“To what extent do macroeconomic conditions and firm characteristics affect zero-leverage decisions of firms?”

Abstract

This study contributes to the existing literature on capital structure. It addresses why some firms have no leverage in their capital structures despite the potential benefits of debt financing. While analyzing 978 US corporations over the period of 1962-2015 have we found that zero-leverage firms either have access to leverage financing, or not. We further observed in our sample that macro-economic sensitivity have a greater impact among financially unconstrained firms compared the constrained counterparts. Growth of financial intermediaries and government debt enhances the chance of a firm to neglect leverage financing. Finally did we also found new evidence that firms invest less after periods where government debt is high and that this observation is stronger among the unconstrained subsample.

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Master Thesis Financial Economics (16 EC)

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Date final version: 21-06-2017

Acknowledgements

I would like to thank Mr. Sjoerd van den Hauwe for his coaching and valuable suggestions during the writing process. Furthermore I would like to thank my parents and all my friends for their continuous help and support. Special thanks to Ismaïl Sardha, which offered a tremendous contribution by providing his voluntary consultation. Special thanks to Helen Widjaja; I dedicate my thesis to you.

Table of contents

1. Introduction

One of the most well-known unsolved problems in corporate finance is the fact that firms carry less debt than is predicted by dominant capital structure theories (e.g. Graham, 2000; Frank and Goyal, 2003). On debt conservatism has been documented that many firms appear to hold less debt than predicted than predicted by conventional capital structure theories (Graham, 2000), despite the potential tax advantage of debt financing (Strebulaev & Yang, 2013). Korteweg (2010) concludes in his research that corporations on average are underlevered relative to the optimal leverage ratio due to firms which hold zero-debt. He also shows that debt-free firms on average could increase their value by 5.50% if they lever themselves up to their optimal debt ratios.

It is known that firms have different motives for neglecting leverage financing. Some corporations are due to market frictions exposed to limited access in debt markets and therefore are financially constraint to finance positive NPV projects with leverage (Devos et al, 2012). We thus classify firms into financially constraint or unconstrained firms. However, following Dang (2013) are there two main reasons why firms purposely would eschew debt. Firms with high growth opportunities want to mitigate the conflicts of interest between debt and equity holders. These companies control through this way the "debt overhang" problem and the arising underinvestment incentives by *ex ante* obtaining no debt financing in their capital structure. In presence of market frictions such as adverse selections or transaction costs, firms might also maintain a zero-leverage strategy to save up their cash holdings in order to borrow for future investment opportunities during constrained periods.

Both financial constraint and strategic motives to eschew leverage financing may also arise from macro-economic conditions. Recently Graham, Leary and Roberts (2014 and 2015) have found that government debt and financial intermediation hold a greater sensitivity on aggregate leverage levels compared to conventional economic measures, like GDP growth and changes in term structure of interest rates. The competition effect between government and corporate debt is a potential mechanism which causes that fluctuations in the supply of government debt, a substitute for corporate debt, can shift the demand curve for corporate debt in a manner that affects equilibrium quantities (Graham, Leary and Roberts, 2015). Moreover do Graham, Leary and Roberts (2015) demonstrate that financial intermediaries - banks, insurance companies and pension funds - are an important factor in facilitating access to capital for corporations. These intermediaries are specialized in settling financial contracts

and therefore mitigate information asymmetry and agency costs which enhance corporate lending. Hence, by analyzing financial intermediaries we can measure the investors' willingness to hold corporate debt at different yields. A plausible explanation for the 'zero-leverage phenomenon' is that these economic forces explain the most puzzling part of zero-leverage behavior since they are the most important factors in comprehensive shifts of supply and demand in the corporate bond market.

Saving debt capacity during unconstrained periods can help firms to access debt markets better during constrained periods, resulting in higher firm investments (De Jong et al., 2012). Investment is an important feature of the ability from a firm to grow in the future and maintain or even grow their profitability and thereby their firm value. Thus, to prevent multiple interpretations from our analysis on why corporations neglect debt financing, do we strengthen it by also examining the relation between investments and capital structure.

Prior studies all over the world have investigated reasons why firms are unlevered (Minton and Wruck, 2001; Strebulaev and Yang; Devos et al, 2012; Bessler et al, 2013; Dang, 2013). During this thesis we try to fill the gap on what extend other macro-economic conditions influences a firm to remain debt-free by including financial intermediation and government debt into the analysis. These economic forces have not been studied with respect to zero-leverage firms. That is why we try to answer the following research questions:

"To what extent do macroeconomic conditions and firm characteristics affect zero-leverage decisions of firms? What is the accompanying effect on corporate investment policy?"

The outcome of this study can help managers, policy makers and other internal and external stakeholders from corporations to make better choices based on varying levels of the state of the economy with respect to optimal capital structure. Examining motivations for a firm to remain debt-free helps to assess whether conservative debt policy is a voluntary, value-reducing decision or whether it is driven by strategic motives (Devos et al, 2012; Dang, 2013). Finding these motivations to remain debt-free is particularly important since throughout the last decades, researchers found a significant upward trend in the percentage of zero-leverage firms.

The research starts with a literature review in order to combine previous literature on the 'zero-leverage phenomenon' and the accompanying effect on corporate investment policies. In chapter three follows the research methodology. This study continues in chapter four with at first the presentation of data description and descriptive statistics. The fifth

chapter presents the results from the sample mean analysis and regressions made. Our concluding remarks are in section six.

2. Literature Review

Despite the fact that the key of the research regarding evaluating both characteristics and motivations of zero debt firms is not completely new, we still try to evaluate and integrate all relevant studies into a new theoretical framework. This is done throughout this chapter.

2.1 Why do capital structure and the zero-leverage phenomenon matter?

But first we need to answer the question; why is it important to focus a complete study on zero-leverage firms. Most corporations hold less leverage than optimal in their capital structure (Graham, 2000). Potential investment and performance distortions may arise from the lack of debt financing, since firms are not able to invest in potential profitable projects without the essential leverage from intermediaries (Dang, 2013). Most conventional capital structure theories fail to explain why corporations on average hold less leverage than optimal with respect to firm value. Instead, conventional studies like the static trade-off and packing order theory predict that in the presence of market frictions usage of debt would be more beneficial due to either the tax deductibility of interest (Myers, 1977), or due to lower costs of asymmetric information compared to equity financing (Myers and Majluf, 1984).

None of the conventional capital structure theories pay attention to or even do not mention the zero-leverage phenomenon in specific, which is even more surprising. Therefore they fail to explain why many corporations completely neglect debt financing. This while Korteweg (2010) finds that firms on average are underlevered relative to the optimal capital structure due to zero-leverage firms. It creates a great omission in the literature because zero-leverage firms can help us to better understand the related 'low-leverage puzzle'. The omission in capital structure theory is also driven by the increasing number of zero-leverage firms which has been documented throughout the last decades. Nowadays zero-leverage firms account to about a quarter of all corporations within developed markets (Bessler et al, 2013). Leaving the zero-leverage phenomenon out of conventional theories generates a gap in understanding capital structure decisions of corporations.

Investigating the 'low-leverage puzzle' using zero-debt firms is also important since it will give advantages compared to capital structure theories. First of all is it often hard to identify what the optimal leverage level for a specific firm is since it requires a model to detect it (Devos et al, 2012). Moreover can a zero-debt sample also serve as a proxy for firms following a conservative debt policy. This holds as long as we can find evidence that these

companies do not experience any constraints, we may presume that they hold a conservative debt policy (Devos et al, 2012).

By focusing on zero-leverage firms, our aspiration is not to adore them. Instead, we know from previous studies that underlevered firms are less-likely to set up value decreasing overinvestments, because they have to be more self-disciplined and vigilant to exploit large and the most profitable investment opportunities with the limited funding resources they have (Barclay et al., 1995). Corporations are therefore more likely to exploit the available investments at their fullest (Lee & Moon, 2011). Like Warren Buffet declares; "Good business or investment decisions will produce quite satisfactory economic results with no aid from leverage" (Buffett, 1987, p.20). In addition do firms with both high unused debt capacities and high financial flexibility make higher future investments than firms who have been using up their full debt capacity (De Jong et al., 2012). Saving debt capacity and being debt conservative help to access debt markets better during constrained periods (De Jong et al., 2012).

2.2 Financial constraints

First we should ask ourselves whether firms face constraints on the debt market. After all is the amount of debt not only determined by the demand of firms for debt, but also by the their ability to raise funds externally at debt providers. When market imperfections are present as a result of asymmetric information or moral hazard, may some firms not be able to obtain sufficient leverage funding at the suppliers of debt to fund promising profitable projects (Dang, 2013). These credit restrictions will occur since lenders cannot provide debt because they are hampered in making good evaluations on either the firms quality, quality of its investments (Stigliz and Weiss, 1981), or because the lender has not build a good reputation and history on the debt market yet (Diamond, 1991). This will cause a large wedge between the costs of debt and alternative financing methods and eventually will provoke firms being rationed by lenders (Devos et al, 2012; Bessler et al, 2013).

Since constrained firms are fully aware of their position on the debt market are they more likely to use lease financing, to lack purchasing assets and to conserve more cash out of cash flows (Almeida et al., 2004; Benmelech and Bergman, 2009; Eisfeldt and Rampini, 2009). These firms only use debt financing when constraints relax, when large, profitable projects could not be funded throughout another manner or when firms are not willing to pay

the large wedge between the costs of external debt and other financing methods (Devos et al, 2012).

Thus when we examine the motivations for a firm to remain debt-free, we have to keep in mind that some firms are financially constrained and therefore do not have the choice to obtain debt financing (Bessler et al., 2013).[1] In particular, we hypothesize that some zero-leverage firms suffer from debt constraints and involuntarily maintain a zero-leverage policy. Financially unconstrained firms on the other hand have unlimited access to the debt market and therefore can freely choose between the different types of funding. In the case of debt-free firms, they voluntarily choose not to fund their investments with debt. Hence, zero-leverage firms should not be treated like a homogenous group and throughout the thesis firms are they either classified as financially constraint or unconstrained firms (Bessler et al, 2013).

According to the literature can we observe these classification based on a couple of firm characteristics. Hadlock and Pierce (2010) developed a financial constrained index that is based on firm size and age, the so-called SA-index. This index shows that financial constrains fall sharply as young and small firms start to mature and grow. Small firms in particular have a problem that little public information is known and the relative costs of collecting this information for the lender can be high. Furthermore have small firms less analyst coverage and therefore experience more information asymmetry and adverse selection problems Stiglitz and Weiss (1981). Large firms however, can attract leverage more easily since their ability to diversify their operations are larger and less hold generally less bankruptcy risk (Hovakimian & Titman, 2006). Young firms are relatively unknown to credit suppliers and therefore include a risk premium (Oliner and Rudebusch, 1992).

Following Dang (2013) we can use dividend policy as a good proxy to identify different levels of financial constraints at zero-leverage firms. Without interest and amortization payments, dividends are the method to transfer earnings of zero-leverage firms free cash flow to the stakeholders. Interest expenses will thus be replaced by dividends and share repurchases. However, when zero-leverage firms do not pay out dividends, it might indicate it is prone to problems and thus cannot obtain debt on the market (Bessler et al., 2013). Dang (2013) observed that non-dividend payers hold large negative profit margins and low cash flow ratios. Moreover Bessler et al (2013) also discovered that they are generally smaller and younger, holding large cash holdings and high growth prospects. These are all characteristics

[1] None of the firms in our sample are completely shut out of financial markets since they are all publically listed on the stock exchange. Therefore they are all able to access public capital markets. We use the terms constrained and unconstrained to denote a relative relation (Korajczyk and Levy, 2003)

which indicate that non-dividend payers are experiencing financial constraints. Thus hold these two separate groups different incentives to avoid debt.

Lastly are the KZ-index (Hadlock and Pierce, 2010) and the estimated probability of default model of Merton (1974) two other proxies to measure whether a firm is financially constrained. Nevertheless, Hadlock and Pierce (2010) show doubts on the validity of the KZ-index. This follows the statement of Bharath and Shumway (2008), who show that naïve estimators of financial constraints are good measures as well. Therefore we also chose to neglect the Merton (1974) model.

2.3 Traditional hypothesis

Although our main focus lies on finding alternative reasons why certain firms neglect debt financing, we also have to consider motives from conventional capital structure theories.

The first research done on capital structure was executed by Modigliani and Miller (M&M) (1958). They argued that the capital structure does not influence firm value because it only modifies the cash flow allocation between equity and debt and does not affect the value of the underlying assets. The model and conclusions of M&M (1958) were insightful, but only holds in perfect capital markets. Due to the existence of taxes, transaction costs, information asymmetry, costs of financial distress and agency problems is the perfect capital market assumption violated. Therefore two other capital structure models were constructed after M&M (1958), namely the static trade-off theory by Myers (1984) and the pecking order theory by Myers and Majluf (1984).

According to the static trade-off theory is capital structure determined by weighing out the benefits and costs of debt. Firms will eschew debt *ex ante* to minimize the costs of financial distress and attract leverage to maximize the benefits of debt, like tax shields, to end up with an optimal capital structure (Myers, 1984). Financial distress concerns are likely to be most relevant to firms with poor performance that struggle paying off their interest and debt obligations. Recent literature also pinpoint that firms may deviate from optimal leverage ratios. Some firms temporarily maintain no debt in their capital structures because of the presence of transaction costs (Leary and Roberts, 2005).

The pecking order theory however formulates a hierarchy between the three sources of funds to firms. Under asymmetric information managers know more about firm-value and future growth prospects than investors do. Therefore do investors place a discount on new security issues (Myers and Majluf, 1984). It creates agency costs between managers, debt and

equity investors. As a consequence firms will prefer to use securities that are less risky and less sensitive to mispricing. For these reasons are retained earnings preferred to debt financing and will equity be issued as a last resort. The pecking order theory hence predicts that profitable firms with large cash flows do not need to raise debt as they can use their internal funds to finance new investments (Dang, 2013).

When external financing is needed, managers can consider evaluating the conditions in both debt and equity markets and then decide which market looks most favorable (Baker and Wurgler, 2002). According to Graham and Harvey (2001) do managers continue to offer at least some support for the idea that firms tend to issue equity following a stock price run-up. Firms are also more likely to prefer equity over debt financing when the term structure of interest rates widens, leading to higher costs of debt. Besides this, managers can also decide to repurchase equity when stock prices are low. Overall does this so called market timing condition not cover a complete capital structure theory and is it mostly ignored during capital structure research. Therefore we will neglect the market timing theory among stocks during this thesis.

In accordance with the financial constraint hypothesis we expect that firms have two different motives to voluntarily eschew debt *ex ante* based on potential agency problems arising from debt. When firms hold highly beneficial and risky growth opportunities, equityholders have an incentive to undertake these risky projects because they can benefit from the upside potential. On the other hand bear creditors only the downside risk of lending out money. Therefore they do not benefit from firms undertaking these highly risky investments since they are aware of the generated increased risk of default. To mitigate this potential agency conflict between debt- and equityholders beforehand, companies can decide to avoid debt financing (Myers, 1977). This results to the underinvestment hypothesis, which predicts that unconstrained firms refuse to invest in low-risk assets in order not to maximize the wealth for debt holders. The underinvestment hypothesis thus predicts that firms have zero leverage for strategic reasons. They mitigate investments with too low profits to satisfy the desire of shareholders with high profits.

Following the survey taken by Graham and Harvey (2001) among 392 U.S. CFOs are most firms also concerned about their financial flexibility when issuing debt. As a result we also expect that some firms choose to accumulate cash to preserve their borrowing capacity for future investment opportunities (Dang, 2013). These firms are unconstrained because they strategically choose to have less or no leverage then optimal with respect to firm value. This

preference for financial flexibility takes place when market frictions such as adverse selection and transaction costs are present in the debt market (Leary and Roberts, 2005). At first firms will use debt conservatively in order to save their debt capacity for financing imperfectly anticipated investment opportunities later on. Therefore the financial flexibility hypothesis predicts that some unconstrained zero-leverage choose to build and maintain financial flexibility, rather than acquiring debt now and being constrained in the future (Dang, 2013).

The financial flexibility hypothesis aims for cash holdings as a tool to enhance investment flexibility. Although the underinvestment hypothesis does not predict a tool that enhances investment flexibility are both hypothesis useful. They lead to the prediction why unconstrained firms strategically and voluntarily choose not to obtain debt within their capital structure for a short period of time (Bessler et al, 2013). These firms will issue debt when profitable investments or favorable market conditions start to arise.

2.4 Why does economics matter in capital structure

The inability of conventional capital structure theories reflected in firm characteristics besides with financing biases to capture all shifts in leverage policies suggest that either capital structure theories are subjected to omitted variable bias. According to Graham, Leary and Roberts (2014) do macroeconomic factors capture changes in firms' propensities in leverage usage over time where firm characteristics and financing biases fail to explain them. We know that the economic cycle phase is an important determinant of default risk, which in turn determines the cost of raising capital (Cook and Tang, 2010). Cook and Tang (2010) also found that movements towards target leverage ratios are due to higher adjustment costs delayed during economic recessions. Corporations thus also have to consider general market conditions in their search for the optimal financing mix (Antoniou, Guney and Paudyal, 2008). Accordingly, we have to run an analysis with changing macroeconomic conditions since these conditions affect zero-leverage policies.

Gertler and Gilchrist (1993) demonstrate as one of the first researchers that firms facing financial constraints do not choose their capital structure in the same way as unconstrained firms during different states of the economy. Unconstrained firms can acquire debt during recessions in order to smooth the impact of lower operational results, while their constrained counterparts cannot afford to do so. Due to a proportionately larger premium on aggregate net debt issues can constrained firms not attract debt during recessions due monetary contraction (Gertler and Gilchrist, 1993). Unconstrained firms thus use their

financial flexibility buffer created in periods of economic expansions to finance the business with unused leverage in periods of monetary contraction. This is in line with the finding of De Jong et al. (2012), who document that US firms with high unused debt capacities save them for more constrained periods in the future, in order to make higher investments in the future than firms with less financial flexibility.

The financial constrained hypothesis is also compatible to the expectation that constrained firms are more sensitive to credit market frictions and market imperfections (Dang, 2013). On the other hand implies the static trade-off theory model that leverage is pro-cyclical related to economic growth. During economic expansions are equity markets booming, the expected bankruptcy costs low, are firms more likely to have higher taxable income to shield and is generally more free cash flows available (Cook and Tang, 2010; Korajczyk and Levy, 2003). Furthermore should debt providers be less reluctant to provide debt on the market. We expect that this only takes place at firms who encounter financial constraints and therefore acquire more debt at times the economy grows.

Levy (2001) also suggests that macroeconomic variables explain counter-cyclical leverage patterns for unconstrained firms. He develops an agency model in which the optimal amount of debt is increased to realign managers' incentives with those of shareholders in recessions. This only happens to the unconstrained firms, since constrained firms do not have the flexibility to attract the extra leverage on the market during economic recessions.

We thus expect that unconstrained firms contain a counter-cyclical zero-leverage policy with respect to real GDP growth rate and that constrained firms have a pro-cyclical zero-leverage policy relative to GDP growth rate. We also predict unconstrained firms to be more sensitive to variations in macroeconomic conditions than the constrained sample since unconstrained firms can deviate from their target capital structure in order to time their issues to periods when market conditions like the relative pricing of securities issued are more favorable (Korajczyk and Levy, 2003).

We also foresee that inflation has a negative relationship on zero-leverage firms. Inflation devalues the nominal value of outstanding debt. During times when expected inflation rate is high, is it more beneficial to obtain more leverage since the future value of the loan will be relatively lower to today (Djankov, McLiesh and Shleifer, 2007). Although literature mostly find mixed results between inflation and debt markets, we still have to correct our results for inflation due to the long sample period of our analysis.

We expect an inverse relationship between the term structure of interest rates and the level of leverage outstanding (Antoniou et al, 2008). At times when long-term interest rates

are expected to rise, firms are less likely to choose debt financing due to the increased cost of debt compared to other ways of financing. This will also imply that we foresee an inverse relationship between zero-leverage policies and the term-structure of interest rates. We thus foresee when the wedge between long and short-term interest rates widens an decrease of firms with leverage outstanding all else held equal.

