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**MARKUS AMPENBERGER**
**THOMAS SCHMID**
**ANN-KRISTIN ACHLEITNER**
**CHRISTOPH KASERER**

WORKING PAPER SERIES


Center for Entrepreneurial and
Financial Studies

# Capital structure decisions in family firms – empirical evidence from a bank-based economy

Markus Ampenberger [1]

Thomas Schmid [2]

Ann-Kristin Achleitner [1]

Christoph Kaserer [2]

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[1] Center for Entrepreneurial and Financial Studies (CEFS) and KfW-Chair in Entrepreneurial Finance, TUM Business School, Technische Universität München, Germany

[2] Center for Entrepreneurial and Financial Studies (CEFS) and Department for Financial Management and Capital Markets, TUM Business School, Technische Universität München, Germany

Corresponding author:

Markus Ampenberger
Center for Entrepreneurial and Financial Studies (CEFS)
TUM Business School │ Technische Universität München
Arcisstr. 21 │ 80333 München
Tel: + 49 (0)89 289 – 25483 │ Fax: + 49 (0)89 289 – 25488
Email: markus.ampenberger@cefs.de

# Capital structure decisions in family firms – empirical evidence from a bank-based economy

**Abstract:**

This study examines how family firm characteristics affect capital structure decisions. In our analysis we disentangle the influence of three distinct components of a family firm: ownership, supervisory and management board activities by the founding family. Thereby, we use a unique panel dataset of 660 publicly listed companies (5,135 firm years) in the broadest German stock index CDAX from 1995 to 2006. This paper is motivated by hitherto inconclusive empirical findings on capital structure decisions in family firms from Anglo-Saxon countries. We provide new evidence for a bank-based economy. In this sense, Germany provides a very fruitful research environment as it (i) traditionally has a bank-based financial system and (ii) family firms are considered to be the backbone of the economy.

We find that family firms have significantly lower leverage ratios than non-family firms, independent of the definition of leverage applied. Among the three dimensions of a family firm, management board involvement by the founding family has a consistently negative influence on leverage across all our models. In contrast, the influence of ownership and supervisory board representation is insignificant in almost all of our models. In line with agency theory, we can show that the leverage level is the lowest if the founding family is simultaneously a large shareholder with monitoring incentives and involved in firm management with convergence-of-interest effects. Finally, we detect that the presence of a founder CEO in firm management has a significant negative effect on the leverage ratio. Our results prove to be stable against a battery of robustness tests including a matching estimator technique to demonstrate causal effects.

**JEL Classification: G 32, G 34**

**Keywords:** Family firms, family ownership, family management, founder CEO, agency costs, capital structure, debt-equity ratio, leverage, corporate governance, risk aversion

## 1 Introduction

The "capital structure puzzle",[1] i.e. the firm's choice of an optimal capital structure, remains one of the large unresolved issues in the financial economics literature. The origin for five decades of capital structure research is provided by Modigliani and Miller (1958). They argue that in a neoclassical world capital structure decisions are irrelevant for the market value of a firm (MM-theory). However, the MM-theory builds on the restrictive assumptions of perfect and complete capital markets with rational investors.

Consequently, further research subsequently enhanced the field of capital structure theory by accounting for several market imperfections. Modigliani and Miller (1963) themselves started to extend their MM-theory by introducing taxes and costs of financial distress. The static "trade-off theory" of capital structure assumes the existence of a target debt ratio where the marginal cost of an additional unit of debt, i.e. the costs of financial distress, equal the marginal benefits of an additional unit of debt, i.e. the tax shield. In other words, according to this theory management aims to establish an optimal capital structure which is determined by a trade-off between the costs and benefits of borrowing debt. In contrast, the second major capital structure theory is based on a dynamic perspective of investment opportunities and information asymmetries (Donaldson 1961, Myers 1984, Myers and Majluf 1984). The "pecking order theory" of capital structure assumes that firms prefer to finance growth opportunities with internal funds, debt, preferred equity and common equity, in that order. Behind the pecking order theory is the rationale that information asymmetries between informed firm insiders and uninformed outside investors lead to a mispricing of equity issues. Hence, the decisions of the management are driven by the desire to minimize transaction costs. Despite the dominance of those two paradigms in the discussion of capital structure theory, several authors have proposed further determinants of capital structure decisions: Among them are signalling aspects (Ross 1977, Leland and Pyle 1977), risk aversion (Fama 1980, Masulis 1988, Berger et al. 1997), corporate control considerations (Harris and Raviv 1988, Stulz 1988 and more recently Ellul 2008), market timing issues (Baker and Wurgler 2002) and firm history (Kayhan and Titman 2007).[2]

In this paper, we focus on another major determinant for capital structure decisions: agency costs (Jensen and Meckling 1976, Easterbrook 1984, Jensen 1986). In particular, we compare two distinct groups of firms that are considered to be unequal in terms of agency costs: family firms and non-family firms. Based on the widespread assumption that agency costs are lower in family firms, we would expect that there is less need for the disciplining role of debt in family firms and that they hence have lower leverage ratios. However, existing empirical evidence on this issue is inconclusive and largely focusing on market-based economies, such as the United States. While Mishra and McConaughy (1999) conclude that U.S. family firms use less debt to avoid a loss of control and decrease the likelihood of bankruptcy, Anderson and Reeb (2003b) find no systematic difference between U.S. family and non-family firms in terms of leverage. Finally, just recently Ellul (2008) finds a positive relationship between leverage and family blockholdings based on a cross-country analysis. However, to our best knowledge detailed empirical evidence from a bank-based economy is missing so far. The importance of the institutional setting for capital structure decisions is stressed by Antoniou et al. (2008, p. 59) who argue that "the capital structure of a firm is heavily influenced by the economic environment and its institutions, corporate governance

[1] The term "capital structure puzzle" refers to Myer's (1984) presidential address at the 1984 AFA meeting, when he asked the question: How do firms choose their capital structures?....we don't know.

[2] Cf. Myers (2001) for an introduction to the extant literature on capital structure. Please note that it goes beyond the scope of this paper to provide a complete overview of the large body of literature on capital structure decisions. For an excellent albeit early review of capital structure theories cf. Harris and Raviv (1991).

practices, tax systems, the borrower-lender relation, exposure to capital markets, and the level of investor protection in the country in which the firm operates".

This paper builds on this research gap and aims to shed more light on hitherto conflicting empirical results by analysing capital structure decisions in family firms within a bank-based economy in greater detail. The country of our choice – Germany – seems to provide a very fruitful research environment since it is characterized by the following stylized facts: (i) a different legal and institutional setting and underdeveloped stock markets in comparison to anglo-saxon countries (La Porta et al. 1998, 1999, 2000) (ii) a bank-orientated financial system with widespread relationship lending (Wenger and Kaserer 1998, Gorton and Schmid 2000) (iii) a tradition where family firms are considered to be the backbone of the economy (Fohlin 2007) and (iv) still concentrated ownership patterns with a large amount of family firms even among listed companies (La Porta et al. 1999, Faccio and Lang 2002, Franks et al. 2008).

Starting from these conflicting observations, it is by far not clear whether family firms in Germany use more or less debt and what factors drive their capital structure decisions. Moreover, it is an open question how the different components of a family firm, namely founding family ownership, supervisory and management board participation, affect those capital structure decisions. The focus of our article is to analyse these issues in greater detail. Thereby, we contribute to the literature in several important dimensions: First, to our best knowledge our empirical study is the first to analyse capital structure decisions of family firms for a bank-based economy. This is interesting against the background that Germany differs largely from the U.S. in terms of institutional setting. We complement recent albeit inconsistent empirical evidence on capital structure decisions of family firms that is so far largely focusing on the U.S. (e.g. Mishra and McConaughy 1999, Anderson and Reeb 2003b, Ellul 2008). Second, in terms of methodology our analysis is more advanced than previous research on capital structure decisions within family firms. We do not only exploit cross-sectional heterogeneity with "between" estimates and pooled OLS regressions but also time variation based on "within" estimates. Those firm fixed effects models allow us to control for unobserved firm heterogeneity. Finally, we employ a battery of robustness tests including a matching estimator that allows us to control for issues of endogeneity. Our results are highly robust and not subject to any special kind of methodology. Third, we investigate an aspect that goes beyond existing research on family firms: We carefully analyse the impact of different family firm characteristics on capital structure decisions. In particular, we distinguish between three separate components of a family firm, i.e. family ownership, family supervisory and management board participation.[3] In fact, that distinction allows us to show that firm leverage heavily depends on agency costs. From these three aspects the convergence-of-interest effect of family management seems to have the strongest (negative) influence on leverage ratios. In the case of combined family ownership and management board participation, in other words if the founding family is a large shareholder with monitoring incentives and simultaneously involved in firm management with convergence-of-interest effects between management and outside shareholders, agency costs and hence firm leverage are the lowest. This outcome underlines the importance of agency cost theory in family firm research.[4] Moreover, in accordance with several previous performance studies

[3] For a similar procedure in the context of family firms cf. Block (2008) or Schmid et al. (2008).

[4] An alternative framework to explain corporate decision making in family businesses is stewardship theory (Davis et al. 1997). Similar to agency theory, stewardship theory describes the relationship between two parties (the manager-principal relationship) and "defines situations in which managers are not motivated by individual goals, but rather are stewards whose motives are aligned with the objectives of their principals" (Davis et al. 1997, p. 21). Family members might act as such stewards, motivated by a strong identification with the family business, the collective goal of optimal firm performance (pro-organizational behaviour) and family altruism. Although the argumentation of stewardship theory is to some extent different from agency theory, the

(e.g. Villalonga and Amit 2006) we detect a significant impact of founder CEOs on capital structure decisions. Our fourth contribution is related to the analysis of capital structure in Germany. In general empirical evidence on this topic based on a large sample of listed firms in Germany is rather limited. So far, Jostarndt and Wagner (2006) and Elsas and Florysiak (2008) provide the only large sample studies on capital structure in Germany. While Jostarndt and Wagner (2006) compare the development of capital structures in Germany and the U.S. over the 1994 to 2004 period, Elsas and Florysiak (2008) analyse whether recent trends in capital structure research hold true for Germany based on a longitudinal analysis for the 1987 to 2006 period. However, both studies totally neglect the influence of ownership and board structure on firm leverage. Nevertheless, they show that the core firm-level factors influencing leverage decisions in the U.S. and Germany are similar. Hence, there should be no limitations in using German data to analyse capital structure decisions in family firms. Finally, our robustness tests indicate that the sample composition and the characteristics of newly listed firms have a strong impact on the level of capital structure. Fama and French (2001) have already provided a similar argument in the context of dividend policy based on a U.S. dataset. In this paper, we particularly show that changing firm characteristics of newly listed firms during the new economy bubble have a significant impact on the level of leverage. New lists that went public during the high tech bubble period show lower leverage levels than more established firms operating in traditional industries. Nevertheless, the family firm effect remains powerful and is not subject to any sample composition issues.

Our analysis is based on a unique dataset of 660 industrial firms listed in the broadest German stock index (CDAX) during the period 1995 to 2006. Family capitalism is much more prevalent in Germany than for example in the U.S. (cf. e.g. La Porta et al. 1999). Of the 660 firms, 390 qualify at least in one year as family firm. Overall, 2,410 of 5,135 firm year observations come from family firms (cf. table 1 for a detailed overview of the sample composition). The ideal research environment is reflected by the fact that, despite the commonness of family firms, the German capital market provides an almost equally weighted control group of non-family firms. Moreover, such an analysis for the German capital market covers a much broader spectrum of firms than similar studies focusing on S&P 500 companies in the U.S. While the S&P 500 covers only the largest firms in the well-developed U.S. stock market, the German CDAX includes large-caps as well as many rather small listed firms. Hence, in the less developed German stock market, the CDAX represent the lion's share of Germany's entire market capitalization.

In our empirical analysis based on pooled OLS regression, "between" estimates and "within" estimates, we find that family firms exhibit lower levels of leverage than their counterparts. Furthermore, we are able to disentangle how different family firm characteristics affect capital structure decisions. Thereby, the results of lower leverage in family firms seem to be mainly driven by family management rather than family ownership and family supervisory board activities. In addition, we find that the founder CEOs have a strong effect on our results. Founders who still act as CEO in their firm lead to significantly lower levels of leverage. Finally, as expected, the interaction term we construct to measure both family management and family ownership simultaneously is highly significant. It indicates that a combined effect of monitoring and convergence-of-interest leads to an especially strong reduction in leverage. Furthermore, we control for several factors related to firm-, industry- or time-specific characteristics including the six core determinants of capital structure recently suggested by Frank and Goyal (forthcoming). Thereby, we corroborate existing evidence about some stylized facts in capital structure research: Firm size, firm age, firm-specific risk, the proportion of tangible assets, median industry leverage and expected inflation rate are positively correlated with our measures for firm leverage. In contrast, growth options

implication is similar: Compared to non-family firms, family businesses are characterised by less severe conflicts between owners and managers.

(measured by market-to-book value) and profitability show a significant negative influence on the level of leverage. Finally, the dummy variable for German GAAP shows a significant positive correlation with the level of leverage. However, this seems to be an accounting effect related to the "prudent" approach of asset valuation and liability recognition inherent to German GAAP (based on the *Handelsgesetzbuch, HGB*, henceforth, German-GAAP) rather than any economic effect. Our results are robust to several definitions of leverage, in particular total leverage, long-term leverage and financial leverage. Thereby, we analyse all leverage ratios both as market and book leverage.

Our empirical evidence is based on large sample association tests. Hence, a natural concern arises whether the results are driven by methodological shortcomings or omitted variable bias. To alleviate these concerns, we show that our results are robust to several specifications (pooled OLS, within- and between-estimator) and we operate a large battery of further robustness checks, specification tests and alternative methodologies. Our results are robust to tests of non-linear size effects, alternative sub-periods, additional control variables and specifications as well as a matching procedure based on propensity score.

The remainder of the paper is structured as follows: Section 2 motivates our paper from two different perspectives: We start with a summary of recent empirical findings for capital structure research regarding three aspects: (i) the impact of managerial entrenchment on capital structure decisions, (ii) differences between family firms and non-family firms and (iii) the influence of the institutional environment on capital structure. We continue with a theoretical argumentation why family firms are distinct from non-family firms in terms of agency costs and thus especially useful to test agency cost related explanations for capital structure decisions. Section 3 explains the construction of our dataset while Section 4 presents descriptive results. Section 5 shows our empirical results on different definitions of leverage while section 6 provides a battery of robustness tests. Finally, section 7 concludes and provides avenues for future research.

