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Leverage and firm growth: The European evidences

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Abstract

This thesis sets out to provide contribution to the on-going discussion of firm leverage and its effects on firm growth (measured in employment, capital expenditure growth and net investments) by applying similar methods as originated in Lang et al. (1996). However, this study presents additional insights dissimilar to existing research in three ways: 1) expand scope by including smaller firms with annual net sales less than $1 billion 2) verify US results in European setting and 3) explore deeper into the data set by introducing additional variables into the mix, such as firm size and legal systems to which the firms belong to.

A set of European data from 13 countries during 1990-2010 is used in this study. Firms included must have a SIC code between 2000 and 3999 (in order to minimize regulation effects) and at least $500 million annual sales in any given year in 1990 USD. The final data sample consists of 523 companies and around 5,000-6,000 firm-year observations depending on which one of the five growth measures are investigated: net investment, one and three-year employment growth rate and one and three-year capital expenditure growth rate. In addition to book leverage, the independent variable, sales growth, capital expenditures, cash flow and Tobin's q are added to the regression model as control variables.

The pooled European data of 13 countries shows that there is a comparable level of statistically significant negative correlation between book leverage and firm growth as the US results, only slightly stronger. There are also convincing evidence to the notion of stronger limiting effects of debt for firms with poor growth opportunities (approximated by low Tobin's q). However, in contrast to previous studies, no correlation is found between leverage and capital expenditure in this study.

In addition, the regression results shows partial support to the hypothesis of company size being inversely related to the severity of debt hindering growth. However, such effect is only limited to the smallest 30% of the firms in Europe concerning net investment but consistently so for all firms with 1-year employment growth measures.

With regards to legal systems, the negative correlation between book leverage and net investment is found to be the strongest in the French legal system, where it provides the least amount of investor protection. Hence results show some support for identifying legal system as a factor in leverage/debt dynamic but such conclusion is far from irrefutable.

Keywords Leverage, debt, firm growth, legal system, Tobin's q, growth opportunities

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1 INTRODUCTION

1.1 Background and Motivation

Pinpoint the perfect balance between the levels of debt and equity is s topic that has been hotly debated by generations of academics since Modigliani and Miller's (MM's) celebrated papers (Modigliani and Miller, 1958; Modigliani and Miller, 1963) published nearly half a century ago. Their analysis of irrelevance of capital structure suggests in a perfect capital market where personal and corporate taxes are absent and firm's financing and investment decisions are independent, shareholder's wealth does not dependent on capital structure.

The idealistic setting of MM's theory stirs up numerous follow-up researches that investigates how capital structure decisions matter when some of MM's assumptions are relaxed. Studies have shown evidences indicating changes in capital structure convey information to investors, e.g. Smith (1986) and Harris and Raviv (1991), but the intricate nature of capital structure decision inner workings still puzzle researches as how firms choose to issue debt, equity and hybrid securities (Kjellman and Hansén, 1995). There are even debates on whether capital structure is of dynamic or static nature: Lemmon et al. (2008) point out that overtime capital structure tends to converge towards a particular level while Korajczyk and Levy (2003) show empirical results proving capital structures do indeed vary.

Therefore, MM's elegant capital structure irrelevance theory is generally regarded as purely a theoretical framework, a reference point upon which branches of research on capital structure are rendered possible. One particular branch, which is of special usefulness to this study, concerns about what elements determine capital structure in reality and consequently how capital structures affect firms.

Majority of inquiries of this nature focuses on firm-level dynamics. The two most influential theoretical foundations are the agency approach of Jensen and Meckling (1976) and asymmetric information approach pioneered by Ross (1977). Agency theories claim that capital structure is the end result of tradeoffs between the agency costs (e.g. asset substitution effect) and benefits (e.g. disciplinary function of debt that prevents managers form empire building) of debt. Theories based on information asymmetry between the company insiders and external stakeholders suggest such information gap can potentially be reduced through signaling via the firm's capital structure.

Focusing on firm-level determinants is not without its reasons: Kayo and Kimura (2010) show that firm characteristics are responsible for 42% of the variance in leverage of companies whereas industry and country variables only account for 12% and 3%, respectively. However, this is not to say that country factors are not important, especially in the setting of this thesis where the empirical data set comes from 13 countries. Some of the most important country-level determinants include legal environment, bank/market orientation and even cultural factors (e.g., LLSV, 1997; de Jong et al., 2008 and Chui et al., 2002).

Controversiality on such a fundamental element of finance theory is one of the original reasons that draw my interests towards this topic. Amongst countless potential consequences of leverage, one that is not clearly understood but has many important implications is how leverage affects firms' future investments and growth. Despite collective efforts and mounting academic interests, there is very little consensus on this particular matter. On one side of the issue, there is the argument that a firm's capital structure is essentially irrelevant. Companies with solid new projects are able to finance growth regardless of how their balance sheets are structured. This is the view of Miller (1977) who states "we should not waste our limited worrying capacity on second-order and largely self-correcting problems like financial leveraging". On the other hand, Myers (1977) makes an extremely compelling case on how leverage could negatively affect firm growth. He argues that such negative effects exist due to agency conflicts between shareholders and bondholders. Highly levered firms may pass on investment opportunities as raising financing for such projects represents a transfer of wealth from shareholders who make the investment to the bondholders who essentially contribute nothing. To safeguard shareholder wealth, company management in the situation would choose to forego investing due to consequence of debt overhang.

The second motivation for studying interaction between leverage and growth is due to the potential significant economic impacts of gaining understanding of such relationship. Growth figures are of paramount importance to firms of all sizes and are watched carefully by everyone from customers to industry analysts. If there is indeed a correlation or even causality that exists between leverage and firm growth measures, understanding the inner workings of such mechanisms could help managers to set up the correct level of leverage.

Lastly, there is a void in this research topic as every single one of previous studies, e.g. Lang et al, (1996) and Hurme (2010), is based on the US data only. European Union, which the data set included in this thesis is a subset of, ranked as the biggest economic entity in 2010 by

the International Monetary Fund. There are both academic and commercial interests calling for more thorough investigation on how growth is affected by firm leverage amongst European companies. After all, comprehension of a potentially vital component that may limit firm growth given the size of European economy should not be overlooked. In addition, it would be highly interesting to see if the perceived institutional differences between Europe and the US are large enough to warrant a discrepancy in how leverage is related to firm growth.

1.2 Objective and Contribution

This thesis sets out to investigate the relationship between book leverage and firm growth measures in the European context between 1990 and 2010. The reason to use book measure instead of market measure of leverage is to avoid giving too much importance to recent changes in equity values of the firm, which the market measures would inevitably incorporate. The purpose is to contribute to the discussion of leverage/firm growth interactions by testing and expanding on a correlation that has found to be statistically significant previously based on the North American data set.

This thesis is constructed similarly as previous studies on the same topic, e.g. Lang et al, (1996) and Hurme (2010). The same three main measures of growth are used: (1) capital expenditure in excess of depreciation normalized by fixed asset, in another word, net investment, (2) the rate of growth of employment and (3) the rate of growth of capital expenditures, to see if the previously documented negative correlation between leverage and firm growth measures in the US context is equally significant in Europe. I also include some previously unexamined factors such as firm size and legal systems in which the company operates to expand the complexity of the study.

So the research questions of this thesis are as following:

1. *Is there a negative correlation between leverage and firm growth in Europe? Provided such negative relationship is found, how does it compare and contrast to the nature of that amongst US companies documented in previous studies?*

2. *How do company size, legal system and anticipated growth opportunities (measured in Tobin's q) affect leverage/firm growth dynamics?*

The first research question is related to Lang et al. (1996) and Hurme (2010), who study relationships between leverage and firm growth in the US. Given the numerous institutional differences between the two continents, it would be very interesting to see if the same results hold in Europe. Validation of their findings in the European setting is carried out by constructing variables following that of Lang et al. (1996) at the pooled European data set level first. Then I also try to find out if such relationship differs between companies who face different sets of growth opportunities and whether or not it holds after controlling for industry effects.

This is a particular interesting question to ask especially in today's economy, where companies are becoming ever more global. Understanding potential different implications of leverage on firm growth depending on geographical boundaries would provide managers with insights on how to optimize capital structures on a multinational level.

The second research question mainly aims to investigate the robustness of the found correlation between leverage and firm growth. In practice, the pooled European data is divided into sub groups based on a set of firm characteristics, e.g. company size and country level factors, e.g. legal systems. The question to be asked here is would the association found on pan-European level also be present on subgroup level?

Contributions to the existing literature

There has been a large quantity of literature previously on the topic of how leverage relates to investment policies and firm growth. However an unambiguous consensus on the subject is still missing and these studies employ methods that are drastically different than the direct approach used in this thesis. Whited (1992) and Cantor (1990) show that investments of highly leveraged firms are more sensitive to changes in cash flows and earnings than the less leveraged companies. Opler and Titman (1994) investigate the relationship between leverage and sales growth yield the result that sales growth is lower for firms in three highest deciles of leverage, meaning slow sales growth is associated with high level of leverage. In addition, they stress that this is particularly true within the distressed industries. Sharpe (1994) demonstrates sales growth has an effect on employment but it is a function of firm leverage. Studies that have used similar methods as these applied in this study, such as McConnell and Servaes (1995) and Lang et al (1996) use pooling regressions and found statistically significant correlation between leverage and growth in Canada and the US.

The contributions of this thesis to existing line of literature are of many levels. First, I test the previous findings of McConnell and Servaes (1995) in Canada and Lang et al (1996) and Hurme (2010) in the US with a larger and more heterogeneous European sample. In addition, I introduce several previously unexamined factors into the mix. The main areas of contribution are as following:

1. First, the scope of study is expanded. In contrary to previous papers (see, for instance Lang et al., 1996 and Hurme, 2010) that set a minimal limit of $1 billion sales per annual for observations to be included. This thesis also includes smaller firm, with observations with annual sales of as low as $500 million in 1990 US dollars. As there are less sales limitations compared to prior studies, my results extend the implication to smaller firms. This validates and improves credibility of previous studies as well as test universality of the conclusions drawn.

2. Second, previously the negative relationships between leverage and firm growth are found to be statistically significant only in North America in two countries, the US and Canada. So far to my knowledge there have not been any equivalent studies done using European data set. My contribution is to reveal any differences, if there are any, in dynamics between capital structure and firm growth between European and North American firms.

3. The data set is split into several subgroups according to company sizes and legal environments in which the company operates in and separate regressions of leverage are ran on growth measures. By looking at the data from novice perspective, I am able to contribute to existing research in terms of providing a wider view on the matter.

1.3 Main Findings

Analysis on the pooled European data of 13 countries included in this study shows that there is a comparable level of statistically significant negative correlation between book leverage and firm growth. In terms of magnitude, the European firms show slightly stronger correlation than their US counterparts on pooled data level (see Lang et al., 1996 and Hurme, 2010 for the US results). Previously found negative correlations between leverage and investment and employment growth measures are found to hold in Europe even after controlling for industry effects, confirming previous findings in McConnell and Servaes (1995), Lang et al. (1996) and Hurme, (2010). However, in contrast to every other study of the similar nature, leverage

appears to be not negatively correlated with firm capital expenditures in Europe (this is found not to be the case in only one regression settings out of the few dozen conducted in this study).

Although a naïve liquidity theory suggests that leverage puts constrains on firms' free cash flow and hence limit their growths for all, modern finance literature implies there should be stronger limiting effects of debt for these firms with poor growth opportunities (approximated by low Tobin's q). At any given level leverage, importance of capital structure decrease as the availability of growth opportunities increases. The numbers indeed support this notion: although both high Tobin's q and low Tobin's q firms show negative correlations between leverage and investment and employment growth measures, underinvestment phenomenon appears to be much more severe amongst low Tobin's q firms than their high Tobin's q peers. Industry adjusted data demonstrates the same results, illustrating the fact that the magnitude of negative correlation observed is a function of availability of growth opportunities, not only across industries but within the industry as well. However, the previously well documented negative correlation between leverage and capital expenditure is missing when the data is divided by growth opportunities.

All in all, my results largely confirm the findings of previous studies on North American firms, with the exception of lack of association of any sort between capital expenditure and book leverage.

The second objective of this study is to examine growth/leverage dynamics in a broader scope by evaluating the effects of company size and legal systems. Similar to the logical reasoning behind why there should be differences in the degree of negative correlation between leverage and firm growth, there also should be a difference between larger and smaller firms. If leverage truly has a limiting effects on firm growth, it should be less prevalent for large companies as they have access to a wider range of financing options, making it easier to find financing than their smaller peers. Firm-year observations are first divided into two groups, one has more and the other has less than 1$ billion annual sales in 1990 US dollars, by which the regression results showed clearly that the negative correlation is much more prevalent for the smaller half of the data set. The subgroup of large firms shows only significant correlations between leverage and net investment and 1-year employment growth measures. In contrast, growth of smaller firms is not only more limited by leverage in terms of

magnitude but also to a larger extend: net investment and both of the employment growth measures are negatively correlated with book leverage.

However, once the data is further sliced into deciles by size, there are less convincing evidences on the assertion that company size is negatively associated to the extent of negative correlation between leverage and growth. Only the smallest three deciles of net investment and entirety of 1-year employment growth measures appear to be affected by company size negatively. Such negative correlation is missing from all the other firm growth measures. Thus the findings on how company size affect firm growth/leverage interaction is of very limited nature: despite certain supporting evidences, company size seems to induce stronger limitation of leverage on growth with respect to investment amongst the smallest firms in the European sample. Alternatively, it also could be that the smallest firms in Europe have the most trouble financing their growth given certain level of leverage. Short-term employment growth, limited to one year, is affected by firm leverage more amongst bigger firms and this finding is consistent throughout all deciles.

Lastly, I also find that legal systems, via various level of perceived investor protection, are a factor that influences the degree of correlation between leverage and firm growth. For instance, common law nations are perceived to provide better investor protection than civil law countries. Because stronger investor protections better shield financiers against expropriations by entrepreneurs, it increases their willingness to exchange their funds for security. This firstly expands the supply of financing within the capital markets and secondly potentially increases the leverage of firms within these countries, assuming they follow peck order theory to prefer debt over equity financing. As the level of leverage increases, so does the possibility of debt overhang and underinvestment. Theoretically, such chain of interconnections could lead to stronger negative correlation between leverage and firm growth in common law countries.

When the data is divided into common law country observations and civil law observations, the results are puzzling. Where coefficients of book leverage regressed on employment measures support the initial hypothesis, corresponding results on net investment is exactly opposite of what is anticipated. The negative correlation between book leverage and net investment is the strongest in the French legal system, where it provides the least amount of investor protection and the weakest in English legal system, where it has the strongest. A potential explanation is that perhaps bigger portion of the debt carried by companies from the

French legal system is there as a counter measure of lack of investor protection to serve as a disciplinary tool to prevent managers from wasting shareholders' wealth. In light of this, it is not difficult to see why there is a stronger negative correlation amongst firms of French legal background. So there is conflicting evidence on how common law/civil law origin of a firm affects how its leverage and growth are related.

In contrary, when the civil law country sample is further divided into French legal systems and German/Scandinavian legal systems, no significant difference is found between these three subgroups.

Overall, regression results on European data shows partial support to the hypothesis of company size being inversely related to the severity of debt limiting growth, but such inference is only limited to the smallest firms concerning net investment but consistently so for 1-year employment growth measures. Legal systems, on the other hand, are a very crude concept upon which the observations are divided. Results showed some supports for suggesting legal system could be a factor influencing dynamics between leverage and firm growth, but the conclusion is not of unambiguous nature.

1.4 Limitations of the Study

The biggest difficulties facing this study is how to interpret the results, despite all the supporting theories and logical inductions, what has been observed is strong correlation between leverage and three of the five measures for firm growth but not necessarily causality. For instance, leverage could proxy for variables forecasting growth opportunities that are not included in the regression setup. One way to get around that problem is to deploy an instrumental variable as done in McConnell and Servaes (1995), who used proportion of the value of tangible assets to total assets as an instrumental variable for leverage. However, the validity of using tangibility as a predictor for leverage is questionable. Hence the predicted leverage that is fed into the second stage equation is unlikely to have much success in predicting firm growth. Alternatively, a nature event that only affects either growth or leverage could provide a setting to isolate and determine the endogeneity of leverage. Perhaps a well-documented change in labor law that would drastically affect the supply of labor within a country could serve the purpose well, but such kind of incident seems pretty hard to come by, especially on a pan-Europe level.

In terms of model specification, there may be factors that would affect leverage significantly but are left out due to various reasons. For instance, leverage changes according to takeover threats, which are not modeled. Also, despite continuous harmonization of accounting standards in Europe during the past two decades, the way how financials are recorded still differs from county to county. As Nobes and Parker (1991) noted, German firms place greater emphasis on "conservatism" and less on "true and fair" principle. This is done to such a degree that the asset values of German firms may be understated relative to that of the other 12 countries included in this study. For instance in France, the Finance Acts of 1978 and 1979 made asset revaluation compulsory. Softer subtle differences form a unique problem that previous studies have not faced as they only include data from only one country. They are very difficult to model per se, but should not be ignored nevertheless.

1.5 Structure of the Study

The rest of the paper is organized as following. Chapter 2 sets out to provide a comprehensive literature review on capital structure and related discussions on how leverage is connected to firm growth. Bearing theoretical foundations in mind, Chapter 3 formulates the hypotheses that guide the general direction of this study. Chapter 4 and 5 cover the data and econometrics methodology required to arrive at the results that are presented and briefly commented in Chapter 6. This is followed by a discussion with reference to previous relevant literatures as well as hypotheses of this thesis in Chapter 7. Finally, Chapter 8 concludes and suggests potential new directions to carry on studies on dynamics between leverage and firm growth.

2 LITERATURE REVIEW

Over the years after MM's legendary paper on irrelevance of capital structure, a torrent of research have been conducted on this topic. Countless models and theories are asserted to motivate the choices of capital structure in general and to describe the optimal capital structures given certain firm characteristics. Undoubtedly, there are tremendous amount of real life implications for finding answers to these questions as capital structure affects not only a firm's operation and profit level, but also bring about broader implications for the entire financial system when aggregated together with other firms. However, despite years of hard work, there are more questionable results than definitive answers.

This chapter reviews the existing academic literature about capital structure and constructs a theoretical foundation upon which the hypotheses of this thesis are formed. This is by no means a collectively exhaustive survey of existing research on the topic of capital structure, rather, a selection of most relevant studies are presented here.

I will first go through some general theories concerning capital structure and some macro level factors at work. Such overview serves as an introduction and background knowledge for other parts of the chapter. Then I shall go into details about the factors that determine capital structure choices in companies on the country level, followed by firm level determinants. Although this thesis has its goal set on determining the consequences of leverage, in particular with regards to the firms' near term growth rather than causes of capital structure choices, it is however important to recite some of the prominent papers and theories to form bases of understanding in order to interpret empirical results.

Accompanying the theoretical review, relevant empirical evidences either support or falsify the theories are presented. This is followed by a comparison of capital structure characteristics based on geographical location of the firms, which looks at the similarities and differences found between European and American companies. This is to provide additional insights when comparing results of this paper to that of previous (US only) studies. Lastly, applicable studies on the implication of leverage has on a company's investment decision and near term growth are reviewed and its inner dynamics probed.

2.1 Determinants of Capital Structure

This subchapter provides a comprehensive review of some proposed and empirically examined determinants of capital structure. Firstly, country level factors are considered, since this thesis utilizes a pan-European dataset extracted from countries from vastly different commercial and macro-economic environments. Secondly, a more detailed review of theories concerning firm-level capital structure determinants is presented.

2.1.1 *Country-Level Determinants*

The preponderance of the studies on previous capital structure focuses on the analysis of certain firm characteristics – e.g., profitability, tangibility, size, etc. – as determinants of leverage and this is for a good reason. Kayo and Kimura (2010) find that according to their model, 42% of the variance within companies' leverage can be attributed to intrinsic firm characteristics. In contrast, industry and country factors only account for 12% and 3% of the leverage variance. Although the variances attributable to country level factors are relatively low, this is not the same as to stating that they are not important. It is especially true for this thesis, which deals with an international data set.

An important finding amongst several recent studies in analyzing role of country characteristics as determinants of firm leverage (e.g., Rajan and Zingales, 1995; Beck et al., 2008; Booth et al., 2001; de Jong et al., 2008; Antoniou et al., 2008) is that these country factors' universality across borders. Financing policy seems to have similar patterns of behavior around the world regardless of evident institutional differences (Rajan and Zingales, 1995; Booth et al., 2001). Booth et al. (2001) find evidence that developed markets (e.g., United States and Europe) and emerging markets capital structure characteristics are explained by more or less the same variables. Other studies differences (Sekely and Collins, 1988; Chui et al., 2002) went further by suggesting in addition to country macroecnomic/institutional factors, even culture may have a market influence on capital structure.

Much of the previous literature has deployed a classification of countries based on the size or power ofthe banking sector, Hence the term "bank-oriented" (Germany, France, and Italy) and "market-oriented" countries (the United States, the United Kingdom, and Canada). This is just one, and perhaps not the most important, institutional difference between the European countries (Bancel and Mittoo, 2004). The tax code, bankruptcy laws, the state of development

of bond markets, and patterns of ownership also may matter. This sub-section is loosely arranged by these said country-level factors.

2.1.1.1 Legal Environment

Several studies advocate legal structure as important determinants for capital structure (Bancel and Mittoo, 2004). La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997, 1998) stress that the legal system is the primary determinant of the availability of external financing in a country. They argue that the common-law system provides better quality of investor protection than civil-law systems, and among the civil-law systems. German and Scandinavian systems provide better protection than the French system. However, Demirgup-Kunt and Maksimovic (2002) argue the deficiency in a country's legal systems concerning investor protection could be somewhat offset via a combination of administration and regulation of the banking system. Also interestingly, due to such dynamics, legal systems in different jurisdiction thus can have different comparative advantages in supporting either a quality banking system or quality securities market.

Several elements within the legal setting affect firms' leverage. Tax code and bankruptcy laws are the two main categories of concerns and are discussed separately.

A quick review of existing literature on relations between tax and leverage indicate the results found are "inconclusive" and "not always large" (graham, 2003, p. 1119) at best. Not only found to be not significant indicators, tax-related variables have shown findings that are contradictory to the predictions of well-established theories. For example, a positive correlation is reported by Bradley, Jarrell and Kim (1984) between non-debt tax shields and level of debt, despite the fact that relevant theories suggest otherwise.

Majority of the existing research on taxes and leverage utilize data set of cross-sectional nature due to various practical reasons (Faccio and Xu, 2011). There is very little usage of tax related time series data, which hinders the validity of the results found. A common criticism of cross-sectional studies is that the correlation observed between tax and leverage could simply be a result of unobservable characteristics which affect both factors rather than an indication of causality.