2.5 Government bonds + Financial Intermediaries

2.5.1 Government bonds

Graham et al. (2014 and 2015) has shown in recent research that government borrowing have significant effects on corporate financing decisions over the past century. Aggregate corporate debt equilibrium is accomplished by a negative relationship between Treasuries and corporate debt expressed in imperfect inelastic demand and supply curves between the two bond types. Government debt is an unique asset class since they hold lower risk and have higher liquidity compared to all other securities Krishnamurthy and Vissing-Jorgenson (KVJ) (2012). Greenwood, Hanson and Stein (2010) suggest that large, safe nonfinancial corporations act as liquidity providers in credit markets by supplying relatively safe securities when alternatives, like Treasuries, are in short supply. This causes that corporate bonds are imperfect substitutes of Treasuries.

By necessity undertake most investors investments that hold the lowest asset risk.[2] This is the reason why their preference for investments in Treasuries and alternatively at safe securities. The unique features causes that investors absorb an increase in the supply of Treasuries, by holding a larger fraction of their wealth in Treasuries. Increasing supplies of government deficit financing therefore crowds out other types of financing by investors (Friedman, 1986). This crowding out effect is more robust for closer substitutes (safe corporate debt) than for poor substitutes (risky corporate debt and corporate equity) (Graham et al., 2014 and 2015). Instruments like risky debt or equity thus depend on the relative substitutability between different securities in investors' portfolios, hence not on safe corporate bonds.

Because of the crowding out effect between government and corporate bonds and the

[2] Financial intermediaries are the most dominant investors on the bond market (KVJ, 2012). Because of regulation and their business model, they must make investments that hold the lowest asset risk. Treasuries hold among all asset classes the lowest risk. Moreover do some investors need Treasuries in order to maintain the optimal portfolio mix between risk and return. Lastly has excess demand by intermediaries for safe assets been increasing over time (KVJ, 2012).

unique characteristics of Treasuries to investors, are supplies of corporate bonds inversely related. KVJ (2012) find that government borrowing affects Treasury-corporate yield spreads by altering the premium investors are willing to pay to hold safe and liquid assets. Besides this does Friedman (1986) predict that government debt issuances increase the cost of corporate debt relative to equity. Moreover mentions McDonald (1983) that increases in the supply of government debt supply must be absorbed by investors who are less willing to hold corporate debt, forcing an increase in corporate debt yields and as a result a decline in corporate debt issuance.

In line with this theoretical reasoning do we expect during times of increasing Treasuries supplies, more firms respond by eschewing debt financing. This adverse relationship should also hold for zero-leverage firms since they are more exposed to market frictions (Devos et al., 2012). Increasing government debt issuances causes an increasing wedge between the costs of external debt and alternative financing which zero-leverage firms are not willing to bear in combination with the high costs of credit lines (Campello et al, 2010). Furthermore do we expect this effect, due to the substitutability previously discussed, to be more significant for unconstrained firms than for their constrained counterparts. Safe unconstrained firms are closer substitutes to Treasury bonds than their risky constrained counterparts.

We also foresee those firms that already have been acquired public rated debt in the past, will have easier access to debt markets. We expect lenders not only willing to accommodate more leverage, but also that these levered firms have access to cheaper sources of debt capital compared to their unlevered counterparts (Fauklander and Petersen, 2006).

Variation in the supply of government debt and the "accompanying" price effect ultimately impact corporate policies (Graham, Leary and Roberts, 2014; Graham, Leary and Roberts, 2015). Because of financial market segmentation between debt and equity markets has little evidence found that firms substitute into alternative sources of external funding for their investments (Graham, Leary and Roberts, 2014). Although larger, more credit-worthy firms are more sensitive to variation in government debt in their debt and leverage policies, we do expect that the overall sensitivity among zero-leverage firms will be larger.

Lastly, when not incorporating the correct control variables, endogeneity can occur. Graham, Leary and Roberts (2015) state that increases in the supply of Treasuries tend to occur during economic downturns when firm investment opportunities are poor and their need for external capital falls. Therefore, when investigating the effects of government debt on capital structure, we must include the GDP growth rate in the model.

2.5.2 Financial Intermediation

Domestic financial intermediaries are responsible for a large share of Treasury and corporate bonds investments in the bond market (Graham, Leary and Roberts, 2014). According to Booth et al. (2001) do domestic financial intermediaries encourage the use of corporate debt. Graham, Leary and Roberts (2015) further elaborate that the financial intermediaries help to facilitate access to capital by decreasing information asymmetry, transaction and agency costs. Following this theory, we would expect that the usage of corporate debt, hereby also the likelihood of firms neglecting leverage, would increase when output from financial markets is high. When these intermediaries are less willing to lend out their capital to corporations, can they ask a higher rate of return, which forces firms to seek for other ways of financing firm investments.

Financial intermediaries are known that they substitute between lending to corporations and lending to governments, when supplies of Treasuries vary over time (Graham, Leary and Roberts, 2014). According to Bernanke et al. (2011) and Graham, Leary and Roberts (2014) they only fill their demand for safe assets with safe corporate debt when Treasury supply is not sufficiently available.

2.6 Investments

In order to reveal what genuinely influences zero-leverage decisions, we must strengthen our analysis by examining the relation between investments and capital structure. We could interpret previous relations in multiple ways, if we do not incorporate this relation (Dang, 2013).

If a zero-leverage policy is mainly driven by a firms' strategic decision to mitigate investment distortions rather than by financial constraints, then, following a period of applying such a conservative debt policy the firms' ability to invest should be enhanced (Dang, 2013). According to the financial flexibility hypothesis, do firms become debt-free in order to save their leverage capacity to diminish future investment distortions. In other words do these firms prepare for large capital expenditures by hoarding cash and temporarily avoid leverage financing (Bessler et al, 2013). Those future investments are more likely to be financed by the issuance of debt (Marchica and Mura, 2010).

When we follow the liquidity providers hypothesis however, we support the idea that unconstrained firms act to investors as liquidity providers by supplying safe debt securities when there is a shortage of Treasury supplies (Graham, Leary and Roberts, 2014). Graham,

Leary and Roberts (2014) found in an extensive study that increases in government borrowing are accompanied with a price decrease of liquid assets relative to illiquid assets. This results in a decline in firms' opportunity cost of holding liquid assets and increases their cost of debt to capital. Finally, firms respond by reducing purchases of illiquid assets (investments) selling liquid assets (debt) and increasing their holdings of liquid asset holdings (Treasuries). The liquidity providers hypothesis can therefore also influence firms' likelihood of neglecting leverage, resulting in less investments (Greenwood, Hanson and Stein, 2010). Although we foresee unconstrained firms to be more sensitive to variation in government debt in their debt and leverage policies, we do expect that the overall sensitivity among zero-leverage firms will be larger because they are more subjected to credit restrictions than leveraged firms (Bessler et al, 2013).

3. Research Method:

This chapter discusses the research method. We also present the hypotheses and the methodology used to test various hypotheses in order to answer the research question. Definitions of all variables used during the thesis are provided in appendix A.

3.1 Methodology

3.1.1 Sample mean analysis

The main research question focuses on why firms hold zero-debt or low leverage levels in their capital structure. Following the literature we define a firm year as zero-leverage (ZL) if the firm does not have any short-term (DLC) and long-term debt (DLTT) for at least two consecutive years ending that year (Devos et al, 2012 ; Bessler et al, 2013). When a firm has at least two debt-free years, it lowers the chance of a certain zero debt observation is nothing more than an occasional period of no debt and show that the conservative debt policy is persistent. (Devos et al, 2012). Day-to-day liability arrangements like accounts payable are not considered as debt in our analysis, since we are only interested in active capital structure choices of firms (Strebulaev and Yang, 2013).

We start our empirical analysis by examining whether firm characteristics of zero-leverage firms differ significantly from leverage firms. We do so by dividing these corporations into levered and zero-levered firms, whereby we compare their sample means for various firm characteristics by using the test statistic derived from Strebulaev and Yang (2013) and Dang (2013):

$$[\ t = \frac{\bar{Y}_{ZL} - \bar{Y}_{ref}}{SE(\bar{Y}_{ZL} - \bar{Y}_{ref})}\ ] \quad (1).$$

Zero-leverage firms who encounter financial constraints are not able or face more difficulties to acquire debt funding since they have not developed a reputation in the debt market. This might influence zero-leverage policies. Unlevered firms are according to the literature nonhomogeneous (Bessler et al, 2013). Particularly when observing dividend payout ratios, firm age and size are some firms according to the literature more likely to suffer from high informational costs when attracting debt. We thus expect to observe that zero-leverage firms are on average younger, smaller and paying out less dividend than their leveraged counterparts. When we observe these characteristics at zero-leverage firms we cannot reject the following hypothesis:

Hypothesis 1: We expect that a significant amount of zero-leverage firms do not have access to the public bond market since they are financially constraint.

In order to detect whether our expectation of non-homogenous restricted and unrestricted unlevered corporations is correct, do we have to divide the sample based on both financial constraints and leverage policy (Dang, 2013; Hadlock and Pierce, 2010). When the dividend payout ratio of a firm year is equal to zero we perceive the firm for that firm year to be constrained. Firms with a payout ratio larger than zero are considered to be unconstrained. The Size-Age index[3] (SA-index) is used as a second robust proxy for dividing corporations based on financial constraints.

Usually do unconstrained firms with risky growth opportunities preserve their debt capacity for future investments by disregarding debt and saving cash. High-growth firms are likely to have low or even neglect leverage to mitigate potential agency problems, resulting in underinvestment incentives (Myers, 1977). We thus expect agency costs of the debt overhang problem to be higher when growth options of firms are containing high potential growth value (Myers, 1977). Therefore we follow Dang (2013), who uses growth opportunities to test the underinvestment hypothesis.

Hypothesis 2a: We expect that high growth firms deliberately imply a zero-leverage policy in order to mitigate underinvestment incentives and *ex ante* diminish potential agency costs arising from debt.

Second, high growth firms could also voluntarily eschew or use little debt *ex ante* in order to stay financially flexible for future investment opportunities. In the presence of market frictions could these firms save their borrowing capacity for future investments, while accumulating cash.

Hypothesis 2b: We expect that firms deliberately imply a zero-leverage policy in order to build and preserve financial flexibility for future investments.

[3] SA-Index index used to divide the sample into constrained and unconstrained firms. SA-index is computed as (-0,737*Size) + (0,043*Size^2) – (0,040*Age), where *Age* is measures as the number of years the firm is publically listed and *Size* equals the log of total assets. Firms are sorted into quintiles based on the yearly average and firms are considered as constrained when they are within the lowest two quintiles (Bessler et al, 2013).

In order not to reject the flexibility hypothesis do we have to find firms with high growth opportunities and cash holdings voluntarily hold zero-leverage policies (Dang, 2013). The underinvestment and financial flexibility hypothesis thus justify why firms potentially strategically could eschew debt *ex ante.* Based on the sample mean analysis we expect to observe the first evidence for hypotheses 1, 2A and 2B.

We refer to appendix A for the complete explanation for the construction of cash holding, dividend payout ratio, firm age, firm size, growth opportunities and investments, which are all computed by equation (1). Based on the accompanying literature, we add in addition to the mentioned variables the following control variables into equation (1); tangibility, cash flows, non-debt tax shields, profitability, the book (BL) and market leverage ratio (ML). Corporations who have few tangible assets in possession tend to be significantly more likely to be underlevered due to the asset substitution effect (Jensen & Meckling, 1976). Tangibility is another proxy for financial constraints, as firms with low tangible assets do not have high collateral value (Dang, 2013). This means that firms without many tangible assets cannot enhance the ability to obtain credit. In line with the pecking order theory are internal financing resources from internal cash flows preferred to debt financing. Profitable firms with large cash flows therefore do not have the urge to raise debt since they can finance their investments internally (Frank and Goyal, 2009). Due to the potential substitutability between debt and non-debt tax shields are firms with high non-debt tax shields less likely to use debt (Dang, 2013). Book and market leverage ratios are also examined with equation (1), to observe whether leverage patterns differ significantly within the different groups of firms. Z-score and earnings volatility are mentioned in literature, but will not be used due to unimportant movements in magnitude with respect to zero-leverage decisions registered by Dang (2013).

Graham, Leary and Roberts (2015) however, have observed that firm characteristics obtain limited power to explain trends in capital structure over time. In the subsequent section we add economic measures to the previous discussed firm-level characteristics. Many researchers however did conclude that firm characteristics should justify trends in capital structure. In order to prevent omitted variable bias we still add them into our analysis.

3.1.2 Logistic analysis

Subsequently to the sample mean analysis, we conduct following Dang (2013) a multivariate logistic regression analysis in order to examine both firm-specific and macroeconomic factors

in the determination of a firms' propensity to have zero leverage. Logistic model (2) is being used in order to find further evidence for hypotheses 1 up to and including 4:

$$\Pr(ZL_{it} = 1 \mid X_{it,} Z_t) = \frac{1}{1+ \text{e} \wedge -(Logit)} = \frac{1}{1+ \text{e} \wedge -(\text{a} + \beta * \text{Xit} + \gamma * \text{Zt} + \Sigma\delta * \text{Industryi})}. \quad (2)$$

Hereby is *ZL* taking the binary variable value of 1 if the firm has zero-leverage for two consecutive years in a given year and 0 otherwise. Furthermore is X a vector of the firm specific variables and Z for the macro-economic characteristics who determine the zero-leverage decision in the logistic regression. β and γ are the vectors of the firm-specific coefficients and macro-economic characteristics, while α is a constant. In addition stands *i* for the individual firm and *t* for the corresponding year. Industry fixed effects dummies are included as $\Sigma\delta * \text{Industry}$ and is explained in subsequent parts. Model (2) is non-linear since the dependent variable only can take a binary value of 0 or 1.

The betas and gammas do not hold much explanatory value since their results can only be interpreted through its sign. We therefore choose only to report the average marginal effects (AME) for all regressions based on model (2). This method computes the average of discrete or partial changes for each data point of the probability for switching one unit of change in the predictor variable, yielding average marginal effects. The computation will be performed over one independent variable at the same time, while holding other variables constant at their means until for all the variables AME are calculated (Bartus, 2005; Dang 2013). Furthermore is AME as a measure not effected by uncorrelated, unobserved heterogeneity. Altogether, do AME have a more intuitive interpretation and tangible effects than betas, since it is possible to compare the magnitudes between different characteristics within the same model. Moreover does the usage of AME also allow us to compare results from different models and thereby results from the literature. Each average marginal effect is backed-up by its related standard error and its level of significance.[4] Due to the consistency and normal distribution in our large sample are t-statistics constructed for each AME, just like in ordinary regressions. For the sake of completeness is the AME formula given at equation (3):

$$\text{AME} = \frac{1}{n} \sum_{i=1}^{n} \frac{\delta E[ZL_{it}=1 \mid x_{it}, zt]}{\delta[x_{it}, z_t]} \quad (3)$$

where δ represents the partial derivative and n for the population. Standard errors are for all logistic regressions from equation (2) clustered at firm level, to take individual firm-level

[4] The level of significance are given for $p<0.01$; $0.01<p<0.05$ and $p<0.10$

factors into account, which could influence the capital structure decision making process of companies (Strebulaev and Yang, 2013; Dang, 2013). These reported standard errors are relevant since they adjust for the correlation among individual firms across several years. We believe that this is evident to exist in our sample due to the presence of unobservable random firm-level determinants of the firms' propensity of having zero-leverage. This correction will lead to larger standard errors at firm specific characteristics. Because of this correction will the interpretation be more robust since the significance levels of AME become more valid to its genuine significance.

We describe the variables of the multivariate logit model from equation (2) based on equation (4), which is an alternative manner of displaying equation (2). We include nine conventional firm specific characteristics in X, six economic characteristics in Z and fixed effect industry dummies. Firm specific and macro-economic characteristics are split up in different vectors since macro-economic depend only on year-level basis. This while firm-characteristics as well rely on firm-level basis.

$$\text{Logit} = \alpha + \beta*(\text{conventional firm specific characteristics})_{it} + \gamma*(\text{economic characteristics})_{t} + \Sigma\delta*\text{Industry}_{i} \quad (4)$$

$$= \alpha + \beta_1*X_{1it} + \beta_2*X_{2it} + \ldots + \beta_{10}*X_{9it} + \gamma_1*Z_{1t} + \ldots + \gamma_6*Z_{6t} + \Sigma\delta*\text{Industry}_{i} \quad (4)$$

In addition to the coefficients who test the validity of various hypotheses do we add at each stage control variables, so that we will not encounter omitted variable bias in regression (4). At first, we only regress these control variables which are, the non-debt tax shield, cash flows and tangibility. These are already described with their reasoning in section 3.1.1. According to Dang (2013) are zero-leverage firms concentrated in certain industries due to industry specific features, like investments that had to be made for specialized industry-specific products (Bessler et al, 2013). Due to the coherence of zero-leverage firms in certain industries are industry dummies included into every logistic regression. The industry dummies are assigned according to the Fama and French (1997) 12-industry classification and are given in Appendix B. These are included as industry fixed effects. Furthermore holds corporate debt conservatism persistence over time, which we will offset by adding a dummy variable into the logit regression. This previous zero-leverage decision dummy holds 1 when a firm had zero-leverage in the previous year and 0 if otherwise (Dang, 2013; Bessler et al, 2013).

As with the sample mean analysis do we include firm size and age in the analysis by adding them as regression coefficients into equation (4). Furthermore we still have to add the dividend payout ratio as a separate coefficient, to further control for firm constraints (Dang, 2013). To evaluate the robustness of hypotheses 2A and 2B, we include growth opportunities and cash holdings in a subsequent regression. Based on leverage policies and firm-level constraints we expect to detect for unconstrained firms a reverse relationship between growth opportunities, cash holdings and zero-leverage policies when we examine the logistic regression estimators. Next to the full sample analysis do we split the sample into dividend payers and non-dividend payers in order to control for and investigate non-homogenous effects due to financial constraints.

In a subsequent regression, we first add four economic variables into equation (4). These are the term structure of interest, inflation, BAA-AAA yield spread and the real GDP growth rate. We incorporate the BAA-AAA corporate bond yield spread to proxy for low and high credit-quality corporate debt. Graham Leary and Roberts (2014) find greater sensitivity of corporate policies to among more credit-worthy firms compared to less credit worthy firms. Moreover tends the BAA-AAA credit spread also to widen in bad times, followed by periods of high government debt. Since inflation devalues the nominal value of outstanding debt, we foresee a negative relationship on the propensity of zero-leverage firms and inflation (Djankov, McLiesh and Shleifer, 2007). Hence, we must correct our results for inflation in our analysis, certainly due to the long sample period. Lastly, when term structure of interest rates widens do firms also tend to eschew debt due to the higher cost of debt (Dang, 2013). This inverse relation between term structure of interest rates and leverage may also be affected by shareholders who provoke wealth-maximizing funding for the capital structure at companies. When long-term interest rates are high, firms are unwilling to raise debt capital and therefore prefer equity to debt when the term structure widens. This is why we should add the term structure of interest when conducting our analysis whether zero-leverage is affected by the state of the economy. The term structure will be measured by the difference between the 10 year USA government bonds and the interest rate on three-month Treasury-bills yield. We use this spread since the data is available for our complete sample, unlike other term structure spreads like the 20 year bond Treasury bills spread.

Equity premium, measured as the difference between the annual return on the stock market and the return on the three-month Treasury bills, is an alternative to the term structure since it also measures the cost of leverage financing, but then relative to equity financing.

However, a high premium may also be caused by overconfidence among investors. This generally create ambiguous results when evaluating equity premiums on firms' propensities to be unlevered (Antoniou et al., 2008; Dang, 2013). Thus, we select term structure of interest rates as our measure for the relative cost of leverage over time.