## 2 Motivation and literature review

### 2.1 What do we know about managerial entrenchment and capital structure?

Starting in the late 1980s one strand of literature examines the relationship between managerial ownership/managerial entrenchment and capital structure in order to test how agency costs affect debt levels.[5] The majority of those articles (see, for example Friend and Lang 1988, Berger et al. 1997 or Kayhan 2005) find a significant negative relationship between managerial ownership/managerial entrenchment and leverage ratios. Hence, a prevalent view in the existing literature is that entrenched managers prefer less than optimal debt levels, for example to reduce human capital risk (Fama 1980, Amihud and Lev 1981), to avoid performance pressure induced by fixed interest payments (Jensen 1986) or for reasons of job retention if other candidates are better qualified (Harris and Raviv 1988, Stulz 1988). However, a recent U.S. study by John and Litov (2008) argues in the exact opposite direction: Applying the Gompers et al. (2003) corporate governance index and the Bebchuk et al. (2009) index of anti-takeover provisions they show that firms with entrenched managers rely more on debt than well-governed firms. They conclude that an equity-orientated governance system (with strong shareholder governance) might align interests of managers and shareholders and hence be good for shareholders but not necessarily be good for debtholders who have to carry the downside risk of value-enhancing risk-taking. Consequently, firms with high managerial entrenchment (weak shareholder governance) might have rely more on debt to meet their

[5] Berger et al. (1997) define managerial entrenchment as managerial preference to avoid pressure from internal and external corporate governance mechanisms. In that sense, managerial ownership is a special way how managers can entrench themselves.

external financing needs than firms with strong shareholder governance and thus exhibit higher leverage ratios. Within the last decade several studies use another unique class of firms to examine the relationship of agency costs and capital structure: family firms.

### 2.2 What do we know about family firms and capital structure?

During the last decade family firms compromise a field of research that increasingly gained attention within the financial economics literature.[6] However, hitherto existing research on the question whether family firms use more or less debt than non-family firms is largely inconclusive. First, Mishra and McConaughy (1999) apply a matching methodology to isolate the effect of founding family control from managerial ownership effects. Using "The Business Week CEO 1000" they draw a sample of large U.S. family firms where the CEO is still either the founder or a relative of the founder. In a second step they match those family firms with two different control groups of non-family firms. Both groups have similar firm characteristics in terms of firm size and industry affiliation. While one group has diffuse ownership structures, the other has a similar level of managerial ownership. They find that family firms use a significantly lower level of debt. Mishra and McConaughy (1999) thereby show that this difference is not driven by the level of managerial ownership but rather by founding family peculiarities. In particular, they argue that founding families are concerned about two negative effects of debt: increasing costs of financial distress and the risk to lose control over their firms. Second, Anderson and Reeb (2003b) find no evidence for a systematic difference between family and non-family firms in terms of capital structure. Using a panel data set of 2,108 firm year observations between 1993 and 1999, they argue that the level of debt in U.S. industrial firms is independent of founding family control. Thereby, they use a family firm definition that is based on an 5%-ownership-threshold and/or participation of the founding family in the board of directors. Third, a recent cross-country study by Ellul (2008) based on a sample of 3,608 firms from 36 different countries finds evidence for a significant positive relationship between family blockholdings and the level of leverage. The author speculates that control considerations may affect this result. Family blockholders are concerned about the loss of control associated with external equity finance. From his perspective, debt offers a solution to receive external financing without diluting control power over the firm's equity stake. Based on the inconclusive empirical findings of these studies we believe that a more detailed analysis of family firm aspects is necessary in order to shed more light on this important issue.

### 2.3 What do we know about the impact of the institutional setting on capital structure?

According to the "law and finance" literature, the institutional setting (such as legal origin, level of investor protection, legal enforcement, level of economic and financial development, corporate ownership patterns etc.) is a major determinant for corporate policy choices (La Porta et al. 1998, 1999 and 2000). Hence, it is not surprising that pioneering international evidence on country-specific factors affecting capital structure (Rajan and Zingales 1995) has recently been complemented by several studies. Demirgüc-Kunt and Maksimovic (1999) argue that institutional differences between developing and developed economies (such as the development stage of the stock market and the banking system, the existence of government subsidies and underlying legal infrastructure) explain a large proportion of financing patterns. Several other recent studies have indicated that even within developed economies like the U.S. or Western European countries institutional factors affect financing patterns and corporate policies. Moreover, cross-sectional firm-specific

[6] For a more general overview of this strand of literature cf. e.g. Schmid et al. (2008).

determinants of capital structure vary by country (see, for example Brounen et al. 2006, Fan et al. 2005 or de Jong et al. 2008). Just recently, Antoniou et al. (2008) draw a large sample of 4,854 firms (57,134 firm year observations) during the 1987 to 2000 period in order to examine differences in capital structure between market-based economies (the U.K. and the U.S.) and bank-based economies (France, Germany and Japan) while simultaneously controlling for firm-specific factors. The following firm-specific factors are important for capital structure choices independent from the financial orientation of the company: firm size and the tangibility of assets positively affect firm leverage, while increases in profitability, growth options and share price performance decreases firm leverage. Nevertheless Antoniou et al. (2008, p. 61) findings confirm that "(i) the lessons learned from the experience of a particular type of economy cannot necessarily be generalized to firms operating in other types of economies; and (ii) in deciding on a firm's financing mix, managers need to consider not only firm-specific factors but also general market conditions." Such a conclusion further motivates an empirical study of capital structure decisions of family firms that focuses (i) on a bank-based economy rather than a market-based economy and (ii) a long enough sample period to cover market timing aspects.

### 2.4 Theory and hypotheses

As pointed out in our introduction there are many theories to explain capital structure decisions. Among the multitude of explanations, we follow one strand of literature that seems to be especially promising in the context of family firms: agency theory. Jensen and Meckling (1976) building on earlier work by Fama and Miller (1972) were the first to argue that agency conflicts between management and shareholders are related to capital structure decisions. The free-cash-flow hypothesis of Jensen (1986) emphasizes the disciplinary role of debt as one effective way to reduce such agency conflicts. In particular, he argues that "debt reduces the agency costs of free cash flow by reducing the cash flow available for spending at the discretion of managers. These control effects of debt are a potential determinant of capital structure" (Jensen, 1986, p. 324). In fact, the commitment to regular payment of interest and principal is a possibility to avoid unwanted managerial behaviour, such as consumption on the job, inefficient investment and empire building. This mitigation of the shareholder-manager conflict is sometimes labelled as benefits of debt financing.[7] It is a widespread assumption that the management-shareholder conflict is less severe in family firms (see, for example Anderson et al. 2003). Hence, a comparison between family firms and non-family firms provides a promising empirical experiment to test the impact of agency costs on capital structure decisions.

Thereby, it is essential to distinguish between the effects of the separate components within a family firm: family ownership and family management. Monitoring activities of large shareholders can reduce agency costs (Shleifer and Vishny 1986). As founding families usually remain large long-term shareholders they are able to overcome the free-rider problem commonly associated with atomistic shareholder structures (Grossman and Hart 1980). In contrast to atomistic shareholders they acquire the necessary information at reasonable cost, have firm-specific knowledge and the incentives to monitor management effectively. Hence, effective monitoring due to family ownership is one rationale for lower agency costs in family firms. Another rationale is supervisory board membership. Monitoring activities might be even more effective if the founding family is institutionally involved in firm's oversight.

[7] Note that leveraged buyouts (LBOs) provide prominent examples for the disciplinary role of debt, i.e. the commitment to pay interest and principal. Many studies have provided empirical evidence that the disciplinary burden of debt is one rationale for such leveraged buyout transactions (e.g. Lehn and Poulsen 1989, Kaplan 1989, Baker and Wruck 1989, Denis 1994 or Cotter and Peck 2001). The first waves of LBOs occurred in the U.S. during the 1980s but they became increasingly popular in Europe within the last decade, too.

Hence, we expect that supervisory board involvement of the founding family may reduces agency costs as well. The third rationale is due to the regular involvement of the founding family in running the daily business. Whenever a member of the founding family is present in the management, interests of (outside) shareholders and management are aligned. This convergence-of-interest effect further reduces (or even eliminates) agency costs within family firms. In fact, agency costs are expected to be the lowest if family ownership and management involvement occur at a time. Hence, if the owners are involved in running the firm's daily business, we expect leverage levels to be the lowest.

Besides the agency cost rationale, other family firm characteristics might also affect capital structure choices. Founding families show a long-term commitment – often spanning more than one family generation – to the firms and provide "patient capital" (James 1999). In many instances, the family reputation is tied to the image and economic success of the family firm. The founding family does not view the firm as just a stream of cash flows but rather as an asset that will be bequeath to future family generations (Casson 1999 or Chami 2001). As a consequence, founding families might be concerned about any loss of control over the firm. This can affect capital structure decisions twofold: Either it is a reason to prefer debt over equity in order to avoid dilution of voting rights or it is a reason to avoid debt because of active creditor monitoring.

Finally, founding families are usually large and undiversified investors.[8] Hence, they face a high risk exposure to one single asset – the family firm – that potentially leads to an increased risk aversion compared to a broadly diversified investor. Additionally, there might be non-financial reasons why founding families want to minimize the default risk of "their" firm. Any private benefit of the founding family like high social reputation might be lost in an event of the firm's financial distress. Hence, family ownership might cause risk aversion and is thus expected to lead to lower leverage ratios.

Based on this argumentation, we expect (i) family firms to have lower leverage ratios than their non-family counterparts, (ii) family ownership to lead to lower levels of leverage due to agency-cost and risk aversion considerations, (iii) family management lead to lower levels of leverage due to convergence-of-interest-effects and lower agency costs (with a stronger effect of family members participation in the management board compared to participation in the supervisory board), (iv) firms in which the founder still acts as CEO to show lower levels of leverage due to the same arguments as in (iii) and particular talent in firm management, (v) and finally the impact of agency costs on leverage levels to be the strongest if both family firm aspects – ownership and management – occur simultaneously.

## 3 Data set and definition of variables

### 3.1 Description of the data set

Our analysis uses an unbalanced panel dataset of 660 industrial companies in Germany between 1995 and 2006. It is constructed in several steps: We start off by drawing a panel of all non-financial firms from the broadest stock index, the Composite German stock index (CDAX).[9] The sample selection rule requires that the common stock of a firm is listed in the CDAX for at least one year of the sampling period. We use the index composition published annually by Deutsche Börse AG to draw this sample. The choice of the sampling period from 1995 to 2006 results from data availability constraints: The disclosure of voting rights (not cash-flow rights) was not mandatory in Germany before 1995. According to the German

[8] Cf. Anderson et al. (2003, p. 267). Based on an analysis of Forbes' Wealthiest American data they report that U.S. families on average invest 69% of their wealth in the firm.

[9] Based on their two-digit primary SIC-Codes 60-65 and 67 we identify 153 firms form the financial service sector. Following several other studies we exclude them from our analysis due to their accounting specifics.

Securities Trading Act (*Wertpapierhandelsgesetz, WpHG*) the reporting of corporate ownership to both the Federal Financial Supervisory Authority (BaFin) and the traded company itself became mandatory for shareholders in 1995 starting with an ownership threshold of 5%. Hence, the starting point for our sampling period is 1995 since the quality of ownership data in Germany is not reliable beforehand. Our sample period ends in 2006 which was the last year with available ownership, accounting and capital market information when constructing the dataset. Since we analyse family firms, it is essential to have information about the firm's founder. We primarily use the history section of *Hoover's Company Profiles* from the *Hoovers Online database* to identify the company founders' names. We complement missing information by collecting information from company homepages and conducting press research from *Factiva* and *LexisNexis.* Despite intensive research, we were not able to obtain this information for 26 firms, which were excluded from our sample.[10] Additionally, we have hand-collected information about the firm's ownership and board structures. The core of this data comes from *Hoppenstedt Aktienführer*. *Hoppenstedt* collects annual data on ownership structures, management and supervisory board composition of publicly listed German firms. Nevertheless, we further use *Bureau van Dijk's Amadeus database*, *Commerzbank's Wer gehört zu wem* and web research in order to verify ownership information. Our sample with complete information on company founders, ownership and board structures covers 660 firms (5,135 firm years).[11] In a final step, we merge this dataset with accounting and capital market data from the *Thomson Financial Worldscope and Datastream databases.*

Our sample of 660 industrial firms contains several types of firms: First, it includes world-renown, large and well-established firms with a long firm history mostly operating in traditional industries, such as Siemens, Bayerische Motoren Werke or Thyssen-Krupp. Second, there are companies that emerged during Germany's post-war economic miracle, such as the publishing house Axel Springer or the former state-owned airline Lufthansa AG. Finally, the sample covers also successful new-economy start-ups from high-tech industries, such as internet, biotech or solar-energy.

Our sample selection criteria limit our analysis to exchange listed family firms only. Although it could be argued that our conclusions might not be representative for the large body of smaller non-listed family firms, we have chosen this sample since there are enormous data availability constraints with non-listed companies. However, since our empirical study is based on Germany's broadest stock index, we expect that our results illuminate interesting links between family capitalism and capital structure decisions.

### 3.2 Classification of family firms

Following the extant body of literature on listed family firms, our definition of a family firm is based on two components: the ownership and management component. In particular, we classify a firm within our sample as a family firm if at least one of the following three conditions is satisfied: (i) the founding family has voting rights of at least 25% (family ownership) and/or (ii) at least one member of the founding family is represented in the supervisory board (supervisory board participation) (iii) at least one member of the founding family is involved in top management (management board participation).[12] The fact

[10] Please note that we have to exclude less than 4% of all industrial CDAX firms due to missing founder information.

[11] Although we have complete ownership and board data for 5.135 firm-year observations, we cannot use all observations in our regressions (section 5) due to incomplete or missing accounting data from Worldscope.

[12] Traditionally, Germany is classified by a two-tier corporate governance structure with the management board being responsible for the management decisions concerning the daily business and the supervisory board for appointing the members of the management board and monitoring them.

that we use 25% of voting rights as ownership threshold is related to the typically more concentrated ownership structures in continental Europe (among others cf. e.g. La Porta et al. 1999 or Faccio and Lang 2002). Moreover, 25% compromises an important control threshold according to the German stock corporation act.[13] Of course, if a company was founded by a team of entrepreneurs (such as e.g. in the case of Villeroy & Boch AG by Niclas Villeroy and Francois Boch or in the case of SinnerSchrader AG by Oliver Sinner and Martin Schrader), the term founding family might refer to more than one family. Based on this definition we have created a dummy variable called Family Firm which is one if the firm qualifies as a family business according to our definition and zero otherwise. Overall, our sample consists of 660 firms and 5,135 firm year observations: 2,410 family firm year observations and 2,725 non-family firm year observations. For an overview of the sample composition over time cf. table 1.

– Insert table 1 about here –

In a second step, we test whether differences in capital structure are driven by family ownership or family management. Therefore, we substitute the dummy variable family firm in all our regression models by three variables: (i) family ownership, (ii) supervisory board participation and (iii) management board participation. Family ownership is the cumulated ownership fraction of the founding family. Supervisory board participation is a dummy variable with unit value one if a member of the founding family is part of the supervisory board. The same dummy variable is constructed for management board participation.