Some early empirical research on the topic, such as Mayer (1990), claims that taxes have no explanatory power. Such statement is somewhat true if only corporate taxes are considered. However, by adding taxation at investor level into the discussion, the overall picture changes

radically. If reality indeed behaves in accordance to theoretical predictions, there should have been a significant decline in leverage during the period of 1987 to 2009 among All OECD (Organization for Economic Cooperation and Development) countries. During the said time frame, the average corporate income tax rate went down from 47% in 1981 to 26% in 2009. Such significant decline should trigger a substantial reduction in the level of debt used amongst companies since lower tax rate leads to lower value of tax shield at corporate level. Surprisingly, the leverage ratio actually inched up 0.05 from 0.20 in 1981 to 0.25 in 2009 (Miller 1977). In the same paper, Miller (1977) reports a similar theory-defying pattern is also observed in the US context: US corporate tax rate quintupled between 20s and 50s but the leverage ratio of US companies barely changed at all.

With regards to the OECD data sample, Faccio and Xu (2011) suggest and empirically verify the seemly puzzling results are consequences of a reduction of personal income tax over the said period. From a taxable investor's perspective, lower personal tax rate on interest income would make debt more attractive of a financing option than equity, since the investor would demand lower pretax returns on debt. From a corporate perspective, although the tax benefits of interest deductibility is reduced due to lower corporate income tax, it is to certain degree compensated via lower expected return by the debt holders (Faccio and Xu, 2011). However, as illustrated by Rajan and Zingales (1995), such finding is very sensitive to assumptions and specification of the model. For instance, a German tax-exempt investor finds debt more tax advantageous than these in the United States (tax advantage of 50% versus 28%). However, such implication is to be reversed if the investors under consideration are in top marginal tax bracket. Hence, it is not enough to only include both corporate and investor level taxation into consideration, pinpointing the correct effective tax rate yields much more precise results.

Bankruptcy laws, on the other hand, is also an innate aspect of a debt contract and should be considered as a factor determining leverage in a firm given its country of registration (Harris and Raviv, 1992).

Laws regarding bankruptcy vary significantly not only across the Atlantic Ocean but also within Europe itself in two aspects. First, the degree to which liquidation is emphasized over renegotiation of claims and secondly and the degree to which management has control during the bankruptcy process (White, 1993 and Kaiser, 1994). Such levers are relevant to the discussion concerning dynamics between leverage and bankruptcy as they determine the threshold conditions by which taking on too much debt is penalized. As Rajan and Zingales

(1995) observed, Germany's bankruptcy law is considerably more creditor friendly than that of the US. The management in a US firm would have significantly more control of the firm during the bankruptcy process who has every incentives to keep the firm operating as a going concern rather than let it be liquidated. Follow such logic, one may argue that there should be more debt utilized in Germany than in US, since creditors are in a relatively more secure position and hence more willing to provide capital. However, despite the fact that stricter enforcement of creditor rights enhances the contractibility of a debt agreement, it may leads to premature liquidation, as pointed out by Kaiser (1994).

On the other hand, having strict creditor rights enforcement in place ex-ante would incentivize management and equity holders not to take on too much debt and stay clear of financial distress to avoid potential negative consequences (Rajan and Zingales, 1995). Such argument would imply that German management would take on less debt as the adverse consequences are more severe.

Overall, the degree to which firm's capital structure decision is determined by the legal system of its home country remains unclear (Bancel and Mittoo, 2004). Empirical works carried out in this field yielded very little conclusive answers. Perhaps one of the biggest problems has been the difference in accounting reporting standards amongst countries examined, which makes it very difficult to compare and draw parallels based on financial data across countries.

2.1.1.2 Bank versus Market Based Countries

In their paper, de Jong et al. (2008) remind us that there is a positive correlation between the maturity of the bond market in a given country and the amount of corporate leverage utilized. The more developed the bond market is, the easier it is to issue and trade corporate bonds and hence greater the supply of debt financing in general. As an alternative source of financing, there is a negative correlation between level of development of the stock market and firm leverage. Both theoretical deductions are found to be statistically significant in their empirical studies.

They also found a statistically significantly negative correlation between market/bank orientation within a country and its firms' leverage, e.g. this is to say that firm leverage is higher in market-based countries, assuming mitigation of agency issues via debt financing. Such causality is also echoed by Purdah (2008), who also suggests that in bank-based

countries it is possible to identify financial distress earlier and the credit renegotiation is easier.

However, using the same data set but a hierarchical regression model specification, Kayo and Kimura(2010) states that inclination of the financial system, e.g. if a country is market or bank orientated, is not statistically significantly related to firm leverage. Confirming this, Rajan and Zingales (1995) also failed to find any significant difference between the bank-oriented countries (Japan, Germany, France and Italy) and market–oriented countries (USA, UK and Canada). They further assert, logically, that the difference between bank-oriented countries and market-oriented countries is reflected in the choice between public (stock and bond) and private (bank loans) financing rather than the absolute amount of leverage.

2.1.1.3 Ownership Structure and Control Characteristics

There is a major difference in terms of ownership structure between countries, both on global level as well as European level. It is well established and documented (see Berglof (1990) and Franks and Mayers (1994), for instance) that in a market oriented countries, such as US, UK and to a less degree, Canada, the ownership structures are more diffused and have an more active takeover market when compared to banking oriented countries such as France, Germany and Italy.

However, as Antoniou et al. (2008) and other economists have faithfully pointed out, the effects of ownership concentration and capital structure, are far from obvious. On the one hand, large shareholders tend to earn themselves seats on the company's board and provide more rigorous supervisory functions to the company management, thus reducing agency costs and consequently the amount of debt. However, on the other hand, as some of these large shareholders may be banks, which is indeed the case in bank-centric countries such as Germany, they incentivize the firms to borrow from them instead of utilizing other forms of external source of financing. Such deduction would imply a positive correlation between ownership concentration and amount of debt used.

2.1.1.4 Cultural Influences

Hofstede (1994) defines culture as "the collective programming of the mind which distinguishes the members of one group or category of people from those of another." Cultural factors, among others, are captured by Broek and Webb (1973) and James (1976) in their works on the identification of cultural clusters. Two countries within a cluster will have

similar national cultures, whereas two countries from different clusters will have dissimilar national cultures (Gleason, Mathur and Mathur, 2000).

Unlike other disciplines, finance has been relatively slow in adopting cultural variables into its studies. Grinblatt and Keloharju (2000) document that investor stock trading decisions are affected by culture factors. More relevantly, Stonehill and Stitzel (1969) and Sekely and Collins (1988) suggest that cultural variables can influence capital structure. By dividing 22 countries into several "cultural realms", based on "fundamental unity of composition, arrangement, and integration of significant traits which distinguish them from other realms" (Broek and Webb p.1973), they observe that Southeast Asian and Latin American as well as the Anglo-American group of countries have lower debt ratio. In contrast, high debt ratios are reported amongst Scandinavian and Mediterranean countries, whereas western Central European countries fall somewhere in between the two extremes.

However, neither study employs specific cultural variables to explain the variations in capital structures. In a more recent study on the same topic, Chui et al. (2002) added Schwartz' Cultural Dimensions into their regression analysis and found out that countries with higher cultural emphasizes on Conservatism, e.g. greater importance on social harmony, preservation of public image, security and tradition and Mastery[1], e.g. emphasis of control and individual success is stressed, tend to use less debt in their capital structure. Such correlation is found to be statistically significant at 0.01 level, which implies cultural factors to be a strong indicator of use of debt within a given country.

2.1.2 *Firm-Level Determinants*

In a comprehensive survey of numerous influential research papers on the topic of capital structure, Harris and Raviv (1991) identified four broad categories of underlying factors affecting a firm's level of leverage. First, there is the agency approach which states that a given capital structure is determined by the inter dynamics among various group of stakeholders that possess claims to the firm's resource. Under such premises, Jensen and Meckling (1976) argue the most optimal capital structure is obtained by trading off the agency cost of debt against the benefit of debt. Secondly, the problem of asymmetric information

[1] Managers motivated by concern for their own reputation will choose to maximize success rather than expected profits when faced with two investment outcomes—success and failure. The implication is that managers in cultures with high Mastery (individualism) may choose lower debt to maximize success and enhance their reputations.

between the insiders, e.g. company management and the outsiders, e.g. investors, is alleviated through capital structure decisions by facilitating signaling between the two groups. Thirdly, by incorporating theories of industrial organization, it can be argued that a firm's capital structure is a function of the firm's products characteristics and on a broader level, its strategy. Lastly, Harris and Raviv (1991) recognize contests over corporate control, e.g. within a takeover setting, can also be a determining factor on the target's leverage.

This sub-chapter begins through a brief overview of originations of capital structure theories and then moves on to more detailed discussions on major theories of determinants for firm leverage while some of MM's assumptions are relaxed. The structure is approximately based on the commonly accepted categorization of capital structure determinants.

2.1.2.1 Beginning of Capital Structure Theories

The modern debate concerning capital structure started with perhaps the most cited paper in this field by MM in 1958. Modigiliani and Miller's (1958) analysis of irrelevance of capital structure implies that under certain conditions, financing decision does not affect the cash flow stream itself. To put it another way, this is the equivalent of stating that the optimal capital structure is irrelevant to creating shareholders' wealth. In their definition, such proposition is valid when the capital market is perfect, personal and corporate taxes do not exist and the firm's financing and investment decisions are independent of each other.

However, such strict and idealistic setting for MM's theory has brought up much criticism over time. It was shown by many empirical studies that when MM's assumptions are relaxed, firm value may vary with change depending on the debt-equity ratio. Empirical evidences indicate that capital structure changes really convey information to investors (see, e.g. Smith, 1986; Harris and Raviv, 1991), but researchers are still puzzled by how firms choose debt, equity or hybrid securities they issue (Kjellman and Hansén, 1995). In addition, while capital structure tends to converge on relatively stable level (Lemmon et al., 2008), it is nevertheless not static but varying over time (e.g., Korajczyk and Levy, 2003). Such dynamic nature of leverage ratio suggests the existence of an optimal capital structure (Kayo and Kimura, 2010).

Following MM's work, most of research on the topic of capital structure has been either focusing on determinants of capital structures based on firm characteristics such as profitability, tangibility, size, etc or broadly on figuring out the optimal mixes of debt and equity in order to maximize shareholder value when the MM's assumptions are relaxed.

Thus although credited as the basis for modern thinking on capital structure, MM's irrelevance analysis is generally viewed as purely theatrical as it disregards many real life factors that influence the capital structure decisions. The real value of MM's theorem does not lie within how a firm's value is irrelevant to how the firm is financed in a perfect market environment. Rather, it provides a reference point for future research to be carried out to find out why the capital structure is relevant, that is, a company's value is affected by its capital structure. Theories based on bankruptcy costs, agency costs, and information asymmetry are all build upon MM's theories, just to mention a few.

2.1.2.2 Agency Costs Related Determinants

Jensen and Meckling (1976) pioneered modeling capital structure dynamics by agency costs, e.g., costs due to conflict of interests amongst groups of stakeholders, which are based on earlier works of Fama and Miller (1972). Namely, there are two broad categories of conflicts: firstly, between shareholders and managers and secondly, between shareholders and equity holders. Each genre will be reviewed below in sequence.

Conflict between managers and shareholders arises due to misalignments of incentives between the two groups. Managers, unless owning 100% of the company themselves, will not capture the entire windfalls of a profit enhancing managerial decision. However, they will bear the full costs of these said decisions. For instance, rather than managing firm resources for the aim of maximizing shareholder value, the managers can instead use firm resources to maximize their own benefits, e.g. consuming perquisites (corporate perks, plush office or private jets) or engage in empire building activities. Refraining from such activities would benefit the firm at the personal costs of the managers.

Jensen (1986) pointed out that such conflict of interests is less the larger the managers' skate of ownerships in the company under their reins. If the managers' absolute investment is held constant, but the portion of the firm that is financed by debt is increased, then the chunk of equity owned by the manager increases and the costs of conflict of interests are reduced. In addition, Jensen and Meckling (1976) state that as debt comes with interest payment obligations, it reduces the amount of free cash available for managers to engage in activities that are more beneficial to themselves than to the company shareholders. According to Stulz (1990) and Jensen (1986), in order to prevent overinvestment, mature, slow-growth firms, who has steady cash flow streams should be highly leveraged compared to firms with abundant investment opportunities.

Contrary to this view, Myers (1977) states that growth opportunities are subject to underinvestment due to lower collateral value, which can be worsened by high leverage (Hume, 2010). Consequently, highly levered firms are more likely to reject sound investment opportunities so that equity finance are preferred by firms with anticipated high future growth (high Tobin's Q). (Myers 1977)

Stulz (1990) also suggests a correlation between degree of leverage deployed and threat of take over. He asserts that although managers in general are reluctant to implement the optimal level of debt due to conflict of interests as explained before, they are more willing to do so in the face of takeover threats. Thus firms that are more likely to experience takeover pressures are expected to have higher level of leverage, ceteris paribus, than these with anti-taker measures in place. This is certainly true in the US context where takeover threats constantly act as a disciplinary measure. However, one may argue it is less relevant for this thesis as the data used originate from European countries, in which takeover and even more so, hostile takeover are less common.

Alternatively, Harris and Raviv (1990) explore other disciplinary nature of debt: the managers are deemed reluctant to relinquish control and unwilling to provide information that could lead to such outcome. Managers often prefer to continue operations even if liquidation of the firm would be optimal for the investors. In their very words "in general, managers do not always behave in the best interests of their investors and therefore need to be disciplined." Debt serves as a disciplining tool as defaults let debt holders to force firm into liquidation. It also conveys messages concerning the company's financial wellbeing, e.g. via firm's ability to make due payments obligations which can be used by investors to evaluate major operating decisions such as liquidation. However, the flip side is that at some point a threshold is crossed as too much company resources is expended investigating the firm that is in default.

In accordance to their model, Harris and Raviv indicate that firm with higher liquidation value, e.g. these with tangible assets, or/and firms with lower investigation costs will have more debt, more likely to default but will have higher market values when compared to its peers. This is due to the fact that, since the more liquation value a firm has, the more likely that liquation, as a strategy, will yield highest possible benefits. Thus information is informational value of debt is high and higher level of debt is deemed more favorable. Using a constant-return-to-scale assumption, they also show that high level of debt is also associated with larger firm value, higher debt level in relation to income. (Harris and Raviv, 1990)

Conflicts between equity holders and debt holders center primarily on reputational considerations of the managers. It is said that reputation concerns moderates the asset substitution problem, e.g., there is an incentive for leveraged equity holders to choose risky, negative NPV projects as the costs is barely unevenly between equity holders and debt holders. Managers would need to maintain their reputation as fail-free as possible and thus have incentives to choose relatively safe projects as results. (Diamond, 1989 and Hirshleifer and Thakor 1989)

In Diamond's (1989) model, older, more established firms with history of making debt payments have a valuable reputation to maintain. Desire to sustain reputation for the company as a whole forbids its managers to fall victim of asset substitution activities. Since lenders can observe only a firm's default history, the longer the firm's history of meeting its debt obligation, the better reputation, and the lower borrowing costs. On the contrary, younger companies, who have nearly no reputation values to lose in comparison, will on average be more likely to take on risky projects. Harris and Raviv (1990) interpolate that although amount of debt is fixed in Diamond's model, it is plausible that by an extension the model would reveal that younger firms have less debt than older ones, ceteris paribus.

2.1.2.3 Asymmetric Information Related Determinants

"Pecking order" theory (Donaldson, 1961; Myers, 1984; Myers and Majluf, 1984) has been one of the most popular models in corporate financing literature. It asserts asymmetric information is the driving force behind capital structure dynamics of a firm. Assuming that the insiders, e.g. managers, hold more information concerning the firm's value than the rest of the market, Myers (1984) argues that the market will penalize equity issuing in the form of mispricing. As the issuance of such equity financing critically depends on the accurate assessment of the firm value, the equity underpricing due to informational gap between the market and company insiders could lead to a net loss for existing shareholders. Furthermore, rejection of equity finance due to possibility of such underpricing may cause firms to forego positive NPV projects, resulting in the problem of underinvestment. Consequently, the pecking order theory indicates firms will only use equity finance as the last resort to cover financing deficits, when other forms of less information sensitive alternatives, such as retained earnings, debt or even convertible bonds, have been exhausted (Bharath, Pasquariello and Wu, 2009).

The most important capital structure-related implication of pecking order theory is that since managers prefer to use retained earnings over external financing, then external debt over equity issuance, then these firms that are profitable will accumulate their earnings and reduce leverage level. In contrast, these companies that are less profitable are more likely to be more leveraged than their peers (Hovakimian et al., 2001).

Empirical studies on the subject have mainly focused on the prediction of the model and the results have been mixed to say the least. Pecking order is found to be a good approximation to firms' financing preference by Shyam-Sunder and Myers (1999). Their positions are challenged by Fama and French (2002) and Frank and Goyal (2003). In response, Lemmon and Zender (2004) counter this challenge by controlling for the value of maintaining financial slack for future investment and to avoid financial distress. Yet even when Leary and Roberts (2004) incorporate financial slack in their analysis of financing policies hierarchy predicted by pecking order theory, no supporting evidences are found.

Also, it is noted when the firms under consideration are of small, high-growth nature, pecking order theory tends to have less explanatory power. Frank and Goyal (2003) shows that despite some large firm demonstrating traces of pecking order theory, more equity than debt is on average utilized for smaller firms with abundant growth opportunities.

However, the most relevant aspect of pecking order theory to this paper is how it relates to a firm's growth opportunities. Pecking order theory itself implies high growth firms with large financing needs tend to prefer issuing equity (assuming relative stock price is used by the market as a proxy for the firm's growth opportunities) and be lower leveraged as a result. Empirical literature confirms such prediction: a significant negative relation between market leverage and growth options has been documented (Barclay et al. 2006). Bradley, Jarrell and Kim (1984) and Long and Malitz (1985) show that industries associated with higher degree of growth opportunities tend to have lower market leverage, which is measured as the value of debt divided by the market value of the firm. Furthermore, Long and Malitz (1985), Smith and Watts (1992), and Barclay, Smith and Watts (1995) all found a negative relation between leverage and market-to-book ratio, a commonly used proxy for a firm's growth opportunities. Such findings are expanded by Rajan and Zingales (1995) by using a data set consists of seven countries.

One thing worth noticing concerning pecking order theory is the limitation of its validity when time horizon under consideration is stretched. Although some results, despite

inconclusive are found, they only shed light on firm leverage in short-run. In contrast, long-term financing decisions tend to move companies towards a somewhat elusive target ratio, which is consistent with traditional capital structure tradeoff model (Hurme, 2011 and Hovakimian et al., 2001).

Other criticisms of pecking order theory include these by Brennan and Kraus (1987), Noe (1988) and Constantinides and Grundy (1989). They collectively show that firms do not necessarily prefer straight debt to equity issuance and that underinvestment problem can be resolved if the firms can signal to the market that a richer set of financing options, e.g. convertible bonds, is available to managers. Hence the basic Myers-Majluf results are shown to be invalidated in some cases.

Alternatively to what has been presented in this subsection, there are models in which investment is fixed and capital structure serves as a signal of private information (Harris and Raviv, 1991). The seminal contribution in this area is that of Ross (1977). In his model, investors take larger debt level as a signal of higher firm quality as they do not have access to insider information that the managers have to make sound assessment of firm quality directly. Although managers benefit from higher market valuation, they bear the consequence of bankruptcy costs. Thus keeping everything else equal, higher quality firms are expected to be more leveraged than these of lower quality due to lower marginal expected bankruptcy costs at any debt level (Harris and Raviv, 1991).

2.1.2.4 Strategic and Product/Input Market Interaction Related Determinants

Historically, industrial organization literature has assumed companies' ultimate objective is maximizing total profit, whereas the finance literature assumed that to be equity value maximization. In contrast, papers linking capital structure and product market strategy in which the managers generally have incentives to maximize equity value rather than profit or total value have been relatively new. The fundamental idea is that since leverage affects payoffs to equity, then it must affect equilibrium product market strategies, and vice versa (Harris and Raviv, 1991).

One of the first paper published deploying such cross disciplinary approach is that of Brander and Lewis (1986). In their pioneering work, Brander and Lewis contemplated the idea of a modified version of Jensen and Meckling (1976)’s capital structure model, in which higher leverage lead equity holders to pursue more risky strategy. Consequently, their model shows that oligopolists are more leveraged than monopolists and firms in competitive market are

more likely to have long term debt (Brander and Lewis, 1986). In addition, companies that do not have a reputation for producing high quality products and highly unionized firms are more leveraged (Titman, 1984 and Sarig, 1988).

Such research produces interesting implications for understanding capital structure dynamics within the confinement of specific industries. By incorporating information such as the unique setting of supply and demand conditions and the degree of competition of said industry, some of the previously unaccounted differences in level of leverage between industries are explained (Titman, 1984; Titman and Wessel, 1988; Maksimovic and Titman, 1991).

2.1.2.5 Capital Structure Choice Driven by Corporate Control Considerations

Capital structure theories based on corporate control considerations have been propagated by mainly three papers, namely Harris and Raviv (1988a), Israel (1991), and Stulz (1988). All three conclude that takeover targets will increase leverage on average, which is accompanied by a positive stock price reaction. In addition, leverage is found to be negatively correlated on average with whether the tender offer goes through.

Both Stulz (1988) and Harris and Raviv (1988) show the capital structure influences the outcome of takeover attempts through its effect on voting power distribution between the management and the investors. Harris and Raviv (1988) suggest that debt is utilized to repurchase equity externally to increase the voting power of the incumbent management. Since the manager's ownership share is determined indirectly by the firm's capital structure, the tradeoff between increase of voting power and the increase in the probability of the firm going bankrupt determines a firm's capital structure in short run.

In contrast, Israel (1991) provides insights on how capital structure influences a takeover attempt outcome through its effect on distribution of cash flows between voting and non-voting securities. He shows that the less leveraged target is more costly to acquire, hence lower the probability of such takeover attempt. However, if the deal goes through, a larger share of premium is captured. Thus, other things being equal, one may expect companies to be more leveraged in a market where takeovers are more immediate of a threat, e.g. the US and the UK, than these markets in which takeovers are less common, e.g. continental European markets. Finally, Israel suggests that higher level of leverage is associated with greater potential takeover gains.

Similar to the pecking order theory explained in subsection 2.1.2.3, theories presented in this subsection only concern short-term changes in capital structure as a response to imminent takeover threats. Such theories have limited explainery power when considering the nature of a firm's long- term capital structure dynamics (Harris and Raviv 1991).

2.2 Capital Structure Related Differences between US and European Firms

Since the primary contribution of this study is to investigate whether a principle that has been tested with US data remains valid in European setting, it is therefore important to understand some fundamental differences between the two continents in terms of capital structure related factors. Some of the most discussed factors in literature are presented in this sub-section.