Economic cyclicality is estimated by analyzing the real GDP growth rate over a period. Dang (2013) has found that the real GDP growth rate have significant effects on the tendency of corporations to become debt-free. Firms are able to voluntarily retain their debt capacity if it enables to gain market share in economic downturns by competing more fiercely with their levered rivals and inducing them to exit the market (Devos et al, 2012). When GDP growth declines we expect the unconstrained firms will choose to lever up. Due to a proportionately larger premium on aggregate net debt issues can constrained firms not attract debt during economic downturns due monetary contraction (Gertler and Gilchrist, 1993).

Hypothesis 3: We expect to discover pro-cyclical leverage patterns for constrained firms and counter-cyclical leverage patterns for unconstrained firms relative to economic growth rates. We foresee also that this implies for zero-leverage policies.

Finally we add government debt and financial intermediation into equation (4). Financial intermediation is measured by the financial sector output from business credit along with equity. This measure acquired by Philippon (2015), which consists of intermediated assets, debt and equities issuances nonfinancial firms. According to Graham, Leary and Roberts (2015) is it a good proxy to measure the output and growth of the financial sector. Furthermore, due to measurement problems caused by trading profits and a wide range of fees of the financial sector charged to the non-financial sector is it hard to define another proxy for financial intermediation.

We predict that a firms' propensity to have zero-leverage decreases for both constrained and unconstrained firms when the financial sector output increases. When this occurs we expect firms to fund a larger fraction of their investments with debt due to a decrease in information asymmetry problems and agency costs between the financial along with the non-financial sector (Graham, Leary and Roberts, 2015). Hence, the possibility that firms deliberately will choose not to obtain debt financing can be affected by this relationship.

An increase in governmental debt makes it more likely that non-financial firms deliberately choose not to attract debt due to factors like the crowding out effect on corporate

bonds. Governmental debt is measured by taking the ratio between federal debt outstanding and the real gross domestic product of that year (Graham, Leary and Roberts, 2015). Federal debt represents the majority of the total governmental debt. It includes the holdings from the monetary authority and it excludes intergovernmental holdings to avoid adding US Treasuries held by other governmental entities (Graham, Leary and Roberts, 2014). Since we expect the crowding out effect to be more pronounced at closer substitutes for government debt, do we foresee unconstrained firms to react more on this crowding out effect than constrained firms (Graham, Leary and Roberts, 2014).

In order to test whether governmental debt and financial intermediation are more pronounced for unconstrained then for constrained firms, we have to divide constrained and unconstrained firms into different regressions. From the logistic analysis are we able to evaluate the significant levels and magnitude of the estimators from these characteristics for both groups, in order to determine whether we will reject the following hypothesis:

Hypothesis 4: Government debt and financial intermediation do affect firms' zero-leverage decision. Furthermore we also foresee that this effect is more pronounced for unconstrained then for constrained zero-leverage firms.

The significance level of all marginal effects are going to be tested by measuring its' given p-value during the various logistic multivariate analysis. Compared to the sample mean analysis does the logistic regression analysis add the possibility to test joint hypothesis between various models and hypothesis (Stock and Watson, 2012, p.263). Hereby is McFadden's Adjusted Pseudo *R*-squared has been widely used to evaluate the goodness-of-fit of binary logit models. This measure compares the likelihood of the intercept of the model to the likelihood for the model with the predictions, while adjusting for the number of predictions (Stock and Watson, 2012, p.440). It can vary between 0 and 1, whereby values that range from 0.2 and 0.5 are usually described as good fits, although values closer to 1 are better. We use this measure of fit since normal *R*-squared statistics are only applicable for linear regressions.

DeAngelo and Roll's (2012) and Bessler et al (2013) observe sharp increases in the number of zero-leverage firms over time. These are mainly driven by IPO waves. During these waves young growth firms had little or no debt when initiating an IPO when they became public. If the IPO had been completed successfully, would these firms immediately be included within our sample resulting in an increase of zero-debt firms. For this reason we

should actually include a time varying constant factor or time dummies to adjust for time specific shifts in the firms propensity to have zero-debt. However, if sharp increases over time are mainly driven by IPO waves, is the firms propensity to be zero-levered already offset by the firm age and size coefficients. Adding time dummies would therefore either lead to indifferent regression results, or to multicollinearity among coefficients. The latter case would affect the degree of accuracy of the results. The first case is in line with Dang (2013), who find that determinants of firms' zero-leverage decisions did not change when he adds time dummies in his multivariate analysis. This while he already had corrected his regression with size and age. The assertion that firm size and age are highly correlated with time will be proven in by a separate analysis in section 4.3. Hence do we not include a time varying constant or time dummies into equation (4).

3.1.3 Logistic robust tests

Several additional tests are conducted to evaluate the robustness of the empirical findings. As earlier described our main goal of this thesis is to check whether we can find new evidence on factors which potentially can influence the low leverage puzzle. By adding robust regressions to further investigate the low leverage puzzle, we can extend our external validity of our analysis (Strebulaev and Yang, 2013). We do so by defining firms which we call almost zero-leverage firms, if it holds a book (AZL) or market-leverage ratio (AZLM) of less than 5% for at least two firm years in a row. On these firms we reproduce the logistic regressions with equation (2) and (4) by replacing ZL with AZL and AZLM as dependent variables in order create a more robust analysis on conservative capital ratios. The book ratio is determined as the ratio of the value of leverage over total assets, while the market leverage ratio is determined by the ratio of leverage over leverage and multiplication of the fiscal year end numbers of shares outstanding by the fiscal year-end total share price (Strebulaev and Yang, 2013).

Hadlock and Pierce (2010) suggest that size and age are also effective predictors for firms' financial constraints in the combined SA-index. In order to ascertain that our findings are robust, we parallel the analysis of the logit regression from model (2) and (4) once more by altering the financial constraint proxy based on the SA-index. Firms in the upper three quintiles are considered as unconstrained and firms in the lower two quintiles as constrained (Bessler et al, 2013). Since the distribution of constrained and unconstrained firms changes do we re execute the sample mean analysis of equation, with (1).

3.2 Investments

Minton and Wruck (2001) show that firms with conservative debt policies increase leverage when they face lower internal funds and higher investments. De Jong et al. (2012) conclude that some firms wait with attracting leverage in order to save debt capacity for more constrained periods. According to him, firms will use their debt capacity in order to continue investing during these periods. Graham, Leary and Roberts (2014 and 2015) also mention that investments and leverage are related to each other, by linking it with the crowding out effect of government debt and private investments. Deficits can affect financing activities of corporations. As pre assumed, if a zero-leverage policy is justified by strategic motivations, investments in following periods should be enhanced. In order to thus reveal what genuinely influences conservative leverage decisions, we must strengthen our analysis by examining the following two hypotheses on the relation between investments and capital structure:

Hypothesis 5a: We expect the firms' ability to invest should be enhanced in the following periods if the zero-leverage policy of corporations is driven by a strategic decision to mitigate investment distortions.

Hypothesis 5b: We expect that firms invest less after periods where government debt is high. As a consequence we foresee less need for debt financing under unconstrained firms.

In order to test these hypotheses, we use the following model of investment from Dang (2013) and Marchica and Mura (2010):

$$\text{Investment}_{i,t} = \alpha + \zeta*\text{Investment}_{i,t-1} + \beta_{ZL}*D_{ZL}*\text{Cashflow}_{i,t-1} + \beta_{L}*D_{L}*\text{Cashflow}_{i,t-1} + \gamma_{ZL}*D_{ZL}*Q_{i,t} + \gamma_{L}*D_{L}*Q_{i,t} + \delta_{ZL}*D_{ZL}*\text{Government debt}_{t-1} + \delta_{L}*D_{L}*\text{Government debt}_{t-1} + \eta_{i} + \varepsilon_{i,t} \quad (5)$$

Investment in model (5) represents the capital expenditures divided by total assets. Investment is also included as a one period lagged independent variable, which are offset for persistency of investments, compared to the previous year. Cashflow is defined by the ratio of the net income plus depreciation, amortization expense and change in deferred taxation, divided by the total assets. This stands for the internal funds raised from the previous period. Furthermore, the symbol Q stands for Tobins' Q, which proxies the impact of future growth opportunities on investments. Q is calculated by taking the ratio of the market value of equity and the book value of debt by total assets. Additionally, government debt stands for the ratio of federal debt outstanding divided by the gross (nominal) domestic product. Investments and

Tobins' Q are regressed at year t, while cash flows and government debt are lagged by one year *t*. In addition are cash flows, Tobins' Q and the lagged investment independent variable observed on individual firm level-basis *i*. Moreover does D_L (D_{ZL}) stand for a dummy taking the value of 1 if the firm has positive (zero) leverage in year *t* and 0 otherwise. Within model (5) does ε_{it} stands for the disturbance term assumed to be serially uncorrelated with error mean of the model, which is equal to zero. If however correlation occurs can the predicted estimators be unbiased and inconsistent. The role and strength of factors influencing firms can yet vary due unobserved firm specific factors. Therefore disturbance terms η_i is added, which represent the fixed firm-specific effects.

The panel nature of the data and the presence of lags in the independent variables, set the estimated model as a dynamic panel regression. However, η_i makes it the case that model (5) is a dynamic fixed effect model since it could be the that firm specific characteristics are omitted (Baltagi, 2008). It is possible that these omitted variables are correlated with the regressed explanatory variables. As a result then, we will choose to control for these factors by adding an additional disturbance term into model (5). This is why we prefer to regress it as a fixed effect over the alternative random effect model without a fixed effect disturbance term. Since most independent variables are lagged by one period and therefore potentially are correlated with the firm-specific error term $\eta_{i,}$ we are not able to regress model (5) with OLS.

To tackle this bias we apply the so-called Generalized Method of Moments (GMM) procedure developed by Arellano and Bond (1991). Their "difference GMM-method" produces first-differences in order to eliminate the fixed individual effect $\eta_{i,}$ since it does not vary in time. This method utilizes lagged values for all independent variables as instruments, instead of the exogenous variables in an OLS two-stage least squares procedure. We regress our GMM regressions with the two-step estimation procedure, whereby the standard covariance matrix is robust to panel-specific autocorrelation and heteroscedasticity. However, standard errors probably risk to be downward biased. This however, is simply adjusted for by adding robust standard errors into the regression, which we will do. Following this "two-step difference GMM-method," will equation (5) be transformed into equations (6.1) and (6.2):

$$\text{Investment}_{i,t} - \text{Investment}_{i,t-1} = \zeta*(\text{Investment}_{i,t-1} - \text{Investment}_{i,t-2}) \ \beta_{ZL}*D_{ZL}*(\text{Cashflow}_{i,t-1} - \text{Cashflow}_{i,t-2}) + \beta_L*D_L*(\text{Cashflow}_{i,t-1} - \text{Cashflow}_{i,t-2}) + \gamma_{ZL}*D_{ZL}*(Q_{i,t} - Q_{i,t-1}) + \gamma_L*D_L*(Q_{i,t} - Q_{i,t-1}) + \delta_{ZL}*D_{ZL}*(\text{Government debt}_{t-1} - \text{Government debt}_{t-2}) + \delta_L*D_L*(\text{Government debt}_{t-1} - \text{Government debt}_{t-2}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \quad (6.1)$$

$$\Delta Investment_{i,t} = \Delta\zeta*(Investment_{i,t-1}) + \Delta\beta_{ZL}*D_{ZL}*(Cashflow_{i,t-1}) + \Delta\beta_{L}*D_{L}*(Cashflow_{i,t-1}) + \Delta\gamma_{ZL}*D_{ZL}*(Q_{i,t}) + \Delta\gamma_{L}*D_{L}*(Q_{i,t}) + \Delta\delta_{ZL}*D_{ZL}*(Government\ debt_{t-1}) + \Delta\delta_{L}*D_{L}*(Government\ debt_{t-1}) + \Delta\varepsilon_{i,t} \quad (6.2)$$

When estimating GMM, I define lagged investments and cash flows to be endogenous and the rest exogenous. Results from coefficients of equation (6.2) will imply that one-standard deviation increase in any of these explanatory variables will lead to a decrease or increase in investment expressed by the output at either β, γ, δ or ζ. Furthermore, all coefficients are backed-up by their related standard errors and t-statistics with their respective the level of significance, whereby we can measure whether individual variables are significant. Without dummy variables D_{ZL} and D_L we could not test the statistical difference between these subcategories (Dang, 2013). To test the difference between zero-leverage and leverage coefficients, we conduct and report F-tests. To achieve efficient estimators two conditions must be met, no serial correlation of second order for GMM performed in differences and the instruments used must be relevant. By conducting the Arellano-Bond (AR (2)) test we can measure whether second order serial correlation is present in our regression, while instrumental relevance can be tested with the Hansen J-test. These latter two tests are executed in order to determine the validity of the model. The Hansen J-test states at its null hypothesis that the instruments are exogenous as a group, it is therefore better to is a higher p-value within the Hansen J-test. Also for the AR (2) test is a higher p-value better, since its null hypothesis states that there is no autocorrelation present.

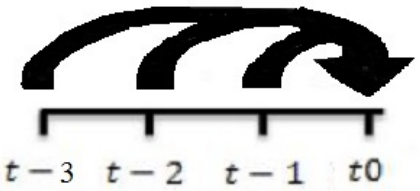

Figure I: Periodicity is cumulative
(t - 3 is transfer executive)

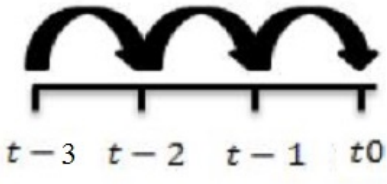

Figure II: Periodicity is one
(t - 3 is transfer executive)

We use the xtabond2 command in Stata developed by Roodman (2009) to execute the GMM procedure. The GMM procedure is applicable to our case since it performs well in little time periods and many cross-sectional observations. We use difference GMM since it uses a smaller number of moment conditions than the system GMM procedure. This is important because our time dimension is twice as big compared to Bessler et al (2013) (T=53 vs T=23). E.g., if T=3, difference GMM generates only one instrument per instrumenting variable and system GMM two. Thus, the instrument count will go towards the sample size

when *t* rises. As a consequence could estimators and related specification tests become misleading (Roodman, 2009). Therefore, we will neglect system GMM as a procedure during this thesis.

Even though the influence of cash flows, growth opportunities and government debt, lagged over an additional period, on the change on investments have never been investigated before; a wide variety of models is suitable for testing various effects on investments and investments' changes when looking at previous research. For simplicity, the equations and regressions presented in this thesis will only denote the cumulative periodicity – Figure 1 – and will neglect that periodicity is one method – Figure 2. Hereby we go as far as the change of independent variables between t-3 and t-2. This is due to our expectation that the effects resulting from coefficients – like government debt and cashflows – are more substantially present over the short run than over the long run. This could be the reason why the investment model of Marchica and Mura (2010) have never been exploited over several time periods in the first place. Take government debt for instance, when government debt increases, it should crowd out investors to finance debt for businesses. However, this crowding out effect should generally only be present at a short term since stable firms should act as liquidity providers based on current market developments. The same short term effects apply for firm specific characteristics. Hence, the effects should be the strongest at short time windows. For the sake of completeness, the second lagged investment model is given as equation (7). The model and its significance will be regressed and tested at the same conditions and procedures as equation (6.2).

$$\Delta Investment_{i,t} = \Delta\zeta*(Investment_{i,t-2}) + \Delta\beta_{ZL}*D_{ZL}*(Cashflow_{i,t-2}) + \Delta\beta_{L}*D_{L}*(Cashflow_{i,t-2}) + \Delta\gamma_{ZL}*D_{ZL}*(Q_{i,t-1}) + \Delta\gamma_{L}*D_{L}*(Q_{i,t-1}) + \Delta\delta_{ZL}*D_{ZL}*(Government\ debt_{t-2}) + \Delta\delta_{L}*D_{L}*(Government\ debt_{t-2}) + \Delta\varepsilon_{i,t} \quad (7)$$

Investment models 6.2 and 7 will be run over the whole sample. An additional separate analysis is constructed over a sample consisting of only dividend payers and non-dividend payers. This is done in order to review differences in investing behavior between constrained and unconstrained firms. We expect this to be necessary since we foresee to find supportive evidence on the financial constrained hypothesis from both the sample mean and logistic analysis. This is why we do not consider it to be necessary to measure the statistical difference between both groups. As a consequence, we predict that the sample cannot be treated homogeneously and therefore it should also be regressed into two different regressions (Dang, 2013).

4. Data and Descriptive Statistics

This chapter provides an overview of the data. It starts by describing the method of data collection in 4.1. It continues with presenting the correlation matrix(es) in 4.2 and concludes with the descriptive statistics in subchapter 4.3.

4.1 Data

Among UK firms is the zero-leverage policy a widely spread phenomenon (Dang, 2013). We however chose to focus on an American sample since it is the biggest market-based economy of the world. Moreover, more data is publicly available in a sample of US companies than any other country. Therefore this empirical research is based on firms which are included on the S&P 1500 index. The reason why we select this index is because the S&P 1500 index includes 90% of the US market capitalization (Us Spindices, 2016). Moreover has it a broader coverage than most US indexes. When comparing the S&P index to the Dow Jones Industrial Average Index, the S&P has a wider range since the Dow Jones index only contains 30 companies. Furthermore are the NASDAQ and the S&P 500 indexes both part of the S&P 500, which automatically gives the S&P 1500 a wider range (Us Spindices, 2016).

The S&P 1500 contains the top 1500 companies on market capitalization in the USA. A drawback from using the S&P 1500 index is that non-publicity based firms are not included in the analysis, like companies which are owned by private equity firms or family firms. You might argue that focusing on big publicity listed firms might contribute to a bias in our final results. However, a key advantage of using this data is that it has been used in prior studies, which makes the results more comparable to previous research. This last argument is stronger since many researchers use the S&P 1500 index as a benchmark for all companies.

The balance sheet data used in the research is collected from COMPUSTAT. Macro-economic data on the other hand is generally collected from Datastream. Furthermore is financial intermediation provided by Philippon (2015) and United States Gross Federal Debt held by the public obtained by USgovernmentspending (2016). Following Strebulaev and Yang (2013) has our sample construction has a timespan which starts in 1962. However we choose to continue the time frame till 2015 in order to have as many observations as possible. In addition, will we start omitting firm-year observations with missing information on total assets, total debt or market value (Bessler et al 2013). As in previous capital research we exclude financial and utility institutions (industry SIC codes 6000-6999 and 4900-4999).

These industries are subject to different regulations and therefore hold different leverage levels. As a result are these two industries not comparable to leverage levels in other industries (Dang, 2013). Following Bessler et al (2013) we assign all firms to industries according to the Fama and French (1997) 12-industry classification scheme based on their four-digit SIC codes.

Next, we follow the literature by winsorizing all firm-level values (except for leverage and dividend payout ratios) at the upper and lower one percentiles to mitigate the potential effects of outliers and possible data-coding errors (Dang, 2013; Graham, Leary and Roberts, 2014). Thereafter, we scale most variables by the book value of assets in order to ensure a useful interpretation of corporate measures which is consistent with most capital structure studies. Only firm size is scaled by using the natural logarithm over total assets. Since we observe many gaps at firm age, we choose to where possible add firm age data provided by Fundinguniverse (2017).

Moreover are all nominal values from firm characteristics converted into year-1990 dollar values using Consumer Price Index (CPI) if not mentioned otherwise. Excluding observations with unavailable data and outliers, leaves 13461 firm year observations, with 978 unique firms, from a minimum of 0 ZL observations in 1962 to a maximum of 132 in 2005.

4.2 Correlation

We have added a correlation matrix in Appendix C to test whether there is any correlation among independent variables used in model (2). The definitions and descriptions of the abbreviations from all variables can be found in Appendix A. We evaluate the most relevant and highly correlated values of this matrix.