Finally we run all regressions with two other specifications: First, we analyse the impact of the firm's CEO. Several other studies, e.g. Anderson and Reeb (2003a) or Villalonga and Amit (2006), argue that the identity of the CEO is of special importance for the firm's corporate policy and performance. Following those studies, we construct a dummy variable called founder CEO that takes unit value one if the founder is still running the firm as CEO and zero otherwise. Second, we interact family ownership and management participation. The interaction term allows us to investigate the hypothesis that the effect of agency costs on capital structure is strongest if the founding family is simultaneously a large shareholder and involved in running the firm's daily business.

### 3.3 Measurement of leverage

We measure leverage in several ways:

(i) We start with a broad definition of book and market leverage. Book leverage is the ratio of total liabilities to total assets while the market leverage is the ratio of total liabilities to the market value of equity plus total liabilities. Thereby, we treat preferred equity as equity rather than debt.[14] By applying such a broad definition of leverage we follow several other

[13] Recent empirical studies on family firm performance and behaviour for France (Sraer and Thesmar 2007) and Germany (Andres 2007, 2008, Schmid et al. 2008) use similar family ownership thresholds in order to adjust for the more concentrated ownership structures in Continental Europe.

[14] This is in contrast to several U.S. studies, e.g. Kayhan and Titman (2007) or Baker and Wurgler (2002) who treat preferred stock as debt. Our choice is related to the large differences in the arrangement of preferred equity between Germany and the U.S. While holders of common shares in Germany have a voting right in the shareholders assembly, holders of preference shares do usually not. The missing voting right is compensated by the payment of a preferred dividend. According to the German stock corporation act (§ 140 AktG), a preferred share receives a voting right and becomes factual a common share whenever the firm cannot meet the payment of a preferred dividend in two subsequent years. This is one example why we decided to treat preferred equity as equity rather than debt. However, as indicated in the robustness section our results remain qualitatively unchanged if we treat preferred equity as debt.

studies on capital structure (e.g. Rajan and Zingales 1995, Fama and French 2002, Baker and Wurgler 2002 or Kayhan and Titman 2007). Moreover, just recently Elsas and Florysiak (2008) have applied similar definitions of leverage for a large sample study of capital structure in the German environment. This broad definition includes non-interest-bearing debt components, such as pension liabilities or accounts payable, and is likely to overestimate financial leverage. Although such a definition is not a very good indication for the future default probability, for many firms those non-interest-bearing debt components are important parts of their capital structure.

(ii) We run all regression models with a definition of long-term leverage. Long-term book leverage is defined as total liabilities minus current liabilities divided by total assets. Accordingly, long-term market leverage is defined as total liabilities minus current liabilities to market value of equity plus total liabilities.

(iii) Finally, we calculate a financial leverage that only considers interesting-bearing debt components. Our measure for the book value of financial leverage is calculated as total liabilities minus the sum of accounts payable, provisions for risks and charges (including pension liabilities) and deferred taxes divided by total assets minus the sum of accounts payable, provisions for risks and charges (including pension liabilities) and deferred taxes. As in the two other measures of leverage, we replace the book value of equity with the market value of equity when we calculate the market value of financial leverage.[15]

### 3.4 Definition of control variables

In our analysis, we use a set of control variables (for a detailed overview of all variables cf. table 2). Frank and Goyal (forthcoming) show that there are six core factors that can explain firm leverage for publicly traded American companies over the period 1950 to 2003: Firm size, profitability, market-to-book ratio, tangible assets ratio, median industry leverage and expected inflation. We include all these factors, which are described below, in our analysis.

Since we already use total assets to scale our dependent variable, we use the natural logarithm of the number of employees to control for firm size (FIRM SIZE). Firm size is included in all specifications to account for the fact that larger firms have a higher creditworthiness, easier access to debt markets and might be able to borrow at lower costs. Moreover, larger firms might use their financing-mix to maximize tax benefits. Overall, we anticipate a positive relation between firm size and leverage.

Family firms might experience lower agency costs of free cash flow and depend more on internal financing. We use an operating profit margin calculated as earnings before interest, taxes, depreciation and amortization divided by total assets (PROFITABILITY) as a proxy for firm profitability. The pecking order theory suggests that firms prefer to finance new investment projects with retained earnings followed by new debt while issuing external equity is only the last resort of financing. Consequently, we expect an inverse relationship between the firm profitability and the leverage ratio.

We control for the firm's growth options by including the market-to-book ratio (MARKET-TO-BOOK) into our regressions. Information asymmetries may lead firms to issue equity instead of debt if they have NPV-positive projects (Myers 1977). Furthermore,

[15] Please note that the Worldscope Database does not in every case report all components that are imperative to our definition of financial leverage. As a consequence, we experience a drop in the number of firm clusters that are eligible for analysis of financial leverage. Hence, our results of financial leverage have to be treated with some caution. Additionally, we eliminate all leverage ratios which are larger than one or below zero. This procedure is consistently applied for all definitions of leverage.

firms may prefer to retain earnings instead of distributing them if they have valuable growth options. Hence, we expect market-to-book ratio to be negatively related to leverage.

We include the ratio of tangible assets to totals assets (TANGIBLE ASSETS RATIO) in our analysis to account for the fact that tangible assets function as collateral and hence increase borrowing capacity. We expect the tangibility ratio to be positively correlated to the firm's leverage.

The median industry leverage (MEDIAN INDUSTRY LEVERAGE) is included as a control for industry originalities. Firms operating in highly levered industries are expected to exhibit higher leverage ratios. For example, Frank and Goyal (forthcoming) show that the industry median leverage ratio has the single largest explanatory power for the firm-level leverage in their long-term dataset on U.S. firms. Although we use industry dummies to control for industry effects in general, we therefore include industry median leverage in our regressions as an additional control variable. This measure is calculated for each industry and year, whereby the firm's industry classification is based on its one-digit primary SIC-Code. Of course, we expect industry leverage to have a positive impact on firm leverage.

The expected inflation rate (EXPECTED INFLATION RATE) is another variable with high explanatory power for leverage ratios. We anticipate firms to show higher levels of leverage if the expected inflation rate is high since debt becomes more attractive in these time periods. In our analysis, we use the next year's realised inflation rate as a proxy for the expected inflation rate. In order to investigate if this adoption leads to biased results, we applied the one-year inflation rate forecast of the German "Sachverständigenrat" as an alternative measure of expected inflation (results not reported). However, the results for these two measures are qualitatively the same.

Besides these control factors proposed by Frank and Goyal (2009) we include several additional variables in our regressions, which are described below.

The dividend payout ratio (PAYOUT RATIO) is likely to play an important role for the firm's financing mix. For example, Rozeff (1982) predicts an inverse relationship between dividend payout and leverage due to agency costs and transaction costs arguments. Also if dividends are considered to be a signal for future earnings, firms with high dividend payout ratios face lower cost of equity. They might prefer equity instead of debt and hence we expect a negative relationship between the firm's dividend payout ratio and the firm's leverage. However, we adopt the payout ratio as suggested by Julio and Ikenberry (2004) and von Eije and Megginson (2008): We set the payout ratio to 1 if it is negative (because of negative income) or above one.

Firm age (FIRM AGE) is the natural logarithm of the number of years since the firm's incorporation. Thereby, the number of years since the firm's incorporation is calculated as the current sample year minus the founding year of the firm. We expect younger firms ceteris paribus to have better growth options than older firms. Younger firms might be more reliable on equity instead of debt and prefer to retain earnings within the firm to finance their growth options. Simultaneously we hypothesize that older firms have more tangible assets, a better borrowing capacity and are more profitable. Hence, the expected relationship between firm age and leverage is positive.

One potential concern is that founding family ownership is not randomly assigned to different industries. In particular, instead of applying risk-reducing strategies at the firm level, founder families might prefer to invest in low-risk businesses and industries. Consequently, we include a measure of firm-specific risk (FIRM SPECIFIC RISK). Firm-specific risk captures the part of stock prize volatility that is unique to an individual firm and thus related to specific operations or capital structure decisions. It is calculated as the residuals' sum of squares (SSE) from a regression of the individual stock returns on the returns of the market

(CDAX) over the preceding calendar year based on stock prizes from calendar year end.[16] Since higher debt-to-equity ratios increase the firm's risk of default, we expect a positive relationship between firm specific risk and leverage.

Decisions about capital structure are dependent on the firm's governance structure. Consequently, we include some corporate governance measures in our analysis. Monitoring by outside shareholders might be an alternative to incentive alignment as a corporate governance device in order to alleviate the classical shareholder-manager conflict. Hence, we include the cumulative corporate ownership of large outside shareholders with an ownership stake of at least 5% in our analysis (OUTSIDE BLOCKHOLDERS). Alternatively, as indicated in our section about robustness tests, we control for the presence of a second large shareholder besides the founding family.

In Germany, the sample period 1995 to 2006 is characterised by a huge heterogeneity in terms of applied accounting standards. This is due to the introduction of the capital raising facilitating act (*Kapitalaufnahmeerleichterungsgesetz – KapAEG*) in 1998. According to this law, all listed German consolidated companies have the possibility to prepare annual consolidated financial statements either in IFRS/IAS (International Financial Reporting Standards or respectively International Accounting Standards, henceforth IFRS) or US-GAAP. Simultaneously they face no requirement to prepare additional annual consolidated (not individual) financial statement in German GAAP if they apply IFRS or US-GAAP. From 2005 onwards, the usage of IFRS is mandatory for consolidated companies according to § 315a German GAAP.[17] Hence, all firms change the applied accounting standard during the sample period. Since the valuation of assets and liabilities is largely dependent on the application of a true-and-fair-view accounting system (such as IFRS or US-GAAP) or a conservative accounting system (such as German GAAP),[18] we control for accounting systems with a dummy variable for the application of German GAAP (DUMMY ACCOUNTING STANDARD). The dummy variable takes unit value one if the firm applies German GAAP and is zero if the firm applies either IFRS or US-GAAP. Due to the principle of prudence in German GAAP we expect a positive relationship between the usage of a conservative accounting system and the leverage ratio.

Theory predicts that mature industries with less opportunity for asset substitution (Jensen and Meckling 1976) have higher leverage ratios. Hence, we use industry dummies based on one-digit SIC codes in all our regressions to control for such industry specifics.[19] Capital structure decisions might be subject to macroeconomic and legal conditions. To control for such time effects we include year dummies in all our analysis.

– Insert table 2 about here –

[16] One might argue that a measure of total risk (market risk plus firm-specific risk) is more suitable than firm-specific risk in our context. However, as indicated in our section about the robustness of our results we have used total risk as an alternative control variable in our analysis. Results remain unchanged and are therefore robust to the usage of total risk as an alternative measure of firm risk.

[17] However, the option to apply US-GAAP instead of IFRS remains transitional until 2007.

[18] For a detailed description of the peculiarities of German GAAP cf. Leuz and Wüstemann (2004). See Hung and Subramanyam (2007) for related empirical evidence on accounting differences between German GAAP and IFRS.

[19] Cf. Jensen (1989) for another argument why certain industries are especially prone to high levels of debt capital. Industries with low growth options but high cash resources benefit from the reduction of free cash flow that goes along with high leverage. Hence, leverage can be one way to reduce empire building or consumption on the job in such industries.

## 4 Descriptive statistics

Table 3 presents descriptive statistics for all sample companies as well as the two subgroups family and non-family firms. As the t-test of differences in means indicates there seem to be huge differences among these two subgroups of firms. Family firms are smaller (in assets, sales and employees) and as a result have smaller management and supervisory boards. They are younger both in terms of years since incorporation and years since the Initial Public Offering. For example, family firms are on average 31 years old, in comparison to an average age of 72 years for non-family firms. Furthermore, several differences in accounting based figures or accounting standard can be found.

Since our study focuses on differences in leverage, it is very interesting that the descriptive statistics indicate that family firms have lower levels of leverage than their non-family counterparts. For example, the mean (median) book leverage is 0.49 (0.5) for family firms in comparison to 0.62 (0.66) for non-family firms. Similar differences occur for market leverage with 0.36 (0.39) for family firms in comparison to 0.54 (0.53) for non-family firms. Statistically significant differences in similar magnitude do also occur for long-term leverage and financial leverage indicating that there are large differences in terms of capital structure between the two firm groups.

– Insert table 3 about here –

## 5 Empirical results

### 5.1 Methodology

Our data structure is organised as an unbalanced panel of 660 firms that are tracked over the 1995 to 2006 period. The panel structure of our data allows us to present three types of regression estimates: pooled OLS, "between" estimates and "within" estimates. From an econometric point of view, all three estimates have advantages and disadvantages. "Between" estimates are OLS estimates of firm means across time. "Within" estimates are OLS estimates of deviations from the firm means across time (also called fixed effects model since they include firm-fixed effects). While the "between" estimates only employs cross-sectional variation, the "within"-estimates only uses variation over time within each section. The pooled OLS estimator combines both aspects as it is a weighted average of both the "between" and "within" estimators.[20] By reporting all three models, we follow earlier work on capital structure by Berger et al. (1997) in terms of methodology and try to show that our results are robust against several different estimation techniques.

Thereby, the fixed-effects estimator has one strong advantage: It offers the possibility to control for unobserved, time-invariant firm heterogeneity. A recent study by Lemmon et al. (2009) indicates that the adjusted R-squares of leverage regressions with firm fixed effects are much higher than the adjusted R-squares from traditional leverage regressions. Hence, such firm fixed effects seem to have a high explanatory power for capital structure decisions. However, in our context the results of the fixed-effects estimator have to be interpreted with caution since the ownership and board structures among listed German firms are rather stable and thus offer little potential to exploit variation over time. As a consequence, the results for these estimations may be driven by variations in few firm-year observations. Consequently, it

[20] An alternative to the application of pooled OLS estimates with adjusting the standard errors for the panel structure of the dataset is to run GLS under random-effects assumptions. However, GLS requires stronger assumptions than the pooled OLS with clustered standard errors and only provides modest efficiency gains. (cf. Angrist and Pischke (2008)). Hence, we prefer pooled OLS with clustered standard errors as suggested by Petersen (2009) over GLS under random-effects-assumptions.

is useful to exploit cross-sectional variance by the "between" and pooled-OLS estimates as well. In addition, "between" estimates allow to mitigate concerns that observations drawn repeatedly from the same sample are independent from each other. Contrary to the "within" estimates, pooled OLS and "between" estimates may be biased if unobservable, time-invariant firm-specific factors exist, leading to a correlation of the error term with the independent variables. This happens if our models fail to include all relevant explanatory variables that are correlated with both the regressors and the dependent variable. Since no single model combines all advantages, we decide to report the estimates of all three models (OLS, "between" and "within" estimates).

In the context of panel datasets it is essential to estimate the standard errors in a correct way as indicated by Petersen (2009). As suggested by him, we calculate the standard errors in the pooled-OLS-specifications[21] and the "within"-estimates using the cluster-robust VCE estimator (this is not necessary for the "between" estimates since there is only one observation per firm and hence no time-series correlation). Our calculation includes adjustment for non-i.i.d. distributed standard errors, resulting both from heteroskedasticity (Huber-White standard errors, cf. White 1980) and time-series correlation. Finally, we calculate variance inflation factors (VIFs) to detect any multicollinearity problem. However, the calculated (not reported) VIFs indicate that our variables are not subject to any issues of multicollinearity. The results of our analysis are reported in tables 4 to 9 at the end of the paper.

