{it-1} - \text{ZLduration}_{it}$ denotes an interaction term with cash flow that test if firms with a shorter zero-leverage duration are more flexible, for instance improving from a lower investment-cash flow sensitivity and thus an increased investment capability. Finally, γ_i denotes an entity fixed effect; γ_t a time-specific effect and ε_{it} a disturbance term (serially uncorrelated with mean zero).

Dang (2013) tests financial constraints, underinvestment and financial flexibility hypotheses using Tobin's Q model of investment:

$$(5) \text{Capital expenditure/Investment}_{i,t+1} = \alpha + \beta_{ZL} * \text{Cashflow}_{i,t} * D_{ZL} + \beta_L * \text{Cashflow}_{i,t} * D_L + \gamma_{ZL} * Q_{i,t} * D_{ZL} + \gamma_L * Q_{i,t} * D_L + \varepsilon_{i,t},$$

where $\text{Capital expenditure/Investment}_{i,t+1}$ is a capital expenditures divided by total assets, D_{ZL} and D_L are dummy variables of zero leverage and $\varepsilon_{i,t}$ is an error term. The cash flow ratio shows how much firm is dependent on internal funds and it is Earnings per Share plus depreciation, all divided by total assets. Dang (2013) states this ratio can be used in

order to test financial flexibility hypothesis. Variable $Q_{i,t}$ presents the Tobin's Q ratio, which explains financial flexibility, financial constraint and underinvestment hypotheses. Tobin's Q is ratio of market to book assets.

Aivazian, Ge, and Qiu (2005) state that leverage has significantly negative impact on investment and that negative shock is stronger for firms with low growth opportunities. The same negative association is observed by Lang, Ofek, and Stulz (1996). If we take a look at the Dang (2013), he identifies two types of firms which choose zero-leverage, first group has financial constraints. We can assume that if firm has financial constraints and low growth opportunities, the choice to have more debt will have negative impact on investment.

Several researchers who try to explain zero-leverage puzzle suggest that for further studies it is necessary to take into an account macroeconomic conditions, also different motivation why firms choose zero leverage (Dang 2013; Strebulaev & Yang 2013). The models which have been introduced before do not take into an account macroeconomic conditions. Also Strebulaev and Yang (2013) suggest that for further research it is more useful to investigate the relationships between leverage and investment process (e.g., front-loaded versus back-loaded). Maybe this relationship can influence the levels, timing, and persistence of corporate financial policy.

4.3 Approach and model

The empirical analysis in this thesis is divided into two parts univariate analysis and multivariate analysis. Additionally, the multivariate analysis presents the zero-leverage phenomenon analysis around financial crisis and zero-leverage relationship with investment around financial crisis.

In univariate analysis each different variable and sample are explored. First is presented the distribution of zero-levered and levered firms in four samples: whole sample, sample before crisis, sample during the crisis and sample after crisis. Secondly, the descriptive analysis of whole sample is done, which help to summarize the sample. Further, the correlation matrix of the main variables is presented. The analysis of variables' correlation could help to identify a predictive relationship. Finally the difference of means test is done.

The multivariate study analyses the zero-leverage phenomena and its relationship with investment around financial crisis. In this part four main hypotheses are tested. First one is related with financial crisis impact for capital structure, the last ones try to explain zero-leverage phenomenon. These hypotheses are financial constrain, financial flexibility and underinvestment. The study is based by Bessler et al. (2013) and Dang (2013). First is presented the logistic regression and later is estimated a linear Tobin's Q investment model.

The logistic regression is binary where a dependent variable could have only two possible types, in this case 0 or 1. In order to check why firms keep following the zero-leverage policy and how it is changed around financial crisis the proxy variables is selected from Bessler et al. (2013) study. Idea to use the GDP ratio and previous year zero-leverage dummy variable is based by Dang (2013). According the authors, these proxy variables are positively associated with tendency to keep zero-leverage policy.

Below in the Table 4 is presented a list of explanatory variables and how they are measured. The dependent variable is a binary variable taking the value 1 if the firm has zero leverage in a given year and 0 otherwise.

Table 4. Variables and calculations

Variables	Definitions
<i>Book-leverage</i>	Ratio of long- and short-term debt to total book assets.
<i>Size</i>	Natural logarithm of total book assets.
<i>Market-to-book</i>	Market-to-book ratio.
<i>Tangibility</i>	Ratio of fixed assets to book assets.

<i>Profitability</i>	Ratio of operating income before depreciation to book assets.
<i>Abnormal earnings</i>	Ratio of difference between the income before extraordinary items for time t and $t - 1$ to the market value of equity.
<i>Retained earnings</i>	Ratio of retained earnings to book assets.
<i>Asset growth</i>	Ratio of assets in event year t minus assets in year $t - 1$ divided by assets in $t - 1$.
<i>Capital expenditure/ Investment</i>	Ratio of capital expenditures to books assets.
<i>Δ Property, plant and equipment</i>	Ratio of difference between the net property plant and equipment for time t and $t - 1$ to book assets.
<i>R&D</i>	Ratio of research and development expenses to book assets.
<i>Payout dummy</i>	Dummy variable that takes value of 1 if a firm has a payout ratio greater than zero in a given year (and 0 otherwise).
<i>Payout ratio</i>	Ratio of the sum of cash dividends and share repurchases to book assets.
<i>Equity issuance</i>	Ratio of total equity issuances to book assets.
<i>Taxes</i>	Ratio of income taxes paid to total book assets.
<i>Non-debt tax shield</i>	Ratio of depreciation to book assets.
<i>Cash holdings</i>	Ratio of cash holdings to book assets.
<i>Asset risk</i>	Unlevered annualized volatility of logarithmic monthly stock return.
<i>GDP</i>	GDP growth rate.
<i>Previous ZL decision</i>	One year lagged zero-leverage dummy variable.