The correlation matrix shows for most variables highly significantly and either positively or negatively correlated with either book leverage or market leverage. The variables subjected to financial constraints hypothesis give as predicted a positive and significant correlation with both debt leverage ratios. We further observe the first evidence of the strategic hypothesis, due to the negative relationship between the leverage ratios with both growth opportunities and cash holdings. These findings indicate that there is a bigger likelihood to stay unlevered when a firm has more growth opportunities and cash holdings, but a smaller probability if a firm is subjected to financial constraints.

In contrast to firm characteristics, do not all macroeconomic variables demonstrate significant correlations with both leverage ratios. This might be the case since in the correlation matrix we did not distinguish between constraint and unconstrained firms. We do however observe a significantly negative relationship between GDP growth, Government Debt and ML confirm the third and fourth hypothesis. Financial Intermediation however is negatively correlated with both leverage ratios. When intermediation increases should the development of monitoring and supervision expertise from the financial sector on the non-financial sector increase. Despite improvements in information technologies does the cost of intermediary consultation not decrease enough to let leverage ratios decline (Philippon, 2015). The likelihood that non-financial companies acquire funding from the developed financial sector thereby decreases due to the increased expertise to detect doubtful investments, which is reflected in lower leverage ratios. This finding is further analyzed in the subsequent subparts.

Next, several independent variables are highly correlated with each other. In order to prevent multicollinearity in the logistic regression (2), we do take precautions by dropping profitability, cash holdings, term structure and financial intermediation in various regressions. Moreover do we also make precautions with the dummy variable for previous year's zero-leverage decision in order to avoid any potential estimation complexities associated with this term (Dang, 2013).

4.3 Descriptive statistics

Table 1 exhibits the summary statistics from all variables used during the empirical analysis. Panel A from Table 1 exhibits the winsorized summary statistics from the firm-year panel data. Panel B however, provides the country-level summary statistics without being winsorized. What immediately stands out is that financial

Table 1 - Summary statistics. *See appendix A for variable definitions*

Panel A. Firm-level panel data	N	Mean	Std. Dev.	Min.	Max.
Corporate level variables					
Book levarage-ratio	13.461	0,168	0,176	0	0,780
Market leverage-ratio	13.461	0,145	0,184	0	1,000
Firm Size	13.461	6,165	1,779	2,257	10,855
Firm Age	13.461	14,323	14,872	0	95
Dividend payout-ratio	13.461	0,010	0,019	0	0,112
Growth opportunities	13.461	2,128	1,785	0,003	10,437
Profitability	13.461	0,120	0,147	-0,574	0,408
Tangibility	13.461	0,238	0,189	0	0,836
Cash holdings	13.461	0,221	0,219	0	0,875
Investments	13.463	0,059	0,051	0	0,272
Non-debt tax shield	13.461	0,044	0,026	0	0,148
Cash flows	13.461	0,063	0,176	-0,873	0,346
Panel B. Country-level aggregate panel data	**N**	**Mean**	**Std. Dev.**	**Min**	**Max**
Macroeconomic variables					
Termstructure of interest rates	55	1,054	0,507	0,320	3,090
BAAAAA	55	0,015	0,014	-0,015	0,040
Real GDP growth rate	55	3,093	2,123	-2,800	7,300
Inflation	55	0,039	0,028	-0,004	0,135
Government variables					
Government Debt	55	0,346	0,283	0,077	1,085
Financial Intermediation	50	1,169	0,248	0,827	1,778

intermediation has less observations compared to the other macroeconomic variables. This due to the fact that Philippon (2015) calculated this measure till 2010. Thus when regressing financial intermediation do we have less observations than when we disregard it.

Table 2 on page 34 displays the distribution of ZL firms by time and across 10 industry groups according to the Fama-French's classification. It acknowledges in panel A that over the complete sample period, 17% of the firm year observations consist of ZL firms and 33,68% of firm year observations consist of AZL firms. Furthermore do 35,38% of the firms no hold any debt at least two consecutive years on their balance sheet. Due to the upward trend of extremely conservative debt policies are these findings slightly higher than previous findings by Dang (2013) in the UK and both Strebulaev and Yang (2013) ; Bessler et al. (2013) in the USA, since our timespan continues further in time. Bessler et al (2013) attribute this to the IPO wave of the 90s and 00s. During this period many small, high-growth firms went public while simultaneously being constrained to the debt market. This upward trend is clearly visible in panel A.

In addition exhibits Panel B that ZL and AZL firms are concentrated in the healthcare and business equipment/technology sector, which is consistent with the findings of Dang (2013) and Strebulaev and Yang (2013). Dang (2013) further states that extreme debt conservatism within these industries is clarified since these are industries subjected to high-growth. Debt conservatism however is less present in the Energy and Chemicals industry. A possible explanation to the latter finding is that within our sample selection the firms in Energy and Chemical industry sectors have on average more cash flows, less cash holdings and growth opportunities than most industries. Therefore are these firms less stimulated to acquire debt in their capital. We have to take industry dynamics into account when conducting our analysis since debt conservatism occurs in certain industries.

In order to declare that the increase of zero-leverage firms in recent years have been increased due to IPO waves, it is important for us to observe a strong correlation between the relative number of zero-leverage firms distributed as being constrained firms by using the SA-index and time. Panel C discloses the distribution of ZL firms by time and SA-index group quartile. Here, we can clearly notice a relative and absolute increase of zero-leverage firms in the two most constraint quartiles over time. Even the decrease of zero-leverage firms in the two most constraint quartiles in 2008-2015 and 2001-2007 is related to changes of IPO-shifts. Gao, Ritter and Zhu (2013) note that there was a decline in IPO activity due to the burst of the internet bubble in 2000. After the burst in 2000, less IPOs were made, hence the

decline in the relative sample distribution of ZL firms in the most constrained quartiles from 2001-2015.

When we correlate the percentage of zero-leverage firms in the most constrained subcategory with the distribution of zero-leverage firms by time (Panel A), we find a correlation of 66%. If we add the second to the first quartile, we discover an even higher correlation of 91% with the distribution of ZL firms over time of Panel A. This indicates that shifts over time are highly related with the recent IPO waves of small young firms going public. Similar results are found in an unreported analysis, executed on AZL firms.

Accordingly, just like various sources of the literature (e.g. Bessler et al, 2013; Dang, 2013 and DeAngelo & Roll's, 2012) have illustrated, we have found ourselves that the distribution of zero-leverage over time is closely related to the IPO-waves of young and small firms in the last decades. Therefore there will no time adjustment in the multivariate regression analysis in section 5.2.

Table 2 - Distribution of zero-leverage firms

This table summarizes the distribution of zero-leverage (ZL) and almost zero-leverage (AZL) firms by time, industry and constraints. Panel A lists the number and percentage of firms that have ZL or AZL in a given time periods based on the economic cycle, while Panel B presents the distribution of these firms according to Fama-French's 12 industries with utilities and finance excluded. Panel C displays the distribuition of zero-leverage firms over time and SA-index, in order to prove that changes over time are related to IPO shifts.

Panel A - Distribution of zero-leverage firms by time

Periods	All Sample	ZL	% ZL	AZL	% AZL
1962-1973	283	6	2.12%	36	12.72%
1974-1979	350	10	2.86%	28	8.00%
1980-1990	1015	40	3.94%	148	14.58%
1991-2000	4371	649	14.85%	1548	35.42%
2001-2007	3822	825	21.59%	1538	40.24%
2008-2015	3620	758	20.94%	1236	34.14%
Number of firm-year observations	13461	2288	17.00%	4534	33.68%
Number of firms	978	346	35.38%	569	58.18%

Panel B - Distribution of zero-leverage firms by industry

Industry	All Sample	ZL	% ZL	AZL	% AZL
Consumer Non-Durables	585	45	7.69%	115	19.66%
Consumer Durables	426	40	9.39%	82	19.25%
Manufacturing	1852	126	6.80%	380	20.52%
Energy (Oil, gas and coal industry)	348	3	0.86%	24	6.90%
Chemicals	529	3	0.57%	67	12.67%
Business Equipment / Technology	4392	1,307	29.76%	2224	50.64%
Telecom	192	13	6.77%	45	23.44%
Shops	2227	337	15.13%	663	29.77%
Healthcare	2233	350	15.67%	792	35.47%
Other (Mines, Construction, Hotels etc.)	677	64	9.45%	142	20.97%
Number of firm-year observations	13461	2288	17.00%	4534	33.68%

Panel C - Distribution of zero-leverage firms by time and the first and second quartile of the SA-index.
Correlation with time is computed by the correlation between %ZL in panel A and its marked column in Panel C

	1			2			1+2	
Periods	ZL	%ZL	All Sample	ZL	%ZL	All Sample	All Sample	
1962-1973	3	50.00%	1.06%	0	0.00%	0.00%	1.06%	
1974-1979	2	20.00%	0.57%	2	20.00%	0.57%	1.14%	
1974-1979	35	87.50%	3.45%	2	5.00%	0.20%	3.65%	
1991-2000	448	69.03%	10.25%	159	24.50%	3.64%	13.89%	
2001-2007	299	36.24%	7.82%	334	40.48%	8.74%	16.56%	
2008-2015	122	16.09%	3.37%	239	31.53%	6.60%	9.97%	
Total:		39.73%			32.17%			
Correlation with time:			65.91%	Correlation with time:			91.30%	

5. Results

Throughout this chapter are the results from the different hypotheses discussed. This chapter begins with the results from sample mean analysis and the multivariate logistic regression analysis of a firms' decision to have zero leverage in subchapter 5.1 and 5.2. Subchapter 5.3 address investment distortions, followed by section 5.4, which briefly presents the robust results.

5.1 Sample mean analysis

We undertake a sample mean analysis in this subchapter since we expect that dividend payers and non-payers significantly differ from each other. By comparing characteristics zero-leverage and levered firms we expect to find the first evidence whether firms voluntarily or involuntarily neglect debt financing.

Panel A of Table 3 presents strong evidence for our expectation that a significant amount of zero-leverage firms do not have access to the debt market. By comparing zero-leverage firms (column (1)) and levered firms (column (2)) can we observe that zero-leverage firms are smaller, younger and distributing less dividend than their levered counterparts, which is in line with the financial constraint hypothesis (Bessler et al, 2013; Hadlock and Titman, 2010; Oliner and Rudebusch, 1992). Zero-leverage firms have also less tangible assets, lower profits and lower cash flows which genuinely means that they are more constrained at attracting debt than their levered counterparts. This gives us strong evidence supporting the financial constraint hypothesis.

The same panel provides evidence for the strategic motives, specified by the second hypothesis. Both cash holdings and growth opportunities are significantly larger for ZL firms than their levered firm sample. This might indicate that some firms hoard cash to preserve their financial flexibility and others deliberately mitigate underinvestment incentives in order to diminish potential agency costs arising from debt. This finding is also consistent with findings in previous studies (Dang, 2013; Myers, 1977; Myers and Majluf; 1984).

Panel A also demonstrates that investments, book and market leverage ratios are significantly lower for zero-leverage firms than their levered counterparts. Panel A provides evidence for most theoretical predictions and ensures us to continue with further empirical analysis in panel B. This panel compares the characteristics of ZL and levered firms with different levels of constraints expressed by the dividend payout policy in order to present evidence that zero-leverage firms may not be homogeneous.

ZL payers (column (1)) account for only 3,07% of the sample size, while the non-dividend distributing counterparts (column (2)) account for 13,93%. This indicates that over four fifth of all zero-leverage firms are categorized as constrained to debt financing. ZL non-payers have indeed more constrained characteristics than their paid counterparts since they are both younger and smaller, have lower profit margins and cash flows. Furthermore do these corporations also hold less tangible assets and significantly pay out less dividend than their unconstrained counterparts. Moreover, these constrained firms have higher growth opportunities and hoard more cash than their unconstrained unlevered counterparts which is in line with the underinvestment and financial flexibility hypotheses (Dang, 2013; Myers, 1977; Myers and Maljuf, 1984). We recall that growth firms accumulate cash to preserve their financial flexibility and thereby reduce future investment biases.

What is even more interesting is that ZL dividend payers pay out more dividend than their levered counterparts. This might indicate that major listed S&P 500 index firms such as Texas Industries, Yahoo or Urban Outfitters, who simply outperform the market and therefore do not need leverage, dominate the average dividend payout ratio in the relatively small ZL payers group (Bessler et al, 2013). Striking is that there are no significant differences between constrained and unconstrained ZL firms. This might influence results in the investment distortions analysis.

Nevertheless do we notice non-homogeneous zero-leverage firms as we predicted with the first hypothesis. Corporations are apparently subjected to financial constraints, while others freely choose not to attract debt from the market. Due to potential agency costs, which might arise from debt or simply in order to build up financial flexibility for future investments (Almeida, Campello & Weisbach, 2004). Throughout the sample mean analysis have we found evidence to not to reject the hypothesis 1, 2a and 2b. Nonetheless, exclusively observing results from the sample mean analysis could give inaccurate conclusions since the analysis does not incorporate interaction between multiple variables. Since this analysis is inadequate is the logistic model (2) and (4) being used in subchapter 5.2 in order to find further evidence to support these hypotheses on firm characteristics.

Table 3 - Sample mean analysis, dividend payers and non-payers

Characteristics of zero-leverage firms. Panel A compares the mean of firm-specific characteristics of ZL and levered firms. The means are calculated by taking the average equally across observations. Panel B compares the characteristics of ZL firmswith different levels of constraints and further divides the sample into dividend payers and non-payers. See appendix A for variable definitions. *, ** and *** indicate that differences are significant at the 10%, 5% and 1% levels, respectively.

Panel A. Zero-leverage firms vs levered firms

Variable	ZL firms (1)	Levered firms (2)	T-statistic for differences in means (1) vs (2)
Book leverage	0.000	0.206	-52.207***
Cash flow	0.055	0.065	-2.498**
Cash holdings	0.402	0.184	46.852***
Payoutratio	0.007	0.01	-7.595***
Firm Age	9.659	15.279	-16.636***
Firm Size	5.084	6.386	-33.162***
Growth opportunities	2.870	1.976	22.223***
Investments	0.050	0.060	-8.574***
Market leverage	0.000	0.175	-44.257***
Non-debt tax shield	0.039	0.044	8.297***
Profitability	0.097	0.125	-8.407***
Tangibility	0.152	0.255	-24.360***
Number of observations	2288	11173	

Panel B. Zero-leverage payers and non-payers vs levered payers and non payers

Variable	ZL payers (1)	ZL non-payers (2)	Levered payers (3)	Levered non-payers (4)	T-statistic for diff. in means (1) vs (2)	T-statistic for diff. in means (1) vs (3)	T-statistic for diff. in means (2) vs (4)
Book leverage	0.000	0.000	0.231	0.187	-	29.34***	39.278***
Cash flow	0.085	0.049	0.093	0.044	3.1614***	1.046	0.044
Cash holdings	0.327	0.418	0.106	0.243	-7.918***	-32.241***	-30.036***
Payoutratio	0.038	0.000	0.024	0.000	48.527***	-12.525***	-
Firm Age	13.777	8.751	23.057	9.366	13.169***	9.560***	2.949***
Firm Size	5.618	4.967	7.305	5.687	9.486***	19.801***	18.736***
Growth opportunities	2.572	2.935	1.661	2.215	-3.026***	-13.338***	-14.069***
Investments	0.050	0.050	0.063	0.058	-0.003	5.398***	5.700***
Market leverage	0.000	0.000	0.211	0.147	-	22.798***	34.492***
Non-debt tax shield	0.041	0.039	0.044	0.045	1.396	2.278**	7.888***
Profitability	0.139	0.087	0.155	0.102	5.044***	2.910***	3.379***
Tangibility	0.201	0.141	0.311	0.213	7.484***	11.579***	15.590***
Number of observations	413	1875	4825	6348			

5.2 Logistic Analysis

Our primary goal still is to investigate the motivations for a firm to remain debt-free in order to discover whether this conservative debt policy is a voluntary decision or whether it is driven by strategic motives. Furthermore, we also study in what extend macro-economic conditions also affects firms' conservative debt policy. Our sample mean analysis displays that (zero-leverage) firms are non-homogeneous; hence a subdivision has been made to embody a thorough analysis.

The results from the logistic regression analysis of equation (2) and (4) on a firms' propensity to have zero leverage are displayed at table 4A for firm characteristics, 4B for economic variables and table 4C for government debt and financial intermediation. Each table reveals panel A results for the whole sample and panel B the results for dividend payers and non- payers. In table 4A do we report the firm characteristic control variables in column (1), the second column adds the financial constraint characteristics and the third strategic firm variables. For both columns (4) and (5) is the dummy variable for the previous years' zero-leverage policy neglected. This in order to avoid any conceivable estimation complexities related to this dynamic term (Dang, 2013). Finally do we neglect cash holdings in column (4) due to its strong correlation with firm size and growth opportunities. Industry dummies are added in all logistic regressions. Effects from these dummies appears to be broadly consistent and therefore not reported.

With the McFadden's adjusted pseudo R^2 varying between 0.113 and 0.657 are in general all regressions from table 4A highly significant. Persistence among zero-leverage firms is important, since when we neglect the previous ZL decision dummy variable becomes the McFadden's adjusted pseudo R^2 mostly below 0.2. This is outside our range of a good fit model. This is in line with Dang (2013). He however mentions it is more important to analyze whether individual effects are generally consistent and significant. Therefore we will not base our conclusion on the validity of our model on this measure.

More importantly, the average marginal effects from firm size on a firms' propensity to have no leverage are significantly negative in columns (2) till (5). Although the magnitude of firm size overall is small, does our findings suggest that smaller firms are more likely to have zero leverage. Furthermore do results from the same columns show that firms with high dividend payout ratios renounce debt financing more often than firms with low dividend payout ratios. The dividend payout ratio, which as our prediction and findings indicate whether a firm is not constraint, shows a positive relationship with the firms propensity to

Table 4A. ZL - Firm

Logisitc regression of firms' zero leverage decisions. This table reports the average marginal effects and the standard errors from the logisitic regressions of firms' zero leverage (ZL) decisions.
Panel A exhibits the results of all firms. Panel B exhibits the results for dividend payers and non-dividend payers. The standard errors clustered at firm level are reported in parentheses,
*, **and *** indicate significance at the 10%, 5% and 1% levels, respectively. See appendix A for variable definitions. Industry dummies are included in all regressions.