### 5.2 Family firms vs. non-family firms

In a first step we analyse differences in leverage between family and non-family firms. We find that family firms show significantly lower levels of leverage. This is true for total leverage, long-term leverage and financial leverage both with book and market values of equity. The coefficients of the dummy variable family firm estimated by OLS, "between" and "within" estimates are all negative and in most cases statistically significant. The strongest evidence in terms of statistical significance for our claim is provided if we use long-term market leverage (cf. table 7, model I). For this, the coefficients estimated by the three models show a similar magnitude, which lies between 0.26 and 0.53, and are highly statistically significant. Additionally, the coefficients indicate high economic significance as well. For market leverage, we find – based on OLS estimates – that family firms have a leverage ratio that is about 19% lower compared to the sample mean of all non-family firms. To summarise, our results support the hypothesis of lower leverage levels in family firms compared to non-family firms. It is interesting to note that the adjusted R-square of our regressions are comparable to earlier empirical work on capital structure decisions: For example, for book leverage (market leverage), it is between 28% and 29% (between 25% and 26%) for OLS-estimates, between 35% and 36% (between 31% and 32%) for "between"-estimates and between 81% and 82% (between 80% and 81%) for the "within" estimates. Thereby, in accordance with Lemmon et al. (2009) we observe a strong explanatory power of firm fixed effects. Two implications are important in this context: First, our German data are obviously driven by a similar data generating process as comparable U.S. data. Second, the strong economic and statistical importance of family firm characteristics in explaining leverage ratios does hold over all applied estimation techniques.

[21] As shown by Petersen (2009), standard errors clustered by firms are unbiased, even if the firm-specific effect is temporary.

### 5.3 Three components: Family ownership, supervisory board and management board

Next, we distinguish between the three components that qualify a firm as family firm: Family ownership, family management and family supervisory board. As expected, we find that family participation in the firm's management board leads to lower levels of leverage. However, the analysis indicates almost no evidence for our hypothesis that founding family ownership leads to less leverage. For founding family participation in the supervisory board, we neither find any statistically significant effect. Since founding family participation in the management board reduces agency costs more effectively through a convergence-of-interest-effect, this result is not surprising. To summarise, we find strong evidence in favour of the agency cost hypothesis of family management. For participation in the supervisory board and a reduction of agency costs by firm oversight, we find no convincing support. Contrary to our expectations, we neither find any support for the risk aversion and monitoring hypothesis of family ownership.

### 5.4 The effect of a founder CEO

As argued before, we expect that the presence of the founder as CEO leads to lower levels of leverage due to lower agency costs within these firms. Additionally, we hypothesize that the presence of the founder as CEO reduces agency costs even more effectively than just the presence of a founding family member in the management board (as investigated in the previous section). CEOs are especially important for corporate policies.[22] Founder CEOs are special in a number of ways: they often consider the firm as their life-time achievement and might show a strong commitment to the firm rather than enjoying the "quiet life". Founder CEOs might have superior technological skills or firm-specific knowledge, or even more entrepreneurial talent in comparison to descendent or non-family CEOs. Moreover, founder CEOs have shaped their organizations from the very beginning and might therefore have an especially strong influence on corporate decision making.[23] Hence, we expect the size of the coefficients of the dummy variable for founder CEO to be larger than the coefficient for the presence of members of the founding family in the management board. Our empirical results show strong support for this hypothesis. The dummy variable for founder CEO is negative in all our specifications. Even more, there is a high statistical significance of the estimated coefficients. Every founder CEO coefficient except for one is statistical significant at least at the 5 %-level, with most coefficients being significant at the 1%-level. Furthermore, the effect of a founder CEO is – as expected – in 14 of the 18 models higher than the effect of family management (the participation of a member of the founding family in the management board) in the previous models.

### 5.5 Two components at a time: Family ownership with simultaneous family management

In order to analyse the effect of reduced agency costs even further, we apply an interaction term of founding family ownership and founding family participation in the management board. We do not consider participation in the supervisory board because the analysis described above shows that we cannot find significant effects for supervisory board. Since this interaction is different from zero only if founding family ownership and

[22] See for example Bertrand and Schoar (2003), Bennedsen et al. (2006) or Frank and Goyal (2007).

[23] Cf. Fahlenbrach (2008) for a similar argumentation about the special capabilities of founder CEOs. See Bertrand and Mullainathan (2008) for the "quiet life view" of CEOs and Adams et al. (2005) for empirical evidence on the strong decision power of founder CEOs. In line with this view, several studies have confirmed that corporate performance advantages of family firms depend on CEO identity; see for example Anderson and Reeb (2003a), Villalonga and Amit (2006) or Perez-Gonzalez (2006).

participation in the management board are present at the same time, we expect it to be a very powerful measure of reduced agency costs due to low conflicts between shareholders and management (which are, at least to some extent, members of the founding family).

Our results support this hypothesis. The coefficient for the interaction term is negative in all our models, indicating that simultaneous ownership and management board participation lead to lower levels of leverage. In most models, the estimates are statistically significant, often at the 1%-level (in 11 out of 18 models).

### 5.6 Interpretation of control variables

We find that firm size has a positive and highly significant correlation with the level of leverage in the majority of our regression models. However, the empirical finding that large and growing companies - as indicated by the fixed effects model coefficient - have more debt in their balance sheet is not surprising. Another highly significant control variable that is positively correlated with leverage is firm specific risk. Again, this is not surprising since a higher leverage increases costs of financial distress and hence risk of default. Firm age (measured by the natural logarithm of years since incorporation) is positively correlated with the level of leverage as well. Mature firms tend to use more debt than younger firms. The tangibility ratio measured by tangible assets divided by total assets shows – as expected by capital structure theories – a positive correlation with the level of leverage in most of our models since collaterals increase borrowing capacity. For payout ratio, median industry level and expected inflation rate we find a positive and statistically significant effect in the majority of our models as well. In contrast, growth options (measured by the market-to-book ratio) and profitability have on average a negative influence on the leverage ratio. All these findings are consistent with standard capital structure theories and the recent empirical findings for the U.S. and Germany presented in Frank and Goyal (forthcoming) and Elsas and Florysiak (2008), respectively.

Interestingly, we find that firms which follow German GAAP have higher levels of leverage. However, the reason for this is likely to be found in differences in accounting rules rather than economic differences: German GAAP requires firms to account their liabilities very carefully (hence they are likely to overestimate them), while the main objective of international accounting standards (IFRS, US-GAAP) is to draw a true picture of the firm's assets and liabilities in place.[24] For outside block ownership we cannot find an effect that is persistent over all of our models.

## 6 Robustness tests

This section explores the robustness of our results along five main dimensions: (i) misspecification of our regressions (ii) non-linear effects of firm size (iii) the impact of changing market conditions over time (iv) insider ownership and (v) endogeneity issues. All our robustness tests apply to two particular models: First, we check for the robustness in overall differences between family and non-family firms. Thereby, we use the market leverage definition. Some of the robustness tests are reported in tables 10. Second, we investigate the robustness of our results for the founder CEO effect. The results are reported in table 11 at the end of the paper, but not discussed here since they are similar to those of the robustness tests for family firms. Other robustness tests are not reported in detail.

– Insert table 10 about here –

[24] For related empirical evidence cf. Hung and Subramanyam (2007) who show that the accounting standard has a strong impact on the valuation of assets and liabilities. While German GAAP use a "prudent" accounting approach (balance sheet conservatism), IFRS are characterized by a true-and-fair-view orientation.

### 6.1 Misspecification issues

Our results are robust to the usage of several alternative control variables, such as ln sales in lieu of ln employees as a proxy for firm size, total risk in lieu of firm-specific risk, a dummy variable for dividend payment in lieu of payout ratio and ln IPO age in lieu of ln founding age to control for firm age. Furthermore, our results are also robust to the treatment of preferred capital as debt rather than equity. Our results remain qualitatively unchanged if we include the following additional control variables: cash-to-assets, a measure for liquidity based on the ratio of current assets-to-current liabilities and preferred to total equity. Furthermore our results are not significantly changed if we measure outside shareholder monitoring in several other ways. For example, we have created dummy variables for the existence of outside shareholders at several important control thresholds, such as 5%, 10% and 25%. We have also distinguished between outside monitoring by strategic and financial investors. None of those modifications changed our results.

Elsas and Florysiak (2008) use regressor variables lagged by one year in all of their regressions. Behind this procedure is the idea that current firm characteristics, such as firm size and available collateral, determine future borrowing capacity. In contrast, we have used contemporaneous firm characteristics in all our regressions. However, our results remain largely unchanged if we use lagged instead of contemporaneous regressors (cf. table 10).

Our empirical tests of the founder CEOs indicate that firms under the leadership of the company founder exhibit significant lower leverage ratios. However, since such effects require an active company founder those results might be biased towards younger firms. Hence we apply an alternative dummy variable for family CEOs that take unit value one if the founder or a relative of the founder is CEO. This robustness check rendered similar results indicating that besides the founder CEO effect any family member in charge of running the family business significantly reduces the leverage within the firm.[25]

### 6.2 Non-linear effects of firm size and outlier-correction

Linear regressions only correct for linear influences of control variables. In order to control for non-linear effects of firm size, we (i) include a squared term of firm sizes (ln employees) and additionally (ii) divide our sample in two sub-samples. In particular, we use the median value of firm size (ln employees and alternatively ln sales) to divide the sample in two sub-samples of equal size and then employ the same regression models as for the whole sample (only based on the pooled OLS regressions to cover cross-sectional and across time variance). Overall, both methods lead to qualitatively unchanged findings indicating that there is no non-linear size effect driving our results (cf. table 10).

In order to check whether our results are sensitive to outliers we have winsorized our variables at 2.5%. We find qualitatively the same results as for our regressions without outlier corrections (cf. table 10).

[25] At first glance this result is surprising having in mind the numerous studies of U.S. family firms who find only a founder CEO-effect for corporate performance but conclude that firms with descendent CEOs perform worse than firms with founder CEOs (for example, see Villalonga and Amit 2006 or Perez-Gonzalez 2006). However, our analysis of the family CEO remains largely driven by founder CEOs. Additionally, it is interesting that Sraer and Thesmar (2007) in their analysis of French family firms find that both family firms with founder CEOs and descendant CEOs perform better than family firms with outside CEOs. Against the background that France is similar to Germany in terms of institutional environment it is interesting to note that there seems to be not so strong differences in both countries in terms of CEO quality between founders and descendents.

### 6.3 Sample composition effects

Our unbalanced sample is influenced in two important ways: First, a large number of new lists went public during the 1998 to 2000 IPO boom phase.[26] Against the background of the comparatively less developed German stock market this was an uncommon large IPO wave. Most of those new lists are young high-tech firms that went public at the technology stock exchange "Neuer Markt". Another time trend reflected in our sample is the wave of going private transactions after the introduction of the "squeeze-out-law" in 2002. It allowed majority owners of many traditional firms by law to compensate minority shareholders and take the firm private if they have at least 95% of voting rights. Table 1 indicates that the importance of family firms in our sample is increasing over time. While in 1995 – the starting year of our sample period – 28% of firms are family businesses (65 firms out of 230), in 2006 236 out of 494 firms are family businesses (48%). In the context of capital structure decisions, the changing sample composition can affect our results in several ways. One concern is that new lists during the 1998 to 2000 period have different firm characteristics than established companies. For the U.S., Fama and French (2004) have argued that both the number and characteristics of new lists has changed dramatically in the U.S. Cross sectional characteristics of new lists show more left skewed profitability in combination with more right skewed growth options resulting in a sharp decline of survival rate. Fama and French (2001) further show that those changing firm characteristics can have a large influence on corporate policy decisions, such as payout policy. Hence, we analyse whether the changing characteristics of new lists – that play an important role according to the pecking order theory of capital structure – affect our results. To do so, we run all regression models for two additional, separate sub-samples: One regression is based on a sub-sample of firms whose Initial Public Offering was in the 1998 to 2000 period and one regression for the sub-sample of firm with an IPO before or after this IPO boom phase. However, by excluding the "Neuer Markt" companies our results remain qualitatively unchanged. The same regression is performed for companies which had their IPO during the 1998 to 2000 period. Interestingly, the coefficient for the dummy variable family firm is again highly significant and larger compared to the previous regression. This indicates that the difference in leverage is even more pronounced for firms which went public during this boom phase. The second test involves the introduction of a dummy variable "high-tech firm" for all IPOs during this boom phase. However, this variable is negative, but statistically not different from zero. If the dummy for family firms is excluded from the model, the high-tech firm dummy is negative and significant at the 10%-level. However, if we compare the level of leverage between the traditional firms and the "Neue Markt" companies based on mean and median values of book and market leverage, we find significant differences between those two groups. Based on that univariate analysis the influence on new lists' firm characteristics on leverage ratios is non-deniable and statistically significant at the 1%-significance level. New lists with an IPO between 1998 and 2000 have a mean value of market leverage of 0.35 (median value of 0.33), while more mature firms (IPO before 1998 or after 2000) have on average a market leverage of 0.53 (median value of 0.55). Nevertheless, the influence of family firm characteristics remains strong in our robustness test regressions (both for the differences between family firms and non-family firms and the CEO founder effect) and dissipates any concerns that our results are driven by sample composition effects. Family firms differ from their non-family counterparts in terms of capital structure decisions and this result is not subject to changing firm characteristics of new lists.

Second, the composition of a firm's capital structure is determined by equity and debt issues. Market-timing explanations propose that firms issue equity during favourable market

[26] Out of the 660 firms in our sample, 328 had their IPO in this time period.

times when equity prices are overvalued ("window of opportunity") and buy back shares when equity prices are undervalued (Baker and Wurgler 2002). Especially, stock markets (both initial and seasoned public offerings) seem to be highly cyclical (e.g. Bayless and Chaplinsky 1996 or Lowry and Schwert 2002). Hence, we control for timing issues by dividing our sample into two sub-periods: one sub-sample covers only observations during the 1995 to 2000 period (six years) that includes the boom phase at the IPO-market while the other sub-sample covers only firm-year observations during the 2001 to 2006 period (six years) of normal to conservative stock market climate. In both sub-periods the observed family firm effects remain qualitatively unchanged indicating that they are independent of any market timing considerations.

### 6.4 Insider ownership

As shown in our literature review several studies analyse the impact of managerial ownership, insider ownership or managerial entrenchment on capital structure decisions. One natural concern is that our results for family firms may be caused by insider ownership since founding family ownership is highly correlated with insider ownership.[27] Hence, we have conducted a robustness test to investigate whether our results are really caused by family firm characteristics. Thereby, insider ownership is defined as the percentage equity holdings from all members of the management and supervisory board., We run the regression only for those firms in our sample with (i) no insider ownership and (ii) insider ownership below 10%. Regression results indicate that insider ownership is not affecting our results substantially, since the coefficient for family firms is still negative and statistically significant at the 5%-level if we exclude firms dominated by insider ownership. However, if we consider only firms with no insider ownership the number of observations drops significantly, from 3,741 to 1,562. Nevertheless, these robustness tests indicate that our results are robust against the exclusion of firms dominated by insider ownership. Hence, our study detects family firm effects on capital structure decisions rather than insider ownership effects. This interpretation is in line with earlier findings by Mishra and McConaughy (1999) for U.S. data.