Additionally to these variables listed in the Table 4, the time dummy variables are added. Sample period captures the years from 2003 to 2012 and is divided into three sub periods: pre crisis, crisis and post crisis. The first period contains years 2003-2006, the second 2007-2009 and the third 2010-2013. The time dummy variables are included in the analysis in order to present the crisis impact for the zero-leverage phenomenon.

According to Bessler et al. (2013) first in the logistic model the traditional capital structure variables are analysed. This includes such variables: *size*, *market-to-book*, *tangibility*, and *profitability*. Later, the expended logistic model is tested. Bessler et al. (2013) emphasize that these factors could explain zero-leverage phenomenon: high taxes payments, profitable firms rely on internal funds, high growth options and cash holdings; moreover firms tend to rely on equity financing. All explanatory variables are lagged by one year.

Additionally, all these variables are presented in the above table and they are analysed based on traditional capital structure theories. First theory is pecking order theory, which indicates that firms rely more on internal funds, when they have low debt level. Therefore the profitability and retained earnings ratio should be high. Next theory is trade-off theory, where firms should be small, have low tangibility and high growth opportunities. The growth opportunities in this study are presented as a combination of market-to-book ratio and research and development ratio.

For analysis of zero-leverage relationship with investment the main four hypotheses are tested using (5) equation. The fifth equation represents a linear Tobin's Q investment model. This regression examines what affect zero-leverage policy has for firm's future investment.

The interpretation of Tobin's Q coefficients in (5) equation could be varied. First in relationship with financial flexibility and underinvestment hypotheses firms follow zero leverage policy to reduce the investment bias, than firms' capability to invest in future should increase. The results should be strong for both groups' levered and zero-levered firms. In order to accept the constrained hypothesis the zero-levered firms should take fewer growth opportunities in comparison with firms which obtain zero-leverage policy in order to reduce investment bias.

Cash flow ratio in (5) equation shows the cash flow sensitivity to investment. This ratio could help to identify how much firm is dependent on internal funds. Dang (2013) suggest that this coefficient could be used to examine the financial flexibility hypothesis. Author state that if firms avoid debt just for the reason to maintain financial flexibility, than these firms do not depend so much on internal funds.

According Dang (2013) this analysis based on (5) equation will help to identify the difference between financial constraint hypothesis in comparison with underinvestment and

financial flexibility hypothesis. This regression could help to explain what effect firm's zero-leverage policy has on its future investment during three periods: before, during and after financial crisis.

5. EMPIRICAL RESULTS

5.1 Univariate analysis

The firms in the table 5 are categorized by two groups: zero-levered firms and levered firms. Additionally, the distribution of zero-leveraged and leveraged firms is presented by three different periods. First one, 2003 and 2006 is a period before financial crisis. Second, 2007 and 2009, present the financial crisis period and the last one, is a period after financial crisis, 2010 – 2013. In the parentheses is presented the per cent of zero-leveraged and leveraged firms.

Table 5. Number of zero-leverage and leveraged observations by different period

Variables	All period	2003-2006	2007-2009	2010-2013
Zero-levered observations	3115 (28.55%)	1115 (28.10%)	832 (27.96%)	2799 (70.54%)
Levered observations	7797 (71.45%)	2854 (71.90%)	2144 (72.04%)	1169 (29.46%)
Whole sample	10912 (100%)	3968 (100%)	2976 (100%)	3968 (100%)

It can be seen that most of the observations, nearly three fourths of whole sample are levered. The same structure is presented also in the period before financial crisis and during the financial crisis. However, during 2010 and 2013 results have changed, firms tend to be zero-levered. After financial crisis, almost three fourths of whole sample are zero-levered firms.

The results show that there are an increasing number of zero-leveraged firms after financial crisis. Therefore, it could be said that financial crisis has impact for firm's capital structure.

Table 6 presents the descriptive statistics for the full sample of firms. The descriptive statistics are represented by means, standard deviations, medians, maximums, minimums values and the number of observations for the variables.

Table 6. Descriptive statistics of full sample

Variables	Full Sample					
	Mean	S.D.	Median	Min.	Max.	N
Book leverage	0.197	1.137	0.079	0.000	77.757	10912
Size	5.373	0.822	5.387	0.477	8.316	10912
Market-to-book	2.902	16.739	1.757	-2.421	1276.31	10912
Tangibility	0.204	0.204	0.129	0.000	1.000	10912
Profitability	-0.083	2.461	0.057	-207.67	2.362	10912
Abnormal earnings	0.008	1.008	0.008	-15.52	92.213	9911
Retained earnings	6.921	508.38	0.008	-7303.06	50096.67	10912
Asset growth	1.441	117.85	0.061	-0.930	11729.38	9920
Tobin's Q	2.902	16.74	1.752	-2.421	1276.31	10912
Capital expenditures	0.046	0.067	0.027	0.000	2.99	10912
Δ Property, plant and Equipment	0.009	0.083	0.002	-3.825	0.952	9920
R&D	0.110	1.168	0.021	0.000	93.087	10912
Payout ratio	0.037	0.110	0.001	0.000	5.013	10912
Equity issuances	0.085	0.424	0.008	-0.024	25.948	10912
Taxes	0.019	0.053	0.011	-1.091	1.227	10912
Non-debt tax shield	0.037	0.039	0.028	0.000	1.936	10912
Cash holdings	0.284	0.252	0.214	0.000	1.000	10912
Asset risk	0.724	0.969	0.584	-9.980	48.001	10912