	Panel A. Whole sample					Panel B. Dividend payers versus non-payers									
	(1)	(2)	(3)	(4)	(5)	(1)		(2)		(3)		(4)		(5)	
	All	All	All	All	All	Payers	Non Payers	Payers	Non Payers	Payers	Non Payers	Payers	Non Payers	Payers	Non Payers
Previous ZL decision	0.235***	0.226***	0.218***	-	-	0.149***	0.296***	0.137***	0.291***	0.130***	0.280***	-	-	-	-
	(0.005)	(0.004)	(0.004)	-	-	(0.008)	(0.007)	(0.006)	(0.006)	(0.005)	(0.005)	-	-	-	-
Non-debt tax shield	0.016	-0.126	0.066	-0.353	0.081	0.152	-0.146	0.015	-0.252*	0.094	0.025	0.010	-0.802**	0.173	-0.126
	(0.101)	(0.094)	(0.087)	(0.278)	(0.248)	(0.138)	(0.134)	(0.121)	(0.131)	(0.108)	(0.126)	(0.333)	(0.379)	(0.274)	(0.347)
Cash flows	0.017	0.053***	0.065***	0.109***	0.171***	0.001	0.028*	0.025	0.068***	0.028*	0.087***	0.085**	0.126***	0.116***	0.209***
	(0.012)	(0.011)	(0.012)	(0.031)	(0.033)	(0.019)	(0.016)	(0.017)	(0.016)	(0.015)	(0.017)	(0.036)	(0.045)	(0.040)	(0.047)
Tangibility	-0.109***	-0.084***	-0.015***	-0.278***	-0.135***	-0.076***	-0.105***	-0.047**	-0.098***	-0.014	-0.054**	-0.158**	-0.304***	-0.038	-0.157**
	(0.018)	(0.017)	(0.016)	(0.061)	(0.059)	(0.025)	(0.024)	(0.020)	(0.024)	(0.019)	(0.024)	(0.075)	(0.080)	(0.071)	(0.078)
Size	-	-0.021***	-0.016***	-0.055***	-0.042***	-	-	-0.013***	-0.027***	-0.009***	0.020***	-0.035***	-0.067***	-0.026***	-0.052***
	-	(0.002)	(0.002)	(0.005)	(0.005)	-	-	(0.002)	(0.003)	(0.002)	(0.003)	(0.006)	(0.008)	(0.005)	(0.008)
Age	-	-0.001***	-0.000	0.001*	0.001**	-	-	-0.000	-0.001	-0.000	0.000	-0.000	0.006***	-0.000	0.006***
	-	(0.000)	(0.000)	(0.001)	(0.001)	-	-	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)
Dividend Payout Ratio	-	0.187*	0.152	0.315	0.345	-	-	0.289***	0.000	0.184**	0.000	0.846***	0.000	0.656***	0.000
	-	(0.105)	(0.104)	(0.339)	(0.318)	-	-	(0.089)	(0.000)	(0.089)	(0.000)	(0.227)	(0.000)	(0.224)	(0.000)
Cash holdings	-	-	0.119***	-	0.352***	-	-	-	-	0.098***	0.143***	-	-	0.312***	0.414***
	-	-	(0.012)	-	(0.032)	-	-	-	-	(0.018)	(0.017)	-	-	(0.046)	(0.044)
Growth Opportunities	-	-	0.003***	0.013***	0.002	-	-	-	-	0.002	0.004**	0.006	0.018***	-0.006	0.006
	-	-	(0.001)	(0.002)	(0.003)	-	-	-	-	(0.002)	(0.002)	(0.004)	(0.004)	(0.004)	(0.004)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes 1)	Yes	Yes 1)	Yes	Yes 1)	Yes	Yes 1)	Yes	Yes 1)	Yes
Number of observations	13461	13461	13461	13461	13461	4578	8223	4578	8223	4578	8223	4578	8223	4578	8223
McFadden's Adj. Pseudo R-squared	0.583	0.609	0.624	0.170	0.211	0.604	0.550	0.638	0.570	0.657	0.584	0.201	0.113	0.266	0.150
comments	1) industy 4 & 5 are dropped, due to perfect predictions														

have zero leverage. A caveat is associated with these results since they are mainly highly insignificant. However, the average marginal effect from the payout ratio becomes more significant in panel B when we choose to split the sample by degree of financial constraints. These coefficients are highly consistent with the sample mean analysis section 5.1 and in line with hypothesis 1. Firm age is due to collinearity with firm size an exception to this finding. In an unreported analysis does the coefficient on firm age become significantly negative as foreseen when neglecting firm age in the regression. All these findings are in line with Dang (2013), hence have we not found evidence to reject the first hypothesis.

When including growth opportunities and cash holdings into the logistic regression, we generally notice an increase of the McFadden's adjusted pseudo R^2. This indicates that the fitness of the model increases while adding these parameters into the model. Also observable from Panel A of Table 4A are the positive average marginal effects (AME) from growth opportunities and cash holdings, which might suggest that firms deliberately build up financial flexibility and also mitigate potential future underinvestment problems incentives by *ex ante* diminishing potential agency costs through not obtaining debt financing. However, the AME of growth opportunities in column (5) is not significant due to the previously reported high correlation with cash holdings. As soon we drop cash holdings in column (4) do we detect the AME of growth opportunities becomes significant.

Since non-debt tax shields are highly insignificant does our regression results barely provide evidence to support the static tradeoff theory. Zero-leverage firms have less tangible assets and therefore depreciate less assets, which might explain why we cannot find evidence to support the static trade-off theory with tax shields (Dang, 2013). Tangibility is highly negatively and significantly related to the firms propensity of neglecting leverage firms. Firms without many tangible assets cannot enhance the ability to obtain credit, since they cannot provide collateral to debt financing and thus have a higher propensity to stay unlevered (Jensen & Meckling, 1976). Average marginal effects of cash flows shows evidence for the pecking order theory. This theory accurately predicted that profitable firms with large cash flows do not need to raise debt as they can use their internal funds to finance new investments, which is observable from the highly significant positive sign (Dang, 2013).

Most results from panel B of Table 4A are, despite the fact that some effects differ for constrained and unconstrained firms, quite similar to both Panel A and Dang (2013). At first and foremost, negative effects of firm size and tangibility more powerful for constrained firms. This implies that the financial constrained hypothesis is more suitable to constrained

Table 4B. ZL - Economic

Logisitc regression of firms' zero leverage decisions. This table reports the average marginal effects and the standard errors from the logisitic regressions of firms' zero leverage (ZL) decisions.
Panel A exhibits the results of all firms. Panel B exhibits the results for dividend payers and non-dividend payers. The standard errors clustered at firm level are reported in parentheses,
*, **and *** indicate significance at the 10%, 5% and 1% levels, respectively. See appendix A for variable definitions. Industry dummies are included in all regressions.

	Panel A. Whole sample				Panel B. Dividend payers versus non-payers							
	(1)	(2)	(3)	(4)	(1)		(2)		(3)		(4)	
	All	All	All	All	Payers	Non Payers	Payers	Non Payers	Payers	Non Payers	Payers	Non Payers
Previous ZL decision	0.218***	0.216***	0.223***	-	0.130***	0.280***	0.127***	0.280***	0.135***	0.288***	-	-
	(0.004)	(0.004)	(0.004)	-	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	-	-
Non-debt tax shield	0.066	0.046	-0.098	-0.497*	0.094	0.025	0.060	0.021	0.016	-0.193	-0.112	-0.851**
	(0.087)	(0.087)	(0.092)	(0.278)	(0.108)	(0.126)	(0.112)	(0.126)	(0.120)	(0.129)	(0.345)	(0.376)
Cash flows	0.065***	0.065***	0.046***	0.109***	0.028*	0.087***	0.028*	0.087***	0.016**	0.061***	0.084**	0.129***
	(0.012)	(0.012)	(0.011)	(0.031)	(0.015)	(0.017)	(0.015)	(0.017)	(0.015)	(0.016)	(0.038)	(0.045)
Tangibility	-0.015***	-0.038**	-0.078***	-0.226***	-0.014	-0.054**	-0.007	-0.053**	-0.037*	-0.098***	-0.094	-0.282***
	(0.016)	(0.016)	(0.017)	(0.059)	(0.019)	(0.024)	(0.019)	(0.024)	(0.020)	(0.024)	(0.072)	(0.078)
Size	-0.016***	-0.017***	-0.021***	-0.058***	-0.009***	0.020***	-0.009***	-0.021***	-0.012***	-0.026***	-0.037***	-0.069***
	(0.002)	(0.002)	(0.002)	(0.005)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.006)	(0.008)
Age	-0.000	-0.000	-0.001**	0.001	-0.000	0.000	-0.000	0.000	-0.000	-0.000	-0.000	0.005***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Dividend Payout Ratio	0.152	0.159	0.133	0.391	0.184**	0.000	0.172*	0.000	0.190*	0.000	0.760***	0.000
	(0.104)	(0.105)	(0.105)	(0.325)	(0.089)	(0.000)	(0.077)	(0.000)	(0.095)	(0.000)	(0.228)	(0.000)
Cash holdings	0.119***	0.118***	-	-	0.098***	0.143***	0.095***	0.142***	-	-	-	-
	(0.012)	(0.012)	-	-	(0.018)	(0.017)	(0.018)	(0.017)	-	-	-	-
Growth Opportunities	0.003***	0.003***	0.007***	0.014***	0.002	0.004**	0.002	0.004**	0.005***	0.008***	0.006	0.019***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.004)	(0.004)
Term Structure	-	-0.001	-	-	-	-	-0.003	0.007	-	-	-	-
	-	(0.006)	-	-	-	-	(0.007)	(0.010)	-	-	-	-
Inflation	-	-0.192	-0.190	-1.807***	-	-	-0.186	0.178	-0.195	0.053	-1.349***	-1.326***
	-	(0.141)	(0.134)	(0.346)	-	-	(0.128)	(0.290)	(0.151)	(0.261)	(0.448)	(0.514)
BAA-AAA yield	-	-0.072	0.034	-0.747***	-	-	-0.011	-0.111	0.098	-0.012	-0.584*	-0.896**
	-	(0.171)	(0.171)	(0.272)	-	-	(0.220)	(0.250)	(0.217)	(0.250)	(0.350)	(0.394)
GDP growth rate	-	-0.003*	-0.004***	-0.014***	-	-	-0.002	-0.002	-0.002*	-0.004**	-0.011***	-0.014***
	-	(0.002)	(0.001)	(0.002)	-	-	(0.002)	(0.003)	(0.001)	(0.002)	(0.003)	(0.004)
Time Dummies	No	No	No	No	No	No	No	No	No	No	No	No
Industry Dummies	Yes	Yes	Yes	Yes	Yes 1)	Yes	Yes 1)	Yes	Yes 1)	Yes	Yes 1)	Yes
Number of observations	13461	13461	13461	13461	4578	8223	4578	8223	4578	8223	4578	8223
McFadden's Adj. Pseudo R-squared	0.624	0.624	0.614	0.181	0.657	0.584	0.656	0.583	0.643	0.573	0.221	0.117
comments	1) industy 4 & 5 are dropped, due to perfect predictions											

non-dividend paying firms than for dividend distributing firms (Dang, 2013). Due to the existence of two groups based on the dividend payout ratio, should effects from dividend payout ratio on zero-leverage firms be interpreted with care. Panel B shows significant positive AMEs on the dividend payout ratio for unconstrained firms, which is in line with the expectations. Firms with low leverage levels smooth the earnings to shareholders by distributing dividend payments to shareholders. Hence are significant and positive effects for dividend distributing firms at panel B observable for all columns (Fama and French, 2002).

In order not to reject the hypotheses 2A and 2B, do we have to observe that growth opportunities and cash hoarding at unconstrained firms should increase a firms propensity to have zero-leverage more than constrained ones. Marginal effect of growth opportunities on zero-leverage firms are generally small. Due to multicollinearity with cash holdings, do we choose to focus for growth opportunities on results from column (4), where we clearly can observe that the magnitude is bigger for non-payers than for dividend payers. Effects from cash holdings are in column (3) also larger for unconstrained firms. Column (5) shows greater effects among constrained firms on cash holdings, which is in line to the above mentioned findings. Together with results found from column (4) does it entail that underinvestment and financial flexibility are more relevant to constrained firms. We found no evidence due to contradicting results to support hypothesis 2a and 2b. Whether this conclusion is premature must be confirmed by the successive regressions.

From Panel A of table 4B we study the economic variables. We drop term structure in columns (3) and (4) due to its high correlation with GDP growth. We immediately observe that there are some effects which are somewhat inconsistent to their significance levels or signs. We further acknowledge an increase in GDP growth rate, negatively effect on the firms propensity to remain unlevered. Overall are firms more likely to eschew debt when GDP growth is declining and during times the yield spread is widening, which is in line with Dang (2013). Because inflation devalues the nominal value of outstanding debt, we notice a negative relationship on the propensity of zero-leverage firms and inflation, although effects resulting from inflation are only significant in column (4) (Djankov, McLiesh and Shleifer, 2007).

What is more, at Panel B of Table 4, we find no proof of counter-cyclical leverage patterns for unconstrained firms at column (4). Although, we can observe a more counter-cyclical effect on leverage patterns for unconstrained firms than for constrained firms in column (4), while in column (3) it is the other way around. This ambiguous finding is

Table 4C. ZL - Governmental + Financial Intermediation

Logisitc regression of firms' zero leverage decisions. This table reports the average marginal effects and the standard errors from the logisitic regressions of firms' zero leverage (ZL) decisions.
Panel A exhibits the results of all firms. Panel B exhibits the results for dividend payers and non-dividend payers. The standard errors clustered at firm level are reported in parentheses,
*, **and *** indicate significance at the 10%, 5% and 1% levels, respectively. See appendix A for variable definitions. Industry dummies are included in all regressions.

	Panel A. Whole sample					Panel B. Dividend payers versus non-payers											
	(1)	(2)	(3)	(4)	(5)	(1)		(2)		(3)		(4)		(5)		(6)	
	All	All	All	All	All	Payers	Non Payers	Payers	Non Payers	Payers	Non Payers	Payers	Non Payers	Payers	Non Payers	Payers	Non Payers
Previous ZL decision	0.216***	0.216***	0.223***	-	-	0.127***	0.280***	0.119***	0.284***	0.127***	0.292***	-	-	-	-	-	-
	(0.004)	(0.004)	(0.005)	-	-	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	-	-	-	-	-	-
Non-debt tax shield	0.046	0.059	-0.097	-0.438	-0.504*	0.060	0.021	0.031	-0.051	-0.043	-0.159	-0.175	-0.701*	-0.142	-0.829**	-0.219	-0.789**
	(0.087)	(0.098)	(0.103)	(0.278)	(0.276)	(0.112)	(0.126)	(0.128)	(0.141)	(0.136)	(0.145)	(0.352)	(0.381)	(0.338)	(0.374)	(0.360)	(0.379)
Cash flows	0.065***	0.056***	0.039***	0.088***	0.100***	0.028*	0.087***	0.032**	0.073***	0.022	0.049***	0.068*	0.102**	0.073*	0.121***	0.082**	0.111**
	(0.012)	(0.012)	(0.012)	(0.030)	(0.031)	(0.015)	(0.017)	(0.014)	(0.018)	(0.014)	(0.017)	(0.036)	(0.043)	(0.037)	(0.044)	(0.037)	(0.044)
Tangibility	-0.038**	-0.035*	-0.076***	-0.193***	-0.188***	-0.007	-0.053**	-0.002	-0.055**	-0.029	-0.103***	-0.046	-0.277***	-0.054	-0.257***	-0.069	-0.297***
	(0.016)	(0.018)	(0.019)	(0.061)	(0.058)	(0.019)	(0.024)	(0.021)	(0.027)	(0.023)	(0.027)	(0.074)	(0.081)	(0.071)	(0.078)	(0.076)	(0.082)
Size	-0.017***	-0.016***	-0.020***	-0.053***	-0.060***	-0.009***	-0.021***	-0.008***	-0.019***	-0.012***	-0.024***	-0.032***	-0.064***	-0.041***	-0.072***	-0.031***	-0.062***
	(0.002)	(0.002)	(0.002)	(0.006)	(0.006)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)
Age	-0.000	-0.001*	-0.001**	-0.000	-0.000	-0.000	0.000	-0.000	-0.001	-0.000	0.001	-0.000	0.002	-0.001	0.003*	-0.000	0.003***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Dividend Payout Ratio	0.159	0.181	0.146	0.432**	0.328	0.172*	0.000	0.202*	0.000	0.208*	0.000	0.606**	0.000	0.639***	0.000	0.694***	0.000
	(0.105)	(0.125)	(0.124)	(0.350)	(0.317)	(0.077)	(0.000)	(0.105)	(0.000)	(0.105)	(0.000)	(0.251)	(0.000)	(0.237)	(0.000)	(0.239)	(0.000)
Cash holdings	0.118***	0.116***	-	-	-	0.095***	0.142***	0.093***	0.138***	-	-	-	-	-	-	-	-
	(0.012)	(0.013)	-	-	-	(0.018)	(0.017)	(0.019)	(0.018)	-	-	-	-	-	-	-	-
Growth Opportunities	0.003***	0.003***	0.007***	0.014***	0.014***	0.002	0.004**	0.002	0.004***	0.005***	0.008***	0.007**	0.019***	0.006	0.019***	0.006*	0.019***
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)
Term Structure	-0.001	0.006	-	-	-	-0.003	0.007	0.005	0.010	-	-	-	-	-	-	-	-
	(0.006)	(0.007)	-	-	-	(0.007)	(0.010)	(0.008)	(0.013)	-	-	-	-	-	-	-	-
Inflation	-0.192	0.206	0.096	0.529	-0.358	-0.186	0.178	0.317*	0.248	0.289	-0.003	0.709**	0.420	-0.188	-0.207	-0.180	-0.852
	(0.141)	(0.220)	(0.187)	(0.339)	(0.329)	(0.128)	(0.290)	(0.180)	(0.456)	(0.177)	(0.346)	(0.346)	(0.557)	(0.365)	(0.516)	(0.447)	(0.485)
BAA-AAA yield	-0.072	-0.023	0.068	-0.429	-0.988***	-0.011	-0.111	0.232	-0.199	0.331	-0.109*	-0.268	-0.646	-0.755**	-1.153***	0.108	-0.560
	(0.171)	(0.197)	(0.195)	(0.296)	(0.277)	(0.220)	(0.250)	(0.256)	(0.288)	(0.252)	(0.284)	(0.370)	(0.420)	(0.345)	(0.403)	(0.357)	(0.415)
GDP growth rate	-0.003*	0.000	-0.002	-0.006***	-0.012***	-0.002	-0.002	0.001	0.000	-0.000	-0.002	-0.003	-0.008***	-0.008***	-0.013***	-0.007***	-0.013***
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)	(0.002)	(0.004)
Financial Intermediation	-	0.011	0.010	0.087***	-	-	-	0.044***	-0.008	0.046***	-0.009	0.092***	0.078**	-	-	0.160***	0.107***
	-	(0.013)	(0.013)	(0.025)	-	-	-	(0.016)	(0.019)	(0.017)	(0.019)	(0.033)	(0.038)	-	-	(0.033)	(0.037)
Government Debt	-	0.081***	0.078***	0.367***	0.188***	-	-	0.040	0.080*	0.046	0.071*	0.250***	0.353***	0.135***	0.174***	-	-
	-	(0.027)	(0.026)	(0.055)	(0.028)	-	-	(0.034)	(0.043)	(0.032)	(0.042)	(0.063)	(0.090)	(0.030)	(0.048)	-	-
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes 1)	Yes	Yes 2)	Yes	Yes 2)	Yes	Yes 2)	Yes	Yes 1)	Yes	Yes 2)	Yes
Number of observations	13461	11320	11320	11320	13461	4578	8223	3657	7008	3657	7008	3657	7008	4578	8223	3657	7008
McFadden's Adj. Pseudo R-squared	0.624	0.607	0.596	0.191	0.191	0.656	0.583	0.632	0.564	0.6180	0.5550	0.241	0.115	0.239	0.121	0.225	0.116
Financial Intermediation	No	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes

1) industy 4 & 5 are dropped, due to perfect predictions
2) Industries 4, 5 and 7 dropped, due to perfect predictions

consistent with findings the literature. While Graham Leary and Roberts (2014) observed that macro-economic sensitivity of corporate policies are greater among credit-worthy firms compared to less credit-worthy firms, did Dang (2013) observe the opposite. Taking the previous findings with the overall lower significance levels from McFadden's adjusted R^2 in comparison with table 4A together, do we await with our judgment on either rejecting or not rejecting the third hypothesis. In the end are government debt and financial intermediation both macroeconomic variables which are closely related with the state of the economy.

When comparing overall the effects from the firm characteristics, we notice highly consistent results. Firm size (except for the regression before adding economic variables column (1)) and tangibility effects are still stronger for constrained firms. At Panel B we also observe smaller magnitudes for dividend payers compared to non-payers. Effects from growth opportunities and cash holdings are generally larger for non-dividend payers than for dividend payers. Therefore has there been no evidence found in all new regressions (column (2) till (4)) to support both the financial flexibility and the underinvestment hypotheses.

All regressions in table 4C are highly significant since the McFadden's adjusted pseudo R^2 is varying across all regressions between 0.115 and 0.656. However, we notice slightly lower pseudo R^2 compared to table 4B due to the drop in observations from columns (2), (3), (4) and (6). This is caused by data limitations of financial intermediation, which causes we can only run regressions up until 2011. Moreover do we choose to exclude this variable in column (5) since it is highly correlated with government debt. Other variables with high correlations are just like in previous regressions at columns (3) up to and including (6) excluded.