### 6.5 Endogeneity issues

One common problem with capital structure analysis is the endogeneity of ownership, board composition and capital structure (cf. Petersen 2009). In general, endogeneity may arise from three different sources: (i) measurement error (ii) potential "reverse causality" between capital structure and family firm characteristics and (iii) omitted variables. We want to focus our discussion on the issues of (ii) and (iii).

We start with potential "reverse causality". The panel structure of our data allows us to employ lagged variables for the family firm dummy as well as the family ownership, supervisory and management board dummy variables. While lagged variables cannot completely solve the endogeneity problem they are suitable to alleviate the concern of reverse causality. In general, our results remain robust to the use of lagged family firm variables (cf. table 11).

An issue more difficult to deal with are omitted variables, especially if the (unknown) firm heterogeneity affects in parallel both our dependent and independent variables. Cf. Himmelberg et al. (1999) for a detailed discussion of endogeneity issues in a similar context, i.e. managerial ownership and firm value. For this issue, again the panel structure of our data is helpful. The fixed effects estimator is unbiased and consistent if we assume that potentially unobserved omitted variables are time constant (such as e.g. the firm's culture). However, if

[27] Thereby, insider ownership refers to the percentage of equity held by both the management and supervisory board.

this is not the case and the unobserved, omitted variables are not constant over time, the endogeneity problem is still prevalent. One obvious solution to this problem would be the application of instrumental variables. Such instrumental variables must be uncorrelated with the dependent variable while they simultaneously have to show a high correlation with the potentially endogenous independent variable (which in our case is the dummy family firm or the family firm characteristics ownership and management). The natural solution – the use of observed firm characteristics as instruments for the family firm and its components – is practically difficult since they are used as further control variables for capital structure decisions. Due to the lack of strong instruments we apply another methodology to control for endogeneity issues. Angrist (1998) argues that the application of a matching estimator has similar advantages as instrumental variables. A natural solution would be to match family firms with similar non-family firms. However, for the application of matching estimators it is a crucial point to restrict the choice of the vector of control variables X that assign the observations to either the treatment or control group to ones that are not influenced by the treatment itself. This is necessary in order to assume exogenous or unconfounded assignment to treatment. As a practical consequence, the matching procedure must often rely on pre-treatment variables. The natural treatment in our case would be the status as a family firm itself. However, in this case there are no pre-treatment variables, since family firms according to our definition are already "born" as a family business from the very incorporation.

Hence, we have to use another treatment which is the change from a family firm to a non-family firm.[28] Thereby, we construct our matched sample as follows: First, we consider only firms that were family firms during the sample period. In a second step, we identify those firms which evolve from a family firm to a non-family firm. This evolvement is used as treatment, whereby the "treated" firms are matched to "untreated" firms, namely firms that remain family firms. Albeit ownership and board structures are rather stable over time, we are able to identify 97 firms which evolve from a family to a non-family firm. We apply kernel matching based on a propensity score for each year. The propensity score is based on pre-treatment variables that influence both the probability of treatment and the outcome. This is necessary to ensure that the outcome variable is independent of treatment conditional on the propensity score.[29] We decided to apply the following variables (measured one year before the treatment): founding family ownership, number of founding family members in supervisory and management board, outside block ownership, firm size, profitability, firm age and industry classification. Our identification strategy is to show that the treatment (which is the change from a family firm to a non-family firm) has a significant (positive) impact on the level of leverage. To allow for a reasonable time of capital structure adjustment, we compare the book leverage two years before and two years after the treatment. We find that the average treatment effect on the treated (ATT) is 0.104 and the corresponding t-value is 1.95. Since standard errors may be biased we alternatively used a bootstrapping method to calculate them, but the results were in the same order of magnitude.

Besides the matching estimator based on the evolvement of family firms to non-family firms, we apply a matching estimator on another treatment: the exit of the last founding family member from the firm's management board. This is especially promising since our prior analyses show that the involvement of founding family members in the management board has a strong (negative) influence on leverage. The matching estimator is constructed in a very similar way as described above. However, we first consider only those family firms fulfilling the family management characteristics at any time during our sample period. In a

[28] Cf. Klasa (2007) for a similar use of treatment in the construction of a matching estimator. Klasa (2007) uses this procedure to study what shapes the founding families' decision to finally sell their remaining ownership stake within the family business.

[29] Cf. also Rosenbaum and Rubin (1983), Heckman et al. (1998) or Todd (2006) for a further description of the applied methodology.

second step, we identify those firms in which the founding family leaves the management board during our sample period and use this "exit" as the treatment variable. Propensity score calculation and measurement of changes in the book leverage are equal to the estimator for the evolvement of family firms to non-family firms. As expected, we find a positive average treatment effect on the treated (ATT) with a coefficient of 0.111. The corresponding t-value is 2.42, with similar results obtained from bootstrapped standard errors.

These results strongly support our prior results: Family firms evolving to non-family firms significantly change their capital structure. In fact, leverage ratios increase significantly after some time period necessary for adjustment of capital structure. A similar effect is observed for the withdrawals of founding family members from the management board. Overall, this robustness test suggests a significant, negative and causal relationship between family firm characteristics (especially family management) and the level of leverage.[30]

## 7 Conclusion

With a large sample of German CDAX firms in the period 1995 to 2006 we show that even in listed firms the founding families continue to remain an important shareholder and in many cases are still involved in supervisory and management board activities. Among 660 industrial CDAX firms in our sample 390 qualify at least in one sample year as a family firm. Those figures underline the importance of listed family firms in Germany.

We further investigate whether these family firms differ from their non-family counterparts in terms of capital structure decisions. Thereby, we are able to add one small piece to the "capital structure puzzle" by using the institutional differences between family firms and non-family firms in order to show how agency costs affect the firm's capital structure. In fact, by considering three different components of family firms (ownership, supervisory and management board activities of the founding family) we find that - as predicted by theory - the level of leverage is the lowest if the founding family is both a large shareholder and present in the management board at a time. In general, we can show that family firms use less debt (measured by several definitions of leverage) than their non-family counterparts. In this sense, our analysis contributes to an ongoing discussion, since previous research on family firms and leverage mainly focused on market-based economies and was inconclusive. In this regard, to our best knowledge we provide the first study investigating capital structure decisions in family firms for a bank-based economy. Our results are robust to a battery of robustness tests, including misspecification issues, timing effects, insider ownership explanations and non-linear size effects. Finally, we use a matching estimator to alleviate concerns of endogeneity. Overall, our study suggests a strong, negative and causal relationship between family firm characteristics (especially family management) and the level of leverage.

Although the result of lower leverage ratios within German family firms is very robust, the interpretation of these results is complex. As pointed out above, one reasonable explanation is related to agency costs considerations. Family firms have lower agency costs and thus the disciplinary effect of debt as proposed by Jensen (1986) becomes less relevant. However, several alternative explanations are possible: (i) the lower leverage might indicate that family firms have lower target debt ratios, e.g. because the founding family has a different perception concerning the costs and benefits of debt in comparison to shareholders and management in non-family firms. For example, with relation to their largely undiversified portfolios the founding family might emphasize the risk of default within their capital

[30] Just recently, Lemmon et al. (2009, p. 1576) conclude that "leverage ratios are remarkably stable over time". Against this background the observed changes in capital structure on this large scale around our treatment events is especially interesting and a strong sign for the causal effects of family firm characteristics on capital structure decisions.

structure decisions. (ii) Another potential reason for a lower level of leverage can be related to profitability. If – as several different studies indicate (e.g. Anderson and Reeb 2003a, Villalonga and Amit 2006, Andres 2008 for Germany) – family firms are indeed more profitable than their non-family counterparts, then they might have better capabilities to generate internal funds and constant cash-flows. Hence, they are less dependent on external finance (both debt and equity). While explanation (i) is related to the trade-off theory of capital structure, explanation (ii) is related to the pecking order theory. Other potential reasons include (iii) a motivation to avoid a loss of control (as argued by Mishra and McConaughy 1999) in the context of close creditor monitoring within a bank-based economy, or (iv) a restricted access to debt markets due to their family firm characteristics.

Some important questions are left for further research: A recently emerged strand in capital structure research focuses on dynamic capital structure adjustment. So far we did not study whether family firms differ from non-family firms in terms of how they adjust their capital structure.[31] While our study helps to shed more light on an issue with so far limited and inconclusive empirical evidence – overall differences between family and non-family firms in terms of overall leverage – the interpretation of our results remains a demanding task. However, this provides a fruitful avenue for further research. To gain more insight into this complex issue, survey evidence among CFOs of listed firms might be reasonable to illuminate the motivation for lower leverage within German family firms. Of course, another natural avenue for future research is to extend the analysis to the large number of private family firms in Germany. Finally, there might be other interesting corporate policy choices which are affected by family firm characteristics, such as payout policy or executive compensation.

[31] Several recent studies analysed the issue of dynamic capital structure adjustment in greater detail, see for example Leary and Roberts (2005), Liu (2005), Flannery and Rangan (2006), Hovakimian (2006) or Kayhan and Titman (2007). We plan to incorporate an analysis whether family firms differ from non-family firms in terms of dynamic capital structure adjustment in a future version of this paper. Thereby, this will be another major contribution since no other study so far covered the issue of target capital structure adjustment in the context of family firms.

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**Table 1: Composition of sample**

| Year | Firms | Family Firms | Non-Family Firms |
|---|---|---|---|
| 1995 | 230 | 65 | 165 |
| 1996 | 235 | 68 | 167 |
| 1997 | 250 | 75 | 175 |
| 1998 | 312 | 111 | 201 |
| 1999 | 430 | 203 | 227 |
| 2000 | 566 | 312 | 254 |
| 2001 | 568 | 315 | 253 |
| 2002 | 542 | 278 | 264 |
| 2003 | 514 | 262 | 252 |
| 2004 | 500 | 248 | 252 |
| 2005 | 494 | 237 | 257 |
| 2006 | 494 | 236 | 258 |
| | 5135 | 2410 | 2725 |

Note: This table shows the development of the sample composition over time. Column 1 presents the 12 sample years between 1995 and 2006, column 2 the number of firms in each year and column 3 and 4 the number of family and non-family firms in each year.

**Table 2: Definition of Variables**

| Variable group | Variable name | Description of variable |
|---|---|---|
| Corporate Governane Variables | Dummy Family Firm | Dummy which is one if (a) the cumulative ownership stake of the founding family is at least 25% and/or (b) a member of the founding family is represented in either the management or supervisory board |
| | Founding Family Ownership | Percentage of stock ownership held by all members of the founding family |
| | Family Management [MB] | Equals 1 if a member of the founding family is involved in the management board |
| | Family Management [SB] | Equals 1 if a member of the founding family is involved in the supervisory board |
| | Founder CEO | Equals 1 if the CEO is the founder of the firm |
| | Ownership * Management [MB] | Interaction term of founding family ownership and family management [MB] |
| Control Variables | Firm Size [Ln] | Ln of the firm's number of employees |
| | Profitability | Earnings before interest, taxes, depreciation and amortization (EBITDA) / total assets |
| | Outside Blockholders | Stock ownership of outside block owners (which have an ownership stake of at least 5%) |
| | Firm Specific Risk | Residuals' sum of squares from a regression of the individual stock returns on the returns of the market (CDAX) |
| | Firm Age [Ln] | Ln of the number of years since the firm's incorporation |
| | Tangible Assets Ratio | Tangible assets / Total assets |
| | Market-to-Book | Market value of the firm / book value of the firm |
| | Dummy Accounting Standard | Equals 1 if the firm applies German GAAP and zero if it applies US-GAAP or IFRS |
| | Payout Ratio | Common dividends / net income available to common equity; Equals 1 if calculated payout ratio is below 0 or above 1. |
| | Median Industry Leverage | Median leverage in the firm's industry indicated by the first number of the SIC code for each year (Leverage is defined as for the dependet variable in each model) |
| | Expected Inflation Rate | Inflation rate of the following year |
| | Dummy High-Tech Firm | Equals 1 if the firm went public during 1998 and 2000 |
| Capital Structure Variables | Book Leverage | Total liabilities / (Book value of equity + total liabilities) |
| | Market Leverage | Total liabilities / (Market value of equity + total liabilities) |
| | Long-term Book Leverage | (Total liabilities - current liabilities) / (Book value of equity + total liabilities) |
| | Long-term Market Leverage | (Total liabilities - current liabilities) / (Market value of equity + total liabilities) |
| | Financial Book Leverage | (Total liabilities - provisions - accounts payable - deferred taxes) / (Book value of equity + total liabilities - provisions - accounts payable - deferred taxes) |
| | Financial Market Leverage | (Total liabilities - provisions - accounts payable - deferred taxes) / (Market value of equity + total liabilities - provisions - accounts payable - deferred taxes) |

**Table 3: Descriptive Statistics**

| | All Firms | | Family Firms | | Non-Family Firms | | |
|---|---|---|---|---|---|---|---|
| | **Mean** | **Median** | **Mean** | **Median** | **Mean** | **Median** | **t-test** |
| **Corporate Governance Aspects** | | | | | | | |
| Founding Family Ownership [%] | 17.90 | 0 | 37.71 | 40.05 | 0.63 | 0 | 29.25 |
| Outside Blockholders [%] | 33.73 | 20.3 | 15.23 | 5.50 | 50.0 | 51.0 | -16.97 |
| Size Management Board | 3.16 | 3 | 2.94 | 3 | 3.34 | 3 | -3.34 |
| Size Supervisory Board | 7.56 | 6 | 5.32 | 3 | 9.54 | 8 | -11.58 |
| **Firm Size and age** | | | | | | | |
| Assets (in million €) | 2,988.08 | 142.74 | 996.62 | 74.67 | 4,757.64 | 310.49 | -3.30 |
| Sales (in million €) | 2,501.35 | 167.39 | 1,121.77 | 80.38 | 3,735.04 | 369.07 | -3.24 |
| Employees | 11,379 | 1023 | 6,324 | 428 | 15,863 | 2159 | -2.65 |
| Firm Age | 52.97 | 28 | 31.18 | 15 | 72.42 | 74 | -10.79 |
| IPO Age | 14.62 | 6 | 5.91 | 4 | 22.38 | 11 | -12.34 |
| **Accounting figures** | | | | | | | |
| Profitability | -0.07 | 0.11 | 0.10 | 0.09 | -0.27 | 0.11 | -1.19 |
| Tangible Assets Ratio | 0.23 | 0.20 | 0.20 | 0.15 | 0.26 | 0.24 | -4.81 |
| Market-to-Book | 2.86 | 1.73 | 3.08 | 1.74 | 2.66 | 1.72 | 0.72 |
| Dummy Accounting Standard | 0.46 | 0.00 | 0.32 | 0.00 | 0.58 | 1.00 | -8.85 |
| Payout ratio | 0.27 | 0.00 | 0.22 | 0.00 | 0.32 | 0.19 | -5.11 |
| **Dependent variables** | | | | | | | |
| Book Leverage | 0.56 | 0.59 | 0.49 | 0.50 | 0.62 | 0.66 | -9.27 |
| Market Leverage | 0.47 | 0.46 | 0.36 | 0.39 | 0.54 | 0.53 | -8.32 |
| Long-term Book Leverage | 0.26 | 0.25 | 0.20 | 0.17 | 0.32 | 0.31 | -9.53 |
| Long-term Market Leverage | 0.22 | 0.20 | 0.16 | 0.12 | 0.26 | 0.25 | -9.59 |
| Financial Book Leverage | 0.48 | 0.48 | 0.43 | 0.41 | 0.51 | 0.53 | -4.18 |
| Financial Market Leverage | 0.35 | 0.37 | 0.28 | 0.33 | 0.39 | 0.41 | -3.88 |

Note: Accounting information is obtained from Thomson's Worldscope Database. Information on ownership structure is hand-collected from the Hoppenstedt Stock Guide. The sample consists of all non-financial firms in the broadest German stock Index (CDAX) between 1995 and 2006. Firms are classified as family firms if the founding family has an ownership stake of at least 25% and/or a member of the founding family participates in the management or supervisory board. ***, ** and * indicate significance on the 1%-, 5%- and 10%-level respectively. The t-statistics are corrected for serial correlation. A detailed definition of all variables can be found in table 2.