This is a field that has been studied extensively over the years. A pre-conceived impression of major difference in terms of capital structure had long been established amongst academics and practitioners alike. Most empirical papers conclude companies from continental Europe are more leveraged that their counterparties in the US and the UK. Borio (1990) conventionally named the former countries as “high leverage countries” and the latter as “low leverage countries” in his study. Furthermore, Rutherford (1988) surveyed previous literature and added evidences from O.E.C.D to show firms in France, Germany and Japan carry proportionally more debt than these in Anglo-American economies. Numerous reasons are put forward by waves of economists to try to explain such observed differences. Borio (1990) attributes the difference in level of debt to the difference in extend and maturity of the financial intermediaries of the said countries. Frankel and Montgomery (1991) suggest institutional structures governing bankruptcy and debt renegotiations are the real reasons for the difference. Some scholars, such as Bergiof (1990) assert even the mechanism of corporate control could be a possible determinant of capital structure differences between countries. In contrast, in their study based on data obtained from G-7 countries[2], Rajan and Zingales (1995) find companies from G-7 countries to have surprisingly similar level of leverage, at least less than previously thought. Further, their findings confirm most of the factors correlated with leverage in the US data also applies elsewhere.

However, the differences we observe between firms across countries are not merely the results of the direct impact of country-specific factors mentioned before. de Jong et al. (2008)

[2] The US, Japan, Germany, France, Italy, the UK and Canada

show that there is a second-layer to the story: country-specific factors also affect the role of firm-specific determinants. For instance, in countries with better legal environment and more stable and sound economies, companies are not only likely to take on more leverage, but the effect of firm-level determinants, e.g. firm size, is also stronger.

2.3 Firm Leverage, Growth Opportunities and Near-Term Growth

Before moving on to how does leverage and growth are related, it is useful to briefly discuss how investment opportunities and leverage are related in modern theories of capital structure choices.

First in line is the agency theory, which focuses on interests of conflicts between bondholders and shareholders. Myers (1977) argues that a highly leveraged firm may pass on advantageous investment opportunities simply because raising funds to finance these opportunities is in fact a transfer of wealth from the shareholders to the debt holders. Therefore, for a firm with valuable growth opportunities, the underinvestment problems are the primary concern when choosing its capital structure. Consequently, firms with valuable growth options, which on average should grow more than others, carry less debt. This theory implies that amongst a group firms facing similar growth opportunities, e.g. within a tight closed industry, firms that are more leveraged will grow less.

Secondly, capital structure can help mitigate potential agency conflicts between shareholders and managers (Stulz, 1990). Debt limits management's ability to pursue suboptimal growth objectives by forcing funds to be paid out. The so called "debt overhang" limits management's ability to raise fund in the future and further worsen the information asymmetries that make it difficult for the management to communicate the equality of investment opportunities to potential investors. To safeguard their investment, shareholders then would want firms with poor growth opportunities to have high leverage to prevent these firms form overinvesting at the expense of shareholder wealth. On the other hand, they would want firms with good growth prospect to be less leverage so these firms would not end up in a situation where they cannot finance their growth due to heavy interest payment burden.

Previous literature also establishes connections between leverage and other factors within the corporate setting. For instance, according to Harris and Raviv (1991), leverage is positively related to fixed assets, firm size, non-debt tax shields and firm value, whereas it is negatively correlated to factors such as volatility, advertising expenditures, profitability and the

probability of bankruptcy. Some research even indicates there is a negative correlation between leverage and growth opportunities through its influence on cash flow (Jensen and Meckling, 1976; Stulz, 1990).

Despite evidences showing investment is negatively related to cash flow for firms where the wedge between the costs of external and internal funds is large, the relationship between leverage and growth is less straightforward. Cash flow includes both operational and financing flows, but previous literatures have largely treated them as a combined entity rather than probing how each category affects investment differently. There is clear indications how financing cash flows such as debt service influences investment clearly differently than operating cash flow. As Myer (1978) points out, a highly levered firm facing underinvestment problem may not even be able to raise any external funds at all to finance new projects. In contrast, an all-equity financed firm can always issue safe debt. For such firm, cash flow shortfalls should have a negligible effect on investment. Thus, in the presence of agency costs and information asymmetries, leverage (debt services) affects growth through both reducing availabilities of discretionary funds internally and increasing the costs of raising external funds (Lang et al., 1996).

Intuitively, both positive and negative aspects of debt financing are present for all firms. However, McConnell and Servaes (1995) suggest the predominant effect of debt is a function of availabilities of investment opportunities faced by that company. On the one hand, for "high-growth" firms with plenty of growth opportunities, negative effects predominate. As the debt payment reduces funds, managers are forced to pass on positive NPV projects. On the other hand, for "low-growth" firms with limited growth opportunities, positive effects of debt prevail as it limits the fund available for managers to pursue investment activities of value destroying nature, e.g. empire building,. This particular implication of McConnell and Servaes (1995)' finding suggests that depending on perceived future growth, which is measured by Tobin's q, leverage affects growth differently.

There are also other empirical results supporting negative relationship between firm leverage and other measurements of growth instead of investment. For example, Sharpe (1994) investigates the relationship between firm's leverage and employment. It is found that firms with higher level of leverage tend to be associated with quicker layoff of employees in recession but slower than its peers in hiring during expansion (Sharpe, 1994). This leads to interesting interpretations on the negative correlation between employment and leverage:

highly leveraged firms' labor force may grow slower and less as the disciplinary effects of debt force managers to behave efficiently during a recession but weary to hire back when the economy starts to pick up again. In support to this, Cantor (1990) shows that investment and employment is more volatile for more leverage companies.

However, there is an alternative hypothesis which is noted in Lang et al.'s study as the "naïve liquidity effect", which suggests debt reduces investment and growth regardless of the investment opportunities faced by one particular firm. Even further, in contrast to what is suggested earlier in this subsection, leverage could even have a greater negative effect on growth if the companies are faced with valuable growth opportunities since these are the companies with greater informational asymmetries that induces higher external borrowing costs (Lang et al. 1996).

Table 2.1:Summary of findings by Lang et al. (1996)

The sample period is 1970 – 1989. Included firms have $1 billion of sales in 1989 dollars for each year in which they are included in the sample. Data are obtained from Compustat. Investment is capital expenditures minus depreciation at year +1 divided by fixed assets (FA) at the end of year 0. Capital expenditures (employment) growth is the percentage change of capital expenditures (employment) for 1- or 3-year time period compared to year 0. Book leverage is the ratio of book value of total debt to total assets (TA). Relation is stated as "Negative"/"Positive" (5%-level significance), or "No" (no significance in regression), "Weak Neg." (10%-level) relation is stated separately. "Low-q" ("high-q") firms are firms with q <1 (q > 1) or q < industry median (q > industry median) of the whole time period 1970-1989.

Correlation Between Leverage and Firm Growth (Lang et al. 1996)					
Data 1970 - 1989	***Net Investment***	***1-year Employment Growth***	***3-year Employment Growth***	***1-year Capital Expenditure Growth***	***3-year Capital Expenditure Growth***
Overall					
Book leverage	Negative	Negative	Negative	Negative	Negative
Industry-adjusted leverage	Negative	Negative	Negative	Negative	Negative
Low-q					
Book leverage	Negative	Negative	Negative	Negative	Negative
Industry-adjusted leverage	Negative	Negative	Negative	Negative	Negative
High-q					
Book leverage	No	No	No	Negative	No
Industry-adjusted leverage	No	No	No	Weak Neg.	No

Lang, et al. (1996) explore the relation between leverage and near term growth and find strong negative correlation between leverage (measured in book value of debt over total assets) and

near-term firm growth measured in subsequent growth in number of employees and capital expenditures. However, this relation is only found to be prevalent amongst firms with limited investment opportunities, e.g. Tobin's q < 1 (see Table 2.1 for summary of results of findings). In four out of five growth measurements, there are no significant relations for firms with ample growth opportunities, e.g. Tobin's q > 1. This confirms the assertions that companies with good growth opportunities will finance their growth in one way or another as long as the growth opportunities are acknowledged by external investors. Thus it is safe to say that high-q firms do not suffer from underinvestment problem imposed by leverage.

As asserted by Jensen (1986) and Stulz (1990), Lang et al.'s empirical data support the conjecture that leverage prevents firms with poor investment opportunities from overinvesting, highlighting the positive effect of leverage. In contrast, looking at the results for the high-q firms, the theoretical formulated negative "underinvestment" effect seems less convincing. The results that Lang, et al. explained is of robust nature. The negative relationship holds within industry, with different regression specification (using a system of two equations where the other equation explains leverage itself) and different measures of leverage and growth opportunities. The results even hold for smaller firms and the subsamples of better performing firms (Lang, et al., 1996).

Lang et al.'s dataset consists of firms with at least one billion dollar sales in 1989 dollar for each year between 1979-1989. All of their data are obtained from Compustat, including the research tapes. The sample is also limited to industrial firms only in order to remove industry specific regulation factors.

There are mainly three growth measures used throughout Lang et al.'s studies. The first is net investment in year + 1 divided by the book value of fixed assets in year 0 with net investment measured as capital expenditures in year + 1 minus depreciation. The second measure is the growth rate of real capital expenditures, defined as the ratio of capital expenditures in year + 1 adjusted for inflation (using the CPI) to the capital expenditures in year 0, minus one. This reflects the rate of change of investment. The final measure is the ratio of the number of employees in year + 1 to the number of employees in year 0, minus one. This measure captures the growth rate of employment. Slightly longer term measurements of growth are used for growth measures taking the ratio of year + 3 (instead of year + 1) to year 0.

Other measurements are included in a robust test to show that deployed. Leverage is measured using ratio of book value of short-term and long-term debt to book value of total assets. The

author motivated using book measure rather than market value to exclude excessive influences of recent changes in company equity value.

Table 2.2: Summary of findings over the entire data period (1990-2008) by Hurme (2010)

The sample period is 1990 – 2008. Included firms have $1 billion of sales in 1990 dollars for each year in which they are included in the sample. Data are obtained from Thomson One Banker. Investment is capital expenditures minus depreciation at year +1 divided by fixed assets (FA) at the end of year 0. Capital expenditures (employment) growth is the percentage change of capital expenditures (employment) for 1- or 3-year time period compared to year 0. Book leverage is the ratio of book value of total debt to total assets (TA). Relation is stated as "Negative"/"Positive" (5%-level significance), or "No" (no significance in regression), "Weak Neg." (10%-level) relation is stated separately. "Low-q" ("high-q") firms are firms with q <1 (q > 1) or q < industry median (q > industry median) of the whole time period 1990-2008.

Correlation Between Leverage and Firm Growth Over the Entire Data Period (Hurme, 2010)					
Data 1990-2008	***Net Investment***	***1-year Employment Growth***	***3-year Employment Growth***	***1-year Capital Expenditure Growth***	***3-year Capital Expenditure Growth***
Overall					
Book leverage	Negative	Negative	Negative	Negative	Negative
Industry-adjusted leverage	Negative	Negative	Negative	Negative	Negative
Low-q					
Book leverage	No	Negative	Negative	Negative	Negative
Industry-adjusted leverage	Weak Neg.	Negative	Negative	Negative	No
High-q					
Book leverage	Negative	No	No	Negative	Negative
Industry-adjusted leverage	Negative	No	No	Weak Neg.	Negative

Identical setups are used in Hurme (2010)'s update of Lang et al. (1996)'s study using a more recent US data set (1990-2008). The whole data sample findings are presented in Table 2.2. Based on the averaged results on the entire data range span, there is a significant negative relation of book leverage to growth, both across and within the industry. However, the results do deviate from the original Lang et al.'s study when the anticipated growth opportunity, which is measured in Tobin's q, is used as criteria to divide the sample into subgroups. Low-q firms show strong correlation between leverage and growth with minor exception of investment. High-q firms, on the other hand, exhibit some deviation from the original study: whereas Lang et al. generally found no significant correlation between nearly all growth measures and leverage, Hurme (2010)'s data set shows statistically significant negative correlation between leverage and capital expenditure and investment growth measures.

Despite minor deviations, Hurme (2010)'s findings are more or less aligned with Lang et al.'s when the whole sample periods are considered. What is really interesting about Hurme's paper is that she found dynamics between firm leverage and growth differs significantly between so called "abnormal years" meaning stock bubble and recession's years and "normal" meaning intermediate years with calmer economic environments. The said findings of different time periods are presented in Table 2.3 and Table 2.4 respectively.

Table 2.3: Summary of findings during abnormal years by Hurme (2010)

The sample period is 1990 – 2008. Included firms have $1 billion of sales in 1990 dollars for each year in which they are included in the sample. Data are obtained from Thomson One Banker. Investment is capital expenditures minus depreciation at year +1 divided by fixed assets (FA) at the end of year 0. Capital expenditures (employment) growth is the percentage change of capital expenditures (employment) for 1- or 3-year time period compared to year 0. Book leverage is the ratio of book value of total debt to total assets (TA). Relation is stated as "Negative"/"Positive" (5%-level significance), or "No" (no significance in regression), "Weak Neg." (10%-level) relation is stated separately. "Low-q" ("high-q") firms are firms with q <1 (q > 1) or q < industry median (q > industry median). Abnormal years cover base years 1990, 1997-2001, 2006-2008. The author motivate these are the years of either bubbles or financial turmoil and hence the term "abnormal years".

Correlation Between Leverage and Firm Growth During Abnormal Years (Hurme, 2010)					
Data 1990, 1997-2001, 2006-2008	***Net Investment***	***1-year Employment Growth***	***3-year Employment Growth***	***1-year Capital Expenditure Growth***	***3-year Capital Expenditure Growth***
Overall					
Book leverage	No	Weak Neg.	No	Weak Neg.	No
Industry-adjusted leverage	No	No	No	Weak Neg.	No
Low-q					
Book leverage	No	Negative	No	Negative	No
Industry-adjusted leverage	No	Negative	No	Negative	No
High-q					
Book leverage	Weak Neg.	No	No	No	No
Industry-adjusted leverage	No	No	No	No	No

In essence, there is nothing abnormal about stock bubbles and recessions per se, it is only the nature cycle of economy. However, when compared to the years in between, these turmoil times are characterized by higher degree of uncertainty, fluctuations in macroeconomic conditions and market environments.

A noticeable difference between results obtained during abnormal years and the overall period is the absence of any statistical correlations between leverage and growth for investment and both 3-year growth measures. Only low-q firms' leverage is shown to be statistically correlated to 1-year growth measures. This results hold within and across industries. Hurme (2010) motivates such results by stating that three years in the sample covers the bubble, the burst and the following recession, whatever causalities between leverage and growth are probably overshadowed by other macro factors at three-year level. However, one may argue the credibility of such finding to begin with as the "abnormal period" actually includes two periods of economic cycles of distinctive interest rate conditions: the bull market and bubble are accompanied by rising equity issuing and interest rates whereas when economy moves into recession after the bubble burst, lower interest rate usually follows suit shortly. Grouping these two periods together would inevitably blur the results as the leverage is affected differently at different stage of an economic cycle.

The picture is noticeably different during so called "normal" period (results presented in Table 2.4), accordingly to Hurme (2010). Other than the minor exception of 1-year capital expenditure, there is statistical correlation between leverage and other growth measures across the board. Hence the results clearly show leverage affects growth and investments of both high-q and low-q firms. Such finding is interesting as the observed statistical significance with regards to high-q firms is conflicting with Lang et al.'s work earlier. The author puts forward an explanation that consists of mainly two factors: first, during intermediate years where external financing are abundantly available, both high-q and low-q firms ramp up their investment in growth opportunities. Second, high-q firms are observed to decrease their leverage during these years (possibly due to accumulated internal funds) while the low-q firms maintain their leverage through intermediate times.

To sum up, the empirical results so far have largely supported the notion that there is a negative correlation between leverage and firm growth, at least so in pooled data in the two main studies cited. However, such relationship is not unambiguous or clearly motivated if studied at a more detailed level. If anything, the empirical data has revealed that such assertion is not of general and broad applicable nature. When it manifests itself, there are restrictions by which the correlation is guided. It applies differently between high-q and low-q firms, between stages of economic cycles, industries, even ownership structures and legal environments. So far, all the studies are done with US data, spanning three decades but there

is a need for additional empirical research to see if the same principle applies elsewhere and if they do, to which degree.

Table 2.4: Summary of findings during normal years by Hurme (2010)

The sample period is 1990 – 2008. Included firms have $1 billion of sales in 1990 dollars for each year in which they are included in the sample. Data are obtained from Thomson One Banker. Investment is capital expenditures minus depreciation at year +1 divided by fixed assets (FA) at the end of year 0. Capital expenditures (employment) growth is the percentage change of capital expenditures (employment) for 1- or 3-year time period compared to year 0. Book leverage is the ratio of book value of total debt to total assets (TA). Relation is stated as "Negative"/"Positive" (5%-level significance), or "No" (no significance in regression), "Weak Neg." (10%-level) relation is stated separately. "Low-q" ("high-q") firms are firms with q <1 (q > 1) or q < industry median (q > industry median). Normal years cover base years 1991-1996, 2002-2006. The author motivate these are the years of relatively more stable economic recovery hence the term "normal years".

Correlation Between Leverage and Firm Growth During Normal Years (Hurme, 2010)					
Data 1991-1996, 2002-2006	***Investment***	***1-year Employment Growth***	***3-year Employment Growth***	***1-year Capital Expenditure Growth***	***3-year Capital Expenditure Growth***
Overall					
Book leverage	Negative	Negative	Negative	Negative	Negative
Industry-adjusted leverage	Negative	Negative	Negative	Negative	Negative
Low-q					
Book leverage	Negative	Negative	Negative	No	Negative
Industry-adjusted leverage	Negative	Weak Neg.	No	No	Negative
High-q					
Book leverage	Negative	Negative	Negative	Negative	Negative
Industry-adjusted leverage	Negative	No	Weak Neg.	Negative	Negative

3 HYPOTHESES

This chapter presents the hypotheses of this thesis. The hypotheses are derived from the academic literature reviewed in the chapter 2.

3.1 Theoretical Foundations and Corresponding Hypothesis

It has been observed and tested by several studies, namely Lang et al. (1996) and Hurme (2010), that there is indeed a negative correlation between book leverage and firm growth in terms of investment, employments and capital expenditure. The studies are done within a single country setting with the US data covering three decades from 1970 to 2008. Despite various differences between the firms on two sides of the North Atlantic Ocean, there are more similarities between European companies and their US counterparts than previously thought when it comes to capital structure decisions. This is illustrated in section 2.2 via numerous studies such as Rajan and Zingales (1995) and de Jong et al. (2008).

Undeniably, dissimilarities in law, accounting standards and even culture can potentially cause some deviations in dynamics between book leverage and firm growth. However, as the world is becoming ever so connected and best corporate practices become more and more standardized across the globe, it is unlikely that the differences between Europe and the US are of such substantial different nature that it would revert the negative correlation between book leverage and firm growth observed in the US setting, thus

> **H1a.** *Firm growth is affected by book leverage within the European context. The relationship between leverage and growth measure is expected to be negative.*

Intuitively, companies have different appetite for leverage in different industries. This is supported by Bradley, Jarrell, and Kim (1984) as they show there are indeed industry effects influencing firm leverage. Thus it is important to investigate if the results obtained in this study are an indication that the variation of leverage is not only across industries and that leverage acts as a proxy for industry effects. Previous studies by Lang et al (1996) and Hurme (2010) show the correlation between leverage and firm growth remains even after controlling for industry effects, implying such correlation stays true within industries. Since there are no obvious factors to cause such nature to alter within the European context, it is expected the similar results to be observed in this study.

H1b. *Industry difference affects interactions between book leverage and firms' growth, but the negative correlation between the two should remain evident even when industry effects are controlled.*

Capital structure literature implies that firms with valuable growth opportunities should have relatively low level of leverage. This notion is supported by Jung, Kim and Stulz (1995), which shows that high Tobin's q (an indication of high growth opportunities are available) firms are more likely to issue equity rather than debt when raising external finance. Further, Lang et al. (1996) and Hurme (2010) both find the correlation between book leverage and firm growth measures is more prevalent for firms with limited investment opportunities, i.e. low Tobin's q firms. For high Tobin's q firms, whose abundant growth opportunities are acknowledged by external investors, underinvestment problem caused by debt overhang is less severe.

H2. *Leverage affects firm growths differently given investment opportunities that are available to the particular firm, which is measured in Tobin's q. High Tobin's q firms are expected to exhibit less negative correlation between book leverage and growth measures than low Tobin's q firms*

The expected negative effects that leverage has on firm growth should be weaker amongst large firms than amongst their smaller peers (Lang et al., 1996). As a firm increases in size and matures over years, it gains more and more access to capital market. Consequently with more external financing options in hands, large firms can finance their growth in one way or another and are less limited by their level of leverage, unlike the smaller companies.

H3a. *Leverage affects firm growths differently given different firm size, the negative correlation between leverage and firm growth measures are expected to be more prevalent amongst smaller companies.*

In light of H2 and H3a, when company size and growth opportunities are both allowed to influence the regression of growth measure on leverage, limiting effects of leverage on growth are expected to be the strongest amongst small companies with poor growth prospects and the weakest in amongst the big companies with ample growth prospects.

H3b. *The strength of the negative correlation between book leverage and firm growth is expected to be the highest amongst small low Tobin's q firms and the lowest amongst large high Tobin's q firms.*

Numerous studies in the past have stressed the important impacts that a country's legal structure may have on firms' capital structure decisions (Bancel and Mittoo, 2004). As common law countries in general provides better investor protection, which leads to higher degree of external financing availabilities. Assuming pecking order theory persists in reality then companies are more likely to take on more debt in common law countries in comparison to civil law countries, keeping everything else equal.

Since there is no logical explanation why growth figures should be consistently different between the 13 European countries included in this study over the course of past two decades, it is then reasonable to assume the expected negative correlation between leverage and growth measures are stronger amongst common law countries. As La Porta, Lopez-de-Silanes. Shleifer. and Vishny (1997. 1998) helpfully point out, within the civil law countries, German and Scandinavian legal systems tend to provide better investor protection than that of French legal system. So it is expected that countries belong to the German and Scandinavian legal system to have higher level of leverage and stronger evidence of correlation between book leverage and firm growth measures than in the countries belong to the French legal system.

> **H4a.** *Leverage affects firm growths differently given different legal environments where the companies operate in. Common law countries provide higher degree of investor protection than that of civil law countries, which implies a higher level of leverage and stronger negative correlation between leverage and firm growth in common law countries.*
>
> **H4b.** *Within the civil law countries, German/Scandinavian law countries provide higher level of investor protection than that of French law countries. So the expected higher level of leverage and stronger negative correlation between book leverage and firm growth to be found amongst German/Scandinavian law countries than French law countries.*

3.2 Summary of Hypothesis

The hypotheses used in this thesis and the expected effects of the hypotheses are summarized in this part.