Definitions of all variables presented in the fourth chapter, table 4. First, the results in table 6 are compared with Bessler et al (2013) results. This kind of analysis will help to identify possible errors in data. The book-leverage, size, market-to-book, tangibility and profitability ratios are lower in this study in comparison with Bessler et al. (2013) findings. Moreover the ratios of abnormal earnings and retained earnings in Bessler et al. (2013) study are negative and low, however in this study these ratios are positive and the ratio of retained earnings is extremely high. Additionally the biggest difference is in asset grow

ratios, in Bessler et al. (2013) this ratio is quite low and in this study it is high. It shows that firms in this study are small and have higher growth opportunities in comparison with firms in Bessler et al. (2013) study. This suggestion is supported by one more finding, the ratio of research and development is higher in this study in comparison with Bessler et al. (2013). Moreover the companies in this study are riskier, because the ratio of asset risk is higher. In this study the abnormal earnings and retained earnings ratios deviate most from findings in Bessler et al. (2013) study. However, the higher retained earnings ratio the less firm is dependent on equity or debt; therefore this ratio could not be removed from this study.

The traditional variables which explain capital structure is size, market-to-book ratio, tangibility, and profitability. The average of size is 5.373 and the highest firm's size is 8.316. It could be said that firms in this sample are not that big. In addition, mean of book leverage of all sample is also low, just 0.197. Therefore, it could be said that on average this sample contains small and low-leveraged firms. The market-to-book ratio shows adjust firm's market value to its' accounting value. The mean of market-to-book ratio is 2.902, even though the maximum market-to-book ratio is 1276.31. The low market-to-book ratio shows that firms are undervalued and the stock price of these companies are expected to rise. The average ratio of tangibility is 0.204 and the mean of profitability is -0.083.

Further some additional variables are examined. Such as asset growth, Tobin's Q, capital expenditures, research and development, payout ratio, equity issuances, taxes, non-debt tax shield, cash holdings, asset risk and change of property, plant and equipment. All these variables, expect the change of property, plant and equipment, are used in order to explain the tendency of zero-leverage firms over time.

In the 7 table is presented a correlation matrix for dependent and independent variables. Additionally is analysed the variables in 5 equation. Book leverage appears to have a positive and strong relationship with market-to-book, retained earnings, Tobin's Q, equity issuance ratios. There is a strong and negative association with book leverage and

profitability. For 5th equation the dependent variable is capital expenditures and independent variables are cash flow and Tobin's Q. All these variables experience low correlation.

Table 7. Correlation matrix

	Book leverage	Size	Market to book	Tangibility	Profitability	Abnormal earnings	Retained earnings	Tobin's Q	Capital expenditure	Equity issuance	Cash holdings	Cash flow
Book-leverage	1,00											
Size	-0,06	1,00										
Market to book	0,55	-0,13	1,00									
Tangibility	0,05	0,17	-0,03	1,00								
Profitability	-0,92	0,13	-0,56	0,02	1,00							
Abnormal earnings	0,01	0,01	0,00	0,00	0,01	1,00						
Retained earnings	0,46	-0,05	0,01	-0,01	-0,47	0,00	1,00					
Tobin's Q	0,55	-0,13	0,99	-0,03	-0,56	0,00	0,01	1,00				
Capital expenditure /Investment	0,05	0,09	-0,00	0,61	-0,01	0,00	0,01	0,00	1,00			
Equity issuance	0,69	-0,23	0,41	-0,07	-0,69	0,00	0,33	0,00	0,00	1,00		
Cash holdings	-0,05	-0,26	0,06	-0,44	-0,05	-0,01	0,02	0,06	-0,21	0,20	1,00	
Cash flow	0,00	-0,03	0,00	-0,05	0,00	0,00	0,00	0,00	-0,04	0,01	0,10	1,00

Finally, the characteristics of zero-leverage firms with those of levered firms are compared. This analysis helps to test if there are statistically significant differences in means between two groups, in this case zero-leverage firms and levered firms. This study is based by book leverage ratio, based on this ratio is created the dummy variable of zero-levered firms. Therefore, from the table 8 is seen that the ratio of book leverage for zero-levered firms is equal to zero. This is the main indicator which distributes zero-levered firms from levered ones. As it can be seen from the table the difference in means is highly statistically significant.

Table 8. Difference of means test

		Zero – levered firms	Levered firms	t-statistics
1	Number of observations	3115	7797	
2	Book leverage	0.000	0.276	-11.508
3	Size	5.123	5.472	-20.382
4	Market-to-book	3.283	2.750	1.503
5	Tangibility	0.131	0.234	-24.360
6	Profitability	-0.056	-0.094	0.741
7	Abnormal earnings	-0.006	0.013	-0.828
8	Retained earnings	2.863	8.543	-0.527
9	Asset growth	0.303	1.900	-0.610
10	Capital expenditure	0.036	0.049	-9.271
11	R&D	0.127	0.103	0.968
12	Δ Property, plant and equipment	0.004	0.011	-3.855
13	Payout ratio	0.054	0.030	10.179
14	Equity issuances	0.106	0.077	3.197
15	Taxes	0.025	0.016	7.868
16	Tobin's Q	3.294	2.746	1.546
17	Non-debt tax shield	0.030	0.039	-11.688
18	Cash holdings	0.442	0.222	44.876
19	Cash flow	151.645	46.135	4.045
20	Asset risk	0.891	0.657	11.434
21	Previous year's ZL decision	0.852	0.059	-129.834

The most important finding that the firm's size ratio is statistically significant, which indicates that there is difference between the average firm sizes of zero-levered firms and levered firms. However, the average of zero-levered firm is 5.1234 and levered firm is 5.472. The average size ratios between these two groups are nearly identical. This finding contradicts with Dang (2013) result that zero-levered firms are smaller and younger in comparison with levered firms.