**Table 4: Book Leverage**

| **Model** | **I a** | **I b** | **I c** | **II a** | **II b** | **II c** | **III a** | **III b** | **III c** | **IV a** | **IV b** | **IV c** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** |
| **Dummy Family Firm** | **-0.041*** ** | **-0.049** ** | **-0.019** | | | | | | | | | |
| | **(-2.62)** | **(-2.46)** | **(-1.04)** | | | | | | | | | |
| **Family Ownership** | | | | **-0.046** | **-0.066** | **-0.051*** | | | | | | |
| | | | | **(-1.44)** | **(-1.58)** | **(-1.70)** | | | | | | |
| **Family Management [MB]** | | | | **-0.042** ** | **-0.043*** | **-0.023** | | | | | | |
| | | | | **(-2.43)** | **(-1.95)** | **(-1.13)** | | | | | | |
| **Family Management [SB]** | | | | **0.0029** | **0.011** | **0.018** | | | | | | |
| | | | | **(0.16)** | **(0.49)** | **(1.19)** | | | | | | |
| **Founder CEO** | | | | | | | **-0.061***** | **-0.075***** | **-0.047** ** | | | |
| | | | | | | | **(-2.89)** | **(-3.44)** | **(-2.14)** | | | |
| **Ownership * Management [MB]** | | | | | | | | | | **-0.11***** | **-0.12***** | **-0.086***** |
| | | | | | | | | | | **(-3.18)** | **(-2.91)** | **(-2.62)** |
| Firm Size [Ln] | 0.039*** | 0.044*** | 0.045*** | 0.038*** | 0.043*** | 0.045*** | 0.038*** | 0.040*** | 0.043*** | 0.039*** | 0.044*** | 0.045*** |
| | (9.96) | (8.73) | (5.13) | (9.51) | (8.56) | (5.20) | (9.31) | (7.72) | (4.33) | (9.77) | (8.91) | (5.18) |
| Profitability | -0.00017*** | 0.00023 | -0.00036*** | -0.00020*** | 0.00015 | -0.00035*** | -0.00021*** | 0.000075 | -0.00036*** | -0.00021*** | 0.00013 | -0.00035*** |
| | (-3.93) | (0.44) | (-6.62) | (-4.17) | (0.29) | (-6.52) | (-4.31) | (0.14) | (-7.42) | (-4.51) | (0.24) | (-6.43) |
| Outside Blockholders | -0.0080 | -0.061** | -0.012 | -0.015 | -0.068** | -0.016 | -0.00072 | -0.058** | -0.0043 | -0.0094 | -0.058** | -0.016 |
| | (-0.39) | (-2.06) | (-0.64) | (-0.74) | (-2.22) | (-0.83) | (-0.037) | (-2.04) | (-0.22) | (-0.50) | (-2.05) | (-0.84) |
| Firm Specific Risk | 0.11*** | 0.15*** | 0.055*** | 0.11*** | 0.15*** | 0.055*** | 0.11*** | 0.10*** | 0.061*** | 0.11*** | 0.15*** | 0.053** |
| | (4.23) | (4.00) | (2.70) | (4.14) | (4.13) | (2.66) | (3.86) | (3.58) | (2.80) | (4.09) | (4.06) | (2.57) |
| Firm Age [Ln] | 0.0080 | 0.0048 | 0.047*** | 0.0062 | 0.0032 | 0.045** | 0.0049 | 0.0021 | 0.036* | 0.0080 | 0.0046 | 0.043** |
| | (1.19) | (0.62) | (2.59) | (0.92) | (0.42) | (2.46) | (0.69) | (0.26) | (1.92) | (1.20) | (0.61) | (2.34) |
| Tangible Assets Ratio | 0.12*** | 0.11** | 0.26*** | 0.13*** | 0.11** | 0.27*** | 0.100** | 0.087 | 0.25*** | 0.12*** | 0.11** | 0.26*** |
| | (2.92) | (2.07) | (5.67) | (3.00) | (2.15) | (5.74) | (2.33) | (1.57) | (5.18) | (2.94) | (2.03) | (5.60) |
| Market-to-Book | 0.0011*** | 0.0024*** | 0.00089*** | 0.0011*** | 0.0023*** | 0.00088*** | 0.0011*** | 0.0023** | 0.00086*** | 0.0010*** | 0.0023*** | 0.00088*** |
| | (6.53) | (2.73) | (7.36) | (6.44) | (2.68) | (7.18) | (5.57) | (2.54) | (6.46) | (6.69) | (2.61) | (7.16) |
| Dummy Accounting Standard | 0.078*** | 0.11*** | 0.044*** | 0.078*** | 0.11*** | 0.043*** | 0.076*** | 0.088*** | 0.044*** | 0.081*** | 0.11*** | 0.043*** |
| | (5.37) | (3.70) | (4.45) | (5.40) | (3.73) | (4.36) | (5.04) | (3.06) | (4.26) | (5.67) | (4.03) | (4.35) |
| Payout Ratio | -0.033** | -0.024 | -0.028*** | -0.031** | -0.021 | -0.027*** | -0.032** | -0.019 | -0.027*** | -0.031** | -0.024 | -0.027*** |
| | (-2.46) | (-0.65) | (-3.44) | (-2.34) | (-0.56) | (-3.45) | (-2.29) | (-0.50) | (-3.09) | (-2.37) | (-0.64) | (-3.52) |
| Median Industry Leverage | 0.30*** | 0.41 | 0.33*** | 0.30*** | 0.42 | 0.33*** | 0.30*** | 0.61* | 0.31*** | 0.30*** | 0.48 | 0.33*** |
| | (2.81) | (1.26) | (4.00) | (2.84) | (1.28) | (3.99) | (2.73) | (1.84) | (3.62) | (2.88) | (1.46) | (4.03) |
| Expected Inflation Rate | 0.029** | 0.046 | 0.030*** | 0.027** | 0.046 | 0.027** | 0.030** | 0.027 | 0.030** | 0.027** | 0.047 | 0.028** |
| | (2.41) | (0.45) | (2.66) | (2.21) | (0.45) | (2.39) | (2.34) | (0.30) | (2.49) | (2.25) | (0.47) | (2.44) |
| Constant | -0.030 | -0.23 | -0.25** | -0.0086 | -0.22 | -0.23** | -0.0063 | -0.22 | -0.19* | -0.030 | -0.29 | -0.23** |
| | (-0.27) | (-0.61) | (-2.44) | (-0.076) | (-0.59) | (-2.25) | (-0.055) | (-0.63) | (-1.65) | (-0.27) | (-0.78) | (-2.19) |
| Observations | 3746 | 3746 | 3746 | 3746 | 3746 | 3746 | 3449 | 3449 | 3449 | 3746 | 3746 | 3746 |
| Number of clusters | 589 | 589 | 589 | 589 | 589 | 589 | 566 | 566 | 566 | 589 | 589 | 589 |
| Adj. R-squared | 0.28 | 0.35 | 0.81 | 0.28 | 0.36 | 0.81 | 0.29 | 0.35 | 0.82 | 0.28 | 0.36 | 0.81 |
| Model | OLS | BE | FE | OLS | BE | FE | OLS | BE | FE | OLS | BE | FE |

Note: A detailed description of the variables can be found in table 2. OLS is a pooled OLS regresion model, BE is a "between" effects panel model and FE is a "within" effects panel model. Time and industry dummies are included. The standard errors of the coefficients are corrected for serial correlation on a firm level and for heteroscedasticity using the Huber-White-Sandwich estimator based on White (1980). T-statistics are presented in parentheses. ***, ** and * indicate significance on the 1%-, 5%- and 10%-level respectively.

**Table 5: Market Leverage**

| **Model** | **I a** | **I b** | **I c** | **II a** | **II b** | **II c** | **III a** | **III b** | **III c** | **IV a** | **IV b** | **IV c** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** |
| **Dummy Family Firm** | **-0.060*** ** | **-0.073*** ** | **-0.017** | | | | | | | | | |
| | **(-3.16)** | **(-3.42)** | **(-0.87)** | | | | | | | | | |
| **Family Ownership** | | | | **-0.054** | **-0.064** | **-0.040** | | | | | | |
| | | | | **(-1.49)** | **(-1.44)** | **(-1.24)** | | | | | | |
| **Family Management [MB]** | | | | **-0.048** ** | **-0.052** ** | **-0.048** ** | | | | | | |
| | | | | **(-2.46)** | **(-2.19)** | **(-2.38)** | | | | | | |
| **Family Management [SB]** | | | | **-0.019** | **-0.013** | **-0.00017** | | | | | | |
| | | | | **(-0.91)** | **(-0.53)** | **(-0.0094)** | | | | | | |
| **Founder CEO** | | | | | | | **-0.059** ** | **-0.079*** ** | **-0.017** | | | |
| | | | | | | | **(-2.58)** | **(-3.36)** | **(-0.81)** | | | |
| **Ownership * Management [MB]** | | | | | | | | | | **-0.12*** ** | **-0.12*** ** | **-0.11*** ** |
| | | | | | | | | | | **(-3.06)** | **(-2.84)** | **(-3.43)** |
| Firm Size [Ln] | 0.029*** | 0.035*** | 0.046*** | 0.028*** | 0.035*** | 0.047*** | 0.028*** | 0.032*** | 0.041*** | 0.029*** | 0.037*** | 0.046*** |
| | (6.02) | (6.60) | (5.79) | (5.72) | (6.50) | (6.02) | (5.41) | (5.78) | (4.44) | (5.90) | (6.93) | (5.81) |
| Profitability | -0.000080 | 0.00044 | -0.00034*** | -0.000098 | 0.00039 | -0.00033*** | -0.00012 | 0.00034 | -0.00033*** | -0.00012 | 0.00035 | -0.00033*** |
| | (-0.93) | (0.79) | (-4.10) | (-1.13) | (0.69) | (-4.03) | (-1.37) | (0.59) | (-4.45) | (-1.37) | (0.63) | (-3.92) |
| Outside Blockholders | -0.034 | -0.10*** | -0.040** | -0.041 | -0.11*** | -0.047** | -0.016 | -0.070** | -0.032 | -0.025 | -0.086*** | -0.046** |
| | (-1.35) | (-3.23) | (-2.00) | (-1.62) | (-3.21) | (-2.28) | (-0.65) | (-2.32) | (-1.52) | (-1.06) | (-2.79) | (-2.28) |
| Firm Specific Risk | 0.14*** | 0.16*** | 0.062*** | 0.13*** | 0.16*** | 0.061*** | 0.14*** | 0.16*** | 0.062*** | 0.13*** | 0.17*** | 0.060*** |
| | (4.63) | (4.17) | (2.93) | (4.50) | (4.12) | (2.87) | (4.04) | (4.29) | (2.65) | (4.44) | (4.21) | (2.82) |
| Firm Age [Ln] | 0.0097 | -0.0028 | 0.083*** | 0.0088 | -0.0036 | 0.080*** | 0.0096 | -0.0051 | 0.080*** | 0.011 | -0.0020 | 0.078*** |
| | (1.28) | (-0.33) | (4.09) | (1.16) | (-0.42) | (3.94) | (1.21) | (-0.59) | (3.68) | (1.43) | (-0.25) | (3.84) |
| Tangible Assets Ratio | 0.24*** | 0.22*** | 0.31*** | 0.25*** | 0.22*** | 0.30*** | 0.23*** | 0.25*** | 0.30*** | 0.24*** | 0.21*** | 0.30*** |
| | (5.15) | (3.91) | (6.25) | (5.21) | (3.95) | (6.21) | (4.63) | (4.31) | (5.86) | (5.12) | (3.80) | (6.08) |
| Market-to-Book | -0.00041 | -0.0019* | -0.000080 | -0.00040 | -0.0019* | -0.000072 | -0.00033 | -0.0017 | -0.000063 | -0.00042 | -0.0020* | -0.000082 |
| | (-0.90) | (-1.69) | (-0.37) | (-0.89) | (-1.67) | (-0.34) | (-0.69) | (-1.57) | (-0.26) | (-0.91) | (-1.79) | (-0.39) |
| Dummy Accounting Standard | 0.076*** | 0.11*** | 0.017 | 0.076*** | 0.11*** | 0.015 | 0.072*** | 0.087*** | 0.018 | 0.079*** | 0.12*** | 0.015 |
| | (4.34) | (3.66) | (1.51) | (4.36) | (3.76) | (1.32) | (3.90) | (2.87) | (1.50) | (4.62) | (4.09) | (1.34) |
| Payout Ratio | -0.025 | -0.040 | -0.014 | -0.024 | -0.040 | -0.012 | -0.024 | -0.031 | -0.013 | -0.024 | -0.040 | -0.012 |
| | (-1.61) | (-0.97) | (-1.45) | (-1.54) | (-0.97) | (-1.32) | (-1.38) | (-0.75) | (-1.30) | (-1.53) | (-0.97) | (-1.34) |
| Median Industry Leverage | 0.54*** | 0.70** | 0.43*** | 0.54*** | 0.72** | 0.42*** | 0.56*** | 0.86*** | 0.44*** | 0.55*** | 0.76** | 0.43*** |
| | (6.56) | (2.14) | (5.36) | (6.52) | (2.19) | (5.27) | (6.58) | (2.64) | (5.34) | (6.58) | (2.33) | (5.31) |
| Expected Inflation Rate | 0.042*** | -0.036 | 0.020* | 0.040*** | -0.032 | 0.015 | 0.043*** | -0.065 | 0.023** | 0.041*** | -0.032 | 0.016 |
| | (3.55) | (-0.32) | (1.79) | (3.31) | (-0.28) | (1.30) | (3.40) | (-0.68) | (2.00) | (3.39) | (-0.28) | (1.41) |
| Constant | -0.22** | -0.25 | -0.48*** | -0.20* | -0.27 | -0.45*** | -0.23** | -0.24 | -0.45*** | -0.23** | -0.34 | -0.45*** |
| | (-2.04) | (-0.65) | (-4.93) | (-1.81) | (-0.70) | (-4.58) | (-2.04) | (-0.68) | (-4.28) | (-2.15) | (-0.89) | (-4.62) |
| Observations | 3859 | 3859 | 3859 | 3859 | 3859 | 3859 | 3547 | 3547 | 3547 | 3859 | 3859 | 3859 |
| Number of clusters | 591 | 591 | 591 | 591 | 591 | 591 | 571 | 571 | 571 | 591 | 591 | 591 |
| Adj. R-squared | 0.26 | 0.32 | 0.80 | 0.26 | 0.31 | 0.80 | 0.26 | 0.31 | 0.81 | 0.25 | 0.31 | 0.80 |
| Model | OLS | BE | FE | OLS | BE | FE | OLS | BE | FE | OLS | BE | FE |

Note: A detailed description of the variables can be found in table 2. OLS is a pooled OLS regresion model, BE is a "between" effects panel model and FE is a "within" effects panel model. Time and industry dummies are included. The standard errors of the coefficients are corrected for serial correlation on a firm level and for heteroscedasticity using the Huber-White-Sandwich estimator based on White (1980). T-statistics are presented in parentheses. ***, ** and * indicate significance on the 1%-, 5%- and 10%-level respectively.