Table 3.1Hypothesis of this study

Hypothesis from previous sub section is collected and briefly summarized here

Hypothesis	
H1a	Firm growth is expected to be negatively affected by firm leverage
H1b	The expected negative correlation between leverage and growth remains after controlling for industry effects
H2	The expected negative correlation between leverage and growth is stronger for low Tobin's q firms than high Tobin's q firms
H3a	The expected negative correlation between leverage and growth is stronger for small firms than large firms
H3b	The expected negative correlation between leverage and growth is strongest for small low Tobin's q firms and the weakest for large high Tobin's q firms
H4a	The expected negative correlation between leverage and growth is stronger in common law countries than in civil law countries
H4b	Within civil law countries, the expected negative correlation between leverage and growth is stronger for countries that belong to German/Scandinavian legal system than these in French legal system

4 DATA

This chapter first explains the data collection and initial preparation process in section 4.1. This is followed by section 4.2. where descriptive statistics exploring the fundamental nature of the data used in this study are shown.

4.1 Data Collection and Final Sample

This main pooled dataset used in this study consists of large industrial firms in Europe. The choice of only non-financial firms of large size is due to several reasons. First, according to Lang et al. (1996), if there is indeed a correlation between leverage and firm growth, it is expected to be weaker for the larger and more established firms who have had access to public security market for years. As the choice of financing increases, chances of firm's investment being limited by debt lowers. If the expected correlation is found within only large companies, the results then can be said to be more robust than the equivalent found within a sample of both large and small companies. Second, from a mere economic impact perspective, finding significant results amongst large firms is much more useful and has bigger aggregated economic implication than probing a relation between leverage and growth of a sample of small companies. Thirdly, as it turns out during the collection process, availabilities of needed data are much higher for firms of large size. Thus one may argue a side benefit of using only large firms is to avoid possible selection bias resulting from incomplete data. Lastly, this study sets out to compare and contracts its findings to that of Lang et al. (1996) and Hurme (2010), who used US dataset. Having similar setup would ensure comparability, although the threshold value for the defining “large firm” varies slightly.

In contrast to previous studies of the same nature, investigating European data inevitably involves the decision of which countries are included and which ones are excluded from the studies. To maximize the geographical coverage of the data sample, I started with all the current European Member states as of 2010, which consists of 27 nations. Then I looked at out of these countries, which of these were already members of the European Economic Community in 1990 and had at least one company with sales of more than $500 million per annual in 1990. Filtered by these two restrictions, only13 countries remains in my sample: Germany, Sweden, Spain, Italy, Great Britain, Finland, France, Netherland, Luxemburg, Belgium, Denmark, Austria and Ireland.

Dataset used in this thesis spans from 1990 to 2010. Three-year growth measures used in regression analysis span from 1990 to 2007 since the latest available data are from year 2010 as this paper is written. The sample is restricted to firms with at least $500 million sales in 1990 dollar. The growth is measured from the base year (year 0) or the year of relevant data becomes available in the database for companies that meet the said size criterion. Thus no sample selection bias is induced due to this size criterion.

Data on all countries are obtained from Thomson ONE banker. To avoid concerns of industry specific regulations and to ensure results comparability with previous studies, the sample is restricted to industrial companies under sic code 2000 and 3999. These SIC codes include for example groceries, beverages, textiles, chemicals, medical instruments and different machinery industries. Excluded SIC codes cover for example transportation, telephone communication, cable TV, gas, electric, oil, and mining industries. Firms included must have needed data on sales, cash flow, leverage, assets, market value of equity and capital expenditure to calculate necessary explanatory variables. These firms must have enough data to calculate at least one of the three growth measures to be included in the regression analysis. Number of employees is needed to calculate employment growth measures, capital expenditure and depreciation are needed for calculating net investment and capital expenditures are needed for calculating capital expenditure growth over the period.

Consumer Price Index (CPI) data needed for inflation adjustments is obtained through the statistical portal of Organization for Economic Co-operation and Development (OECD) website.

Initial sample

The initial sample consisted of 574 companies and 10,394 firm-year observations from 13 countries between 1990 and 2010. The sample consists of observations that have at least one of the data point needed to calculate needed dependent and independent variables.

Final sample

Within the constrain of our initial sample, there are 523 companies and 5,495 firm-year observations which are qualified for the net investment regression analysis, 6,012 firm-year observations for 1-year employment growth regression, 5,975 firm-year observations for 3-year employment growth regression, 5,983 firm-year observations for 1-year capital expenditure growth regression and 5,865 firm-year observations for 3-year capital expenditure

growth regression. The main reason for considerable amount of firm-year observations to be dropped from the initial example is that the entire firm-year observation is omitted if any data is missing for calculating any of the dependent variables. There are 13 countries included in sample for regression analysis without industry adjustment: Germany, Sweden, Spain, Italy, Great Britain, Finland, France, Netherland, Luxemburg, Belgium, Denmark, Austria and Ireland.

Data sample for regression analysis with industry effects adjusted has a further reduced sample size as for any given year, for any industry group defined by two digits-SIC code, there has to be at least three companies. If this is not met, then all companies in that two digits-SIC code subgroup in that given year is omitted from the regression analysis. Within the data sample with industry effects adjusted, there are there are 495 companies and 5,152 firm-year observations qualified to be included in the net investment regression analysis, 5,608 firm-year observations for 1-year employment growth regression, 5,579 firm-year observations for 3-year employment growth regression, 5,579 firm-year observations for 1-year capital expenditure growth regression and 5,475 firm-year observations for 3-year capital expenditure growth regression. There are 13 countries included in this sample: Germany, Sweden, Spain, Italy, Great Britain, Finland, France, Netherland, Luxemburg, Belgium, Denmark, Austria and Ireland.

4.2 Descriptive Statistics

This sub-section describes characteristics of the data used in this study. First the general features are presented, followed by breakdown by countries and national legal characteristics. Lastly summary statistics illustrating correlation between different variables are listed and explained.

Table 4.1 contains the statistical description of the dataset. In comparison to the corresponding data from the US used in Hurme (2010), my data characteristics seem to be much less upward biased in terms of Tobin’s q mean value. One possible explanation for this could be that the dot-com bubbles and economic overheating in the early to mid-2000s had less of an effect on European companies included in this study than their US counterparts. Nevertheless, the data sample display typical positive skewness in most of the measures included, implying median would be a better descriptive statistics in most situations instead of average.

Table 4.1: Growth, leverage and investment opportunities data characteristics

The sample period is 1990 – 2010. Sample consists of yearly observations for all firms that have at least $500 million of sales in 1990 dollars. Years with less than $500 million sales are excluded from the sample. Years with less than $500 million sales are excluded from the sample. Data are obtained from Thomson One Banker. Capital expenditures (employment) growth is the percentage change of capital expenditures (employment) for 1- or 3-year time period compared to year 0. All growth measures are obtained by comparing such variable at the end of the year in which the firm enters the sample to that at the end of the following (third) year for one-year (three –year) growth measures. Investment is capital expenditures minus depreciation at year +1 divided by fixed assets at the end of year 0. Book leverage is the ratio of book value of total debt to total assets at year 0. Cash flow is gross of interest payments. Tobin's q is total value of market value of equity and book value of total debt divided by total assets of year 0. All figures are adjusted for inflation.

	Average	25th percentile	Median	75th percentile	Standard deviation	Number of firm-years observations
1-year employment growth	0.030	-0.060	-0.004	0.053	0.659	6291
3-year employment growth	0.239	-0.135	0.009	0.183	0.951	6237
1-year capital expenditure growth	0.460	-0.217	0.000	0.249	0.162	6602
3-year capital expenditure growth	1.633	-0.311	0.042	0.513	0.932	6478
Net investment	0.055	-0.010	0.031	0.081	0.581	5687
Book leverage	0.233	0.100	0.218	0.331	0.200	7022
Cash flow	0.111	0.076	0.109	0.144	0.079	6711
Capital Expenditure	0.262	0.129	0.185	0.270	0.258	6703
Tobin's q	1.140	0.421	0.665	1.070	1.650	6243

The spared is significant in leverage measures. Typically, the 25th percentile of leverage is more than 50% lower than the median and the 75th percentile nearly 50% higher than the median. Such spread illustrate the diversity in level of leverage in companies and the importance of understanding impacts that varying degrees of debt have.

Table 4.2 lists the 13 countries included in this study, their legal origin, legal system as well as mean and median of leverage for the companies included. As it appears to be, Germany has the lowest level of leverage in the sample with a mean of 18.58% and median of 14.5%. Of

course, such observation may be attributed to the fact of pension liabilities are not treated as component of company's on-balance sheet debt (Rajan and Zingales, 1995). Ireland, on the other hand, has the highest level of leverage in the sample with a mean of 34.24% and median of 35.46%.

Table 4.2: Distribution of observations by country and legal systems

This table presents distribution of companies and observations by countries for the data sample in this study, as well as average and median leverage. Each country is also classified into categories according their legal origin and system.

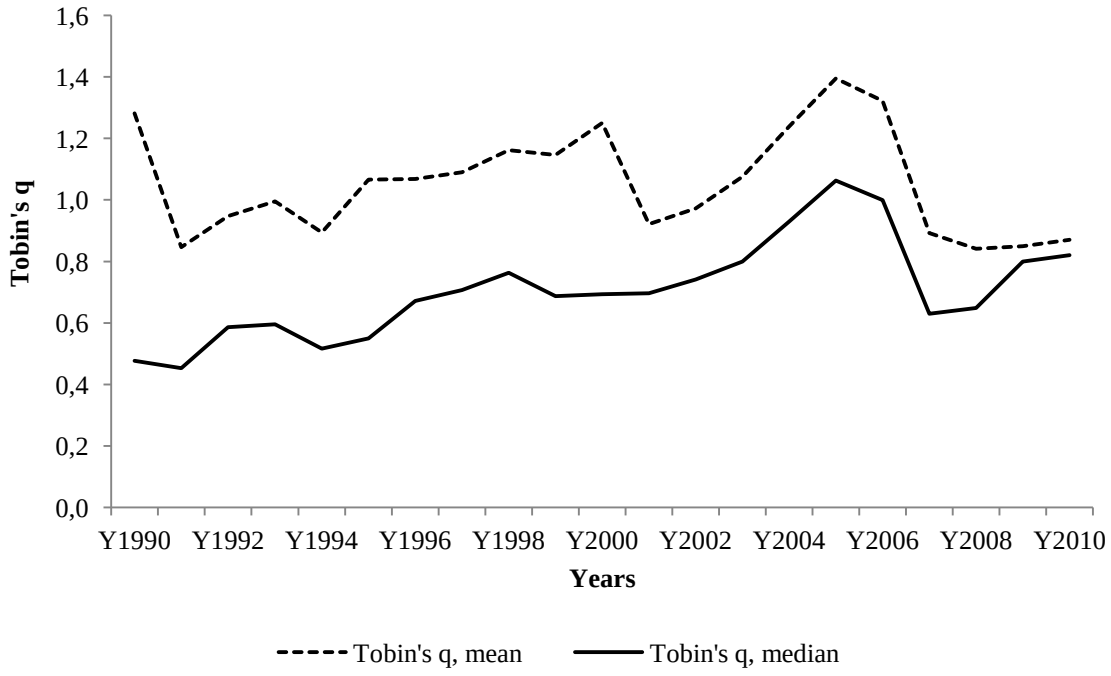
Countries	Legal Origin	Legal system	# of companies	% of total	# of Observations	% of total	Average leverage	Median leverage
Austria	Civil	German	8	1.4 %	96	1.4 %	22.80 %	21.82 %
Belgium	Civil	French	13	2.3 %	160	2.3 %	23.10 %	22.37 %
Germany	Civil	German	127	22.1 %	1520	21.6 %	18.58 %	14.50 %
Denmark	Civil	Scandinavian	15	2.6 %	235	3.3 %	23.11 %	22.52 %
Spain	Civil	French	19	3.3 %	198	2.8 %	18.70 %	18.38 %
Finland	Civil	Scandinavian	25	4.4 %	336	4.8 %	33.15 %	33.39 %
France	Civil	French	122	21.3 %	1460	20.8 %	23.01 %	22.16 %
UK	Common	English	119	20.7 %	1580	22.5 %	23.75 %	21.77 %
Ireland	Common	English	6	1.0 %	107	1.5 %	34.24 %	35.46 %
Italy	Civil	French	50	8.7 %	574	8.2 %	26.93 %	27.00 %
Luxemburg	Civil	French	1	0.2 %	12	0.2 %	29.14 %	31.30 %
Netherland	Civil	French	32	5.6 %	391	5.6 %	25.51 %	21.95 %
Sweden	Civil	Scandinavian	37	6.4 %	353	5.0 %	23.76 %	23.13 %
Total			**574**	**100.0 %**	**7022**	**100.0 %**	**25.1 %**	**24.3 %**

Common law countries, including UK and Ireland, have higher level of leverage than civil law countries on average. When countries are split further into subgroups by legal systems, countries in English legal system has the highest leverage level at an average of nearly 29%, followed by countries in Scandinavian legal system with an average leverage of 27%. Countries in French and German legal system trail with average leverage of around 25%. At first this seems slightly anti-intuitive, as bank-centric countries such as Germany should have

higher level of debt since one would expect banks and creditors alike play a bigger role in corporate world than their market-orientated counterparts. However, this dataset support previous empirical studies on relations between degree of being bank-centric and debt level. For example, Rajan and Zingales (1995) found no significant difference in terms of level of debt between countries from legal systems. They further assert, logically, that the difference between bank-oriented countries and market-oriented countries is reflected in the choice between public (stock and bond) and private (bank loans) financing rather than the absolute amount of leverage.

Figure 4-1: Annual development of mean and median for Tobin's q from 1990-2010

Tobin's q is defined as in Chung and Pruitt (1994) to be the market value of installed capital divided by replacement cost of capital, which is market value of equity plus book value of debt divided by total assets at the end of each base year. It measures the perceived future growth opportunities faced by a given company. All data are adjusted for annual inflation to be in 1990 US dollars.



In terms of distributions of companies by geography, firms from UK, France and Germany account for 64.1% of the total number of companies included in the sample and 64.9% of the total number of observations. This is hardly a surprise as these are three biggest economies in Europe.

Figure 4-1 shows the developments of Tobin's q over the entire data period under consideration. Similar to what is found in previous studies based on the US data, e.g. Hurme (2010), there seems to be a ramp up of Tobin's q for companies during late 1990 dot-com

bubbles as the market believed in an ever growing future for many companies. This is also a reflection of discrepancies between market capitalizations of the firm to that of its balance sheet valuation. Similar phenomenon is seen can also be seen during the on-going financial crisis that started from the end of 2007 onwards as a drastic decline of Tobin's q around that time can also be evidently seen.

Figure 4-2: Annual development of mean and median for book leverage from 1990-2010

Book leverage is defined as total debt, including both long term and short term debt, divided by total assets at the end of each base year. All data are adjusted for annual inflation to be in 1990 US dollars.

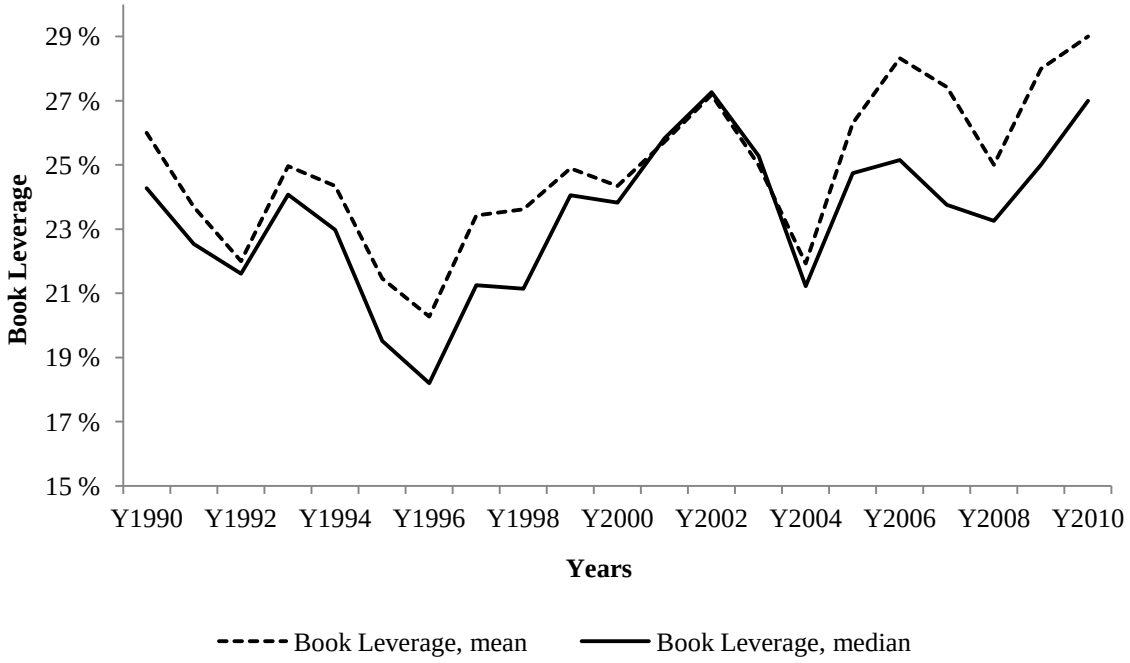


Figure 4-2 shows the developments of book leverage over the entire period covered by dataset used. Book leverage tracks general economic cycles moderately. There is a significant increase of leverage right before the dot-com bubble burst around 2000s and the current financial crisis around late 2007 then a sharp decline afterwards. There is also relatively less upward bias in comparison to Tobin's q as the spread between the mean and median is evidently smaller.

Table 4.3: Correlations between variables used in this study

The first line gives the correlation between two variables using the raw data; the second line gives the correlation using industry-adjustment variables. Capital expenditures (employment) growth is the percentage change of capital expenditures (employment) for 1- or 3-year time period compared to year 0. Investment is capital expenditures minus depreciation at year +1 divided by fixed assets at the end of year 0. Book leverage is the ratio of book value of total debt to total assets at year 0. Cash flow is gross of interest payments. Tobin's q is total value of market value of equity and book value of total debt divided by total assets of year 0. *significant at 1% level

	1-year employment growth	**3-year employment growth**	**1-year capital expenditure growth**	**3-year capital expenditure growth**	**Net investment**	**Book leverage**
1-year employment growth	1 1					
3-year employment growth	0.0577* 0.0553*	1 0.0553*				
1-year capital expenditure growth	0.0006 0.0002	-0.0006 -0.0009	1 1			
3-year capital expenditure growth	-0.0031 -0.0020	0.0229 0.0228	0.0093 0.0091	1 1		
Net investment (1)/fixed asset(0)	0.1033* 0.1029*	0.0046 0.0038	0.0050 0.0035	-0.0009 -0.0010	1 1	
Sales Growth	0.3491* 0.3634*	0.0214 0.0173	0.0155 0.0138	0.0023 0.0038	-0.0040 -0.0078	
Book leverage	-0.1335* -0.1635*	-0.0294* -0.0298*	-0.0019 -0.0024	-0.0030 -0.0089	-0.0316 -0.0336	1 1
Cash flow	0.1057* 0.1055*	0.0122 0.0064	0.0037 -0.0043	-0.0086 -0.0053	0.0208 0.0118	-0.0027 -0.0523*
Capital expenditures	0.0009 0.0004	0.0044 0.0025	0.0508* 0.0468*	0.0020 0.0018	0.0059 0.0062	0.0021 -0.0004
Tobin's q	0.0136 0.0126	0.0001 0.0004	0.0002 0.0001	0.0018 0.0011	0.0123 0.0131	-0.0785* -0.0838*

Table 4.3 shows the correlation between the variables. There is a uniform negative correlation between book leverage and the five growth measures. Although only the correlation between employment growth measures and book leverage is statistically significant at 1% level. Correlation between net investment and leverage is only significant at 5% level.

At the same time, leverage is negative correlated with Tobin's q, which is positively correlated with all the growth measures. This is somewhat excepted as market perceived future growth measure (Tobin's q) should be positively correlated with the actual growth.

Furthermore, leverage is negatively correlated with cash flow before interest, which itself is positively correlated with most growth measures. Just based on these correlation reported, one could conclude there is an undisputable negative correlation between growth and leverage. However, this relation may find its roots in correlation between leverage and cash flow, capital expenditures and Tobin's q. Such consideration provides motivation to conduct further investigation via multivariable regression while controlling for cash flow, capital expenditures, Tobin's q and other possible correlated factors.

5 METHODOLOGY

This chapter elaborates on the methodology used to conduct data analysis. Dependent and independent variables which are fed into statistical analysis programs to run regressions are defined in section 5.1. General principle of Ordinary Least Squares (OLS) regression is reviewed and described in section 5.2 and followed by a comprehensive review of variable covariance calculation in section 5.3. To extend understandings of the underlying correlation between leverage and firm growth and check robustness of the results, the total sample is divided into numerous subgroups and separate regressions are ran for each subgroup of data. The methods by which the segmentations are done are explained in section 5.4. The chapter ends with a brief explanation of Mann-Whitney-Wilcoxon correction of heteroskedasicity between high Tobin's q and low Tobin's q firms.

All data points collected from Thomson One Banker are exported and manipulated in Microsoft Excel 2010, which are then fed to Stata/SE 11.2 with Outreg2 add-on to conduct necessary regression analysis.

5.1 Definition of Variables

This subsection defines the variables used in this study: first, the dependent variables, followed by independent variables and lastly control variables. The setup and definition largely follows previous literature and closely resembles that used in Lang et al (2010). All data is adjusted for inflation using the CPI at 1990 USD level to ensure comparability with previous literature.

5.1.1 *Dependent Variables*

Three growth measures, all together five variation of them are used as dependent variables throughout this paper. The definition and setting follows that in Lang et al. (1996).

Net Investment Growth (5.1) is a continuous growth variable, which is defined as net investments in year 1 divided by the book value of fixed assets in year 0. Net investment is calculated as capital expenditure in year 1 minus depreciation. Year of the data point is included in parenthesis, 0 indicating base year. All figures are inflation adjusted.

$$Net\ investment = \frac{Net\ investment\ (1)}{Fixed\ assets\ (0)} = \frac{CapEx(1) - Depreciation(1)}{Fixed\ assets\ (0)} \qquad (5.1)$$

Capital Expenditure Growth (5.2) is a continuous growth variable expresses the real growth rate of capital expenditure, defined as the ratio between capital expenditure in year 1 or 3 and capital expenditure of year 0, minus one. Year of the data is included in parenthesis, 0 indicating base year. All figures are inflation adjusted.

$$Capital\ Expenditure\ (1\ or\ 3) = \frac{CapEx\ (1\ or\ 3) - CapEx\ (0)}{CapEx\ (0)} \tag{5.2}$$

Employment Growth (5.3) is a continuous growth variable captures the growth rate of employment, defined as the ratio between number of employees in year 1 or 3 and employees of year 0, minus one. Year of the data is included in parenthesis, 0 indicating base year.

$$Employment\ (1\ or\ 3) = \frac{Employment\ (1\ or\ 3) - Employment\ (0)}{Employment\ (0)} \tag{5.3}$$

5.1.2 *Independent Variables*

This paper sets out to investigate the relationship between firm leverage and growth, thus it is important to clearly motivate the choice of leverage definition used. In this thesis, leverage is defined as the ratio of the book value of both short-term and long-term debt to the book value of total asset. This definition follows the one used in Lang et al. (1996). The reason to use book value measure rather than market value measure is to avoid incorporating too much recent changes in the firm's equity values, which reflects market's expectation of firm growth. Regressing market measures of leverage on market's expectation of growth, which is reflected by the firm's equity value, would inevitably yield a negative relation. Such exercise provides very little insights into the relationship between growth and leverage. In contrast, using book measure of leverage mitigates such problem as book measure of leverage is much less affected by the market movement.