More intriguing is that Table 4C mostly report consistent effects for firm characteristics and economic variables compared with results from table 4B. Results clearly show evidence for the financial constrained hypothesis. Again are the results not supporting the underinvestment and financial flexibility hypothesis. Most economic parameters become significant when we abandon the previous ZL decision dummy variable from the regression. Furthermore are countercyclical leverage patterns among unconstrained firms still not observable. Instead, for unconstrained firms are less procyclical leverage patterns observable when adding government debt and financial intermediation into the regression. We must reject the third hypothesis since we cannot clearly observe a difference in the AME magnitudes for the two groups of companies, which would have served as evidence for

differences in cyclicity. Therefore do we not find evidence to support the third hypothesis. Beyond this is GDP growth rate insignificant at our complete regression of column (2).

Panel A from the same table provides evidence that government debt and financial intermediation both effect firms' propensity to be unlevered, whereby government debt has a highly positive effect on this propensity. Firms are thus more likely to eschew debt in periods with high government debt. This finding supports Friedmans' (1986) theory that increasing supplies of government deficit financing crowds out other types of financing by investors, which could increase the general tendency of zero-leverage firms. In column (4) we also observe for financial intermediation a positive effect on the firms propensity of having a zero-leverage leverage structure, even though we expected a negative relationship. Like Graham, Leary and Roberts (2015) we assumed that increases in financial intermediation would cause decreases in agency costs and information asymmetry problems between the financial and non-financial sector. Despite improvements in IT over time does the cost of intermediary consultation according to Philippon (2015) not decrease enough to let leverage ratios rise. This might be caused by the ever increasing complexity of businesses, financial models and legislative restrictions on the financial sector over time (Claessens, 2009). The high cost of financial intermediation could also be caused by the increase in risk tolerance of financial intermediaries, allowing them to earn higher returns, which do not necessarily lead to a lower unit cost (Philippon, 2015). The probability of non-financial companies obtaining leverage funding from the developed financial sector, thereby decreases. Ultimately should this lead to decreases in debt financing, resulting in the detected increasing propensity of ZL firms. Insignificant results from columns (2) and (3) on financial intermediation are neglected in the analysis due to its high correlation with previous ZL decision dummy variable.

Highly significant positive effects for government debt are visible in regressions at columns (4) and (5) from Panel B of Table 4C. Hereby is the magnitude for government debt larger for constrained firms than for unconstrained firms. This observation is not as expected since we hypothesized unconstrained firms as closer substitutes to treasuries than their constrained counterparts (Graham, Leary and Roberts, 2015). Financial intermediation however has in columns (4) and (6) more significant and pronounced effects on dividend payers than for non-dividend payers.

Table 4C clearly shows that government debt and financial intermediation do affect firms' zero-leverage decision. The forth hypothesis is still rejected since we observe for constrained firms more pronounced effects on government debt then for unconstrained firms. Following Graham, Leary and Roberts (2015), we thought that financial intermediation and

debt conservatism have an inverted relationship, whereas we observed the opposite is true. The cost of intermediary consultation does not decrease as the financial sector develops (Philippon, 2015). The results are slightly more inconsistent in signs, significance and magnitude in most regressions. Hence, ambiguous evidence has been found for the forth hypothesis.

Altogether, clear evidence has been found to support the financial constraint hypothesis. Furthermore are the financial flexibility and underinvestment still rejected since we generally find larger effects of growth opportunities and cash holdings on constrained firms. Unfortunately do we mostly not find the evidence for the third hypothesis, we were expecting that we would find proof of counter-cyclical leverage patterns for unconstrained firms. Moreover do both financial intermediation and government debt effect the firms' propensity to be unlevered, although only financial intermediation provides us moderate evidence for the forth hypothesis. We thought that financial intermediation and debt conservatism have an inversely related to each other. This is not the case, therefore we reject the forth hypothesis for now. This is why we will re-analyze hypotheses 2, 3 and 4 in the following subchapters. This since the sample mean analysis pointed out that unlevered firms hold characteristics of firms who strategically discard zero-leverage. However, this does not seem to influence the zero-leverage phenomenon. Hence, further examination on our data has to be made.

5.3 Results investments

Strengthening our research by examining the relation between investments and capital structure is necessary in order to reveal what genuinely influences zero-leverage decisions. So far our empirical analysis does report that firm characteristics and macroeconomic conditions influence the firms' decision making process on attracting leverage. However, most hypothesis are still rejected. A direct analysis between the firms' zero-leverage decisions and their future investments is executed in order to minimize multiple interpretations of results found in previous sections (Dang, 2013). We use equations (6.2) and (7) to test the validity of hypotheses 5A and 5B. The parameters from this equation are estimated by using the two-step difference Generalized Method of Moments (GMM) procedure, while utilizing robust standard errors.

Cash flows, growth opportunities and government debt are highly significant on firm investments for both unlevered and levered firms according to Panel A of Table 5A. Cash

flow sensitivity on investments seems to be more important for levered firms, than for unlevered firms. The difference however is insignificant, meaning that levered firms depend overall as much on internal cash flows to support their investments as unlevered ones. Furthermore the effect of growth opportunities on firm investments is significantly larger for levered firms than for unlevered ones. This might indicate that levered firms are more likely to invest with growth opportunities than firms without loans. Government debt is adversely related to firms investment in the subsequent period for both zero-leverage firms and leverage firms, which could mean that the corporations in our subsample act as liquidity providers in credit markets (Greenwood, Hansen and Stein, 2010). With a significance of 10%, this difference between levered and unlevered firms does indeed matter. Accompanying p-values for the Hansen J-test and Arellano-Bond test for autocorrelation are well above 10%, so that we can define this regression of Panel A as genuine.

Table 5A - Investment distortions, lagged for one period

Investment decisions of zero-leverage and levered firms. This table reports results for the Tobin's Q model of investment for zero-leverage (ZL) and levered (L) firms. Panel A presents the results for all firms. Panel B devides firms on different levels of financial constraints, namely dividend payers and non-payers. F-test is a test for the difference in coefficients. Robust standard errors are reported in the parentheses. *, ** and *** indicate the t-statistic significance levels of coefficients at 10%, 5% and 1% levels, respectively. Lagged investments and cash flows are endogenous, rest exogenous. We conducted all estimators by using the two-step difference GMM method. Second order serial correlation is tested using Arellano-Bond test for autocorrelation. Its reported value is the p-value for rejecting the null hypothesis of no autocorrelation or serial correlation. See appendix A for variable definitions and abbreviations. Lastly, the estimated model is presented in the methodology as equation (6.2).

Dependent variable	Panel A	Panel B	
$Investments_{(t)}$	Whole sample	Dividend payers vs non payers	
	(1)	(1)	(2)
Independent variable:	All	Payers	Non-payers
$Investments_{(t-1)}$	0.501***	0.614***	0.457***
	(0.006)	(0.002)	(0.012)
$Cash\ flow_{(t-1)} \cdot D_{ZL}$	0.030***	0.033***	0.027***
	(0.004)	(0.001)	(0.005)
$Cash\ flow_{(t-1)} \cdot D_{L}$	0.037***	0.008***	0.054***
	(0.002)	(0.000)	(0.005)
$Tobin's\ Q_{(t)} \cdot D_{ZL}$	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
$Tobin's\ Q_{(t)} \cdot D_{L}$	0.003***	0.003***	0.002***
	(0.001)	(0.000)	(0.000)
$Government\ debt_{(t-1)} \cdot D_{ZL}$	-0.024***	-0.018***	-0.019***
	(0.001)	(0.001)	(0.002)
$Government\ debt_{(t-1)} \cdot D_{L}$	-0.026***	-0.021***	-0.021***
	(0.001)	(0.000)	(0.002)
Number of observations	10775	3876	6019
Number of instruments	194	193	142
Hansen J-test	0.208	0.999	0.453
2nd order serial correlation	0.224	0.006	0.929
F-test ($Cash\ flow \cdot D_{ZL} = Cash\ flow \cdot D_{L}$)	2.70	454.57***	13.54***
F-test ($Tobin's\ Q \cdot D_{ZL} = Tobin's\ Q \cdot D_{L}$)	46.01***	1574.76***	8.42***
F-test ($Govdebt \cdot D_{ZL} = Govdebt \cdot D_{L}$)	3.29*	22.19***	1.80

The corporations in Panel B are separated into two groups based on the dividend payout policy as a proxy for financial constraints. At column (1) of Panel B, we find that there is a statistically significant difference in magnitude between levered and unlevered firms for growth opportunities, cash flows and government debt as is noticeably expressed by the outcome of the partial F-test. We do find that cash flows are higher among zero-leverage firms than for levered ones, which is according to our expectations. Thus, this result indicate that zero-leverage firms are able to invest more with internal funding than their levered counterparts. As expected, cash flow still holds a significant positive impact on investments in a subsequent period. Results also suggest that if the federal government applies for more debt, fewer investments are made in subsequent periods by levered unconstrained corporations than their unlevered unconstrained counterparts. By all means, this could entail that levered corporations undoubtedly are dependent on leverage financing to support their investments. These findings support the belief that levered corporations act as liquidity providers by supplying relatively safe liquid assets. As soon as government debt rises, these firms will no longer act as liquidity providers due to the rising costs of corporate debt. Their leverage positions will thus have to decrease, causing investments financed by leverage to fall **(**Greenwood, Hansen and Stein, 2010).

Results from Panel B of column (1) indicate that growth opportunities do influence levered unconstrained firms more than their unlevered unconstrained counterparts. Although the magnitudes are small, we do perceive that growth opportunities influence more on subsequent investments for levered unconstrained firms. According to the underinvestment hypothesis, firms with high growth opportunities should avoid debt financing to undertake risky investments in subsequent periods when agency problems are present (Myers, 1977). These findings contradict the underinvestment hypothesis. In sum provides column (1) of Panel B evidence that unlevered unconstrained firms finance their investments mainly from internal financing resources and invest less after periods, where government debt is high potentially caused by the crowding out effect of investors on corporate debt. This crowding out effect is higher for corporations who already have obtained leverage. In addition, we find no evidence for the underinvestment hypothesis, which is in line with findings from the previous subchapter.

The results from this regression, however, should be interpreted with caution since the p-value of the second order serial correlation is extremely low (0.6%). It indicates that the instruments used for the regression are invalid, which results in the fact that we should

perceive the estimators are inefficient. As a result, we should interpret these results with caution.

Constrained firms have less differences among each other, given the smaller F-statistics and the insignificant differences between levered and unlevered firms on government debt. However, column (2) from Panel B reports that differences among levered and unlevered firms differ significantly for growth opportunities and cash flows, even though the difference between growth opportunities can be seen as negligible (0.001 versus 0.002). This suggests that unlevered non-payers convert fewer growth opportunities into real capital expenditures than levered non-dividend payers. Due to the small magnitude of growth opportunities, we can conclude that investments largely depend on internal financing resources, federal debt outstanding and lagged investments, which is consistent with the results from Panel A and column (1) from Panel B. Furthermore, unlevered non-payers do seem to have a weaker investment ability than unlevered dividend distributors, given the larger magnitudes of coefficients on lagged investments and cash flows. These results are therefore consistent with the financial constraint hypothesis.

For the regression on column (2) panel B we can further mention that this regression seems valid, based on the high p-values arising from the Hansen J-test and Arellano-Bond second order serial correlation test.

Table 5B however, displays insignificant results for five out of six p-values of the latter two mentioned tests. This means that we cannot validate the results from the underlying model (7) since the estimators are inefficient. Nevertheless, we do not discover any major deviations compared to table 5A, since the differences among zero-leverage and leverage firms for the most part are still valid. Furthermore, there is still no evidence found for the underinvestment hypothesis. More interestingly, we find evidence for hypothesis 5b since unconstrained firms are slightly more hit by changes in government debt than constrained firms. However, we do not incorporate this last finding into the conclusion due to the problems with inefficient estimators, as we mentioned before.

When we evaluate the validity of the fifth hypothesis, we have to acknowledge that we observe that the firms' ability to invest is enhanced at high growth firms in a subsequent year after periods of strategically mitigating future investment distortions. Zero-leverage policies from corporations are simply driven by it. However, since the magnitudes are both small and smaller for unconstrained unlevered firms than their levered counterparts, we have not been able to find evidence to support the intuition that zero-leverage policy is driven by a

strategic decision to mitigate investment distortions. It is likely that our sample was not susceptible to market friction problems, like adverse selection and problems between agencies, which is a necessary condition to detect strategic investment distortions (Minton and Wruck, 2001; Myers, 1977). Therefore we do have to reject hypothesis 5A. Unlevered constrained firms seem constrained because they really depend on their internal funds compared to growth opportunities. As a direct consequence they can invest in fewer growth opportunities than levered constrained firms.

Furthermore we have perceived that firms invest less after periods where government debt is high. Under unconstrained firms is this effect clearer for levered firms than for unlevered firms, where we find diverging investment behaviors between zero-leverage and levered ones. Thus, enough evidence has been found to support hypothesis 5B and therefore can it not be rejected.

Table 5B - Investment distortions, lagged for two periods

Investment decisions of zero-leverage and levered firms. This table reports results for the Tobin's Q model of investment for zero-leverage (ZL) and levered (L) firms. Panel A presents the results for all firms. Panel B devides firms on different levels of financial constraints, namely dividend payers and non-payers. F-test is a test for the difference in coefficients. Robust standard errors are reported in the parentheses. *, ** and *** indicate the t-statistic significance levels of coefficients at 10%, 5% and 1% levels, respectively. Lagged investments and cash flows are endogenous, rest exogenous. We conducted all estimators by using the two-step difference GMM method. Second order serial correlation is tested using Arellano-Bond test for autocorrelation. Its reported value is the p-value for rejecting the null hypothesis of no autocorrelation or serial correlation. See appendix A for variable definitions and abbreviations. Lastly, the estimated model is presented in the methodology as equation (7).

Dependent variable	Panel A	Panel B	
$Investments_{(t)}$	Whole sample	Dividend payers vs non payers	
	(1)	(1)	(2)
Independent variable:	All	Payers	Non-payers
$Investments_{(t-2)}$	-0.001	0.107***	-0.098
	(0.007)	(0.002)	(0.012)
$Cash\ flow_{(t-2)} \cdot D_{ZL}$	0.022***	0.043***	0.021***
	(0.003)	(0.001)	(0.004)
$Cash\ flow_{(t-2)} \cdot D_{L}$	0.062***	0.023***	0.075***
	(0.002)	(0.000)	(0.007)
$Tobin's\ Q_{(t-1)} \cdot D_{ZL}$	0.002***	0.002***	0.003***
	(0.000)	(0.000)	(0.000)
$Tobin's\ Q_{(t-1)} \cdot D_{L}$	0.003***	0.006***	0.004***
	(0.000)	(0.000)	(0.000)
$Government\ debt_{(t-2)} \cdot D_{ZL}$	-0.054***	-0.052***	-0.045***
	(0.002)	(0.001)	(0.003)
$Government\ debt_{(t-2)} \cdot D_{L}$	-0.052***	-0.054***	-0.041***
	(0.002)	(0.001)	(0.003)
Number of observations	9636	3428	5132
Number of instruments	189	189	134
Hansen J-test	0.002	0.999	0.034
2nd order serial correlation	0.000	0.000	0.004
F-test ($Cash\ flow \cdot D_{ZL} = Cash\ flow \cdot D_{L}$)	120.28***	335.83***	51.73***
F-test ($Tobin's\ Q \cdot D_{ZL} = Tobin's\ Q \cdot D_{L}$)	40.32***	693.91***	9.64***
F-test ($Govdebt \cdot D_{ZL} = Govdebt \cdot D_{L}$)	0.68	3.11*	4.06**

5.4 Robust analysis

Firstly as a robust check, we rerun the logistic regressions, but then on the firms' propensity of being almost zero-leverage with respect to the book (AZL) and market-leverage ratio (AZLM). These robustness checks are executed with other dependent variables since our primary goal was to discover whether conservative debt policy is a voluntary, value-reducing decision or whether it is driven by strategic motives (Devos et al, 2012; Dang, 2013). By conducting another regression on different proxies for debt conservatism do we produce a more robust analysis as several models on capital structure produce conservative leverage ratios well above zero (e.g., Goldstein, Ju and Leland, 2001; Korteweg, 2010). Thereafter, the logistic regressions are repeated with a different proxy to determine financial constraints is used, namely the SA-index. These regressions only conducted for companies without leverage financing.

Appendix D reports the average marginal effects of the logistic regression with firms AZL decisions as dependent variable. Reported effects from firm size and tangibility are smaller for firms who do not distribute dividends to their shareholders compared to the distributing counterparts. These results are consistent with effects reported in section 5.2, therefore do we find enough evidence to not reject the first hypothesis. Appendix D further shows that both growth opportunities and cash holdings are bigger for constrained than for unconstrained firms. This might indicate that investment distortions are not applicable within our subsample. This is against our expectations and the second hypothesis, but also consistent with previous findings. However, it could also be the case that these firm characteristics obtain limited power to explain capital structure trends over such a long sample period. Furthermore displays appendix D a significant positive effect of cash flows at panel A. Hence, there is evidence supporting the pecking order theory of financing choices. Results further show that the non-dividend paying subsample is more sensitive in changes from cash flows on having a conservative financing structure than the dividend distributing subsample, which is consistent with results from section 5.2.

Besides, for most regressions reports Panel A for GDP growth a negative sign. This means that more firms are willing to eschew debt when GDP declines. The sample is therefore overall pro-cyclical. From column (3) till (5) of Panel B can we observe that more pro-cyclicality among constrained firms than for unconstrained since the effects are more

negative. Therefore we do not discover any evidence to support the third hypothesis, which is in accordance with previous results.

Financial intermediation shows positively significant effects for all regressions in Panel A. On the other hand has Panel B more pronounced and significant results for constrained firms, which is inconsistent with previous results and not as the forth hypothesis had predicted. Panel A reports positive effects for government debt on the firms' propensity to have a AZL capital structure. At the second panel appears government debt to be more pronounced for constrained than unconstrained firms when we evaluate the magnitude and significance levels from columns (3) and (4) Panel B. These results are consistent with results from section 5.2. Thus again, did we not find any evidence to support the forth hypothesis.

When observing the effects on a firms' propensity to have a AZLM capital structure, which is reported in appendix E, can we notice that our findings on the first four hypotheses remain qualitatively unchanged in appendix D. As a result are the interpretations straightforward, therefore we discard rewriting a second analysis on results from appendix E.

In previous chapters have we been unable to find evidence for some of the predetermined hypotheses. So far has dividend policy been the only proxy used to allocate corporations into different financial constraints categories. To erase the possibility that we selected the wrong proxy for financial constraints which could lead to a bias in our results, will another analysis be made with an alternative proxy. Hadlock and Pierce (2010) suggest that size and age are also effective predictors for firms' financial constraints in the combined SA-index. For the last robustness check, we parallel the analysis from section 5.1 done for table 4C, but then by altering the financial constraint proxy based on the SA-index. Firms in the upper three quintiles are considered as unconstrained and firms in the lower two quintiles as constrained (Bessler et al, 2013). To compare the mean characteristics of constrained and unconstrained ZL firms is at first a robust sample mean analysis constructed. A comparison between results from panel B of table 3 is added to investigate potential different outcomes between the sampling groups.

Unconstrained zero-leverage firms, displayed at column (1) of Appendix F account for just 5,85% of the sample size, while their constrained counterparts at column (2) account for 11,15%. Around two third of all zero-leverage firms are thus categorized as constrained to debt financing, which is about ten percent lower than businesses assigned to the non-dividend payers group. ZL unconstrained firms hold more cash flows, have less investments, less tangible assets and make more profit than their constrained counterparts. In addition hold ZL

constrained firms higher growth opportunities and hoard more cash than their unconstrained unlevered counterparts, which is in line with the underinvestment and financial flexibility hypotheses (Dang, 2013; Myers, 1977; Myers and Maljuf, 1984). The t-statistic for growth opportunities however is less significant than in Table 3 (5% versus 1%). Overall are the t-statistics for differences in means larger than results from Table 3, which implies that size and age are a better proxy to measure the firm constraints between zero-leverage firms.