It was mentioned before that those classical variables for explaining firm's capital structure are size, market-to-book ratio, tangibility and profitability. The difference of means test

shows that there is no difference between market-to-book and profitability of zero-levered and levered firms. However, the tangibility ratio is statistically significant, which indicates that zero-levered firms have lower asset tangibility in comparison with levered firms.

Zero-levered firms are expected to have lower abnormal earnings compared with levered firms. Results in the table x show that the average abnormal earning for zero-levered firms is lower than levered firms. However, the results are not statistically significant. Including retained earnings, the difference between the means is not statistically significant. Even though, the analysis presents sufficiently high disparity in means. The average of retained earnings for zero-levered firm is 2.862733, levered firm is 8.542500.

Asset growth ratio, research and development ratio, and Tobin's Q are not statistically significant, which states that these two groups are not different in means in relation with these ratios. However, the average asset growth ratio for zero-levered firms is lower in comparison with levered firms. The opposite situation is for Tobin's Q, the average Tobin's Q is higher for zero-levered firms than levered firms. The mean of research and development ratio is approximately equal.

Equity issuances, taxes, cash holdings, cash flow and asset risk ratios are statistically significant and the mean of zero-levered firms are higher in comparison with levered firms. This indicates that zero levered firms tend to issue more equity, pay higher taxes, have more internal funds and there is more uncertainty.

The difference of payout ratio means is statistically significant. Moreover the average payout ratio for zero levered firms is higher compared with levered firms. Additionally the difference of change of property, plant, and equipment ratio and non-debt tax shield is also statistically significant.

The mean of previous year's zero-leverage dummy variable for zero-levered firms is statistically different in comparison with levered firms. This implies that zero-levered firms consistently choose to follow such extremely conservative debt policy.

In general, the zero-levered firms have a book leverage which is equal to zero, have lower tangibility ratio compared with levered firms. The average firm's size ratio is approximately equal between two groups, even though it is statistically significant. Zero-levered firms have a lower capital expenditure ratio, change of property, plant and equipment ratio, and non-debt tax shield ratio in comparison with levered firms. In addition, the payout ratio, equity issuances ratio and taxes ratio is higher for zero-levered firms than levered firms.

5.2 Multivariate analysis

5.2.1 Logistic regression analysis of zero-levered firms

Table 9 presents the results of logistic regression models. The depended variable is a dummy variable of zero-levered firm, which takes the value one if a firm does not have debt during time t and 0 otherwise. All independent variables in this analysis are lagged by one year. The table 9 is divided into 6 columns, which presents various logistic regression models. First column [1] is created by standard capital variables in order to compare results with more expanded logistic regression model in second column [2]. In the third model [3] previous year zero-levered dummy variable is included. The fourth [4] and fifth [5] models represent how financial crisis affected firms decision to follow zero-leverage policy. The sixth [6] model, the dummy variable of previous year zero-leverage decision is excluded, in order to avoid possible evaluation complications. The number in parenthesis is a t-statistic, additionally bold numbers are significant at 5% level and italic numbers are significant at 10% level.

Table 9. Logistic regression

Independent variable	[1]	[2]	[3]	[4]	[5]	[6]
Previous ZL decision			3.050 (45.556)	3.055 (45.533)	3.050 (45.332)	
2007-2009 dummy					-0.114 (-1,130)	0.032 (0,392)
2010-2013 dummy					-0.004 (-0,038)	0.197 (2,384)
Size	-0.532 (-16,308)	-0.634 (-15,999)	-0.489 (-9,998)	-0.492 (-10,047)	-0.489 (-9,961)	-0.634 (-15,947)
Market-to-book	0.057 (6,613)	0.044 (4,148)	0.034 (2,786)	0.038 (2,934)	0.036 (2,925)	0.046 (4,189)
Tangibility	-2.989 (-18,997)	-1.552 (-6,293)	-0.842 (-2,957)	-0.865 (-3,036)	-0.900 (-3,151)	-1.612 (-6,496)
Profitability	0.605 (9,040)	0.908 (8,090)	0.871 (7,653)	0.896 (7,845)	0.887 (7,759)	0.901 (7,804)
Abnormal earnings		-0.131 (-1,593)	-0.101 (-1,207)	-0.093 (-1,130)	-0.097 (-1,154)	-0.140 (-1,663)
Retained earnings		-0.001 (-3,633)	-0.001 (-1,667)	-0.001 (-1,704)	-0.001 (-1,693)	-0.001 (-3,491)
Asset growth		-0.001 (-0,151)	-0.007 (-1,345)	-0.006 (-1,298)	-0.006 (-1,301)	-0.000 (-0,198)
Capital expenditure		2.103 (3,252)	-0.473 (-0,591)	-0.324 (-0,405)	-0.203 (-0,253)	2.364 (3,656)
R&D		0.348 (1,902)	0.221 (1,077)	0.182 (0,882)	0.192 (0,936)	0.308 (1,646)
Payout dummy		0.472 (7,594)	0.243 (3,233)	0.228 (3,025)	0.227 (2,994)	0.446 (7,123)
Payout ratio		0.615 (2,296)	-0.363 (-1,426)	-0.377 (-1,470)	-0.350 (-1,379)	0.635 (2,330)
Equity issuances		-0.807 (-5,654)	-0.212 (-1,405)	-0.177 (-1,172)	-0.184 (-1,224)	-0.812 (-5,553)
Taxes		2.202 (4,078)	1.194 (2,013)	1.205 (2,033)	1.200 (2,016)	2.217 (4,075)
Non-debt tax shield		0.233 (0,206)	2.398 (1,894)	2.369 (1,877)	2.372 (1,869)	0.376 (0,331)
Cash holdings		3.407 (26,063)	2.303 (14,620)	2.303 (14,591)	2.274 (14,346)	3.366 (25,500)
GDP growth rate				-0.053 (-3,051)	-0.053 (-2,579)	-0.013 (-0,809)
Asset risk					0.074 (1,976)	0.173 (4,434)
Intercept	2,299 (13,195)	1,162 (5,409)	-0,350 (-1,309)	-0,249 (-0,923)	-0,269 (-0,949)	0,979 (4,257)
Number of observations	9920	8916	8916	8916	8916	8916
Pseudo R ² (McFadden)	0,082	0,179	0,414	0,414	0,415	0,183

The intercepts vary in various logistic models, it is positive in [1] and [2] models, but negative in [3], where previous year dummy variable of zero levered firms is included. According Bessler et al. (2013) negative intercepts indicates that zero-levered firms are less common than levered firms. Perhaps in this study there is lack of panel data, Bessler et al. (2013) have data of 112029 observations.