To ensure the choice of leverage definition is optimal, Lang et al. (1996) tested a number of other alternative measurements for leverage and found all exhibit similar negative correlation to growth measures, with one exception of market measure of leverage. Some of these alternative measurements include market leverage, interest/total assets, book equity/total assets and long-term debt/total assets. Since there is no logical explanation why market value

measure of leverage would yield better results in the European context, book leverage is chosen to be the independent variable in this study.

Book Leverage (5.4) is a continuous percentage variable indicating the ratio between book value of both long-term and short-term debt and total assets at end of each base year. *BV(x)* refers to the book value of *x*.

$$Levearge = \frac{BV\ (Debt)}{BV\ (Total\ Assets)} \tag{5.4}$$

5.1.3 *Control Variables*

In order to rigorously investigate the relationship between leverage and the five growth measures, it is important to control for various factors that may have an impact on the growth measures. The control variables will be explained in this sub-section in sequence.

Tobin's q is the ratio of sum of book value of debt and market value of equity to the replacement costs of the firm's assets (Tobin and Brainard, 1977). This is a future looking variable that implies companies with higher value of Tobin's q would have more valuable growth opportunities. In Lang et al. (1996), replacement costs are estimated using the Landenberg and Ross (1981) algorithm with the modification described in Lang, Stulz and Walking (1989). However, such calculation is notably more demanding in terms of amount of data required, which would reduce the sample size considerably. Instead, a more popular approximation that was put forward by Chung and Pruitt (1944) is used in this study.

Tobin's q (5.5) is a continuous variable defined as the ratio between market value and replacement value of the same physical asset, which is approximated by comparing the market value of a company's stock with its equity book value. Market value of equity is defined as share price multiplied by the number of shares outstanding. Market value of debt is approximated using the book value of debt including short-term liabilities minus short-term assets (Hurme, 2010). *BV(x)* refers to the book value of *x* and *MV(x)* refers to the market value of *x*

$$\begin{aligned} Tobin's\ q &= \frac{MV\ (Installed\ capital)}{Replacement\ cost\ of\ capital} \\ &\approx \frac{MV\ (equity) + BV\ (debt)}{BV\ (equity) + BV\ (debt)} \\ &\approx \frac{\#\ of\ shares \times Share\ price + BV\ (debt)}{BV\ (Total\ assets)} \end{aligned} \tag{5.5}$$

Previous finance literature, including Fazzari, Hubbard and Petersen (1988), Hoshi, Kashyap, and Scharfstein (1991) and many others all indicated a correlation between level of investment (proxy for growth) and amount of disposal internal funds. In nearly all of these previous studies, cash flow measures are net of interest expense. However, such setup is unsuitable for this study since the amount of interest expenses is a partially reflected through leverage. Logically, firms with higher level of leverage tend to have higher interests expense. What is needed in this study is for the cash flow measure to proxy for availability of internal funds rather than a proxy for the firm's capital structure (Lang et al. 1996). To mitigate this problem, net interest expenses is added back to the raw cash flow figure obtained from Thomson One Banker database.

It is worth noticing that regardless of which measurement is used, cash flow is still affected by the firm's leverage through tax payments in relation to its capital structure. Such effect is said to be of inconsequential nature (Lang et al. 1996).

Cash flow (5.6) is a continuous variable that measure the availability of internal funds for investment. Net interest expenses in year 1 of the base year is added back to raw cash flow in year 1 which is net of interest in order to remove effects of a given level of leverage. Cash flow is standardized by dividing it by total assets of year 0. All figures are inflation adjusted.

$$Cash\ Flow\ (1) = \frac{Raw\ Cashflow\ (1) + Net\ interest\ expenses\ (1)}{Total\ assets\ (0)} \tag{5.6}$$

Capital expenditure affects net investment growth measures indirectly and capital expenditure growth measures directly. Thus it needs to be added to the multivariable regression as a control variable.

Capital expenditure (5.7) is a continuous variable measured by dividing capital expenditure in year 1 by fixed assets in year 0. All figures are inflation adjusted.

$$Capital\ expenditure\ (1) = \frac{Capital\ expenditure\ (1)}{Fixed\ assets\ (0)} \tag{5.7}$$

Sales growth is added to control for multiplier effect (Lang et al. 1996).

> *Sales growth (5.8)* is a continuous variable measured by dividing sales in year 1 by sales in year 0. All figures are inflation adjusted.

$$Sales\ growth\ (0) = \frac{Sales\ (0)}{Sales\ (-1)} \tag{5.8}$$

5.1.4 *Dummy Variables*

There are three factors (year, country and economic cycle) in this study that are expected to have possible categorical effects on the regression outcome. These are assigned with a dummy variable to increase model fit at a costs of a fewer degree of freedom. However in light of the large number of observations of the data sample used in this study, this should not cause a serious threat to the validity of the results obtained.

> *Year* is a binary variable and each year between 1990 and 2010 is assigned its own dummy variable. The value of 1 in a particular year indicates the data point year of which the data point is recorded in the database. The value of 0 implies otherwise.

Since the data set under consideration consists of 13 different sovereign nations with vastly different accounting, cultural and legal background, it is important to control for potential differences due to country origin of a particular observation.

> *Country* is a binary variable for each of the 13 countries included in the data sample. The value of 1 in a particular country dummy indicates the data point from which the firm is incorporated is from that country. The value of 0 implies otherwise.

Business cycles affect the company growth and may results in negative relationship with leverage if the company happens to carry less debt at the same time. In order to mitigate that, an economic cycle indicator depending on the year of the observation must be added. This follows the setting of Hurme (2010).

> *Economic cycle* is a binary variable that indicate the general categorical economic environment of an observation to be either “abnormal” or “normal”. This dummy variable takes on a value of 1 if the data point is

observed from normal years. Abnormal years covers that of stock bubble and recession years that follows (1990, 1997-2001, 2006-2010), whereas normal years covers the intermediate years (1991-1996, 2002-2005).

All the variables explained in this subsection are summarized in Table 6 below.

Table 5.1: Summary of variables

This table presents a summary of all variables used in the regression analysis

Variable Category	Variable	Type	Definition
Dependent	1-year employment growth	Continuous	Measures the growth of employees in a time span of 1 year, # of employees in year 1 divided by that of year 0 minus one
	3-year employment growth	Continuous	Measures the growth of employees in a time span of 3 year, # of employees in year 3 divided by that of year 0 minus one
	1-year capital expenditure growth	Continuous	Measures the growth of capital expenditure in a 1 year, capital expenditure in year 1 divided by that of year 0 minus one
	3-year capital expenditure growth	Continuous	Measures the growth of capital expenditure in 3 year, capital expenditure in year 3 divided by that of year 0 minus one
	Net investment	Continuous	Measures the growth of net investment, standardized by fixed assets the year before
Independent	Book leverage	Continuous	Relative amount of debt a firm carries in relation to its total assets for any given year
Control	Cash flow	Continuous	Cash flow gross of net interests payments divided by total assets the year before
	Capital expenditures	Continuous	Capital expenditure divided by fixed assets the year before
	Tobin's q	Continuous	Measures the growth opportunities faced by a particular firm, the ratio of sum of book value of debt and market value of equity to the replacement costs of the firm's assets
Dummy	Year	Binary	Year dummy for each year included
	Economic cycle	Binary	Economic cycle dummy for either abnormal or normal years
	Country	Binary	Country dummy for each country included

5.2 OLS Regression

OLS regression analysis is the primary method used in this thesis to investigate correlation between leverage and a number of other measures for firm growth. OLS is a method for estimating the unknown parameters in a linear regression model. This method minimizes the sum of squared vertical distances between the observed responses in the dataset and the responses predicted by the linear approximation.

Explanatory variables (independent variables that include control and dummy variables explained in the previous section) are regressed on each one of the dependent variables (growth measures), using the multiple linear regression for *n* data points and *m* independent variables. Assuming the dependent variable *Y* to depend on *m* explanatory variables according to a true but unknown relationship, we have equation 5.9:

$$y_i = \beta_0 + \sum_{k=1}^{m} \beta_k x_{k,i} + \varepsilon_i, \quad i = 1,2,\dots,n \tag{5.9}$$

where y_i is the *i*th data point of dependent variable, in this situation an observation or calculated figure of growth measure, $x_k, k = 1,2,\dots,m$ are observations of independent, control and dummy variables, $\beta_k, k = 1,2,\dots,m$ are the estimated parameters, and ε_i is the error term associated with the *i*th observation. Based on (5.9), the population parameters can be thus estimated using the equation (5.10).

$$y_i = \beta_0 + \sum_{k=1}^{m} \beta_k x_{k,i} + e_i \tag{5.10}$$

where e_i is the residual $e_i = y_i - y_i$, which is the difference between the value of the dependent variable predicted by the model. y_i refers to the estimated value of y_i. The residual is estimated by using OLS method to minimize the sum of squared residuals, SSE, summarized in equation 5.11 below:

$$SSE = \sum_{k=1}^{n} e_i^2 \tag{5.11}$$

The OLS estimator is consistent when the repressors are exogenous and there is no multicollinearity, and optimal in the class of linear unbiased estimators when the errors are homoscedastic and serially uncorrelated. Under these conditions, the method of OLS provides

minimum-variance mean-unbiased estimation when the errors have constant variances. Under the additional assumption that the errors be normally distributed, OLS is the maximum likelihood estimator.

The assumption of error terms having constant variances are rarely met in reality. Error terms are very likely to be correlated within industries, years or countries. Consequently, the p-value for the estimates may have an upward bias. To counter such situation, the White adjustment, which provides Heteroscedasticity-consistent (HC) standard errors are used to define more reliable and consistent t-statistics for regression coefficients estimations.

To evaluate the joint explanatory power of the independent variables included in the regression, I report R^2. This coefficient of determination is a statistical measure of how well the regression line approximates the real data points. The theoretical minimum of is 0. An $R^2$of 1 would indicate that the regression line fits perfectly the data.

5.3 Variable Covariance

Correlation between various variables presented in Table 4.1 is defined using sample correlation calculation described in equation 4.12:

$$r_{xy} = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{(n-1)s_x s_y} = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2 \sum_{i=1}^{n}(y_i - \bar{y})^2}}, \qquad (4.12)$$

where x and y are the sample means of *X* and *Y*, and s_x and s_y are the sample standard deviations of *X* and *Y*.

5.4 Formation of Data Subgroups

The pooled data sample spanning from 1990 to 2010 is divided into several subgroups to test the correlation between leverage and growth measures subjects to different kind of restrictions. Methods by which the main data sample is divided are explained in this subsection.

By Tobin's Q

For each year, all firm observations are studied separately by their corresponding Tobin's q figure, e.g. the sample is divided into two subgroups of high Tobin's q (q>1) and of low Tobin's q (q<1). This is done to investigate whether or not there is different dynamics

between leverage and growth between high-growth firms and low-growth firms. For the sample that has been treated with industry adjustment, which will be described in the following subsection, the definition of high and low are (q>0) and (q<0).

Industry Adjustments

Industry effects adjusted variables are fed into regression alone side of non-adjusted sample to examine the potential impact of industry effects. Industry adjustments are conducted in the following manner: first, for each year, firm observations are grouped according to the first two-digits of SIC codes so that there are at least 3 companies in each group. If there are only two or less observations in a given group sample in a given year, then these observations are dropped from the industry adjusted data sample. Second, industry group median is subtracted from each variable observation to obtain an "above industry median" value for that specific variable. This is done for all years included in this study, namely 1990-2010.

The reason for not simply setting an industry dummy is to avoid correlation between industries effects that are not accounted for in that case. For example leverage within telecommunication and media may move in the same direction due to overall economic environment. Using de-medianed data set would reveal insights into if the relationship between leverage and growth holds within the industry as well as across industries.

By Size

First the sample is divided by into two groups namely "large firms" and "small firms" where the large companies have more than 1$ billion in sales in the year of the data entry and small firms have less than 1$ billion in sales. Second, groups are divided for every decile by sales as a proxy for company size in ascending order: group (1) consists of observations of the smallest 10 percentiles in sales whereas group (10) consists of the largest 10 percentiles. Separate regression is run for each and every subgroup for all five grow measures.

By legal systems

All the firm-year observations are divided into four major legal systems: English, German, Scandinavian and French according to the categorization presented in Table 4.2. Separate regression is run for observations included in each legal system.

5.5 Mann-Whitney-Wilcoxon Adjustments

The Mann–Whitney U test (also called the Mann–Whitney–Wilcoxon (MWW) or Wilcoxon rank-sum test) is a non-parametric statistical hypothesis test for investigating if two

independent samples of observations have equally large values (Hurme, 2010). The mean and median of both subgroups of high-q and low-q firms are compared to help interpreting the regression results. The differences are tested with MWW rather than the usual student t-tests because MWW is much less sensitive towards extreme values. Such setting follows that of Lang et al. (1996).

6 RESULTS

This chapter presents the empirical results of the regression analysis, which typically includes coefficients and p-value statistics for leverage, controlled variables and a constant. Coefficients of dummy variables that are included in all regressions to control for potential country and year effects are not reported. In all regressions, we follow the methods used in Lang et al. (1996) to apply White adjustments for heteroskedasicity due to potential correlations of error terms of individual firms within a given industry.

This chapter is divided in to three sections. First, regression results of the pooled data from 1990-2010 are presented in section 6.1. Then results based on subgroups of different company size are presented in section 6.2. The chapter ends with section 6.3, which looks into the potential impacts legal systems have on the dynamics between book leverage and firm growth.

6.1 Pooled Data Sample 1990-2010

Regression results for the entire data set are presented in this section. Subsection 6.1.1 presents and compares regression results on t the pooled dataset with and without industry effects adjustments. In subsection 6.1.2, Tobin's q is added into the mix to segregate its effects on the relationship between leverage and firm growth.

6.1.1 *Regression of Growth on Book Leverage and Other Firm Characteristics*

Table 6.1 shows that there is a strong negative relation between book leverage and firm growth measures of net investment and employment growth, both in one-year and three-year measures. Contrary to the findings of Lang et al. (1996), there seems to be very little evidence suggesting there is a statistically significant correlation between book leverage and capital expenditure growth measures. However, the sign of the regression coefficient conforms to the suggested relationship for 3-year capital expenditure growth. Cash flow appears to be a powerful explanatory variable for both net investment and employment growth measures. The expected multiplier effects associated with sales growth appear is only statistically significant for 1-year employment growth. Lastly, capital expenditure shows significant negative correlation with 1-year capital expenditure growth measure, providing support for similar findings in Lang et al. (1996).

Table 6.1: Unadjusted regressions of growth measures on leverage for 1990-2010

Sample consists of yearly observations for all firms that have at least $500 million of sales in 1990 dollars. Years with less than $500 million sales are excluded from the sample. Years with less than $500 million sales are excluded from the sample. Data are obtained from Thomson One Banker. Capital expenditures (employment) growth is the percentage change of capital expenditures (employment) for 1- or 3-year time period compared to year 0. All growth measures are obtained by comparing such variable at the end of the year in which the firm enters the sample to that at the end of the following (third) year for one-year (three –year) growth measures. Investment is capital expenditures minus depreciation at year +1 divided by fixed assets at the end of year 0. Book leverage is the ratio of book value of total debt to total assets at year 0. Cash flow is gross of interest payments. Tobin's q is total value of market value of equity and book value of total debt divided by total assets of year 0. All explanatory variables are computed for the base year; flow variables are normalized using total assets at the end of the previous year. All figures are adjusted for inflation. P-value in parenthesis:*** p<0.01, ** p<0.05, * p<0.1

Dependent variables	Net Investment	1-year Employment Growth	3-year Employment Growth	1-year Capital Expenditures Growth	3-year Capital Expenditures Growth
Leverage	-0.125***	-0.554***	-1.449**	0.471	-2.153
	(0.000)	(0.000)	(0.049)	(0.714)	(0.632)
Sales Growth	0.015	0.251***	0.176	0.092	0.182
	(0.255)	(0.000)	(0.222)	(0.712)	(0.833)
Cash Flow	0.296***	0.483***	0.406**	-0.748	-6.893
	(0.000)	(0.000)	(0.018)	(0.809)	(0.524)
CapEx	0.001	-0.005*	0.014	-1.584***	-0.047
	(0.735)	(0.094)	(0.773)	(0.000)	(0.873)
Tobin's q	-0.001	-0.002**	-0.006	-0.002	-0.009
	(0.210)	(0.020)	(0.665)	(0.940)	(0.913)
Constant	-0.058	-0.045	-0.464	-0.341	1.021
	(0.661)	(0.813)	(0.831)	(0.917)	(0.900)
# of obs.	5,495	6,012	5,975	5,983	5,865
R-squared	0.019	0.156	0.005	0.010	0.004

Despite having a statistically significant negative relationship between leverage and most of the growth measures, it is the economic implication that is most relevant. One way to illustrate the economic relevance is as follows: in our data sample, the average book leverage is 23% and the average 1-year employment growth is 3%. According to findings presented in Table 6.1, the point estimate implies that a firm with half of the average sample book leverage would have a 1-year employment growth rate of around 9%, which is three times higher than the sample average. In comparison to what was found in previous studies on US data, the effects of book leverage on employment is considerably stronger, whereas the impact on net investment measures is about the same level. However, capital expenditure measures show no

correlation with leverage whatsoever. The potential causes for such discrepancies are motivated in the discussion section in the next chapter.

Table 6.2: Industry-adjusted regressions of growth measures on leverage for 1990-2010

Sample consists of yearly observations for all firms that have at least $500 million of sales in 1990 dollars. Years with less than $500 million sales are excluded from the sample. Industry effects are adjusted by subtracting the industry median from the specific firm variable figure, provided there are at least three firms in each industry group defined by 2-digits SIC code for a given year. Data are obtained from Thomson One Banker. Capital expenditures (employment) growth is the percentage change of capital expenditures (employment) for 1- or 3-year time period compared to year 0. All growth measures are obtained by comparing such variable at the end of the year in which the firm enters the sample to that at the end of the following (third) year for one-year (three – year) growth measures. Investment is capital expenditures minus depreciation at year +1 divided by fixed assets at the end of year 0. Book leverage is the ratio of book value of total debt to total assets at year 0. Cash flow is gross of interest payments. Tobin's q is total value of market value of equity and book value of total debt divided by total assets of year 0. All explanatory variables are computed for the base year; flow variables are normalized using total assets at the end of the previous year. All figures are adjusted for inflation. P-value in parenthesis: *** p<0.01, ** p<0.05, * p<0.1

Dependent variables	Abnormal Net Investment	Abnormal 1-year Employment Growth	Abnormal 3-year Employment Growth	Abnormal 1-year Capital Expenditures Growth	Abnormal 3-year Capital Expenditures Growth
Abnormal Leverage	-0.154*** (0.000)	-0.590*** (0.000)	-1.610** (0.050)	-0.097 (0.946)	3.272 (0.514)
Abn. Sales Growth	-0.022 (0.305)	0.296*** (0.000)	0.010 (0.948)	-0.113 (0.686)	0.065 (0.947)
Abnormal Cash Flow	0.332*** (0.000)	0.530*** (0.000)	0.676** (0.035)	-1.672 (0.635)	-2.535 (0.836)
Abnormal CapEx	0.001 (0.758)	-0.005** (0.046)	0.004 (0.935)	1.514*** (0.001)	0.045 (0.884)
Abnormal Tobin's q	-0.001 (0.213)	-0.002*** (0.007)	-0.006 (0.661)	-0.002 (0.930)	-0.006 (0.943)
Constant	-0.011 (0.932)	0.173 (0.251)	0.100 (0.974)	-0.188 (0.938)	-0.349 (0.987)
# of obs.	5,152	5,608	5,579	5,579	5,475
R-squared	0.021	0.261	0.004	0.010	0.004

Table 6.1 results do not account for industry effects, the adjusted regression results are presented in table 6.2. This is done by subtracting industry mean form the specific company variable value given there are at least 3 companies in the same industry (defined by 2-digits SIC code) in any given year. Similar to the unadjusted data set, strong negative correlation is found between book leverage and investment and employment growth measures, whereas

similar relationship is absence between book leverage and capital expenditure growth measures. This implies for a firm with higher than industry median level of leverage, it grows less than the industry median rate in net investment and employment.

Similar to what is contained in Table 6.1, cash flow is a significant explainery variable for investment and employment growth but not for capital expenditure measures. Tobin's q has a negative correlation with all growth measures but only statistical significant results are present for 1-year employment growth.

6.1.2 *Effects of Growth Opportunities and Leverage on Firm Growth*

Results from previous section prompt the question if leverage uniformly decreases growth regardless of whether a firm has good investment opportunities. Lang et al. (1996) states that a firm with recognized investment opportunities (approximately by high Tobin's q) should be affected much less by leverage than its peers with less recognized investment opportunities. In order to explore to which degree availability of growth opportunities affects the dynamics between leverage and growth, separate parallel regression analysis are ran for companies that are classified as "high Tobin's q firms" for firms with a Tobin's q value of higher than one and "low Tobin's q firms" for firms with a Tobin's q value of less than one. The main results are presented in Table 6.4.

Supporting results from previous subsection in this thesis but contrary to that of Lang et al. (1996) and Hurme (2010), a statistically significant relationship between capital expenditure growth measures and book leverage is yet to be found. Nevertheless, when significant negative correlation is found, they sustain results from previous literature: for both investment and employment growth measures, effects of leverage are both less in magnitude in terms of coefficient values and less statistically significant. For instance, for net investment, not only book leverage has a significant negative coefficient for low Tobin's q firms, but the coefficient is nearly 2.5 times of that of high Tobin's q firms. However, unlike in Lang et al. (1996), within the European context, book leverage remains a statistically significant explainer, albeit at 5% level, for employment growth, even for high Tobin's q firms.