**Table 6: Long-term Book Leverage**

| **Model** | **I a** | **I b** | **I c** | **II a** | **II b** | **II c** | **III a** | **III b** | **III c** | **IV a** | **IV b** | **IV c** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** |
| **Dummy Family Firm** | **-0.036*** ** | **-0.051*** ** | **-0.023*** | | | | | | | | | |
| | **(-3.10)** | **(-3.89)** | **(-1.68)** | | | | | | | | | |
| **Family Ownership** | | | | **-0.0067** | **-0.012** | **-0.039*** | | | | | | |
| | | | | **(-0.32)** | **(-0.42)** | **(-1.80)** | | | | | | |
| **Family Management [MB]** | | | | **-0.052*** ** | **-0.053*** ** | **-0.039** ** | | | | | | |
| | | | | **(-3.98)** | **(-3.52)** | **(-2.29)** | | | | | | |
| **Family Management [SB]** | | | | **0.0021** | **-0.0046** | **-0.0090** | | | | | | |
| | | | | **(0.18)** | **(-0.31)** | **(-0.76)** | | | | | | |
| **Founder CEO** | | | | | | | **-0.048*** ** | **-0.051*** ** | **-0.044** ** | | | |
| | | | | | | | **(-3.33)** | **(-3.36)** | **(-2.40)** | | | |
| **Ownership * Management [MB]** | | | | | | | | | | **-0.085*** ** | **-0.075*** ** | **-0.082*** ** |
| | | | | | | | | | | **(-3.58)** | **(-2.70)** | **(-2.72)** |
| Firm Size [Ln] | 0.020*** | 0.024*** | -0.0063 | 0.019*** | 0.023*** | -0.0053 | 0.020*** | 0.023*** | -0.0035 | 0.020*** | 0.025*** | -0.0064 |
| | (6.95) | (7.00) | (-0.95) | (6.52) | (6.89) | (-0.82) | (7.18) | (6.54) | (-0.49) | (6.97) | (7.48) | (-0.99) |
| Profitability | -0.00035*** | -0.00026 | -0.00047*** | -0.00037*** | -0.00029 | -0.00046*** | -0.00037*** | -0.00030 | -0.00048*** | -0.00038*** | -0.00030 | -0.00046*** |
| | (-12.4) | (-0.75) | (-12.2) | (-12.5) | (-0.84) | (-12.2) | (-11.7) | (-0.84) | (-12.2) | (-12.7) | (-0.88) | (-12.0) |
| Outside Blockholders | 0.024 | -0.0070 | 0.015 | 0.024 | -0.0015 | 0.0089 | 0.028* | 0.016 | 0.013 | 0.026* | 0.0076 | 0.013 |
| | (1.60) | (-0.35) | (0.85) | (1.56) | (-0.075) | (0.50) | (1.95) | (0.85) | (0.75) | (1.78) | (0.39) | (0.73) |
| Firm Specific Risk | 0.051*** | 0.085*** | 0.026*** | 0.050*** | 0.082*** | 0.026*** | 0.051*** | 0.082*** | 0.026** | 0.049*** | 0.086*** | 0.025*** |
| | (4.66) | (3.26) | (2.92) | (4.60) | (3.16) | (2.83) | (4.49) | (3.40) | (2.31) | (4.55) | (3.27) | (2.77) |
| Firm Age [Ln] | 0.0051 | 0.00033 | 0.021 | 0.0027 | -0.00091 | 0.018 | 0.0028 | -0.00028 | 0.0053 | 0.0053 | 0.0018 | 0.017 |
| | (0.90) | (0.064) | (1.30) | (0.47) | (-0.17) | (1.10) | (0.47) | (-0.053) | (0.33) | (0.93) | (0.36) | (1.04) |
| Tangible Assets Ratio | 0.28*** | 0.28*** | 0.29*** | 0.28*** | 0.28*** | 0.29*** | 0.27*** | 0.28*** | 0.28*** | 0.28*** | 0.27*** | 0.29*** |
| | (8.69) | (7.91) | (6.37) | (8.87) | (7.93) | (6.35) | (8.25) | (7.87) | (5.85) | (8.82) | (7.74) | (6.28) |
| Market-to-Book | 0.00016 | -0.00011 | 0.00011 | 0.00017 | -0.000054 | 0.00012 | 0.00017 | -0.00049 | 0.00012 | 0.00016 | -0.00016 | 0.00011 |
| | (0.74) | (-0.16) | (0.97) | (0.82) | (-0.082) | (1.04) | (0.69) | (-0.79) | (1.04) | (0.68) | (-0.25) | (0.94) |
| Dummy Accounting Standard | 0.083*** | 0.087*** | 0.067*** | 0.081*** | 0.087*** | 0.065*** | 0.083*** | 0.088*** | 0.069*** | 0.085*** | 0.095*** | 0.066*** |
| | (7.49) | (4.84) | (7.06) | (7.44) | (4.79) | (6.96) | (7.05) | (4.80) | (7.30) | (7.87) | (5.30) | (7.02) |
| Payout Ratio | -0.029*** | -0.036 | -0.020** | -0.029*** | -0.041 | -0.018** | -0.028** | -0.039 | -0.016* | -0.028*** | -0.036 | -0.019** |
| | (-2.66) | (-1.41) | (-2.56) | (-2.65) | (-1.61) | (-2.46) | (-2.47) | (-1.54) | (-1.96) | (-2.59) | (-1.42) | (-2.51) |
| Median Industry Leverage | 0.31*** | 0.58 | 0.19** | 0.31*** | 0.60* | 0.19** | 0.31*** | 0.73** | 0.19** | 0.31*** | 0.64* | 0.20** |
| | (3.07) | (1.63) | (2.30) | (3.01) | (1.68) | (2.31) | (2.90) | (2.12) | (2.19) | (3.09) | (1.79) | (2.37) |
| Expected Inflation Rate | 0.018* | -0.030 | 0.0084 | 0.016* | -0.030 | 0.0053 | 0.021** | -0.062 | 0.015 | 0.017* | -0.024 | 0.0067 |
| | (1.93) | (-0.45) | (0.89) | (1.73) | (-0.46) | (0.57) | (2.15) | (-1.06) | (1.56) | (1.86) | (-0.37) | (0.72) |
| Constant | -0.16*** | -0.14 | 0.078 | -0.14** | -0.14 | 0.099 | -0.16*** | -0.060 | 0.10 | -0.17*** | -0.19 | 0.096 |
| | (-2.94) | (-0.80) | (1.03) | (-2.50) | (-0.76) | (1.30) | (-2.94) | (-0.37) | (1.32) | (-3.15) | (-1.10) | (1.26) |
| Observations | 3492 | 3492 | 3492 | 3492 | 3492 | 3492 | 3214 | 3214 | 3214 | 3492 | 3492 | 3492 |
| Number of clusters | 565 | 565 | 565 | 565 | 565 | 565 | 545 | 545 | 545 | 565 | 565 | 565 |
| Adj. R-squared | 0.35 | 0.47 | 0.75 | 0.36 | 0.47 | 0.75 | 0.36 | 0.46 | 0.75 | 0.35 | 0.46 | 0.75 |
| Model | OLS | BE | FE | OLS | BE | FE | OLS | BE | FE | OLS | BE | FE |

Note: A detailed description of the variables can be found in table 2. OLS is a pooled OLS regresion model, BE is a "between" effects panel model and FE is a "within" effects panel model. Time and industry dummies are included. The standard errors of the coefficients are corrected for serial correlation on a firm level and for heteroscedasticity using the Huber-White-Sandwich estimator based on White (1980). T-statistics are presented in parentheses. ***, ** and * indicate significance on the 1%-, 5%- and 10%-level respectively.

**Table 7: Long-term Market Leverage**

| **Model** | **I a** | **I b** | **I c** | **II a** | **II b** | **II c** | **III a** | **III b** | **III c** | **IV a** | **IV b** | **IV c** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** |
| **Dummy Family Firm** | **-0.042*** ** | **-0.053*** ** | **-0.026** ** | | | | | | | | | |
| | **(-3.90)** | **(-4.49)** | **(-2.09)** | | | | | | | | | |
| **Family Ownership** | | | | **-0.017** | **-0.018** | **-0.027** | | | | | | |
| | | | | **(-0.87)** | **(-0.73)** | **(-1.16)** | | | | | | |
| **Family Management [MB]** | | | | **-0.045*** ** | **-0.043*** ** | **-0.052*** ** | | | | | | |
| | | | | **(-3.75)** | **(-3.18)** | **(-3.32)** | | | | | | |
| **Family Management [SB]** | | | | **-0.0067** | **-0.0080** | **-0.013** | | | | | | |
| | | | | **(-0.59)** | **(-0.60)** | **(-1.17)** | | | | | | |
| **Founder CEO** | | | | | | | **-0.046*** ** | **-0.046*** ** | **-0.041*** ** | | | |
| | | | | | | | **(-3.39)** | **(-3.44)** | **(-2.59)** | | | |
| **Ownership * Management [MB]** | | | | | | | | | | **-0.077*** ** | **-0.058** ** | **-0.093*** ** |
| | | | | | | | | | | **(-3.40)** | **(-2.33)** | **(-3.32)** |
| Firm Size [Ln] | 0.016*** | 0.020*** | 0.0089 | 0.015*** | 0.020*** | 0.010* | 0.016*** | 0.018*** | 0.0091 | 0.016*** | 0.021*** | 0.0087 |
| | (5.70) | (6.50) | (1.59) | (5.34) | (6.51) | (1.84) | (5.61) | (5.78) | (1.50) | (5.73) | (7.11) | (1.57) |
| Profitability | -0.00024*** | -0.00012 | -0.00034*** | -0.00026*** | -0.00015 | -0.00033*** | -0.00027*** | -0.00018 | -0.00034*** | -0.00027*** | -0.00015 | -0.00033*** |
| | (-7.11) | (-0.40) | (-11.9) | (-7.31) | (-0.48) | (-11.8) | (-7.40) | (-0.56) | (-11.4) | (-7.83) | (-0.49) | (-11.4) |
| Outside Blockholders | 0.0095 | -0.015 | -0.0056 | 0.0099 | -0.0084 | -0.011 | 0.018 | 0.0079 | -0.0040 | 0.017 | 0.0046 | -0.0081 |
| | (0.64) | (-0.87) | (-0.39) | (0.66) | (-0.45) | (-0.74) | (1.30) | (0.47) | (-0.27) | (1.19) | (0.26) | (-0.56) |
| Firm Specific Risk | 0.052*** | 0.080*** | 0.023*** | 0.051*** | 0.078*** | 0.022*** | 0.055*** | 0.073*** | 0.024** | 0.051*** | 0.082*** | 0.021*** |
| | (4.96) | (3.42) | (2.92) | (4.80) | (3.33) | (2.75) | (4.79) | (3.41) | (2.45) | (4.78) | (3.46) | (2.71) |
| Firm Age [Ln] | 0.0056 | 0.00038 | 0.039*** | 0.0042 | -0.000087 | 0.035** | 0.0042 | -0.00043 | 0.033** | 0.0064 | 0.0022 | 0.034** |
| | (1.12) | (0.083) | (2.61) | (0.82) | (-0.019) | (2.36) | (0.80) | (-0.091) | (2.07) | (1.28) | (0.47) | (2.29) |
| Tangible Assets Ratio | 0.29*** | 0.28*** | 0.27*** | 0.29*** | 0.28*** | 0.26*** | 0.29*** | 0.29*** | 0.26*** | 0.29*** | 0.27*** | 0.26*** |
| | (8.90) | (8.91) | (5.56) | (9.04) | (8.85) | (5.57) | (8.58) | (9.17) | (5.13) | (8.97) | (8.62) | (5.50) |
| Market-to-Book | -0.00011 | -0.00071 | -0.000058 | -0.00010 | -0.00069 | -0.000049 | -0.000064 | -0.00069 | -0.000039 | -0.00012 | -0.00078 | -0.000061 |
| | (-0.47) | (-1.22) | (-0.62) | (-0.45) | (-1.17) | (-0.55) | (-0.26) | (-1.25) | (-0.41) | (-0.48) | (-1.32) | (-0.66) |
| Dummy Accounting Standard | 0.066*** | 0.075*** | 0.044*** | 0.065*** | 0.076*** | 0.042*** | 0.065*** | 0.068*** | 0.044*** | 0.069*** | 0.084*** | 0.043*** |
| | (6.18) | (4.65) | (4.95) | (6.18) | (4.69) | (4.81) | (5.73) | (4.20) | (4.82) | (6.55) | (5.18) | (4.89) |
| Payout Ratio | -0.017* | -0.030 | -0.0053 | -0.016* | -0.034 | -0.0037 | -0.016 | -0.036 | -0.0030 | -0.016 | -0.031 | -0.0039 |
| | (-1.71) | (-1.34) | (-0.76) | (-1.70) | (-1.50) | (-0.55) | (-1.63) | (-1.57) | (-0.41) | (-1.65) | (-1.35) | (-0.59) |
| Median Industry Leverage | 0.27*** | 0.73** | 0.20** | 0.26*** | 0.78** | 0.19** | 0.34*** | 1.10*** | 0.22*** | 0.27*** | 0.79** | 0.20** |
| | (3.04) | (2.36) | (2.56) | (2.95) | (2.50) | (2.40) | (3.60) | (3.51) | (2.67) | (2.95) | (2.53) | (2.46) |
| Expected Inflation Rate | 0.024*** | -0.053 | 0.0084 | 0.023*** | -0.051 | 0.0046 | 0.026*** | -0.057 | 0.010 | 0.023*** | -0.049 | 0.0059 |
| | (2.99) | (-0.92) | (0.98) | (2.77) | (-0.87) | (0.54) | (3.02) | (-1.10) | (1.10) | (2.89) | (-0.83) | (0.69) |
| Constant | -0.15*** | -0.089 | -0.13** | -0.13*** | -0.10 | -0.11* | -0.16*** | -0.11 | -0.12* | -0.16*** | -0.15 | -0.11* |
| | (-3.18) | (-0.57) | (-2.07) | (-2.80) | (-0.66) | (-1.67) | (-3.49) | (-0.76) | (-1.79) | (-3.56) | (-0.94) | (-1.68) |
| Observations | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3221 | 3221 | 3221 | 3500 | 3500 | 3500 |
| Number of clusters | 565 | 565 | 565 | 565 | 565 | 565 | 545 | 545 | 545 | 565 | 565 | 565 |
| Adj. R-squared | 0.34 | 0.45 | 0.75 | 0.34 | 0.45 | 0.75 | 0.35 | 0.46 | 0.75 | 0.34 | 0.44 | 0.75 |
| Model | OLS | BE | FE | OLS | BE | FE | OLS | BE | FE | OLS | BE | FE |

Note: A detailed description of the variables can be found in table 2. OLS is a pooled OLS regresion model, BE is a "between" effects panel model and FE is a "within" effects panel model. Time and industry dummies are included. The standard errors of the coefficients are corrected for serial correlation on a firm level and for heteroscedasticity using the Huber-White-Sandwichestimator based on White (1980). T-statistics are presented in parentheses. ***, ** and * indicate significance on the 1%-, 5%- and 10%-level respectively.