The results for the robust logistic regression, on the firms' propensity of having a zero-leverage capital structure, are reported at appendix G. For the financial constraint hypothesis we evaluate tangibility and dividend payout ratio. This is a way to avoid complexities with the dynamic term since firms are divided by size and age (Dang, 2013). Panel B clearly shows that constrained firms tend to have less tangible assets and also tend to distribute less dividends to the shareholders, which obviously is in line with the financial constraint hypothesis (Bessler et al, 2013; Hadlock and Pierce, 2010). What is more, effects from firm size are generally more negative for constrained than for unconstrained firms (except for column (3) and (5)). We also notice that the magnitude of age is small and positive. Like previous regressions this is due to multicollinearity but also given the existence of two groups of ZL firms should these outcomes be read with caution. However, still do these effects provide evidence to not reject the financial constraint hypothesis.

Moreover, results from column (1) of Panel B show no evidence to support both the underinvestment and financial flexibility hypothesis. AME from cash holdings and growth opportunities are larger for constrained than unconstrained firms. Furthermore, after leaving cash holdings out of the regression, results from columns (2) till (5) also show us that generally growth opportunities have larger effects on the constrained subsample. These results are consistent with findings in previous subchapters, although columns (3) till (5) show small differences in magnitude.

What is more, more pro-cyclical leverage patterns for unconstrained firms are observable from columns (1) and (5) when comparing them to constrained firms. These findings are not in line with hypothesis 3, which among other things foresaw counter-cyclical leverage patterns for unconstrained firms relative to economic growth rates. However, these findings are more in line with Graham, Leary and Roberts (2014), who state that macro-economic sensitivity have greater impact among credit-worthy firms compared to less credit-worthy firms. This is reflected by the magnitudes, which are further away from zero for unconstrained firms than constrained ones. Predominantly, do we observe during this thesis

pro-cyclical leverage patterns, which implies that during economic growth, less uncertainty arises on assets in place. Further does it imply that collateral value of companies together with the net worth is more likely to be higher during times of economic growth compared to economic contractions, which leads to the observed pro-cyclical leverage patterns (Korajczyk and Levy, 2003).

We can determine from Panel A that financial intermediation and government debt affect high conservative zero-leverage policies. Intermediation is not significant in columns (1) and (2) since it is highly correlated with the previous ZL decision dummy. Columns (3) and (5) of Panel B report for intermediation more pronounced positive effects for unconstrained firms then their constrained counterparts. This is in line with our expectation and the results are also consistent with section 5.1. However, we still have to admit that we did not expect to notice positive effects on the firms' propensity of having zero-leverage. At Panel B are the effects of government debt on the firms' propensity of being zero-leverage larger in magnitude for constrained firms than unconstrained ones.

Overall is pro-cyclicality observed among all firms. However, for unconstrained firms have we found a higher macro-economic sensitivity than for constrained counterparts, which was not in the line with our expectations (Graham, Leary and Roberts, 2014). Furthermore do financial intermediation and government debt influence conservative capital structure policies.

Further research on zero-leverage firms is necessary since we have found some ordinary findings in the independent variables. The fact that we did not find evidence on the underinvestment and financial flexibility hypotheses in the multivariate analysis is perhaps the most striking. Many researches (e.g. Dang, 2013; Myers, 1977) found evidence for those hypotheses, unlike this one.

The role of government debt should be exploited future research in order to gain a better understanding, since constrained firms are according to the investment distortions analysis more crowded out from investments in subsequent periods. Since we found inconclusive evidence to support the forth hypothesis, do we have to reject the forth hypothesis as well.

6. Conclusion

Korteweg (2010) concludes that corporations are underlevered relative to the optimal leverage ratio due to zero-leverage firms. He further states that unlevered firms could increase their value by 5,50% if they lever up. Finding the complete reasoning as to why should corporations stay unlevered is particularly necessary since researchers also have found a significant upward trend in the percentage of zero-leverage firms over the last decades. Furthermore, conventional capital structure theories do fail to explain the "zero-leverage phenomenon." Investigating the motivations for a firm to remain debt-free would help to assess whether this conservative debt policy is a voluntary, value-reducing choice or whether it has been driven by strategic motives (Devos et al, 2012; Dang, 2013). Dang (2013) and Devos et al. (2012) indeed show that firms are indeed not homogeneous, which is reflected by various firm characteristics. Graham, Leary and Roberts (2014 and 2015), however, find that the changes in government debt and financial intermediaries have a considerable impact on corporate policies over time. This while these factors never have been investigated on unlevered firms specifically.

We have set five main hypotheses in order to answer our the main research question; Do macroeconomic conditions and firm characteristics affect zero-leverage decisions of firms in the USA? We have done an empirical research spread over 978 corporations with a time span of fifty-three years in order to investigate this manner. Since firm age, firm size, dividend payout ratio and tangibility all provide evidence to support the financial constraint hypothesis, this hypothesis will not be rejected. For the financial flexibility and the underinvestment hypothesis, however, we have found evidence in the sample mean analysis that unconstrained zero-leverage firms generally possess both more cash and growth opportunities than their levered counterparts. However, when analyzing the motivations of zero-leverage decisions in a multivariate analysis, we did not find evidence to support these hypotheses. Graham, Leary and Roberts (2015) mention that firm characteristics over time obtain limited power to explain trends in capital structure. Probably due to the long sample period, which could have affected our results, we were not able manage to encounter some evidence for these hypotheses.

Graham, Leary and Roberts' (2014) argument, that macro-economic sensitivity have a greater impact among credit-worthy firms compared to less credit-worthy firms, seems to be more plausible than our third hypothesis. We generally observe more pro-cyclical leverage patterns for unconstrained than for constrained firms.

Although results indicate that financial intermediation and government debt affect firms' zero-leverage policies, it is still necessary that we further investigate these macro-economic characteristics in future research. We assumed that increases in financial intermediation would cause decreases in agency costs and information asymmetry problems between the financial and non-financial sector. Despite improvements in information technologies over time, Philippon (2015) explains that the cost of intermediary consultation does not decrease enough to let leverage ratios rise. This might be induced by the increased complexity of financial models, businesses and legislative restrictions on the financial sector over time. The relative increase in the cost of financial intermediation could also be caused by the increase in risk tolerance of financial intermediaries (Claessens, 2009; Philippon, 2015). Future research can shed more light on the relation between agency costs, information asymmetry, risk tolerance, the cost of intermediary consultation and financial intermediaries, so that we can diminish multiple interpretations between financial intermediation and leverage policies. In general is the magnitude for government debt larger for constrained firms than for unconstrained firms. However, we expected to notice larger effects upon unconstrained firms since we hypothesized that bonds on firms are closer substitutes for Treasuries compared to their constrained counterparts (Graham, Leary and Roberts, 2015). Even the altering of the proxy of financial constraints did not generate significant changes into our results. Hence, in our opinion needs this interaction to be investigated in a future research.

We can also acknowledge from the results that firms invest more after a period of strategically discarding leverage in order to enhance future investments. We did not find that this is more the case for unconstrained unlevered high growth firms, even though we hypothesized it. We did discover that firms invest less after periods where government debt is high and that this observation is stronger among the unconstrained subsample, which was in line with the hypothesis.

In sum, it does appear that firm characteristics together with macro-economic conditions determine conservative capital structure decisions. The assumption that firms even among a long period of time should not be treated as homogeneous based on the evidence that we found on the financial constraint hypothesis. We also observed that firms invest less after periods where government debt was high and that this observation is present among the unconstrained subsample.

Macro-economic conditions in general influence zero-leverage and almost zero-leverage decisions. How these conditions exactly influence conservative capital structures decisions should be examined further in future studies. This study and future research will help managers, policy makers and other internal and external stakeholders from corporations to make better choices based on varying levels of the state of the economy with respect to optimal capital structure. Our results clearly demonstrate that financial intermediaries and government debt are clearly the economic forces which explain the most puzzling part of zero-leverage behavior, probably because they are the most important factors in comprehensive shifts of supply and demand in the corporate bond market. Using the knowledge from this research and future studies can ultimately result in more sustainable growth in corporate investments and eventually lead to higher firm values.

Future research may also provide an opportunity to involve lease financing in the investigation. We did not investigate this since lease financing is outside our scope. Eisfeldt and Rampini (2009) have found that leasing is a common used source of funding assets under zero-leverage and constrained firms. Therefore, the addition of this element into a multivariate analysis could further improve our view of why corporations choose to finance themselves without leverage. Another opportunity for future research is to investigate what drives the zero-leverage firms to lever up. Unfortunately, this was also outside our scope. However, it could be worthwhile to investigate why and when firms decide to lever up in order to solve the ‘low-leverage puzzle’.

Lastly, executing an ordered probit or logit analysis with marginal effects could potentially add value to the ‘low-leverage puzzle.’ This method allows to assign different classes to firms into one regression as a dependent variable, like ZL, AZL and levered firms. It reveals cut off points of marginal effects, which are used to predict a specific category of a dependent variable on the highest likelihood. However, the various researchers that we discussed during the thesis decided to forgo this method. They mostly considered that constructing a sample mean analyses between the three different classes, the execution of a multivariate logit regression on ZL and AZL firms, while considering previous scientific findings, as sufficient. We leave it up to future research to use ordered probit or logit method, while expecting that no new evidence will be found due to our robust research approach. However, we still recommend to consider the ordered probit or logit method due to the accuracy of these approaches.

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Appendix A. Description of variables

Variables	Definitions	Sources: Literature
Panel A – *Firm-level variables (Abbreviation)*		
Growth opportunities / Tobins' Q (TQ)	Firms market value = (Market value of equity + book value of debt) / Total assets*	Dang (2013); Lee & Moon (2011); Marchica and Mura (2010); Strebulaev and Yang (2013)
Firm size (Size)	Log of total assets	Dang (2013);
Firm age (Age)	The difference between the year of the observation and the first date of trading according to CRSP	Dang (2013); Devos et al (2012) ; Lee & Moon
Cash holdings (Cash)	Cash and short-term investments divided by total assets*	Dang (2013);
Tangibility (Tang)	Fixed assets (Net PPE) divided by total assets*	Dang (2013)
Profitability (Profit)	Earnings before interest, taxes and depreciation (EBITDA) divided by total assets*	Dang (2013);
Cash Flows (Cashflow)	(Net income + depreciation and amortization expense + (change in deferred taxation))/total assets*	Cleary (1999)
Dividend payout ratio (Payoutratio)	Total dividends paid divided by total assets*	Dang (2013); Devos et al (2012).
Investments (Inv)	Capital expenditures divided by total assets*	Marchica and Mura (2010); Graham, Leary and Roberts; (2014)
Non-debt tax shield (N_debt)	Depreciation and Amortization divided by total assets	Dang (2013)
Book leverage-ratio (BL)	(Long term debt *(DLTT)* + Debt in current Liabilities *(DLC)*)/Total Assets (AT)	Strebulaev and Yang (2013)
Market leverage-ratio (ML)	(DLTT + DLC) / (DLTT + DLC + Fiscal year-end numbers of shares outstanding *(CSHO)* x Fiscal year-end common share price (*PRCC_F)*)	Strebulaev and Yang (2013)
Panel B – *Macro-level variables*		For Panel B: Both Literature and Data Sources
Real GDP	Annual real GDP	Datastream
Real GDP growth rate (GDPgrowth)	Annual real GDP growth rate (in %)	Dang (2013); Datastream and partially calculated manually
Term structure of interest rates (Termstr)	Difference between the 10 year yield USA government bonds and the interest rate on three-month Treasury-bills	Dang (2013); Datastream
Financial Intermediation (Interm)	Financial sectors' output from business credit and equity / Intermediate assets issued by non-financial firms.	Philippon (2015); Datasource: http://pages.stern.nyu.edu/~tphilipp/research.htm

Government Debt (GovDebt)	Ratio of Federal debt outstanding and the (nominal) gross domestic product in year *t*/GDP(t).	Graham, Leary and Roberts (2015)
Inflation (Infl)	Annual percentage of inflation	Djankov et al (2007); Data Source: World Development Indicators
BAA-AAA yield spread (BAAAAA)	Moody's Corporate BAA yield – Moody's Corporate AAA yield	Graham, Leary and Roberts (2015); Datastream
Industries	12-industry classification scheme based on their four-digit SIC codes	Bessler et al., (2013); Fama and French (1997).

Appendix B. Industries classified according to Fama and French 12 industry classification

Industry		Code used in Stata
Consumer NonDurables	-- Food, Tobacco, Textiles, Apparel, Leather, Toys	1
Consumer Durables	-- Cars, TV's, Furniture, Household Appliances	2
Manufacturing	-- Machinery, Trucks, Planes, Off furn, Paper, Com printing	3
Energy	-- Oil, Gas, and Coal Extraction and Productions	4
Chemicals	-- Chemicals and Allied Products	5
Business Equipment	-- Computers, Software and Electronic Equipment	6
Telecom	-- Telephone and Television Transmission	7
Utilities	-- Not included	dropped
Shops	-- Wholesale, Retail, and Some Services (Laundries, Repair Shops)	9
Healthcare	-- Healthcare, Medical Equipment, and Drugs	10
Finance	-- not included	dropped
Other	-- Mines, Constr, BldMt, Trans, Hotels, Bus Serv, Entertainment	12

Appendix C. Correlation Matrix

	BL	ML	Profit	Cashflow	Tang	Payoutratio	Cash	Inv	Previous	N_debt	Size	Age	TQ	Termstr	Inflation	BAAAAA	GDP growth	Interm	GovDebt
BL	1																		
ML	0.7757***	1																	
	(0.000)																		
Profit	-0.0283***	-0.0627***	1																
	(0.001)	(0.000)																	
Cashflow	-0.093***	-0.1108***	0.8026***	1															
	(0.000)	(0.000)	(0.000)																
Tang	0.235***	0.2638***	0.2276***	0.1591***	1														
	(0.000)	(0.000)	(0.000)	(0.000)															
Payoutratio	0.0351***	-0.0198**	0.1882***	0.1224***	0.164***	1													
	(0.000)	(0.0213)	(0.000)	(0.000)	(0.000)														
Cash	-0.3284***	-0.4139***	-0.3715***	-0.2387***	-0.4562***	-0.1543***	1												
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)													
Inv	-0.0084	-0.0405***	0.2189***	0.1536***	0.641***	0.0502***	-0.2017***	1											
	(0.3323)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)												
Previous	-0.3584***	-0.3208***	-0.0758***	-0.0254***	-0.1890***	-0.0616***	0.3288***	-0.0716***	1										
	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)											
N_debt	0.0629***	0.0707***	0.038***	-0.0713***	0.4271***	0.0327***	-0.1912***	0.3973***	-0.0638***	1									
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0001)	(0.000)	(0.000)	(0.000)										
Size	0.3164***	0.3623***	0.2844***	0.253***	0.2317***	0.251***	-0.4369***	-0.0107***	-0.2355***	-0.0201**	1								
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.2146)	(0.000)	(0.02)									
Age	0.143***	0.2201***	0.0961***	0.078***	0.1149***	0.2969***	-0.2665***	-0.0824***	-0.1139***	-0.0073	0.5436***	1							
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.3994)	(0.000)								
TQ	-0.1966***	-0.419***	0.0422***	0.0359***	-0.1615***	0.0021***	0.4291***	0.1093***	0.1463***	-0.0974***	-0.2673***	-0.2211***	1						
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.8105)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)							
Termstr	-0.0021	0.0453***	0.0285***	-0.0014	0.0025	0.0551***	-0.0212**	-0.0981***	0.0090	-0.0023	0.1123***	0.1308***	-0.1261***	1					
	(0.8071)	(0.000)	(0.001)	(0.8675)	(0.7682)	(0.000)	(0.0141)	(0.000)	(0.294)	(0.7936)	(0.000)	(0.000)	(0.000)						
Infl	0.0196**	0.0986***	0.0887***	0.058***	0.158***	0.127***	-0.114***	0.1922***	-0.1014***	0.0144*	0.0618***	0.0467***	-0.0734***	-0.1629***	1				
	(0.0227)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0952)	(0.000)	(0.000)	(0.000)	(0.000)					
BAAAAA	-0.0186**	-0.017**	-0.0105	-0.0305***	-0.0521***	-0.014	0.0442***	-0.1147***	0.0107	-0.0094	0.0011	0.0413***	-0.0808***	0.2196***	-0.3325***	1			
	(0.0306)	(0.0484)	(0.224)	(0.0004)	(0.000)	(0.1049)	(0.000)	(0.000)	(0.213)	(0.274)	(0.894)	(0.000)	(0.000)	(0.000)	(0.000)				
GDPgrowth	0.0036	-0.0306***	0.0212**	0.0036	0.0741***	0.0058	-0.0182**	0.1573***	-0.0565***	0.0041	-0.0987***	-0.0939***	0.1268***	-0.6574***	0.0918***	-0.2754***	1		
	(0.6752)	(0.0004)	(0.0139)	(0.6738)	(0.000)	(0.5043)	(0.0346)	(0.000)	(0.000)	(0.6343)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)			
Interm	-0.0309***	-0.0630***	-0.1376***	-0.0989***	-0.1751***	-0.1998***	0.1254***	-0.1688***	0.1328***	0.0384***	-0.0407***	-0.0849***	0.0952***	-0.0348***	-0.5064***	-0.1022***	-0.1069***	1	
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0002)	(0.000)	(0.000)	(0.000)		
GovDebt	0.0065	-0.0521***	-0.0163*	0.0214**	-0.1873***	-0.033***	0.0521***	-0.2445***	0.1314***	-0.0746***	0.1037***	0.1231***	-0.0243***	0.065***	-0.5783***	0.2533***	-0.2957***	0.5902***	1
	(0.4483)	(0.000)	(0.0584)	(0.0132)	(0.000)	(0.0001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0048)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

*The individual correlation is statistically significant at: ***1%, **5% or *10% significance level (1-tailed). P-values are reported below the correlations in parentheses.*

Appendix D. AZL - Governmental + Financial Intermediation

Logisitc regression of firms' almost zero leverage decisions. This table reports the average marginal effects and the standard errors from the logisitic regressions of firms' AZL decisions. Panel A exhibits the results of all firms. Panel B exhibits the results for dividend payers and non-dividend payers. The standard errors clustered at firm level are reported in parentheses, *, **and *** indicate significance at the 10%, 5% and 1% levels, respectively. See appendix A for variable definitions.