Table 6.3: Unadjusted regressions of growth measures on leverage for 1990-2010

Sample consists of yearly observations for all firms that have at least $500 million of sales in 1990 dollars. Years with less than $500 million sales are excluded from the sample. Data are obtained from Thomson One Banker. Capital expenditures (employment) growth is the percentage change of capital expenditures (employment) for 1- or 3-year time period compared to year 0. All growth measures are obtained by comparing such variable at the end of the year in which the firm enters the sample to that at the end of the following (third) year for one-year (three–year) growth measures. Investment is capital expenditures minus depreciation at year +1 divided by fixed assets at the end of year 0. Book leverage is the ratio of book value of total debt to total assets at year 0. Cash flow is gross of interest payments. Tobin's q is total value of market value of equity and book value of total debt divided by total assets of year 0. High q firms are these with Tobin's q value higher than one where as the low-q firms are these with a Tobin's q value of less than one. Flow variables are normalized using total assets at the end of the previous year. All figures are adjusted for inflation. P-value in parenthesis:*** p<0.01, ** p<0.05, * p<0.1

	High Tobin's Q Firms					*Low Tobin's Q Firms*				
Variables	Net Inv	1-year Empl Growth	3-year Empl Growth	1-year CapEx Growth	3-year CapEx Growth	Net Inv	1-year Empl Growth	3-year Empl Growth	1-year CapEx Growth	3-year CapEx Growth
Leverage	-0.060	-0.180**	-0.522**	1.836	0.442	-0.167***	-0.892***	-2.687**	-1.207	2.749
	(0.149)	(0.037)	(0.029)	(0.573)	(0.721)	(0.000)	(0.000)	(0.019)	(0.287)	(0.698)
Sales Growth	-0.017	0.315***	0.001	-0.428	-0.133	-0.016	-0.015	1.046**	0.240	0.727
	(0.364)	(0.000)	(0.975)	(0.320)	(0.424)	(0.333)	(0.502)	(0.010)	(0.596)	(0.772)
Cash Flow	0.170***	0.342***	1.209*	-4.058	-1.247	0.279**	0.760***	0.556	0.607	-8.196
	(0.002)	(0.000)	(0.066)	(0.651)	(0.717)	(0.022)	(0.000)	(0.835)	(0.819)	(0.620)
CapEx	0.204***	-0.073*	0.301	3.933	1.880	0.767**	0.219*	0.207**	1.396***	0.039
	(0.000)	(0.059)	(0.336)	(0.384)	(0.277)	(0.009)	(0.059)	(0.027)	(0.000)	(0.911)
Tobin's q	-0.190	-0.061**	-0.658	-0.301	-1.829	-0.029	-0.276***	-1.373*	-0.605	-2.827
	(0.449)	(0.035)	(0.165)	(0.396)	(0.576)	(0.449)	(0.000)	(0.098)	(0.461)	(0.582)
Constant	0.158**	-0.059	0.510	0.432	-0.895	-0.035	-0.157	-0.087	0.487	3.788
	(0.025)	(0.622)	(0.586)	(0.970)	(0.798)	(0.720)	(0.238)	(0.981)	(0.825)	(0.782)
# of obs.	1,590	1,654	1,641	1,657	1,647	3,905	4,358	4,334	4,326	4,218
R-squared	0.168	0.817	0.024	0.035	0.037	0.021	0.051	0.008	0.012	0.005

Similarly, cash flow remains a significant factor for growth other than capital expenditure measures, but it is of less significance for high Tobin's q firms than for low Tobin's q firms. Capital expenditure's effects on growth also appear to be stronger for low Tobin's q firms.

Table 6.4: Variable means and medians separated by Tobin's q and MWW test results

The sample period is 1990 – 2010. Each firm-year observation with more than $500 million of sales in 1990 dollars is included. Data are obtained from Thomson One Banker. Capital expenditures (employment) growth is the percentage change of capital expenditures (employment) for 1- or 3-year time period compared to year 0. Investment is capital expenditures minus depreciation at year +1 divided by fixed assets at the end of year 0. Book leverage is the ratio of book value of total debt to total assets at year 0. Cash flow is gross of interest payments. The difference between the groups are testing using Mann-Whitney-Wilcoxon (MMW) test, which is a non-parametric tests for medians.

		Book Leverage	1-year Employment Growth	3-year Employment Growth	1-year Capital Expenditures Growth	3-year Capital Expenditures Growth	Net Investment
Mean	(q < 1)	28.75 %	2.56 %	13.27 %	8.09 %	16.56 %	4.50 %
	(q > 1)	23.19 %	3.43 %	25.97 %	15.23 %	19.05 %	6.08 %
Median	(q < 1)	25.75 %	-0.83 %	0.26 %	0.02 %	3.43 %	2.55 %
	(q > 1)	21.02 %	0.75 %	2.96 %	2.43 %	8.78 %	4.72 %
MWW	Z value	11.038	-7.076	-12.427	-13.317	-11.867	-10.342
	Prob > |z|	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Table 6.4 presents average and median figure for book leverage and all growth measures for high Tobin's q firms and low Tobin's q firms. It is evident that high Tobin's q firms have higher means and medians in all investment and growth measures, while having lower level of leverage. Medians of growth measures for low Tobin's q companies fluctuate around zero in most cases and the median of 1-year employment growth is even negative. In contrast, medians and means of growth measures are positive and higher for high Tobin's q firms.

MWW test results illustrate the fact that the difference between high Tobin's q firms and low Tobin's q firms are statistically significant. Such finding conforms to the findings of Hurme (2010) and motivates investigations for high and low Tobin's q firms separately.

Table 6.5: Industry adjusted regressions of growth measures on leverage for 1990-2010

Sample consists of yearly observations for all firms that have at least $500 million of sales in 1990 dollars. Years with less than $500 million sales are excluded from the sample. Industry effects are adjusted by subtracting the industry median from the specific firm variable figure, provided there are at least three firms in each industry group defined by 2-digits SIC code for a given year. Data are obtained from Thomson One Banker. Capital expenditures (employment) growth is the percentage change of capital expenditures (employment) for 1- or 3-year time period compared to year 0. Investment is capital expenditures minus depreciation at year +1 divided by fixed assets at the end of year 0. Book leverage is the ratio of book value of total debt to total assets at year 0. Cash flow is gross of interest payments. Tobin's q is total value of market value of equity and book value of total debt divided by total assets of year 0. High q firms are these with Tobin's q value higher than one where as the low-q firms are these with a Tobin's q value of less than one. Flow variables are normalized using total assets at the end of the previous year. All figures are adjusted for inflation. P-value in parenthesis: *** p<0.01, ** p<0.05, * p<0.1

	High Tobin's Q Firms					*Low Tobin's Q Firms*				
Variables	Abnormal Net Inv	Abnormal 1-year Empl Growth	Abnormal 3-year Empl Growth	Abnormal 1-year CapEx Growth	Abnormal 3-year CapEx Growth	Abnormal Net Inv	Abnormal 1-year Empl Growth	Abnormal 3-year Empl Growth	Abnormal 1-year CapEx Growth	Abnormal 3-year CapEx Growth
Abnormal Leverage	-0.076**	-0.229***	-0.307*	1.214	0.681	-0.222***	-1.044***	-3.948**	-0.346	6.867
	(0.056)	(0.000)	(0.065)	(0.605)	(0.528)	(0.003)	(0.000)	(0.021)	(0.838)	(0.514)
Abn. Sales Growth	-0.046***	0.324***	0.013	-0.377	-0.114	-0.027	0.020	0.617	0.960	1.201
	(0.000)	(0.000)	(0.587)	(0.279)	(0.474)	(0.420)	(0.547)	(0.591)	(0.409)	(0.868)
Abnormal Cash Flow	0.213***	0.096	1.217***	-3.566	-0.059	0.289*	1.038***	1.608	1.082	-2.706
	(0.000)	(0.265)	(0.008)	(0.581)	(0.984)	(0.093)	(0.000)	(0.680)	(0.780)	(0.910)
Abnormal CapEx	0.196***	-0.112***	0.218	2.712	2.385**	0.395***	0.912*	0.297**	1.091**	0.037
	(0.000)	(0.000)	(0.187)	(0.240)	(0.026)	(0.005)	(0.078)	(0.035)	(0.039)	(0.931)
Abnormal Tobin's q	-0.043	-0.018	-0.317*	-0.123	-1.573	0.066	-0.141**	-1.603	-0.556	5.227
	(0.490)	(0.248)	(0.083)	(0.976)	(0.804)	(0.243)	(0.010)	(0.201)	(0.654)	(0.495)
Constant	0.058	0.042	0.349	-0.449	-0.081	-0.023	0.198	-1.658	-0.361	0.915
	(0.520)	(0.620)	(0.620)	(0.943)	(0.978)	(0.911)	(0.343)	(0.768)	(0.924)	(0.969)
# of obs.	1,081	1,114	1,109	1,117	1,215	2,655	2,936	2,930	2,918	2,858
R-squared	0.155	0.671	0.013	0.028	0.023	0.026	0.088	0.010	0.012	0.008

Table 6.5 presents regression analysis with similar settings as in Table 6.3, only this time with industry adjusted data instead. We see a drastic decrease in numbers of observations for both high and low Tobin's q firms. In addition, there is still no correlation between leverage and capital expenditure measures in both groups.

The more important difference between unadjusted and adjusted results appears when comparing book leverage coefficients between industry-adjusted high Tobin's q firms and the unadjusted ones. Unlike in Table 6.3, industry adjusted results in Table 6.5 shows that there is a statistically significant correlation between net investment and book leverage even for high Tobin's q firms.

Nevertheless, in both Tables, the general observation that book leverage is more statistically significant of an explainer and has larger coefficients for low Tobin's q firms than for high Tobin's q firms remain valid. This implies firms with higher than industry median level of leverage growth less than industry median in both net investment and employment. This implication holds true for both high and low Tobin's q companies.

6.2 Impact of Company Size on Dynamics between Book Leverage and Firm Growth

Previous finance literature on capital structure theories has indicated that firms of different sizes have different degree of access to capital markets and bank loans. The difference is to such a large degree that it impacts company's leverage.

To ensure results obtained from previous section are not merely due to company size effects and hold across the board, regression of different subgroups of different company size are reported in this section. First, in subsection 6.2.1, the total sample is divided into two subgroups consists of small companies and big companies. Then separate regressions are ran to investigate if there are any differences between the two subgroups. In subsection 6.2.2 potential influences of perceived growth opportunities that are approximately by Tobin's q are presented separately for subgroups of large and small firms.

Lastly, in subsection 6.2.3, to deepen understanding of impact of company size on dynamics between leverage and growth, a more finely constructed comparison is presented where the data sample are sliced into 10 groups based on ascending sizes. Separate regression is run for each group, results reported.

Table 6.6: Unadjusted regressions of growth measures on leverage divided by firm size

The sample period is 1990 – 2010. Large firms have more than $1 billion of sales in 1990 dollars, whereas small firms have less than $1 billion of sales in 1990 dollars for each year in which they are included in the sample. Data are obtained from Thomson One Banker. Capital expenditures (employment) growth is the percentage change of capital expenditures (employment) for 1- or 3-year time period compared to year 0. All growth measures are obtained by comparing such variable at the end of the year in which the firm enters the sample to that at the end of the following (third) year for one-year (three –year) growth measures. Investment is capital expenditures minus depreciation at year +1 divided by fixed assets at the end of year 0. Book leverage is the ratio of book value of total debt to total assets at year 0. Cash flow is gross of interest payments. Tobin's q is total value of market value of equity and book value of total debt divided by total assets of year 0. High q firms are these with Tobin's q value higher than one where as the low-q firms are these with a Tobin's q value of less than one. All explanatory variables are computed for the base year; flow variables are normalized using total assets at the end of the previous year. All figures are adjusted for inflation. P-value in parenthesis: *** p<0.01, ** p<0.05, * p<0.1

	Large Firms					*Small Firms*				
Variables	Net Inv	1-year Empl Growth	3-year Empl Growth	1-year CapEx Growth	3-year CapEx Growth	Net Inv	1-year Empl Growth	3-year Empl Growth	1-year CapEx Growth	3-year CapEx Growth
Leverage	-0.318***	-0.283**	-0.165	1.469	1.815	-0.471***	-0.783***	-2.057**	-1.154	2.736
	(0.005)	(0.012)	(0.581)	(0.706)	(0.398)	(0.000)	(0.000)	(0.031)	(0.239)	(0.680)
Sales Growth	-0.022	0.276***	0.154***	-0.260	0.058	-0.049***	-0.023	1.239	0.964	-1.969
	(0.469)	(0.000)	(0.000)	(0.540)	(0.797)	(0.000)	(0.532)	(0.143)	(0.201)	(0.703)
Cash Flow	0.210	0.103	0.939*	-1.437	-0.649	0.437***	1.096***	-0.728	1.246	-16.186
	(0.324)	(0.616)	(0.085)	(0.842)	(0.869)	(0.000)	(0.000)	(0.815)	(0.646)	(0.393)
CapEx	-0.002	-0.003	0.015	2.788	0.025	0.035***	0.016	-0.813	1.161***	9.623
	(0.631)	(0.407)	(0.166)	(0.226)	(0.744)	(0.000)	(0.369)	(0.459)	(0.001)	(0.157)
Tobin's q	-0.007	-0.010**	0.007	0.033	0.038	-0.001***	-0.001	-0.005	-0.004	-0.017
	(0.143)	(0.039)	(0.587)	(0.839)	(0.665)	(0.003)	(0.154)	(0.748)	(0.770)	(0.865)
Constant	-0.093	-0.029	0.218	0.275	0.513	0.029	-0.132	0.256	-0.754	-0.106
	(0.704)	(0.948)	(0.870)	(0.981)	(0.923)	(0.240)	(0.403)	(0.898)	(0.829)	(0.993)
# of obs.	1,546	1,721	1,699	1,690	1,639	3,949	4,291	4,276	4,293	4,226
R-squared	0.040	0.259	0.036	0.024	0.022	0.088	0.077	0.006	0.014	0.006

6.2.1 *Comparisons between Subgroups Divided by $1 Billion Annual Sales*

In this section, regressions are conducted to investigate the impact of company size on the dynamics between book leverage and firm growth measure. First the sample will be divided in two parts. Then Tobin's q is allowed to impact the relationship between leverage and growth as similar to the setting in Table 6.5.

Lang et al. (1996) and Hurme (2010) define large companies in their studies as these with more than $1 billion in 1990 dollars in sales per annual at the time of data recording. In contrast, having such restriction on the European data set would yield too few numbers of data observations. So the restriction is set to be $500 million in 1990 dollars instead.

In order to see whether such alteration in model specification influences the results, the total sample is divided into two groups: "large firms" are these observations with more than $1 billion in 1990 dollars in sales per annual, whereas "small firms" are these with less than $1 billion in 1990 dollars in sales per annual. The results are reported in Table 6.6.

Supporting results presented in previous sections, the negative effects book leverage has on net investments and employment growth is observed. However, nothing appears to link book leverage to capital expenditures unlike previous studies base on US data would suggest. One exception is the 3-year employment growth measure, which is not influenced by book leverage. In comparison to findings in Lang et al. (1996), on a holistic level the negative effects of leverage on investment and employment growth are slightly less prevalent in the European setting.

However, there is noticeable difference between the two subgroups results presented in Table 6.6. First, for small firms, coefficients of book leverage are both substantially larger in absolute value than that of large firms, but they also tend to be more statistically more significant. The interpretation here could be that large firms, who have existing funding options easily available, are able to fund their growth strategies in one way or another. Limitation caused by leverage is unlikely to be a serious hindrance. Secondly, coefficients for sales growth, cash flow, capital expenditure and Tobin's q are all highly statistically significant in the net investment regression for small firms. This is not the case for large firms, amongst which these variables are not statistically significant for any growth measures.

A word of caution here is that the division of pool data sample into two groups based on a threshold value of $1 billion in 1990 dollars is somewhat arbitrary and consequently limits the

validity of the findings. Inferring the differences in nature of relationship between leverage and firm growth for “large” and “small” companies based on these results may not be generalized.

6.2.2 *Influence of Tobin’s Q and Company Sizes on Leverage-Growth Dynamics*

In this subsection growth opportunities are allowed to influence the impact of leverage on different firm growth measures. First, results on big firms as defined in previous subsection are presented, followed by that of small firms and ends with a general comparison between the two groups.

Small Firms

Table 6.7 presents the unadjusted regression of growth measures on leverage, split by high Tobin’s q group with their q-value above one and low Tobin’s q group with q-value below one. As it can be expected, the negative impact of leverage is more predominant in low Tobin’s q firms than high Tobin’s q firms. Leverage appears to be the significantly limiting factor for employment growth for small firms with low Tobin’s q: coefficients for 1-year and 3-year employment growth measures are highly statistically significant at -2.228 and -3.683.

What are really interesting about Table 6.7 are the regression results of capital expenditure measures on book leverage. The negative correlation found between book leverage and capital expenditure measures in both Lang et al. (1996) and Hurme (2010) that has been missing throughout this thesis so far finally appears. Despite being both highly statistically significant, the absolute value of the coefficient is rather small, hinting such correlation is not as predominant in the European setting as it is amongst US companies. The linkage between leverage and capital expenditure growth is so weak that it is strictly limited to small firms with low Tobin's q. No statistical correlation is found between capital expenditure growth measures and leverage for even for small companies with high Tobin's q.

One potential factor worth noticing is that there are very few firm-year observations contained in the pooled data sample that both have sales less than 1$ billion sales in 1990 dollars and happens to have low Tobin’s q firms, in another words, small firms with bleak growth perspective. The average number of firm-year observations contained in each of the regression for this particular subgroup is around 350, this calls the validity of the results found based on this sub-sample into question.

Table 6.7: Unadjusted regressions of growth measures on leverage for small firms

The sample period is 1990 – 2010. Included firms have less than $1 billion of sales in 1990 dollars for each year in which they are included in the sample. Data are obtained from Thomson One Banker. Capital expenditures (employment) growth is the percentage change of capital expenditures (employment) for 1- or 3-year time period compared to year 0. All growth measures are obtained by comparing such variable at the end of the year in which the firm enters the sample to that at the end of the following (third) year for one-year (three –year) growth measures. Investment is capital expenditures minus depreciation at year +1 divided by fixed assets at the end of year 0. Book leverage is the ratio of book value of total debt to total assets at year 0. Cash flow is gross of interest payments. Tobin's q is total value of market value of equity and book value of total debt divided by total assets of year 0. High q firms are these with Tobin's q value higher than one where as the low-q firms are these with a Tobin's q value of less than one. All explanatory variables are computed for the base year; flow variables are normalized using total assets at the end of the previous year. All figures are adjusted for inflation. P-value in parenthesis: *** p<0.01, ** p<0.05, * p<0.1

	High Tobin's Q Firms					*Low Tobin's Q Firms*				
Variables	Net Inv	1-year Empl Growth	3-year Empl Growth	1-year CapEx Growth	3-year CapEx Growth	Net Inv	1-year Empl Growth	3-year Empl Growth	1-year CapEx Growth	3-year CapEx Growth
Leverage	-0.054***	-1.161***	-3.552**	-1.580	3.338	-0.084***	-2.228***	-3.683***	-0.258***	-0.845***
	(0.002)	(0.000)	(0.034)	(0.292)	(0.743)	(0.001)	(0.000)	(0.000)	(0.004)	(0.010)
Sales Growth	-0.040***	-0.082*	1.107	0.980	-3.216	-0.008	0.133***	1.916***	0.719***	0.217
	(0.001)	(0.090)	(0.336)	(0.341)	(0.649)	(0.756)	(0.000)	(0.000)	(0.000)	(0.501)
Cash Flow	0.206***	0.652***	0.789	2.706	-23.052	0.417***	1.427***	-0.105	-0.560**	-1.004
	(0.000)	(0.000)	(0.878)	(0.553)	(0.464)	(0.002)	(0.000)	(0.707)	(0.023)	(0.266)
CapEx	0.027***	0.033	-1.340	1.143**	11.728	0.231***	-0.011	0.038	1.543***	3.038***
	(0.000)	(0.133)	(0.394)	(0.015)	(0.234)	(0.000)	(0.733)	(0.743)	(0.000)	(0.000)
Tobin's q	0.014	-0.318***	-2.093*	-0.294	-2.809	-0.023*	0.867	0.015	-2.009	-0.104
	(0.292)	(0.000)	(0.090)	(0.790)	(0.709)	(0.083)	(0.580)	(0.771)	(0.536)	(0.172)
Constant	-0.036	-0.420**	0.063	-0.824	1.318	0.217**	-0.097	0.036	-0.246	-1.094
	(0.504)	(0.026)	(0.989)	(0.852)	(0.965)	(0.011)	(0.290)	(0.900)	(0.312)	(0.118)
# of obs.	1,212	1,354	1,340	1,325	1,275	334	367	359	365	364
R-squared	0.024	0.018	0.429	0.022	0.020	0.087	0.894	0.062	0.041	0.041

Table 6.8: Unadjusted regressions of growth measures on leverage for large firms

The sample period is 1990 – 2010. Included firms have at least $1 billion of sales in 1990 dollars for each year in which they are included in the sample. Data are obtained from Thomson One Banker. Capital expenditures (employment) growth is the percentage change of capital expenditures (employment) for 1- or 3-year time period compared to year 0. All growth measures are obtained by comparing such variable at the end of the year in which the firm enters the sample to that at the end of the following (third) year for one-year (three –year) growth measures. Investment is capital expenditures minus depreciation at year +1 divided by fixed assets at the end of year 0. Book leverage is the ratio of book value of total debt to total assets at year 0. Cash flow is gross of interest payments. Tobin's q is total value of market value of equity and book value of total debt divided by total assets of year 0. High q firms are these with Tobin's q value higher than one where as the low-q firms are these with a Tobin's q value of less than one. All explanatory variables are computed for the base year; flow variables are normalized using total assets at the end of the previous year. All figures are adjusted for inflation. P-value in parenthesis: *** p<0.01, ** p<0.05, * p<0.1

	High Tobin's Q Firms					*Low Tobin's Q Firms*				
Variables	Net Inv	1-year Empl Growth	3-year Empl Growth	1-year CapEx Growth	3-year CapEx Growth	Net Inv	1-year Empl Growth	3-year Empl Growth	1-year CapEx Growth	3-year CapEx Growth
Leverage	-0.023***	-0.298*	-0.349	0.169	1.327	-0.047***	-0.318***	-0.310*	7.848	2.540
	(0.006)	(0.050)	(0.139)	(0.912)	(0.569)	(0.008)	(0.000)	(0.746)	(0.566)	(0.620)
Sales Growth	-0.027	-0.007	1.127*	-0.171	0.976*	-0.013	0.318***	-0.068	0.080	-0.046
	(0.431)	(0.835)	(0.065)	(0.739)	(0.055)	(0.700)	(0.000)	(0.321)	(0.934)	(0.901)
Cash Flow	0.265	0.176	0.405	-0.304	-0.528	0.041	0.465**	1.568	-11.589	-1.108
	(0.339)	(0.501)	(0.160)	(0.909)	(0.894)	(0.686)	(0.018)	(0.454)	(0.701)	(0.923)
CapEx	0.001	-0.001	0.010**	2.045*	0.014	0.134***	-0.134	-0.194	6.092	-6.057
	(0.906)	(0.906)	(0.035)	(0.052)	(0.824)	(0.005)	(0.253)	(0.874)	(0.778)	(0.457)
Tobin's q	-0.117	-0.229**	-0.214*	-1.082	-1.482	0.275	-0.210**	-0.270	0.035	0.046
	(0.291)	(0.027)	(0.062)	(0.303)	(0.351)	(0.172)	(0.063)	(0.989)	(0.933)	(0.767)
Constant	0.052	0.078	-0.081	0.548	1.672	-0.029	-0.684***	-0.355	1.096	1.972
	(0.795)	(0.680)	(0.698)	(0.774)	(0.552)	(0.784)	(0.000)	(0.900)	(0.979)	(0.843)
# of obs.	2,693	3,004	2,994	3,001	2,943	1,256	1,287	1,282	1,292	1,283
R-squared	0.090	0.110	0.009	0.014	0.007	0.185	0.132	0.289	0.257	0.102

Large Firms

Table 6.8, presents the same regression results as that in Table 6.7, but with data limited to large companies. Once again, the results largely is in congruent with the notion that the negative correlation between book leverage and firm growth is stronger for low Tobin's q firms than for high Tobin's q firms. However, no significant correlation is found between leverage and capital expenditure growth measures. This is to be expected considering such association is even missing amongst small high Tobin's q firms.