The positive coefficients of taxes ratio in [2] and [3] columns indicate that firms which pay higher taxes are more likely to follow zero-leverage policy. Furthermore, the positive coefficient of non-debt tax shields indicates that some firms make a decision to follow zero-leverage policy, when they achieve tax deductions from non-debt sources. However, the non-debt tax shield coefficient is statistically significant at 10% level in [3], [4] and [5] columns, where dummy variables of previous year zero-levered firms are included.

The positive coefficient of profitability support pecking order theory that firms rely on internal funds. However, the negative coefficient of retained earnings contradicts with pecking order theory. The other coefficients analysis is more related with trade-off theory. According to the trade-off theory, small firms with higher growth opportunities and low tangibility tend to follow zero-leverage policy. The growth opportunities could be explained by the market-to-book ratio and research and development expenditures. The coefficients of size and tangibility in all columns are low, negative and statistically significant. However the market-to-book ratio is positive and is approximately close to zero. Ratio of research and development is only statistically significant at 10% significance level in column [2] and [6]. The sign of this ratio is positive. In the second and sixth columns, it could be seen that the ratio of capital expenditures is high, positive and statistically significant at 5% significance level, which indicates that higher investment opportunities which were discussed previously have occurred in higher levels of capital expenditure.

These findings do not support financial flexibility hypothesis, considering that the ratios of growth opportunities and cash expenditures are high. However, these results could be interpreted that zero-levered firms with growth possibilities avoid debt, which supports underinvestment hypothesis. Additionally, the high and statistically significant coefficients of cash holdings illustrate that firms tend to avoid underinvestment problems. The coefficients of equity issuances are negative and statistically significant, which do not support underinvestment hypothesis.

The negative sign of size coefficient support financial constraint hypothesis. That firms which follow zero-leverage policies have financial problems and are small. For further studies is recommended to imply the age variable, since small and young firms are more financial constrained.

A pay-out dummy variable which is presented by the value of 1 if a firm pays dividends or repurchases its own shares in a given t year (and 0 otherwise) is positive and significant in all columns. The pay-out ratio is positive and significant in the [2] and [6] columns, while in the remaining columns it is negative and not statistically significant. The sign of these two ratios is positive, that indicates that could be one type of zero-levered firms. However, the pay-out ratio's coefficient should be interpreted carefully and based on the results could be two groups of zero-levered firms: constrained and unconstrained. The [5] and [6] columns present high and statistically significant asset risk coefficients, which imply that zero-levered firms are riskier and therefore should use equity.

In columns [4], [5] and [6] of table 9 are included GDP growth ratio, which is statistically significant in the first two columns, where the previous year's zero-leverage dummy variable is included. The GDP growth ratio coefficients are negative and statistically significant, which implies that zero-leverage policies are affected by macroeconomic conditions.

Previous year zero-leverage dummy variable is included in the analysis and in column [3], [4] and [5] the results are presented. Dang (2013) in his study includes this variable in order to control for the persistency of a zero-leverage policy. The incorporation of this dummy variable in the model gives approximately by 20% higher pseudo R-squared. Additionally, the correlation between zero-leverage dummy variable and previous year's zero-leverage dummy variable is equal to 0.793459. The results in the table 9 present that this dummy variable is positive and statistically significant. This shows that zero-levered firms are expected to maintain their decision to follow zero-leverage policy.

The year dummy variables are included in [5] and [6] columns, provide some evidence that there is a positive and significant impact of financial crisis. The 2010-2013 year dummy coefficients are positive and statistically significant, which implies that firm characteristics in the logistic model could not fully explain why firms tend to follow zero-leverage policy and the number of zero-levered firms increased after financial crisis. A Wald-test rejects the null hypothesis that all year dummy coefficients equal to zero.

5.2.2 Zero-leverage and investment relationship analysis

This analysis is created based on several reasons, first to distinguish constraint hypothesis between underinvestment and financial flexibility hypotheses and secondly examine what is a relationship between zero leverage firm and its' future investment during three different periods. Table 10 presents the results from equation (5).

Table 10 presents the analysis which is based by Tobin's Q model of investment (De Jong et al., 2012). The table 10 is divided into four main columns; first one presents the main relationship between zero-leverage policy and future investment. The last three columns present the different periods around financial crisis. Period 2003-2006 is before financial crisis, from 2007 until 2009 is period of financial crisis, and the last one is related with period after financial crisis. In parenthesis is presented p-values, additionally bold numbers are significant at 5% level and italic numbers are significant at 10% level.