	Panel A. Whole sample					Panel B. Dividend payers versus non-payers									
	(1)	(2)	(3)	(4)	(5)	(1)		(2)		(3)		(4)		(5)	
	All	All	All	All	All	Payers	Non Payers	Payers	Non Payers	Payers	Non Payers	Payers	Non Payers	Payers	Non Payers
Previous AZL decision	0.289***	0.298***	0.315***	-	-	0.195***	0.346***	0.199***	0.355***	0.212***	0.373***	-	-	-	-
	(0.003)	(0.003)	(0.003)	-	-	(0.005)	(0.003)	(0.006)	(0.003)	(0.006)	(0.003)	-	-	-	-
Non-debt tax shield	0.145	0.141	-0.075	0.085	-0.005	0.190	0.132	0.232	0.088	0.191	-0.228	0.250	-0.155	0.334	-0.333
	(0.111)	(0.126)	(0.134)	(0.352)	(0.337)	(0.145)	(0.146)	(0.160)	(0.167)	(0.187)	(0.164)	(0.548)	(0.417)	(0.518)	(0.401)
Cash flows	0.146***	0.158***	0.119***	0.246***	0.249***	0.087***	0.179***	0.098***	0.188***	0.079***	0.139***	0.214***	0.264***	0.212***	0.275***
	(0.015)	(0.016)	(0.016)	(0.035)	(0.034)	(0.020)	(0.020)	(0.021)	(0.021)	(0.020)	(0.021)	(0.053)	(0.045)	(0.050)	(0.044)
Tangibility	-0.083***	-0.097***	-0.168***	-0.409***	-0.409***	-0.006	-0.136***	-0.017	-0.153***	-0.074***	-0.227***	-0.114	-0.561***	-0.125*	-0.552***
	(0.020)	(0.03)	(0.025)	(0.069)	(0.065)	(0.021)	(0.028)	(0.024)	(0.031)	(0.026)	(0.032)	(0.074)	(0.081)	(0.074)	(0.078)
Size	-0.030***	-0.031***	-0.037***	-0.088***	-0.095***	-0.018***	-0.037***	-0.017***	-0.039***	-0.022***	-0.046***	-0.052***	-0.103***	-0.061***	-0.109***
	(0.002)	(0.002)	(0.003)	(0.006)	(0.006)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.008)	(0.008)	(0.008)	(0.008)
Age	-0.001**	-0.001	-0.001	-0.001	-0.001	-0.000*	-0.001	-0.000	-0.001	-0.000	-0.001	-0.000	0.000	-0.001	0.002**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)	(0.001)	(0.002)
Dividend Payout Ratio	0.260*	0.386**	0.323*	0.771	0.386	0.195	0.000	0.286**	0.000	0.324**	0.000	1.446***	0.000	1.338***	0.000
	(0.145)	(0.168)	(0.172)	(0.570)	(0.467)	(0.123)	(0.000)	(0.136)	(0.000)	(0.136)	(0.000)	(0.413)	(0.000)	(0.379)	(0.000)
Cash holdings	0.212***	0.214***	-	-	-	0.184***	0.234***	0.191***	0.232***	-	-	-	-	-	-
	(0.015)	(0.017)	-	-	-	(0.023)	(0.020)	(0.025)	(0.022)	-	-	-	-	-	-
Growth Opportunities	0.010***	0.012***	0.019***	0.041***	0.038***	0.006***	0.013***	0.007***	0.014***	0.014***	0.023***	0.027***	0.048***	0.022***	0.045***
	(0.001)	(0.002)	(0.002)	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.006)	(0.005)	(0.006)	(0.005)
Term Structure	0.012**	0.010	-	-	-	0.003	0.023**	-0.001	0.021	-	-	-	-	-	-
	(0.006)	(0.008)	-	-	-	(0.007)	(0.011)	(0.007)	(0.014)	-	-	-	-	-	-
Inflation	-0.032	0.104	0.011	0.160	-1.091***	0.013	0.314	-0.073	0.670	0.099	0.182	0.080	0.232	-0.682*	-0.991*
	(0.165)	(0.242)	(0.211)	(0.369)	(0.356)	(0.144)	(0.334)	(0.195)	(0.509)	(0.247)	(0.402)	(0.401)	(0.560)	(0.383)	(0.512)
BAA-AAA yield	0.316	0.724***	0.886***	0.729**	-0.041	0.390	0.299	0.551*	0.890***	0.790**	0.987***	0.164	1.108**	-0.082	0.099
	(0.202)	(0.224)	(0.230)	(0.339)	(0.310)	(0.272)	(0.295)	(0.302)	(0.327)	(0.316)	(0.331)	(0.482)	(0.456)	(0.429)	(0.441)
GDP growth rate	-0.002	-0.002	-0.005***	-0.009***	-0.016***	0.001	-0.004	-0.000	-0.003	-0.000	-0.009***	-0.002	-0.011***	-0.008***	-0.018***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.004)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Financial Intermediation	-	0.047***	0.046***	0.103***	-	-	-	0.017	0.065***	0.024	0.061***	0.031	0.133***	-	-
	-	(0.017)	(0.018)	(0.031)	-	-	-	(0.023)	(0.024)	(0.024)	(0.024)	(0.043)	(0.043)	-	-
Government Debt	-	0.010	0.015	0.327***	0.088**	-	-	-0.010	0.039	0.018	0.023	0.208***	0.347***	0.046	0.060*
	-	(0.030)	(0.030)	(0.063)	(0.034)	-	-	(0.033)	(0.053)	(0.034)	(0.052)	(0.069)	(0.099)	(0.037)	(0.031)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	13461	11320	11320	11320	13461	5238	8223	4312	7008	4312	7008	4312	7008	5238	8223
McFadden's Adj. Pseudo R-squared	0.628	0.611	0.595	0.240	0.239	0.644	0.581	0.621	0.562	0.601	0.547	0.243	0.166	0.243	0.170
Financial Intermediation	No	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No

Appendix E. AZLM - Governmental + Financial Intermediation

Logisitc regression of firms' almost zero leverage decisions with respect to market leverage (ML). This table reports the average marginal effects and the standard errors from the logisitic regressions of firms' AZLM decisions. Panel A exhibits the results of all firms. Panel B exhibits the results for dividend payers and non-dividend payers. The standard errors of clustered at firm level are reported in parentheses, *, **and *** indicate significance at the 10%, 5% and 1% levels, respectively. See appendix A for variable definitions.

	Panel A. Whole sample					Panel B. Dividend payers versus non-payers									
	(1)	(2)	(3)	(4)	(5)	(1)		(2)		(3)		(4)		(5)	
	All	All	All	All	All	Payers	Non Payers	Payers	Non Payers	Payers	Non Payers	Payers	Non Payers	Payers	Non Payers
Previous AZLM decision	0.287***	0.288***	0.303***	-	-	0.226***	0.322***	0.224***	0.321***	0.236***	0.336***	-	-	-	-
	(0.003)	(0.004)	(0.004)	-	-	(0.006)	(0.004)	(0.007)	(0.004)	(0.007)	(0.004)	-	-	-	-
Non-debt tax shield	0.148	0.139	-0.018	0.245	0.220	0.120	0.085	0.046	0.091	0.063	-0.162	0.685	-0.241	0.953	-0.348*
	(0.120)	(0.132)	(0.143)	(0.361)	(0.345)	(0.205)	(0.148)	(0.217)	(0.166)	(0.250)	(0.167)	(0.706)	(0.388)	(0.664)	(0.370)
Cash flows	0.150***	0.167***	0.132***	0.235***	0.233***	0.082***	0.180***	0.097***	0.196***	0.079***	0.155***	0.190***	0.251***	0.189***	0.255***
	(0.017)	(0.021)	(0.018)	(0.040)	(0.039)	(0.024)	(0.021)	(0.025)	(0.024)	(0.025)	(0.023)	(0.060)	(0.049)	(0.055)	(0.048)
Tangibility	-0.080***	-0.091***	-0.146***	-0.377***	-0.369***	-0.028	-0.111***	-0.040	-0.122***	-0.084***	-0.179***	-0.255***	-0.422***	-0.241***	-0.418***
	(0.019)	(0.021)	(0.023)	(0.064)	(0.062)	(0.023)	(0.026)	(0.025)	(0.028)	(0.026)	(0.029)	(0.087)	(0.070)	(0.085)	(0.069)
Size	-0.032***	-0.033***	-0.038***	-0.083***	-0.090***	-0.018***	-0.042***	-0.015***	-0.044***	-0.019***	-0.051***	-0.043***	-0.104***	-0.055***	-0.107***
	(0.002)	(0.003)	(0.003)	(0.006)	(0.006)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.008)	(0.007)	(0.009)	(0.007)
Age	-0.001	-0.000	-0.000	-0.000	-0.000	-0.000	-0.001	-0.000	-0.001	-0.000	-0.001***	-0.000	0.000	-0.001	0.001
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Dividend Payout Ratio	0.390**	0.572***	0.538***	1.462***	0.787	0.281	0.000	0.480***	0.000	0.544***	0.000	2.002***	0.000	1.579***	0.000
	(0.179)	(0.193)	(0.194)	(0.558)	(0.484)	(0.172)	(0.000)	(0.172)	(0.000)	(0.170)	(0.000)	(0.475)	(0.000)	(0.454)	(0.000)
Cash holdings	0.182***	0.185***	-	-	-	0.169***	0.191***	0.174***	0.193***	-	-	-	-	-	-
	(0.017)	(0.018)	-	-	-	(0.031)	(0.022)	(0.032)	(0.022)	-	-	-	-	-	-
Growth Opportunities	0.031***	0.033***	0.041***	0.105***	0.100***	0.028***	0.033***	0.028***	0.036***	-0.035***	0.044***	0.100***	0.102***	0.092***	0.100***
	(0.002)	(0.003)	(0.003)	(0.008)	(0.007)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.012)	(0.008)	(0.012)	(0.008)
Term Structure	0.025***	0.023***	-	-	-	0.021***	0.030***	0.016*	0.032**	-	-	-	-	-	-
	(0.006)	(0.007)	-	-	-	(0.007)	(0.011)	(0.009)	(0.013)	-	-	-	-	-	-
Inflation	0.157	0.224	-0.061	0.675*	-0.422	0.066	0.446	0.029	0.746	0.008	0.011	0.982**	0.125	-0.013	-0.765*
	(0.153)	(0.237)	(0.225)	(0.349)	(0.350)	(0.141)	(0.346)	(0.227)	(0.496)	(0.234)	(0.395)	(0.396)	(0.489)	(0.391)	(0.454)
BAA-AAA yield	0.201	0.473**	0.575**	0.760**	0.019	0.091	0.286	0.313	0.631*	0.565*	0.655**	0.787	0.928**	0.196	0.040
	(0.202)	(0.227)	(0.232)	(0.325)	(0.294)	(0.270)	(0.284)	(0.301)	(0.320)	(0.315)	(0.324)	(0.490)	(0.428)	(0.445)	(0.403)
GDP growth rate	0.000	0.001	-0.005***	-0.010***	-0.016***	0.003	-0.002	0.002	0.000	-0.001	-0.008***	-0.003	-0.011***	-0.009***	-0.019***
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Financial Intermediation	-	0.038**	0.030*	0.123***	-	-	-	0.034	0.046*	0.027	0.041*	0.074	0.153***	-	-
	-	(0.018)	(0.018)	(0.030)	-	-	-	(0.024)	(0.024)	(0.025)	(0.024)	(0.046)	(0.041)	-	-
Government Debt	-	0.016	0.003	0.222***	0.052***	-	-	-0.015	0.066	-0.009	0.035	0.142*	0.308***	0.008	0.067**
	-	(0.031)	(0.031)	(0.062)	(0.035)	-	-	(0.036)	(0.052)	(0.036)	(0.050)	(0.074)	(0.093)	(0.024)	(0.030)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	13461	11320	11320	11320	13461	5238	8223	4312	7008	4312	7008	4312	7008	5238	8223
McFadden's Adj. Pseudo R-squared	0.643	0.637	0.626	0.311	0.301	0.659	0.599	0.653	0.590	0.643	0.579	0.307	0.252	0.290	0.247
Financial Intermediation	No	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No

Appendix F - Robust Sample mean analysis, SA index

Characteristics of zero-leverage firms. Panel C compares the mean of firm-specific characteristics of ZL and levered firms. Based on the SA-Index index we divide the sample further into constrained and unconstrained firms. Firms are sorted into quintiles based on the yearly average and firms will be considered as constrained when they are within the lowest two quintiles and unconstrained if otherwise. The means are calculated bytaking the average equally across observations. See appendix A for variable definitions and table 3 for the normal analysis. *, ** and *** indicate that differences are significant at the 10%, 5% and 1% levels, respectively.

Panel C. Zero-leverage Big SA and Small SA vs levered big SA and small SA

Variable	ZL Big SA	ZL Small SA	Levered Big SA	Levered Small SA	T-statistic for diff. in means	T-statistic for diff. in means	T-statistic for diff. in means
	(1)	(2)	(3)	(4)	(1) vs (2)	(1) vs (3)	(2) vs (4)
Book leverage	0.000	0.000	0.233	0.155	-	36.751***	30.437***
Cash flow	0.115	0.024	0.083	0.033	10.113***	-6.939***	1.352
Cash holdings	0.309	0.450	0.139	0.268	-15.582***	-28.028***	-25.968***
Payoutratio	0.011	0.005	0.012	0.007	6.368***	2.001**	3.060***
Firm Age	13.271	7.765	19.985	6.499	18.408***	10.658***	-7.462***
Firm Size	6.195	4.502	7.177	4.911	38.232***	18.876***	10.209***
Growth opportunities	2.713	2.952	1.719	2.454	-2.453**	-18.875***	-7.754***
Investments	0.054	0.048	0.059	0.062	2.878***	2.785***	8.296***
Market leverage	0.000	0.000	0.207	0.113	-	29.798***	27.708***
Non-debt tax shield	0.040	0.039	0.044	0.045	0.413	4.638***	6.834***
Profitability	0.165	0.061	0.142	0.093	12.917***	-6.262***	5.412***
Tangibility	0.185	0.135	0.280	0.209	7.857***	13.142***	14.818***
Number of observations	787	1501	7274	3899			

Appendix G. Robust ZL - Governmental + Financial Intermediation

Logisitc regression of firms' zero leverage decisions. This table reports the average marginal effects and the standard errors from the logisitic regressions of firms' zero leverage (ZL) decisions.
Panel A exhibits the results of all firms. Panel B exhibits the results for constrained and unconstrained firms based on the SA-index. The standard errors clustered at firm level are reported in parentheses,
*, **and *** indicate significance at the 10%, 5% and 1% levels, respectively. See appendix A for variable definitions. Industry dummies are included in all regressions. Unconstr. means unconstrained group.

	Panel A. Whole sample					Panel B. Constrained vs unconstrained firms											
	(1)	(2)	(3)	(4)	(5)	(1)		(2)		(3)		(4)		(5)		(6)	
	All	All	All	All	All	Unconstr.	Constrained	Unconstr.	Constrained	Unconstr.	Constrained	Unconstr.	Constrained	Unconstr.	Constrained	Unconstr.	Constrained
Previous ZL decision	0.216***	0.216***	0.223***	-	-	0.150***	0.326***	0.147***	0.333***	0.149***	0.348***	-	-	-	-	-	-
	(0.004)	(0.004)	(0.005)	-	-	(0.005)	(0.006)	(0.006)	(0.007)	(0.006)	(0.008)	-	-	-	-	-	-
Non-debt tax shield	0.046	0.059	-0.097	-0.438	-0.504*	0.111	0.032	0.183*	0.133	0.145	-0.289	-0.069	-0.990**	-0.136	-1.082***	-0.154	-1.050**
	(0.087)	(0.098)	(0.103)	(0.278)	(0.276)	(0.104)	(0.165)	(0.111)	(0.187)	(0.113)	(0.195)	(0.359)	(0.466)	(0.364)	(0.457)	(0.349)	(0.469)
Cash flows	0.065***	0.056***	0.039***	0.088***	0.100***	0.067***	0.090***	0.055**	0.077***	0.051**	0.041**	0.180***	0.042	0.209***	0.065	0.201***	0.052
	(0.012)	(0.012)	(0.012)	(0.030)	(0.031)	(0.023)	(0.020)	(0.023)	(0.021)	(0.019)	(0.020)	(0.055)	(0.046)	(0.059)	(0.046)	(0.057)	(0.046)
Tangibility	-0.038**	-0.035*	-0.076***	-0.193***	-0.188***	-0.039**	-0.049	-0.040**	-0.057	-0.055***	-0.141***	-0.143*	-0.314***	-0.155**	-0.280***	-0.159**	-0.355***
	(0.016)	(0.018)	(0.019)	(0.061)	(0.058)	(0.018)	(0.034)	(0.019)	(0.039)	(0.019)	(0.039)	(0.074)	(0.106)	(0.072)	(0.100)	(0.075)	(0.108)
Size	-0.017***	-0.016***	-0.020***	-0.053***	-0.060***	-0.013***	-0.022***	-0.013***	-0.021***	-0.014***	-0.026***	-0.049***	-0.046***	-0.056***	-0.062***	-0.046***	-0.042***
	(0.002)	(0.002)	(0.002)	(0.006)	(0.006)	(0.002)	(0.004)	(0.002)	(0.005)	(0.002)	(0.005)	(0.010)	(0.012)	(0.009)	(0.011)	(0.009)	(0.012)
Age	-0.000	-0.001*	-0.001**	-0.000	-0.000	-0.000	0.001	-0.000	-0.002	-0.000	-0.003**	-0.001	0.008***	-0.001	0.009***	-0.001	0.010***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.003)	(0.001)	(0.003)	(0.000)	(0.003)
Dividend Payout Ratio	0.159	0.181	0.146	0.432**	0.328	0.053	0.300	0.197	0.115	0.196	-0.021	0.925**	-0.264	0.496***	-0.021	0.894**	-0.327
	(0.105)	(0.125)	(0.124)	(0.350)	(0.317)	(0.135)	(0.202)	(0.187)	(0.223)	(0.179)	(0.229)	(0.405)	(0.463)	(0.368)	(0.425)	(0.345)	(0.479)
Cash holdings	0.118***	0.116***	-	-	-	0.068***	0.200***	0.061***	0.196***	-	-	-	-	-	-	-	-
	(0.012)	(0.013)	-	-	-	(0.015)	(0.021)	(0.016)	(0.023)	-	-	-	-	-	-	-	-
Growth Opportunities	0.003***	0.003***	0.007***	0.014***	0.014***	0.002	0.005**	0.002	0.005**	0.004**	0.010***	0.016***	0.017***	0.017***	0.017***	0.015***	0.017***
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.005)	(0.003)	(0.004)	(0.003)	(0.005)
Term Structure	-0.001	0.006	-	-	-	0.004	-0.011	0.003	0.004	-	-	-	-	-	-	-	-
	(0.006)	(0.007)	-	-	-	(0.006)	(0.012)	(0.007)	(0.015)	-	-	-	-	-	-	-	-
Inflation	-0.192	0.206	0.096	0.529	-0.358	-0.024	-0.446	0.177	0.023	0.102	-0.065	0.493	-0.269	-0.024	-1.333**	-0.515	-1.912***
	(0.141)	(0.220)	(0.187)	(0.339)	(0.329)	(0.126)	(0.297)	(0.200)	(0.503)	(0.185)	(0.397)	(0.475)	(0.551)	(0.412)	(0.554)	(0.499)	(0.587)
BAA-AAA yield	-0.072	-0.023	0.068	-0.429	-0.988***	-0.005	-0.165	0.140	-0.272	0.185	-0.091	0.059	-0.990*	-0.527*	-1.516***	0.325	-0.898
	(0.171)	(0.197)	(0.195)	(0.296)	(0.277)	(0.171)	(0.352)	(0.202)	(0.404)	(0.199)	(0.401)	(0.349)	(0.570)	(0.310)	(0.531)	(0.330)	(0.572)
GDP growth rate	-0.003*	0.000	-0.002	-0.006***	-0.012***	-0.003*	-0.003	-0.001	0.001	-0.002	-0.000	-0.006***	-0.003	-0.012***	-0.011***	-0.010***	-0.009**
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)	(0.001)	(0.003)	(0.002)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)
Financial Intermediation	-	0.011	0.010	0.087***	-	-	-	0.011	0.017	0.011	0.015	0.095***	0.071	-	-	0.133***	0.128***
	-	(0.013)	(0.013)	(0.025)	-	-	-	(0.014)	(0.028)	(0.014)	(0.028)	(0.031)	(0.050)	-	-	(0.029)	(0.048)
Government Debt	-	0.081***	0.078***	0.367***	0.188***	-	-	0.067**	0.113**	0.065**	0.121**	0.262***	0.410***	0.139***	0.146**	-	-
	-	(0.027)	(0.026)	(0.055)	(0.028)	-	-	(0.028)	(0.056)	(0.027)	(0.052)	(0.066)	(0.101)	(0.036)	(0.061)	-	-
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes 2)	Yes	Yes 2)	Yes	Yes 2)	Yes	Yes 2)	Yes	Yes 2)	Yes	Yes 2)	Yes
Number of observations	13461	11320	11320	11320	13461	7255	5400	6061	4543	6061	4543	6061	4543	7255	5400	6061	4543
McFadden's Adj. Pseudo R-squared	0.624	0.607	0.596	0.191	0.191	0.652	0.549	0.639	0.526	0.636	0.511	0.204	0.101	0.195	0.105	0.195	0.095
Financial Intermediation	No	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes

1) industy 4 & 5 are dropped, due to perfect predictions
2) Industries 4, 5 and 7 dropped, due to perfect predictions