In this subsection, the pooled data sample is split in to four different segments: small firms of low Tobin's q, small firms with high Tobin's q, large firms with low Tobin's q and large firms with high Tobin's q. Since the significance of correlation appears to be negatively correlated to both Tobin's q and company size, then the general expectation is that a natural descending order should be observed: book leverage coefficients should be the largest in absolute value terms and most statistically significant in the subsample of small firms with low Tobin's q and the smallest in absolute value terms and least statistically significant in the subsample of large firms with high Tobin's q firms.

Put differently, for smaller firms with limited growth prospects, having high level of leverage poses considerable constraints on its growth in all three aspects: investment, employment and even capital expenditures. In contrast, book leverage, merely by its own merits, has nearly no negative effects at all for these firms that are larger in size and have bright growth opportunities ahead. Such hypothesis is very much supported by results presented in Table 6.7 and Table 6.8 by comparing book leverage coefficients and their p-value between small low Tobin's q firms and large high Tobin's q firms.

What can be observed from the two groups in between the extremes is more revealing. Both subgroups of small firms with high Tobin's q and large firms with low Tobin's q have two factors (Tobin's q and company size) working in opposite directions. The relative strength of the negative correlation observed between leverage and growth measures will provide insights into which one of the two factors is more predominant. With reference to the left half of Table 6.7 and right half of Table 6.8, small firms with high Tobin's q have much more significant negative correlation between book leverage and net investment and employment growth measures in comparison to that of large firms with low Tobin's q. Thus it appears to be based on the division of sample and the European context, being small instead of having low growth prospects would cause book leverage to be more of an obstacle for a firm to grow, at least in

net investment and employment growth. Hence company size matters, more so than perceived growth opportunities measured in Tobin's q.

6.2.3 *Comparisons between Subgroups of Various Firm Sizes Based on Sales Deciles*

In attempt to deepen my investigations of how does company size affect the perceived negative relationship between book leverage and firm growth, the data set is divided into deciles based on sales and separate regression conducted for each growth measures and each decile groups. The results are presented in Table 6.9.

The general notion that the negative correlation between book leverage and firm growth are more visible and prevalent amongst smaller firms presented in Table 6.6 are marginally supported. The pooled data are divided based on annual sales to form 10 groups in ascending order: group (1) consists of the smallest 10 percentile firm-year observations whereas group (10) consists of the largest 10 percentile. If the results obtained from Table 6.6 are of robust nature, then it is expected that the absolute value of book leverage coefficient would be the largest in group (1) and the smallest in group (10), given a comparatively similar level of statistically significance. Expressed alternatively, a downward sloping line would validate findings from Table 6.6 if such results are presented in a graph with absolute value of book leverage coefficients on y-axis and groups on x-axis in ascending order of company size.

However, figures in Table 6.9 only add additional ambiguity to dynamics between book leverage and growth given a company of particular size. First, for net investment, which is presented in Figure 6.9.1, the expected downwards sloping line is only evidently seen between the 1st and the 2nd deciles and to a lesser extent until 4th decile group. The possible inference that could be drawn here is that the underinvestment problem suggested by finance literature only applies to the smallest subset of the firm-year observations in the Europe, but mostly disappears once a company surpasses certain size threshold.

Table 6.9: Effects of Leverage on Growth Measures, the Decile Groups Perspective, 1990-2010

Included firms have at least $500 million of sales in 1990 dollars for each year in which they are included in the sample. Data are obtained from Thomson One Banker. Capital expenditures (employment) growth is the percentage change of capital expenditures (employment) for 1- or 3-year time period compared to year 0. Investment is capital expenditures minus depreciation at year +1 divided by fixed assets at the end of year 0. Book leverage is the ratio of book value of total debt to total assets at year 0. All figures are adjusted for inflation. The *absolute values* of the book leverage coefficients are presented as dotted line with reference to the primary y-axis for investment and employment growth measures as all of the coefficients are negative and hence conform to expectations. There are no statistically significant relationship found between book leverage and capital expenditure measures nor are the signs of the coefficients consistent with theoretical expectation. So only the 1-year measure is presented for illustration and the 3-year measure is omitted. Notice it is the *actual value* rather than the *absolute value* presented in the primary y-axis. Level of p-value for each leverage coefficient is dubbed on the x-axis next to each decile group label: *** p<0.01, ** p<0.05, * p<0.1and the actual p-values are presented as histogram bars with reference to secondary y-axis. Groups are divided for every decile by sales as a proxy for company size in ascending order: group (1) consists of observations of the smallest 10 percentiles in sales whereas group (10) consists of the largest 10 percentiles.

*Fig. 6.9.*1 Net Investment

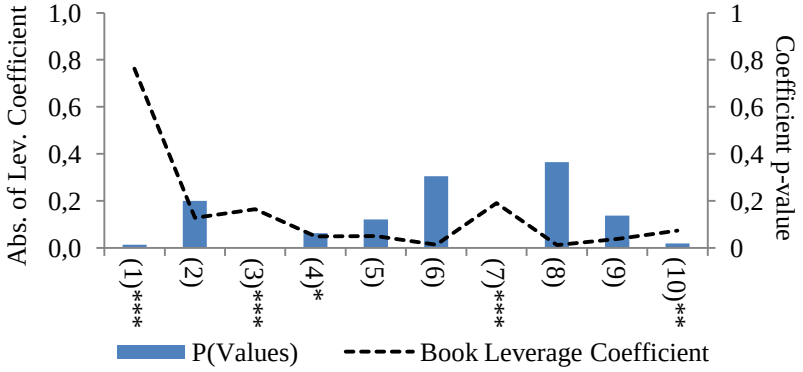


Fig 6.9.2 1-year Capital Expenditure Growth

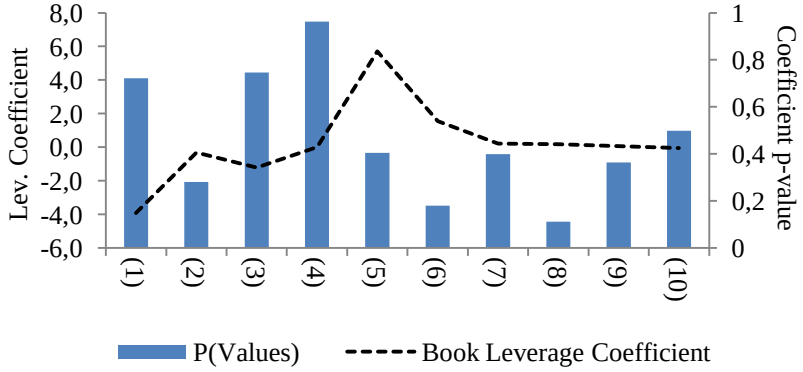


Fig. 6.9.3 1-year Employment Growth

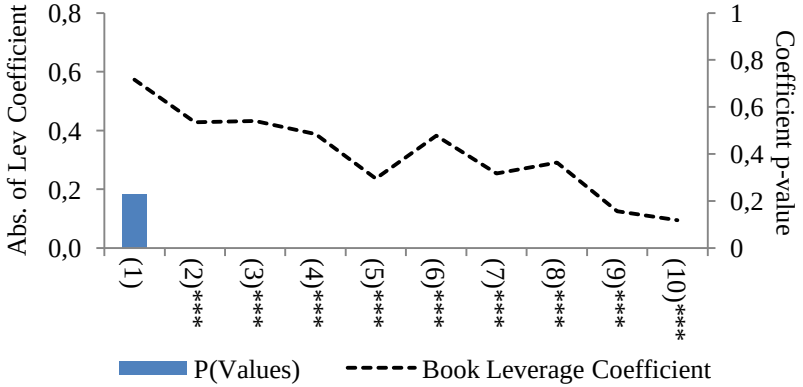


Fig. 6.9.4 3-year Employment Growth

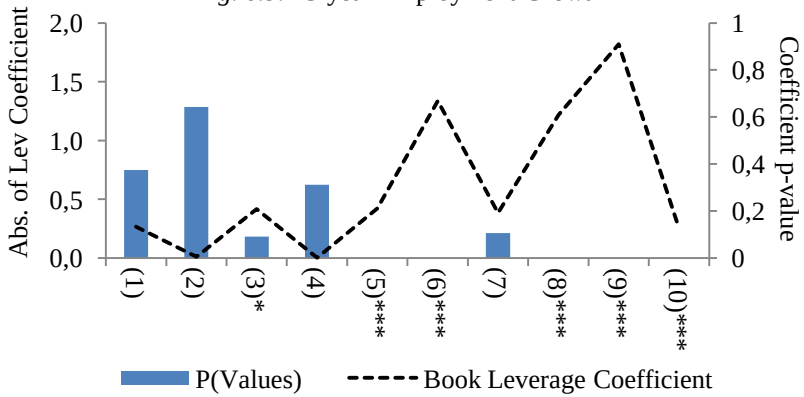


Figure 6.9.2 presents results from regression of leverage on capital expenditure growth measures. Supporting previous findings, no correlation to any remotely convincing degree is found: book leverage coefficients consist of both positive and negative values and for nearly all of the groups the coefficient is not statistically significant at any rate. This applies to both the 1-year as well as the 3-year measures, thus only the 1-year results are presented for illustration purpose only.

The strongest supporting evidences come from 1-year employment growth measure (illustrated in Figure 6.9.3) where a visible downward sloping trend line of book leverage coefficients is observed. More convincingly, nine out of ten groups have a coefficient that is statistically significant at 1% level. This implies that especially within a short range of time period, smaller companies tend to forego hiring because of leverage more so than the big companies. However, leverage is of minimal impacts for the largest companies as the absolute value of book leverage coefficient effectively approaching zero for the 10^{th} group.

In contrast, similar trend is absent for 3-year employment growth measure in Figure 6.9.4. The absolute values of book leverage coefficient fluctuate seemingly randomly but with larger range as companies grow bigger accompanied by an increase in statistically significance. Even if there was indeed any constrains posed by leverage on employment growth, in reality, it is most likely to be overwhelmed by countless other factors in 3 years' time.

6.3 Impacts of Legal Structure on Dynamics between Leverage and Firm Growth

The general trend of capital structure formation within a certain nation can be seen as a function of the availability of external financing and maturity of capital market relative to the prominence of its banking system. In light of such dynamics, it is no surprise that legal structure underpins capital structure characteristics (Bancel and Mittoo, 2004 and La Porta, Lopez-de-Silanes. Shleifer. and Vishny, 1997. 1998). Table 6.10 reports findings on regression that is run separately for each legal system and provides insights into the inner dynamics of how legal backdrops affect leverage-growth interactions.

Countries belong to the English legal system are expected to exhibits the strongest evidence for negative correlations between book leverage and firm growth measures. As illustrated by Panel A in table 6.10, countries in English legal system exhibit negative correlation between leverage and four of the five measures: net investment, both employment growth measures and 1-year capital expenditure growth measure. This is also the only occasion in which a

correlation is found to be statistically significant between capital expenditure growth and leverage in Table 6.10.

Table 6.10: Unadjusted regressions of growth measures on leverage for various legal systems

The sample period is 1990 – 2010. Included firms have at least $500 million of sales in 1990 dollars for each year in which they are included in the sample. Data are obtained from Thomson One Banker. Capital expenditures (employment) growth is the percentage change of capital expenditures (employment) for 1- or 3-year time period compared to year 0. All growth measures are obtained by comparing such variable at the end of the year in which the firm enters the sample to that at the end of the following (third) year for one-year (three – year) growth measures. Investment is capital expenditures minus depreciation at year +1 divided by fixed assets at the end of year 0. Book leverage is the ratio of book value of total debt to total assets at year 0. All explanatory variables are computed for the base year; flow variables are normalized using total assets at the end of the previous year. All figures are adjusted for inflation. English legal system includes the UK and Ireland, which forms the representation of common law countries; German legal system includes Germany and Austria and Scandinavian legal system include Denmark, Finland and Sweden; French legal system includes Spain, France, Belgium, Netherland, Italy and Luxemburg. These three groups represent the common law countries. P-value in parenthesis: *** p<0.01, ** p<0.05, * p<0.1

Dependent variables	Net Investment	1-year Employment Growth	3-year Employment Growth	1-year Capital Expenditures Growth	3-year Capital Expenditures Growth
Panel A. English legal system					
Leverage	-0.022**	-1.223***	-3.400**	-0.209***	-0.163
	(0.013)	(0.000)	(0.053)	(0.000)	(0.819)
# of obs.	1,486	1,484	1,476	1,491	1,475
R-squared	0.196	0.134	0.014	0.460	0.034
Panel B. German legal system					
Leverage	-0.097***	-0.378***	-1.454***	0.462	0.505
	(0.000)	(0.000)	(0.000)	(0.702)	(0.643)
# of obs.	1,342	1,399	1,386	1,393	1,368
R-squared	0.116	0.066	0.241	0.019	0.037
Panel C. Scandinavian legal system					
Leverage	-0.044	-0.308***	-0.335***	-0.158	-0.423*
	(0.863)	(0.000)	(0.000)	(0.299)	(0.096)
# of obs.	599	784	783	781	769
R-squared	0.045	0.076	0.374	0.247	0.246
Panel D. French legal system					
Leverage	-0.304***	-0.323***	-0.958***	-0.686	7.419
	(0.000)	(0.000)	(0.000)	(0.848)	(0.566)
# of obs.	2,068	2,345	2,330	2,318	2,253
R-squared	0.038	0.726	0.054	0.008	0.009

Germany and Scandinavian countries in Panel B and C show somewhat similar behaviors in terms of coefficients of book leverage in both absolute value terms and degree of statistical significance. One exception is for countries belong to Scandinavian legal system to display a mildly significant correlation between book leverage and 3-year capital expenditure. Overall speaking, the negative correlations are weaker between employment measures and leverage but stronger between net investment and leverage.

Panel D, which illustrates regression results for countries belong to the French legal system shows puzzling results with regards to prior predictions. Instead of showing the weakest correlation in general between leverage and growth measures, it demonstrates the strongest negative association between leverage and growth in all legal systems. To a lesser extent, companies originated from countries with French legal background display negative relations between book leverage and employment growth at around the same level as others from civil law origin, but less than that of results based on common law countries.

To briefly sum up, surprisingly the negative correlation between book leverage and net investment is the strongest in the French legal system who provides least amount of investor protections, according to LLSV (1997, 1998), and the weakest in the English system that with the strongest investor protection. German and Scandinavian legal systems are in between the two extremes.

On the contrary and in accordance to my analysis of related literature, there is ample evidences to show the limiting effects of debt on employment growth is more severe in common law countries (English legal system) than in civil law countries. However, such degree of discrepancy in strength of negative correlation is not observed amongst civil law nations.

7 DISCUSSION

This chapter links the empirical results presented from the chapter 6 with hypotheses put forward in chapter 3. Related results and analysis are included in section 7.1, which ends with a general commentary on the findings. Section 7.2 lists some of the limitations of this study and addresses the fundamental problem of differentiating correlation and causalities. Lastly section 7.3 presents potential new routes where further research could be carried out.

7.1 Discussion of Empirical Results with Relation to Hypotheses

The results from previous chapter are distilled and discussed in this section by each major hypothesis listed in Table 3.1.

7.1.1 *Hypothesis 1: Negative Correlation between Leverage and Growth*

Table 7.1 shows summarized results concerning hypothesis 1, which shows partial support for H1a and H1b. Net investment and employment growth measures clearly demonstrate negative correlation with book leverage. In contrast and to the dismay of previous US studies, no statistical correlation is found between capital expenditure growth measure and leverage and this persists for majority of the regression results obtained in this study. Such relationship between leverage and firm growth measures persists even after controlling for industry effects.

Table 7.1: Relation between Leverage and Growth on Pooled European Data

The sample period is 1990 – 2010. Relation statues between leverage and numerous growth measures are classified as "S. Neg." (Strongly Negative) if the coefficient is statistically significant at 1% level, "M. Neg." (Moderately Negative) at 5% level, "W. Neg." (Weakly Negative) at 10% level and "No" if coefficient does not show worthy level of statistical significance. The actual regression coefficients are listed in the parentheses below the relationship statues classification, which is dubbed to illustrate its statistical significance level according to coefficient p-values: *** p<0.01, ** p<0.05, * p<0.1. Book leverage is the ratio of book value of total debt to total assets at year 0. Industry effects are adjusted by subtracting the industry median from the specific firm variable figure provided there are at least three firms in each industry group defined by 2-digits SIC code for a given year.

	Net Investment	***1-year Employment Growth***	***3-year Employment Growth***	***1-year Capital Expenditure Growth***	***3-year Capital Expenditure Growth***
Book leverage	S. Neg. (-0.125***)	S. Neg. (-0.554***)	M. Neg. (-1.449**)	No (0.471)	No (2.153)
Industry-adjusted abnormal leverage	S. Neg. (-0.154***)	S. Neg. (-0.590***)	M. Neg. (-1.610**)	No (-0.097)	No (3.272)

The interpretation is that European companies with above industry median level of leverage will grow less in net investment and employment at a larger rate than the companies with industry median or lower level of leverage.

The industry adjusted results is important due to following considerations: if only the unadjusted negative correlation is observed, it could be a results of correlation across industries and leverage happens to be high and investments happens to be low due to economic conditions. For example, during economic expansion, there are ample amount of cash flows to reduce debt and plenty of other external financing options to fund growth opportunities, which would induce a cross-industry phenomenon of negative correlation between leverage and growth. However, what is of particular importance to this study is to find out if a firm that grows more in an industry have higher or lower leverage than other firms in the same industry, so called within-industry comparison. So industry effects need to be controlled and specifically with the median-reference method explained in chapter 5 rather than the conventional usage of industry dummies.

All in all, the results obtained provide partial support for H1a and H1b as only three out of five growth measures show strong negative correlation with leverage.

7.1.2 *Hypothesis 2: Tobin's Q and Leverage/Growth Relation*

There are principally two alternative theories on how perceived growth opportunities can impact dynamics between firm growth and leverage. First is what is known as the "naïve liquidity effects", which states that as taking on debt reduces the amount of free cash flow available internally for firm expansion purposes in an uniform manner irrespective of investment opportunities (Lang et al., 1996). Secondly, firms with better growth prospects will not be so much limited by their level of leverage, albeit high, since these firms will find a way to finance their growth in one way or another.

Results concerning H2 are summarized and presented in Table 7.2. Principally, they are in congruent with findings of Lang et al. (1996) and Hurme (2010) and support the second theory explained in previous paragraph. Both high Tobin's q and low Tobin's q firms display certain degree of negative correlations between book leverage and some of the growth measures and nothing statistically significant was found between capital expenditure growth measures and book leverage, with both industry-adjusted and unadjusted data. However it is the contrast between the two groups that are more informative: coefficients for investment and

Table 7.2: Relation between Leverage and Growth with Reference to Tobin's Q

The sample period is 1990 – 2010. Relation statues between leverage and numerous growth measures are classified as "S. Neg." (Strongly Negative) if the coefficient is statistically significant at 1% level,"M. Neg." (Moderately Negative) at 5% level, "W. Neg." (Weakly Negative) at 10% level and "No" if coefficient does not show worthy level of statistical significance. The actual regression coefficients are listed in the parentheses below the relationship statues classification, which is dubbed to illustrate its statistical significance level according to coefficient p-values: *** p<0.01, ** p<0.05, * p<0.1. High Tobin's q firms are these companies with q-value more than one (0 for industry adjusted figure) whereas the low Tobin's q firms are these with p-value less than one (0 for industry adjusted figure). Book leverage is the ratio of book value of total debt to total assets at year 0. Industry effects are adjusted by subtracting the industry median from the specific firm variable figure provided there are at least three firms in each industry group defined by 2-digits SIC code for a given year.

	Net Investment	***1-year Employment Growth***	***3-year Employment Growth***	***1-year Capital Expenditure Growth***	***3-year Capital Expenditure Growth***
High Tobin's q firms					
Book leverage	No (-0.060)	M. Neg. (-0.180**)	M. Neg. (-0.522**)	No (1.836)	No (0.442)
Industry-adjusted abnormal leverage	No (-0.076**)	M. Neg. (-0.229***)	M. Neg. (-0.307*)	No (1.214)	No (0.681)
Low Tobin's q firms					
Book leverage	S. Neg. (-0.167***)	S. Neg. (-0.892***)	S. Neg. (-2.687**)	No (-1.207)	No (2.749)
Industry-adjusted abnormal leverage	S. Neg. (-0.222***)	S. Neg. (-1.044***)	M. Neg. (-3.948**)	No (-0.346)	No (6.867)

employment growth measures are larger in magnitude and relatively more statistically significant for low Tobin's q firms than high Tobin's q firms.

These results confirm the intuition that growth is much less affected by leverage for these companies with valuable investment opportunities recognized by the capital market. In contrast, leverage's negative effects on low Tobin's q firms are much more evident. The rationalization here is that the cost of capital for these enterprises increases with their leverage since it is not clear that whether the funds raised externally will be used profitably. Therefore, if leverage reduces growth, it manifests itself through the inability of highly levered firms with poor or unrecognized investment opportunities to obtain external funding.

Notice that the negative correlation between leverage and growth appears to be stronger amongst the industry-adjusted regression results than the unadjusted ones as seen through larger absolute values of coefficients, hinting industry effects perhaps indeed explain some of the variation in leverage.

Similar to hypothesis 1, Table 7.2 provides partial evidence to support H2, since there is simply no empirical correlations found between capital expenditure growth measures and leverage.

7.1.3 *Hypothesis 3: Firm Size and Tobin's Q on Leverage/Growth Dynamics*

Building on the findings in subsection 7.1.2, company size is added into the leverage/firm growth mix to examine its effects. Regression results, which provide evidence supporting H3a and H3b are summarized and distilled from Table 6.7, Table 6.8 and Table 6.9 to Table 7.3.

Intuitively, one should expect the smaller firms to suffer more from cutting growth options due to high level of leverage than their larger peers. Larger firms, with their existing track records, more bargaining power and established ties to the capital market usually will find it easier to land external financing for growth purposes at given level of leverage as their smaller peers. This is assuming that they do follow pecking order theory and choose debt over equity financing. The pecking order theory is very much supported by results from Table 7.3: comparison of coefficients for leverage for large firms and small firms show that the limiting effects of book leverage on investment and growth measures are much more sever amongst small companies than the big ones. For the data sample of small firms, book leverage is found to be strongly correlated to three out of five growth measures whereas only two growth measures. This include one less statistically significant (employment growth) found to be negatively correlated to book leverage in the large firms sample.