Table 10. Investment decision of zero-leverage firms

Independent variable	[1]	[2]	[3]	[4]
	Whole sample	2003-2006	2007-2009	2010-2013
Cash flow*D _{ZL}	-8.99E-08 (0.823)	4.26E-07 (0.896)	4.46E-07 (0.882)	1.41E-077 (0.700)
Cash flow*D _L	-1.35E-06 (0.084)	-1.67E-07 (0.989)	9.26E-07 (0.536)	-8.47E-08 (0.926)
Tobin's Q*D _{ZL}	-6.93E-06 (0.968)	-0.001 (0.010)	0.003 (0.000)	0.002 (0.018)
Tobin's Q*D _L	0.0001 (0.009)	-3.87E-05 (0.848)	5.30E-05 (0.437)	4.96E-05 (0.545)
Number of observations	9826	3930	2945	2951
Adjusted R-squared	0.622	0.695	0.747	0.844
F-test (Cash flow*D _{ZL} = Cash flow*D _L)	2.192	0.002	0.021	0.052
F-test (Tobin's Q *D _{ZL} = Tobin's Q *D _L)	0.653	3.481	15.204	5.216

Column [1] of the table 10 shows that just growth opportunities (Tobin's Q) for levered firms are positive and statistically significant at 5% significance level. However, the cash flow for levered firm is significant at 10% significance level. The difference between cash flow coefficients of zero-levered firms and levered firms implies that levered firms rely less on their internal funds than zero-levered levered firms. This rejects financial flexibility hypothesis, even though not all cash flow coefficients are statistically significant. The Tobin's Q coefficient for zero-levered firms is smaller in comparison with Tobin's Q coefficient for levered firms. This indicates that zero-levered firms tend to invest in hardly any growth opportunities, which supports financial constraint hypothesis. However, the Tobin's Q coefficient for zero-levered firms is not statistically significant.

In columns [2], [3] and [4] is presented the various periods around financial crisis. Only one variable is statistically significant through these periods is a Tobin's Q for zero-levered firms. For the first period, before financial crisis Tobin's Q is negative and statistically

significant just for zero-levered firms, this implies that growth opportunities have negative impact for future investment of zero-levered firms. Later one, during the financial crisis and after financial crisis the Tobin's Q coefficients for zero-levered firms is positive and statistically significant. In comparison with Tobin's Q coefficient for levered firm during financial crisis and after financial crisis, the Tobin's Q coefficient for zero-levered firm is lower. This implies that zero-levered firms invest fewer to growth opportunities, which supports financial constraint hypothesis during and after financial crisis.

In sum, the results indicate that firms have financial constraint problems. However, some coefficients in this study are not statistically significant, and it is difficult to support or reject financial constraints hypothesis. It is recommended for further studies include a larger sample of data, and additionally divided this sample into two groups as presented by Dang (2013) or Bessler et al. (2013), they present zero-levered firms, which pays dividends and repurchases stocks and zero-levered firms which do not.

6. CONCLUSION OF THE STUDY

6.1 Conclusion

This thesis investigates the zero-leverage phenomenon and its relationship with investment in USA by selecting sample from Worldscope database from 2003 to 2013. In the sample are 992 firms with a total 10912 firm year observations. The firms are selected from the NASDAQ stock market index. Macroeconomic variable is taken from the World Bank database.

The main characteristics of zero-levered firms are that these firms pay high taxes and achieve tax deduction from non-debt sources. Coefficients from pay-out dummy variable and pay-out ratio identify that there is one type of zero-levered firm. However, the significance of pay-out ratio is not consistent in various logistic regression models. Additionally, the zero-levered firms are riskier and tend to use more equity. And based by previous year's zero-leverage decision dummy variable, these firms are consistent, they maintain their decision to follow zero-leverage policies.

This study does not support pecking order theory, based on these findings positive and significant coefficients of profitability and negative and significant coefficients of retained earnings. It does not show that zero-levered firms rely more on internal funds.

In order to support trade-off theory zero-levered firms should be small, have low tangibility and high growth opportunities. Findings in this study show that firms are small and have low tangibility; however the results are not so strong for high ratios of growth opportunities. Additionally this contradicts with financial flexibility hypothesis. Results partly supports underinvestment hypothesis, but negative coefficients of equity issuances ratio indicates that underinvestment hypothesis is rejected.

During all this analysis the constraint hypothesis is not rejected. The coefficients of size ratio supports constraint hypothesis, because zero-levered firms are small.

The analysis about zero-leverage phenomenon around financial crisis show that macroeconomic conditions have impact for firms decisions to use zero-levered policies. Moreover, the results indicate that traditional firm characteristics are not capable to explain zero-leverage phenomenon. This study shows that after financial crisis the number of zero-levered firms increased.

The analysis between zero-leverage and investment brings the results that firms have financial constraint problems. However, some coefficients in this study are not statistically significant, and it is difficult to support or reject financial constraint hypothesis.

6.2 Limitations

The data for this thesis have been chosen based by NASDAQ stock market index. Not all listed firms in USA are included in the sample. For further studies it is recommended to include the NYSE stock market index. For panel data studies in is necessary to have a larger amount of data for accuracy of the results.

Furthermore, in order to test financial constraint hypothesis the age ratio should be included. Some academics identify that most financial constrained firms are small and young.

Additionally, the study is related with investment around financial crisis. Investments decreased for both leveraged and non-leveraged firms during the crisis. There is a supply problem in the market, not demand. One of explanations could be that during this period in the market were not that many investments opportunities.

6.3 Suggestions for further studies

For further studies is recommended to study about investment opportunities based on portfolios which is created by zero-levered firms. Additionally various investment strategies could be compared with investment in zero-levered firms. Especially it is interesting to examine these firms, which are presented in Dang (2013) and Bessler et al. (2013) findings, zero-levered firms which pay high taxes, dividends and are profitable.

Additionally, the firm's capital structure is represented by managers and firm's owners. The behaviour of these people could affect firm's capital structure choices. For instance, if the majority of the managers are conservative, it could be related with conservative debt policy.

REFERENCES

- Aivazian, V.A., Ge, Y. & J. Qiu (2005). The impact of leverage on firm investment: Canadian evidence. *Journal of Corporate Finance* 11, 277-291.
- Arslan-Ayaydin, O., Florackis, C. & A. Ozkan (2014). Financial flexibility, corporate investment and performance: evidence from financial crises. *Review of Quantitative Finance and Accounting* 42:2, 211-250.
- Baker, M. (2009). Capital Market-Driven Corporate Finance. *Annual Review of Financial Economics* 1, 181-205.
- Bancel, F. & U. R. Mittoo (2011). Financial flexibility and the impact of the global financial crisis: Evidence from France. *International Journal of Managerial Finance* 7:2, 179-216.
- Bastos, D. D., Nakamura, W. T., & L. F. C. Basso (2009). Determinant of capital structure of publicly-traded companies in Latin America: the role of institutional and macroeconomic factors. *Journal of international finance and economics* 9:3, 24-39.
- Bessler, W., Drobetz, W., Haller, R. & I. Meier (2013). The international zero-leverage phenomenon. *Journal of Corporate Finance* 23, 196-221.
- Bodie, Z., Kane, A. & A.J. Marcus (2011). *Investments and Portfolio Management*. New York: McGraw-Hill Inc.
- Bolton, P. & X. Feixas (2000). Equity, bonds, and bank debt: Capital structure and financial market equilibrium under asymmetric information. *Journal of Political Economy* 108:2, 324–351.
- Booth, L., Aivazian, V., Demirguc-Kunt, A. & V. Maksimovic (2001). Capital Structures in Developing Countries. *Journal of Finance* 56:1, 87-130.

- Brounen, D., de Jong, A. & K. Koedijk (2006). Capital Structure Policies in Europe: Survey Evidence. *Journal of Banking and Finance* 30:5, 1409-1442.
- Brunnermeier, M.K. (2009). Deciphering the Liquidity and Credit Crunch 2007-2008. *Journal of Economic Perspectives* 23:1, 77-100.
- Campello, M., Graham, J.R., & C.R. Harvey (2010). The Real Effects of Financial Constraints: Evidence from a Financial Crisis. *Journal of Financial Economics* 97:3, 470-487.
- Chari, C. & P. Kehoe (2008). Facts and Myths about the Financial Crisis of 2008. Federal Reserve Bank of Minnesota.
- Choe, H., Masulis, R., & V. Nanda (1993). Common stock offerings across the business cycle: Theory and evidence. *Journal of Empirical Finance* 1:1, 3-31.
- Cleary, W.S. (1999). The relationship between firm investment and financial status. *Journal of Finance* 54:2, 673-692.
- Dang, V.A. (2013). An empirical analysis of zero-leverage: New evidence from the UK. *International Review of Financial Analysis* 30, 189-202.
- De Haan, L. & J. Hinloopen (2003). Preference Hierarchies for Internal Finance, Bank Loans, Bond, and Share Issues: Evidence for Dutch Firms. *Journal of Empirical Finance* 10:5, 661-681.
- De Jong, A. (2002). The Disciplining Role of Leverage in Dutch Firms. *European Finance Review* 6:1, 31-62.
- De Jong, A., Rezaul, K. R. & T. Nguyen (2008). Capital Structure around the World: The Roles of Firm- and Country-Specific Determinants. *Journal of Banking and Finance* 32, 1954-1969.

- De Jong, A., Verbeek, M. & P. Verwijmeren (2012). Does financial flexibility reduce investment distortions? *Journal of Financial Research* 35:2, 243-259.
- DeAngelo, H & R. W. Masulis (1980). Optimal Capital Structure under Corporate and Personal Taxation. *Journal of Financial Economics* 8:1, 3-27.
- DeAngelo, H. & L. DeAngelo (2007). Capital structure, payout policy, and financial flexibility. *Working Paper, University of Southern California*.
- DeAngelo, H. & R. Roll (2015). How stable are corporate capital structures? *The Journal of Finance* 70:1, 373-418.
- DeAngelo, H., DeAngelo, L., & R.M. Stulz (2010). Seasoned Equity Offerings, Market Timing, and the Corporate Lifestyle. *Journal of Financial Economics* 95:3, 275-295.
- Degryse, H. A., Goeij, P. C. de, & P. Kappert (2012). The Impact of Firm and Industry Characteristics on Small Firms' Capital Structure. *Small Business Economics* 38:4, 431-447.
- Demiguc-Kunt, A. & V. Maksimovic (1995). Capital Structures in Developing Countries: Evidence from Ten Country Cases. *Policy Research Working Paper by the World Bank* 1320.
- Denis, D.J. & I. Osobov (2008). Why do firms pay dividends? International evidence on the determinants of dividend policy. *Journal of Financial Economics* 89, 62-82.
- Devos, E., Dhillon U. & M. Jagannathan (2012). Why are firms unlevered? *Journal of Corporate Finance* 18, 664-682.
- Duddley, E. (2012). Capital structure and large investments projects. *Journal of Corporate Finance* 18:3, 1168-1192.