By splitting the data even further into two groups by high and low Tobin's q for both large firms subgroup and small firms subgroup, I was able to determine which of company size and perceived growth opportunities is more predominant in influencing leverage/firm growth dynamics. Demonstrated in line (2) and (3) in Table 7.3, it is obvious that small firms with high Tobin's q (line 3) exhibit more significant negative correlation between book leverage and net Investment and employment growth measures in comparison to that the subgroup of large firms with low Tobin's q (line 2). Thus H3b is accepted.

Table 7.3: Company Size and Growth Opportunities Interaction

The sample period is 1990 – 2010. Relation statues between leverage and numerous growth measures are classified as "S. Neg." (Strongly Negative) if the coefficient is statistically significant at 1% level,"M. Neg." (Moderately Negative) at 5% level, "W. Neg." (Weakly Negative) at 10% level and "No" if coefficient does not show worthy level of statistical significance. The actual regression coefficients are listed in the parentheses below the relationship statues classification, which is dubbed to illustrate its statistical significance level according to coefficient p-values: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. High Tobin's q firms are these companies

with q-value more than one (0 for industry adjusted figure) whereas the low Tobin's q firms are these with p-value less than one (0 for industry adjusted figure). Large firms have more than $1 billion of sales in 1990 dollars, whereas small firms have less than $1 billion of sales in 1990 dollars for each year in which they are included in the sample. Lev. (leverage) is the ratio of book value of total debt to total assets at year 0.

	Net Investment	***1-year Employment Growth***	***3-year Employment Growth***	***1-year Capital Expenditure Growth***	***3-year Capital Expenditure Growth***
Large firms lev.	S. Neg. (-0.318***)	M. Neg. (-0.283**)	No (-0.165)	No (1.469)	No (1.815)
(1) High Tobin's q lev.	S. Neg. (-0.023***)	W. Neg. (-0.298*)	No (-0.349)	No (0.169)	No (1.327)
(2) Low Tobin's q lev.	S. Neg. (-0.047***)	S. Neg. (-0.318***)	W. Neg. (-0.310*)	No (7.848)	No (2.540)
Small firms lev.	S. Neg. (-0.471***)	S. Neg. (-0.783***)	M. Neg. (-2.057**)	No (-1.154)	No (2.736)
(3) High Tobin's q lev.	S. Neg. (-0.054***)	S. Neg. (-1.616***)	M. Neg. (-3.552**)	No (-1.580)	No (3.338)
(4) Low Tobin's q lev.	S. Neg. (-0.084***)	S. Neg. (-2.228***)	S. Neg. (-3.683***)	S. Neg. (-0.258***)	S. Neg. (-0.845***)

If so far the empirical results have suggested that both company size and Tobin's q are negatively correlated with the severity of limitations that leverage poses on company growth, then the implication that can be drawn from line (2) and (3) is that company size is more of a factor than growth opportunities. So given a certain level of leverage, small companies with valuable growth opportunities will grow less than bigger firms with limited growth opportunities. The implication is that the market seems to punish companies for being small more than lack of growth prospects, through higher costs of external financing. However this is true, it is an inference limited to the European context and only concerns net investment and both employment growth measures.

The other important conclusion that can be drawn from Table 7.3 is the fact that only for small firms with low Tobin's q, a negative correlation between book leverage and capital expenditure is found. The only condition by which debt is proven to be a limiting factor to a firm's capital expenditure growth is when both size and growth opportunities are working against the company. This is in striking contrast to that of previous studies based on the US dataset where such negative correlation is found to be nearly statistically significant throughout all regressions. Fundamentally, the data is saying capital expenditure is limited by

high level of leverage in US companies, but not so much amongst the European firms with exception of extreme cases. One possible explanation is that accounting standards are less homogenous in European countries, especially during the early periods of the data included in this thesis. Capital expenditures are entered into company books vastly differently in different countries and consequently the validity of regression findings concerning dynamics between leverage and capital expenditures is greatly undermined and distorted.

Using annual sales of $1 billion to divide the sample into two groups of "large firms" and "small firms" and infer general conclusion on the nature of how company size influences firm growth/leverage dynamics can be considered somewhat crude and naive. The results itself provide plenty of insights but it is nearly equivalent of dividing a number of people into two groups named "tall people" and "short people" by a arbitrary threshold value and try to draw conclusions on difference between tall and short people by studying these two groups. Even the results are valid, one must be cautious when generalize it to a larger population.

To really answer the questions of what role does company size plays in the interplay of book leverage and growth, the sample need to be sliced into more and smaller pieces and study these subgroups separately. This is why the company size decile groups are formed and investigated. Results in Table 6.9 illustrates that increasing sample divisions from two groups to ten groups by ascending sizes does indeed reveals more: out of the five growth measurements, only 1-year employment growth show the anticipated downward sloping curve consists of statistically significant coefficients, whereas net investment shows downward sloping only for the first few decile groups. So the answer to the questions whether or not company size is negatively correlated to the severity of the limiting role debt plays on firm growth is yes, but only for 1-year employment growth measures and the smallest few decile groups of net investment measure. Thus H3a is partially rejected.

7.1.4 *Hypothesis 4: Leverage/Growth Dynamics in Relation to Legal Settings*

H4a states that common law countries should exhibit stronger negative correlation between leverage and growth than civil law countries as the former provides better investor protection which leads to higher availability of external financing in the marketplace. H4b using the same logic of investor protection ranking within the civil law countries and propose that, the expected negative correlations between leverage and growth is stronger for countries that belong to German/Scandinavian legal system than these in French legal system. Table 7.4 condenses the information from Table 6.10 and provides evidence regarding H4a and H4b.

Table 7.4: Legal Systems and their Effects on Leverage-Growth Interactions

The sample period is 1990 – 2010. Relation statues between leverage and numerous growth measures are classified as "S. Neg." (Strongly Negative) if the coefficient is statistically significant at 1% level, "M. Neg." (Moderately Negative) at 5% level, "W. Neg." (Weakly Negative) at 10% level and "No" if coefficient does not show worthy level of statistical significance. The actual regression coefficients are listed in the parentheses below the relationship statues classification, which is dubbed to illustrate its statistical significance level according to coefficient p-values: *** p<0.01, ** p<0.05, * p<0.1. High Tobin's q firms are these companies with q-value more than one (0 for industry adjusted figure) whereas the low Tobin's q firms are these with p-value less than one (0 for industry adjusted figure). English legal system includes the UK and Ireland, which forms the representation of common law countries; German legal system includes Germany and Austria and Scandinavian legal system include Denmark, Finland and Sweden; French legal system includes Spain, France, Belgium, Netherland, Italy and Luxemburg. These three groups represent the common law countries. Lev. (leverage) is the ratio of book value of total debt to total assets at year 0.

	Net Investment	***1-year Employment Growth***	***3-year Employment Growth***	***1-year Capital Expenditure Growth***	***3-year Capital Expenditure Growth***
English lev.	M. Neg. (-0.022**)	S. Neg. (-1.223***)	M. Neg. (-3.400**)	S. Neg. (-0.209***)	No (-0.163)
German lev.	S. Neg. (-0.097***)	S. Neg. (-0.378***)	S. Neg. (-1.454***)	No (0.462)	No (0.505)
Scandinavian lev.	No (-0.044)	S. Neg. (-0.308***)	S. Neg. (-0.335***)	No (-0.158)	W. Neg. (-0.423*)
French lev.	S. Neg. (-0.304***)	S. Neg. (-0.323***)	S. Neg. (-0.958***)	No (-0.686)	No (7.419)

The results obtained are of very conflicting and puzzling nature. On the one hand, countries in English legal system clearly demonstrate the strongest evidences of the limiting effects of leverage in both employment growth measure and 1-year capital expenditure growth measure. This partially supports H4a. On the other hand, the variations within countries of the civil law origin, is very limited and hence the rejection for H4b.

The following argument offers a potential explanation for the difference in leverage coefficients of employment growth measure across legal systems. Given certain leverage is of such high level that it requires management to hold company expansion. It is easier to slow down the growth of or even reduce headcounts in a common law setting than in civil law setting. In civil law countries, greater emphasizes are put on employee protection and consequently powerful workers union make it harder for company to adjust their headcounts quickly. If leverage does lead to reduction of employment growth, the reactions would be weaker and slower amongst civil law countries simply because it is harder to let people go

quickly. Such intuition manifests itself through the regression as a weaker correlation between leverage and employment growth.

In contrast, despite finding statistically significant correlations between net investment and leverage from English legal system observations, to my surprise it is actually the smallest in terms of magnitude amongst all four legal systems. In fact, countries from French legal system show strongest negative correlation for net investment, directly opposite of theoretical predictions. Solely based on the absolute value of coefficient, the amount of decrease in investment is many times more (-0.304 for French lev. versus -0.022 for English lev.) for per-unit increase of leverage for companies from French legal system than these from English legal system.

This is indeed a baffling result that directly contradicts earlier hypotheses, but perhaps agency theory could provide some clarifications. Take French legal system for instance, according to LLSV, it provides the least amount of investor protection in all legal systems included in this study. Being a shareholder in such setting, it is only natural to purse a relatively high level of leverage to keep managers from pursuing wasteful projects when the growth opportunity is limited. In comparison, companies from other legal system with better investor protection may have about the same level of leverage, but the debt on their balance sheet is not for the purpose of mitigating agency costs, at least not as much for companies from the French legal system. Thus it is expected to observe the largest limiting effects of debt on investments come from companies with French legal background.

Interpretation of results concerning legal systems and leverage/growth interactions should be taken with caution as legal system and legal origins are very crude concepts by which the data sample is divided. In addition, during the past decade or so, as a consequence of enduring efforts from the European Union, many of the finance related laws across the continent has been harmonized. So the results, even with high level of statistical significance, may actually be a spurious correlation instead of evidence of causality.

7.1.5 *Summary of Empirical Results with Reference to Hypotheses*

In Table 7.5, each hypothesis and its rejection/acceptance is listed according to the corresponding empirical evidences analyzed in previous subsections of this chapter. Out of four main hypotheses and all together 7 variations, only one is completely rejected.

Table 7.5: Summary of Hypotheses Rejection/Acceptance

This table presents the summary of the expected and the realized empirical results.

Hypothesis		Results*
H1a	Firm growth is expected to be negatively affected by firm leverage	Strong support
H1b	The expected negative correlation between leverage and growth remains after controlling for industry effects	Strong support
H2	The expected negative correlation between leverage and growth is stronger for low Tobin's q firms than high Tobin's q firms	Strong support
H3a	The expected negative correlation between leverage and growth is stronger for small firms than large firms	Partial support
H3b	The expected negative correlation between leverage and growth is strongest for small low Tobin's q firms and the weakest for large high Tobin's q firms	Strong support
H4a	The expected negative correlation between leverage and growth is stronger in common law countries than in civil law countries	Partially rejected
H4b	Within civil law countries, the expected negative correlation between leverage and growth is stronger for countries that belong to German/Scandinavian legal system than these in French legal system	Rejected

*Results excluding capital expenditure growth measures

In comparisons to findings from previous similar studies, e.g. Hurme (2010) and Lang et al. (1996), the European results obtained in this paper predominately confirm findings based on the US data. However, the magnitude varies. Correlation between net investment and book leverage seems to be at about the same level across the Atlantic Ocean. In contrast, relationship between employment and book leverage is significantly stronger in Europe than that in the US. This is potentially due to tougher employee protections in Europe, making the headcounts of European companies much more stable and hence exhibit stronger correlations in comparison to their US counterparts. Perhaps the biggest difference between the US and European result is the absence of any statistical correlation between capital expenditure growth measures and book leverage. This is most likely due to accounting difference between the European countries included, which may distort the results.

7.2 Limitation of Research

This subsection goes through some of the potential methodological, philosophical and interpretational drawbacks of this thesis.

7.2.1 *Methodological Limitations*

Dividing the pooled data sample into several subgroups to see how results of separate regression on these groups differ and make inferences accordingly forms the backbone of this study. The logical choices by which the data division is made should be clear cut and chosen in a way that makes the subgroups differ from each other in a meaningful way. Cross country studies of capital structure, including this one, often overlook the distinctive features of multinational firms. These companies face differing tax incentives and legal regimes around the world, making it very difficult to identify the exact impacts of one particular legal setting, even that of its home nation, on their capital structure choices. As large firms tend to operate in more countries than their smaller peers and most of the observations included in this study are obtained from firms that are considered large on a global scale, categorizing these firms into one particular legal system as done in Section 6.3 could be considered coarse and imprecise at best.

The model setup in this thesis is unable to account for factors that may affect leverage significantly. Some of the major ones are briefly discussed here: first, leverage fluctuates depending on takeover threats. Leverage may be raised as a short-term reactionary response to a potential hostile takeover, but would not have any meaningful effects on firm growth even in three year time. The counterargument is that, in Europe where hostile takeovers are relatively rare, the potential impacts from few deviations of leverage from norm due to takeover threats are unlikely to be very significant, especially in a sample consists of thousands of observations.

Secondly, in none of the regression were tax-related variables included. Demirguc-Kunt and Maksimovic (1999) indicate that "The complexity of tax systems make it difficult to compare the benefits of debt across a large sample of countries. And effective tax rates can differ significantly from statutory tax rates. The implications of different tax systems for the composition of debt and for debt maturity are not clear-cut." In theory, standardization of leverage could be employed to eliminate effects of different tax regimes may have on firm leverage. However, implementing such standardization is easier said than done.

Possibly the biggest concern in cross-countries study of capital structure is that not only the leverage is imperfectly modeled, the data on leverage may also contain fundamental differences. Accounting standards across European nations vary greatly to an extent the results could be distorted. For example, the definition of components needed to calculate

leverage may differ across nations. Liabilities of firms maybe in the form of convertible debt, convertible preferred stocks, warrants, deferred payments to management and employees, leasing contracts, forward contracts, pension liabilities, etc., making it extremely difficult to empirically estimate the role of capital structure (Kjellman and Hansén, 1993).

A second example of national differences in accounting method is the valuation of assets. In compliance with general view, Nobes and Parker (1991) states that German accounting rules place greater emphasis on "conservatism" and less on "true and fair" principle when entering value of assets. This is done to such a degree that the asset values of German firms may be understated relative to that of other 12 countries included in this study. Subtle difference as this proves to be nearly impossible to correct in data manipulation, hence one must kept this in mind while examining conclusions drawn from unadjusted data.

7.2.2 *Correlation or Causality?*

There is a fundamental challenge in interpreting results obtained in this study, which shows a negative relation between growth and leverage. Firms autonomously choose their leverage and if high level of leverage prevents them from capitalizing on growth opportunities, one would expect firms with advantageous growth options to have lower level of leverage. If everyone in the market place follow this logic and behave accordingly, then logically there will be a negative correlation between leverage and growth observed. However, this is not to say that higher leverage causes less growth and investments but more likely the other way around. In addition, often financing decisions are made simultaneously with new investment decisions, making it extremely hard to separate the impact of a change in capital structure from the effect emerging from the investment or growth decision.

Essentially, the regression setups in this study suffer from two potential drawbacks. First, book leverage could have a significant coefficient because it proxies for variables forecasting firm growth that are omitted from the model. One potential work around was employed by Lamont (1993), who investigated how does a change in liquidity that is not associated with a change in growth opportunities affects actual firm growth. He looked into how do investments of non-oil divisions within oil companies change when the oil prices drops. These oil firms suffer a liquidity shock as oil prices fall, but this should be completely uncorrelated to growth opportunities faced by the non-oil divisions. Lamont states that he found evidence of oil companies cutting investment in non-oil divisions following a drop in oil price provides

strong evidence that liquidity explains firm growth and not merely a proxy for growth opportunities. .

Applying similar techniques is possible in working around leverage and growth: Lang et al.(1996) investigate how the core and non-core components of a company and find the relation between leverage and growth is much stronger for core divisions than for noncore divisions. For these segments, leverage should matter very little if its success in the firm-level regressions is due to its role as proxy for future growth. The fact that l does affect both core and noncore segments is an indication that leverage does not proxy variables that incorporate firm growth but are omitted from the model. However, this approach is not without its problems. For instance, definitive classification of core and non-core division maybe difficult and consequently the anticipated difference in growth opportunities between the two segments may not be sufficient large.

Second, this paper utilizes OLS regression to estimate relation between leverage and growth. By definition, growth is seen as endogenous whereas leverage is designated as exogenous. However, it is not difficult to see how they can both by endogenous since companies choose leverage and growth simultaneously. It could be that firms decide a target level of leverage and finance their growth opportunities accordingly. Conversely, it could be that firms set their growth strategy first and organize their capital structure with reference to target growth.

In an ideal situation, a natural event that affects only either growth measures or leverage could provide the perfect setting to investigate which one of the two is endogenous and which one is exogenous. Hypothetically, a well-documented change in labor law that changes dramatically the hiring policies of all European countries included in this study would serve this purpose. However, no such event presents itself, especially on a pan-Europe level.

Alternatively, an instrumental variable could be deployed. What is needed is to find an instrument that is correlated with the endogenous explanatory variable, in this case leverage, and at the same time must not be correlated with the error terms in the original explanatory equation. So preferably a variable that is correlated closely with leverage but has no relations with the growth measures, or vice versa, would potentially provide insights in determining if the relations between leverage and growth is due to correlation or causality. There have been plenty of instrumental variables used in the past concerning this subject, but they all are of

non-conclusive nature. For instance, Lang et al. (1996) suggest that growth of sales, cash flow and capital expenditures are linked to growth but not leverage.

If we assume that the European data behave in a similar manner as in the US, then the endogeneity of leverage can be safely assumed in this study. However, reality shows that the data contain slightly different messages, e.g. there is almost no evidence found to support negative correlation between leverage and capital expenditures. Thus despite ample evidences otherwise, one should be extremely cautious in using results found in this study as evidences supporting leverage leads to lower firm growth in Europe.

8 CONCLUSION

Despite the elegance in MM's capital structure irrelevance theory, one must recognize that capital structure is not irrelevant in real world where things are not as perfect. Then the real question becomes how does capitals structure affect a firm during its lifespan? One aspect that is not only interesting but also of great importance to the firm is how firm growth relates to capital structure. Previous literature on this topic, both theoretical and empirical, suggests that there is negative correlation between leverage and growth measure. This thesis contributes the relevant discussion by first verifying previous finding that is based on North American data (see, e.g. Lang et al., 1996, Hurme, 2010 and McConnell and Servaes, 1995) in a European context and second expanding the scope of the study by incorporating previously untested factors as well as smaller firms into the regression analysis.

This study uses a European data set that include 13 countries from 1990-2010. Large size companies with SIC code from 2000 to 3999 with at least $500 million annual sales in 1990 US dollars for any given year is the criteria to be included. The final data sample consists of 523 companies and around 5,000-6,000 firm-year observations depending on how firm growth is measured. This thesis set out to test five growth measures and their relationships with leverage: net investment, one and three-year employment growth rate and one and three-year capital expenditure growth rate. Three year growth measures are only employed from 1990-2007 as the latest available data points originate from year 2010. Leverage is defined using book measure instead of market leverage to avoid incorporating too much emphasis on recent changes in the firm's equity value.

The sample is first divided by growth opportunity (measured by Tobin's q), then by company size first by $1 billion annual sales as a divider then into decile groups and last by legal systems. The initial results support previous findings confirming there is indeed a strong negative correlation between book leverage and some of the firm growth measures. For instance, given a firm with sample average leverage of 23% and average 1-year employment growth of 3%, lowering its leverage by 50% would increase 1-year employment growth to nearly 9%, 3 times of the original figure. Such high level of sensitivity and its potential economic impact should once again warrant attentions from firms of all sizes and trades.

However, the correlation found in the European sample is not without deviations from their US counterparts. The most major abnormality seems to be that unlike the US firms, European

firms show no connections between leverage and capital expenditure growth measures. This implies although high level of leverage could lower net investment and human resources spending, capital expenditure itself is very robust regardless how much debt the firm load itself up with. The reasons behind such discrepancy between European and North American data could be due to numerous reasons, e.g. accounting difference, institutional difference and even legal variance, but pinpointing down to the exact reason is beyond the scope of this thesis.

Company size is found to be a significant indicator of the magnitude of the negative correlation between leverage and growth. The question is that given a certain company size, could anything be predicted about how sensitive its the growth to leverage? When the data is divided into these with more than and less than $1 billion annual sales, growth of smaller firms is considerably more sensitive towards leverage than the larger ones. However, dividing data into deciles by size of sales indicate that 1) the negative correlation between leverage and investment decreases sharply as the company gets larger, to such an extent the coefficient of book leverage regressed on net investment practically reaches zero after the 4^{th} decile group (40% of the smallest firm-year observations). 2) the most consistent results are between leverage and 1-year employment growth, where coefficients of book leverage exhibit steady decline in absolute value from the 1^{st} decile (smallest) the 10^{th} decile (largest) group. Correlation between book leverage and the other three growth measures does not provide any dependable results indicating company size has any influence on the growth/leverage dynamics.

The most controversial finding in this thesis come after individual regression is run for observations from each one of the four legal systems: English, German, Scandinavian and French. Contrary to prediction, observations from the French legal system show the strongest association between book leverage and net investment. This could be a results of the fact that bigger portion of the debt of companies from the French legal system are there to serve as a disciplinary tool to prevent managers from wasting shareholders' wealth. Consequently, in comparison to companies from other jurisdiction that provides better investor protection, the ones governed by the French legal system demonstrate stronger traits of limiting effects of leverage. Regression results on employment growth measures are consistent with prediction: the legal systems offer the strongest investor protection shows the largest sensitivity between growth and both employment growth measures and vice versa. Results with regards to legal

system should be taken with extra caution as legal systems and legal origins are very broad and general concept that may not be the most precise standards by which the dataset is split. In addition, during the past decade, number of the finance related laws across Europe has been harmonized. So the results, even with high level of statistical significance, may turn out to be a spurious correlation instead of evidence of real causality.

This study is not without its limitation, one of the most severe one is the interpretation of the results. A statistically significant coefficient of book leverage regressed on growth measure verify a strong correlation but it is by no means necessarily a sign of causality. Firms autonomously choose their leverage and if high level of leverage prevents them from growing optimally, then one would expect firms with solid growth opportunities to all have low level of debt. If all market players behave in this way, then logically there will be a negative correlation between leverage and growth. However, this is not to say that greater leverage causes less growth and investments.

One way to solved the said endogeneity problem and perhaps is something could be investigated further in future research is to find a suitable instrumental variables that is correlated strongly with leverage but not so with the growth variables. Previously tangibility of assets has been used for this purpose but it is proven to be a weak instrument. Formulating a valid instrumental variable for such purpose is difficult but will add considerable insights into the discussion of connections between leverage and growth.

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