- Fama, E.F. & K.R. French (2001). Disappearing dividends: changing firm characteristics or lower propensity to pay? *Journal of Applied Corporate Finance* 14:1, 67-79.
- Fan, J.P.H, Titman S. & G. Twite (2012). An International Comparison of Capital Structure and Debt Maturity Choices. *Journal Of Financial and Quantitative Analysis* 17, 403-417.
- Faulkender, M. & M. A. Petersen (2006). Does the Source of Capital Affect Capital Structure? *Review of Financial Studies* 19:1, 45-79.
- Frank, M. & V. K. Goyal (2008). Trade-off and Pecking Order Theories of Debt. *Handbook of Empirical Corporate Finance*, 135-197.
- Frank, M.Z. & V.K.Goyal (2003). Testing the Pecking Order Theory of Capital Structure. *Journal of Financial Economy* 67, 217-248.
- Gatchev, V. A., Spindt, P. A. & V. Tarhan (2008). How do firms finance their investmens?: The relative importance of equity issuance and debt contracting costs. *Journal of Corporata Finance* 15:2, 179-195.
- Gertler, M., & S. Gilchrist (1993). The role of credit market imperfections in the monetary transmission mechanism: Arguments and evidence. *The Scandinavian Journal of Economics* 95:1, 43-63.
- Graham, J. (2000). How big are the tax benefits of debt? *The Journal of Finance* 55, 1901-1941.
- Graham, R.J. & C.R. Harvey (2001). The theory and practice of corporate finance: evidence from the field. *Journal of Financial Economics* 60, 187-243.
- Harford, J., Klasa, S. & N. Walcott (2009). Do Firms Have Leverage Targets? Evidence from Acquisitions. *Journal of Financial Economics* 93, 1-14.

- Harris, M. & A. Raviv (1988). Corporate Control Contests and Capital Structure. *Journal of Financial Economics* 20, 203-35.
- Iona, A., Leonida, L., & A. Ozkan (2007). Determinants of financial conservatism: Evidence from low-leverage and cash-rich UK firms. *Working Paper, University of York*.
- Iqbal, A. & O. Kume (2014). Impact of financial crisis on firms' capital structure in UK, France, and Germany. *Multinational Finance Journal* 18:3/4, 249-280.
- Ivashina, V. & D. Scharfstein (2010). Bank Lending during the Financial Crisis of 2008. *Journal of Financial Economics* 97:3, 319-338.
- Kahle, K.M. & R.M. Stulz (2010). Financial Policies and the Financial Crisis: How Important was the Systemic Credit Contraction for Industrial Corporations. National bureau of Economic Research.
- Kim, M.K., & C. Wu (1988). Effects of inflation on capital structure. *The Financial Review* 23:2, 183-200.
- Korajczyk, R. A., Lucas, D., & R. L. McDonald (1990). *Asymmetric information, corporate finance and investment*. Chicago: NBER and University of Chicago Press. 257-278.
- Korajczyk, R.A. & A. Levi (2003). Capital Structure Choice: Macroeconomic Conditions and Financial Constraints. *Journal of Financial Economics* 68:1, 75-109.
- Korteweg, A. (2010). The net benefits to leverage. *The Journal of Finance* 65:6, 2137-2170.
- Kraus, A. & R.H. Litzenberger (1973). A state-preference model of optimal financial leverage. *The Journal of Finance* 28:4, 911-922.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & R. Vishny (2002). Investor Protection and Corporate Valuation. *Journal of Finance* 57:3, 1147-1170.

- Lang, L.E., Ofek, E. & R. Stulz (1996). Leverage, investment and firm growth. *Journal of Financial Economics* 40, 3-29.
- Lemmon, M. L., & J. F., Zender (2001). Looking under lamppost: An empirical examination of the determinants of capital structure. *Working Paper, University of Utah and University of Arizona*.
- Lucas, D. J. & R.L. McDonald (1990). Equity Issues and Stock Price Dynamics. *The Journal of Finance* 45:4, 1019-1043.
- Marchica, M.T. & R. Mura (2010). Financial flexibility, investments ability, and firm value: evidence from firms with spare debt capacity. *Financial Management* 39:4, 1339-1365.
- Margaritis, D. & M. Psillaki (2010). Capital structure, equity ownership and firm performance. *Journal of Banking & Finance* 34, 621-632.
- Meggison, W.L. (1997). *Corporate Finance Theory*. Massachusetts: Addison-Wesley.
- Miller, M. H. (1977). Debt and Taxes. *Journal of Finance* 32:2, 261-275.
- Minton, B.A. & K.H. Wruck (2001). Financial conservatism: evidence on capital structure from low leverage firms. Working Paper. Ohio State University.
- Modigliani, F. & M.H. Miller (1958). The cost of capital, corporation finance and the theory of investment. *The American Economic Review* 48:3, 261-297.
- Modigliani, F. & M.H. Miller (1963). Corporate Income Taxes and the Cost of Capital: A Correction. *American Economic Review* 53:3, 433-443.
- Mokhova, N. & M. Zinecker (2014). Macroeconomic factors and corporate capital structure. *Procedia – Social and Behavioral Sciences* 110, 530-540.
- Muradoglu, Y. G., & S., Sivaprasad (2012). Using firm-level leverage as an investment strategy. *Journal of Forecasting* 31:3, 260-279.

- Myers, S. (1977). Determinants of corporate borrowing. *Journal of Financial Economics* 5, 147-175.
- Myers, S. C. & N. S. Majluf (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics* 13, 187-221.
- Opler, T. & S. Titman (1994). Financial Distress and Corporate Performance. *Journal of Finance* 49:3, 1015-1040.
- Park, S. H., Suh, J. & B. Yeung (2013). Do multinational and domestic corporations differ in their leverage policies? *Journal of Corporate Finance* 20, 115-139.
- Rajan, R. & L. Zingales (1995). What Do We Know About Capital Structure? Some Evidence from International Data. *The Journal of Finance* 50:5, 1421-1460.
- Shyam-Sunder, L. & S.C. Myers (1999). Testing Static Tradeoff against Pecking Order Models of Capital Structure. *Journal of Financial Economics* 51, 219-244.
- Stiglitz, J.E. & A. Weiss (1981). Credit rationing in markets with imperfect information. *American Economic Review* 71:3, 393-410.
- Strebulaev, I.A. & B. Yang (2013). The mystery of zero-leverage firms. *Journal of Financial Economics* 109, 1-23.
- Titman, S. & R. Wessels (1988). The Determinants of Capital Structure Choice. *Journal of Finance* 43, 1-19.