**Table 8: Financial Book Leverage**

| **Model** | **I a** | **I b** | **I c** | **II a** | **II b** | **II c** | **III a** | **III b** | **III c** | **IV a** | **IV b** | **IV c** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** |
| **Dummy Family Firm** | **-0.019** | **-0.038** | **-0.047**** | | | | | | | | | |
| | **(-0.80)** | **(-1.41)** | **(-1.98)** | | | | | | | | | |
| **Family Ownership** | | | | **-0.031** | **-0.011** | **-0.061** | | | | | | |
| | | | | **(-0.72)** | **(-0.20)** | **(-1.55)** | | | | | | |
| **Family Management [MB]** | | | | **-0.054**** | **-0.065**** | **-0.036** | | | | | | |
| | | | | **(-2.06)** | **(-2.10)** | **(-1.28)** | | | | | | |
| **Family Management [SB]** | | | | **0.037** | **0.024** | **0.017** | | | | | | |
| | | | | **(1.63)** | **(0.81)** | **(0.76)** | | | | | | |
| **Founder CEO** | | | | | | | **-0.084***** | **-0.095***** | **-0.083***** | | | |
| | | | | | | | **(-2.90)** | **(-3.12)** | **(-3.00)** | | | |
| **Ownership * Management [MB]** | | | | | | | | | | **-0.13**** | **-0.090** | **-0.10**** |
| | | | | | | | | | | **(-2.53)** | **(-1.54)** | **(-2.36)** |
| Firm Size [Ln] | 0.043*** | 0.042*** | 0.058*** | 0.042*** | 0.041*** | 0.057*** | 0.042*** | 0.042*** | 0.049*** | 0.042*** | 0.043*** | 0.057*** |
| | (7.24) | (5.99) | (3.95) | (6.87) | (5.77) | (3.87) | (6.85) | (5.94) | (3.56) | (7.09) | (6.09) | (3.80) |
| Profitability | -0.11** | 0.084 | -0.13*** | -0.11** | 0.081 | -0.13*** | -0.13*** | 0.054 | -0.14*** | -0.10** | 0.085 | -0.13*** |
| | (-2.23) | (1.18) | (-4.24) | (-2.24) | (1.14) | (-4.08) | (-2.66) | (0.68) | (-4.08) | (-2.10) | (1.19) | (-4.02) |
| Outside Blockholders | -0.034 | -0.11*** | -0.013 | -0.039 | -0.10*** | -0.015 | -0.041 | -0.10*** | -0.0061 | -0.048* | -0.099*** | -0.012 |
| | (-1.12) | (-2.73) | (-0.56) | (-1.26) | (-2.69) | (-0.64) | (-1.46) | (-2.89) | (-0.27) | (-1.70) | (-2.74) | (-0.51) |
| Firm Specific Risk | 0.16*** | 0.16** | 0.065** | 0.16*** | 0.16** | 0.066** | 0.16*** | 0.17*** | 0.070** | 0.16*** | 0.16** | 0.062** |
| | (4.66) | (2.46) | (2.55) | (4.66) | (2.46) | (2.59) | (4.49) | (2.77) | (2.51) | (4.66) | (2.46) | (2.48) |
| Firm Age [Ln] | 0.00064 | -0.0033 | 0.056* | -0.0040 | -0.0070 | 0.054* | -0.0048 | -0.0047 | 0.055* | -0.0022 | -0.0038 | 0.052* |
| | (0.069) | (-0.33) | (1.86) | (-0.43) | (-0.69) | (1.84) | (-0.50) | (-0.46) | (1.96) | (-0.24) | (-0.38) | (1.73) |
| Tangible Assets Ratio | 0.11* | 0.14* | 0.34*** | 0.11* | 0.13* | 0.34*** | 0.097 | 0.12 | 0.32*** | 0.11* | 0.14* | 0.33*** |
| | (1.72) | (1.87) | (3.83) | (1.68) | (1.81) | (3.81) | (1.50) | (1.59) | (3.78) | (1.71) | (1.92) | (3.71) |
| Market-to-Book | 0.0018*** | 0.0038** | 0.0014*** | 0.0018*** | 0.0038** | 0.0014*** | 0.0018*** | 0.0040** | 0.0014*** | 0.0018*** | 0.0035* | 0.0014*** |
| | (3.28) | (1.99) | (3.75) | (3.20) | (1.97) | (3.65) | (3.70) | (2.09) | (3.85) | (3.18) | (1.81) | (3.68) |
| Dummy Accounting Standard | 0.053** | 0.050 | 0.0071 | 0.053** | 0.049 | 0.0055 | 0.054** | 0.060 | 0.0078 | 0.055** | 0.054 | 0.0052 |
| | (2.27) | (1.30) | (0.53) | (2.30) | (1.27) | (0.42) | (2.27) | (1.52) | (0.60) | (2.36) | (1.42) | (0.40) |
| Payout Ratio | 0.0012 | -0.022 | -0.012 | 0.0071 | -0.017 | -0.011 | 0.0011 | -0.020 | -0.0080 | 0.0059 | -0.022 | -0.012 |
| | (0.050) | (-0.47) | (-1.01) | (0.30) | (-0.36) | (-0.91) | (0.046) | (-0.43) | (-0.67) | (0.25) | (-0.47) | (-0.95) |
| Median Industry Leverage | 0.54*** | 0.86*** | 0.45*** | 0.52*** | 0.85*** | 0.44*** | 0.57*** | 1.11*** | 0.45*** | 0.52*** | 0.87*** | 0.44*** |
| | (6.12) | (2.74) | (6.95) | (5.88) | (2.71) | (6.73) | (7.14) | (3.40) | (7.21) | (6.01) | (2.76) | (6.71) |
| Expected Inflation Rate | 0.050*** | 0.20** | 0.025 | 0.047** | 0.20** | 0.021 | 0.058*** | 0.22** | 0.032** | 0.047** | 0.20** | 0.022 |
| | (2.74) | (2.19) | (1.64) | (2.52) | (2.20) | (1.35) | (3.14) | (2.43) | (2.10) | (2.53) | (2.11) | (1.45) |
| Constant | -0.31*** | -0.88*** | -0.50*** | -0.27** | -0.85*** | -0.48*** | -0.30*** | -1.01*** | -0.45*** | -0.27** | -0.88*** | -0.47*** |
| | (-2.88) | (-2.86) | (-3.22) | (-2.34) | (-2.75) | (-3.11) | (-2.72) | (-3.22) | (-2.95) | (-2.43) | (-2.84) | (-3.05) |
| Observations | 2035 | 2035 | 2035 | 2035 | 2035 | 2035 | 1934 | 1934 | 1934 | 2035 | 2035 | 2035 |
| Number of clusters | 391 | 391 | 391 | 391 | 391 | 391 | 378 | 378 | 378 | 391 | 391 | 391 |
| Adj. R-squared | 0.18 | 0.23 | 0.83 | 0.19 | 0.24 | 0.83 | 0.21 | 0.26 | 0.84 | 0.19 | 0.23 | 0.83 |
| Model | OLS | BE | FE | OLS | BE | FE | OLS | BE | FE | OLS | BE | FE |

Note: A detailed description of the variables can be found in table 2. OLS is a pooled OLS regresion model, BE is a "between" effects panel model and FE is a "within" effects panel model. Time and industry dummies are included. The standard errors of the coefficients are corrected for serial correlation on a firm level and for heteroscedasticity using the Huber-White-Sandwich estimator based on White (1980). T-statistics are presented in parentheses. ***, ** and * indicate significance on the 1%-, 5%- and 10%-level respectively.

**Table 9: Financial Market Leverage**

| **Model** | **I a** | **I b** | **I c** | **II a** | **II b** | **II c** | **III a** | **III b** | **III c** | **IV a** | **IV b** | **IV c** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** | **OLS** | **Between** | **Within** |
| **Dummy Family Firm** | **-0.040** | **-0.048*** | **-0.035** | | | | | | | | | |
| | **(-1.52)** | **(-1.74)** | **(-1.40)** | | | | | | | | | |
| **Family Ownership** | | | | **-0.030** | **-0.024** | **0.0092** | | | | | | |
| | | | | **(-0.65)** | **(-0.43)** | **(0.21)** | | | | | | |
| **Family Management [MB]** | | | | **-0.045*** | **-0.042** | **-0.060**** | | | | | | |
| | | | | **(-1.68)** | **(-1.37)** | **(-2.24)** | | | | | | |
| **Family Management [SB]** | | | | **-0.00092** | **-0.0097** | **-0.0034** | | | | | | |
| | | | | **(-0.038)** | **(-0.32)** | **(-0.14)** | | | | | | |
| **Founder CEO** | | | | | | | **-0.073***** | **-0.085***** | **-0.062**** | | | |
| | | | | | | | **(-2.61)** | **(-2.77)** | **(-2.08)** | | | |
| **Ownership * Management [MB]** | | | | | | | | | | **-0.100*** | **-0.084** | **-0.060** |
| | | | | | | | | | | **(-1.89)** | **(-1.43)** | **(-1.32)** |
| Firm Size [Ln] | 0.030*** | 0.032*** | 0.048*** | 0.029*** | 0.031*** | 0.049*** | 0.029*** | 0.031*** | 0.041*** | 0.030*** | 0.033*** | 0.047*** |
| | (4.49) | (4.41) | (3.37) | (4.28) | (4.31) | (3.43) | (4.32) | (4.21) | (2.96) | (4.47) | (4.59) | (3.25) |
| Profitability | -0.22*** | -0.024 | -0.20*** | -0.22*** | -0.026 | -0.20*** | -0.27*** | -0.083 | -0.23*** | -0.22*** | -0.025 | -0.20*** |
| | (-4.18) | (-0.36) | (-6.26) | (-4.18) | (-0.39) | (-6.14) | (-4.49) | (-1.17) | (-6.57) | (-4.17) | (-0.37) | (-6.16) |
| Outside Blockholders | -0.050 | -0.10*** | -0.050** | -0.052 | -0.10** | -0.050** | -0.043 | -0.094** | -0.045** | -0.046 | -0.088** | -0.049** |
| | (-1.58) | (-2.62) | (-2.22) | (-1.65) | (-2.54) | (-2.11) | (-1.44) | (-2.57) | (-2.03) | (-1.59) | (-2.41) | (-2.17) |
| Firm Specific Risk | 0.20*** | 0.19*** | 0.056** | 0.20*** | 0.18*** | 0.058** | 0.19*** | 0.17*** | 0.058** | 0.19*** | 0.18*** | 0.053** |
| | (4.89) | (2.85) | (2.44) | (4.85) | (2.78) | (2.52) | (4.60) | (2.63) | (2.37) | (4.81) | (2.81) | (2.35) |
| Firm Age [Ln] | 0.0062 | 0.0018 | 0.094*** | 0.0038 | 0.00044 | 0.090*** | 0.0025 | 0.00034 | 0.092*** | 0.0054 | 0.0018 | 0.092*** |
| | (0.70) | (0.18) | (2.91) | (0.42) | (0.043) | (2.84) | (0.28) | (0.033) | (2.90) | (0.61) | (0.18) | (2.85) |
| Tangible Assets Ratio | 0.17** | 0.20*** | 0.32*** | 0.17** | 0.20*** | 0.31*** | 0.16** | 0.20*** | 0.31*** | 0.17** | 0.20*** | 0.31*** |
| | (2.40) | (2.68) | (3.96) | (2.39) | (2.66) | (3.84) | (2.26) | (2.65) | (3.98) | (2.38) | (2.72) | (3.85) |
| Market-to-Book | -0.00092 | -0.0042*** | 0.00022 | -0.00087 | -0.0040** | 0.00027 | -0.00081 | -0.0033** | 0.00026 | -0.00095 | -0.0043*** | 0.00023 |
| | (-1.10) | (-2.66) | (0.95) | (-1.04) | (-2.51) | (1.20) | (-0.98) | (-2.16) | (1.16) | (-1.14) | (-2.72) | (1.00) |
| Dummy Accounting Standard | 0.050** | 0.062 | -0.012 | 0.050** | 0.063* | -0.014 | 0.048* | 0.061 | -0.0084 | 0.052** | 0.067* | -0.013 |
| | (2.08) | (1.64) | (-0.83) | (2.09) | (1.67) | (-0.93) | (1.94) | (1.57) | (-0.57) | (2.16) | (1.76) | (-0.87) |
| Payout Ratio | 0.00073 | -0.077 | 0.00088 | 0.0029 | -0.078 | 0.00076 | 0.0049 | -0.072 | 0.0092 | 0.0033 | -0.078 | 0.0012 |
| | (0.031) | (-1.61) | (0.059) | (0.12) | (-1.61) | (0.052) | (0.21) | (-1.49) | (0.67) | (0.14) | (-1.63) | (0.080) |
| Median Industry Leverage | 0.55*** | 1.10*** | 0.38*** | 0.54*** | 1.10*** | 0.38*** | 0.51*** | 1.08*** | 0.35*** | 0.54*** | 1.10*** | 0.38*** |
| | (5.92) | (3.07) | (6.54) | (5.80) | (3.08) | (6.45) | (5.57) | (3.08) | (6.24) | (5.87) | (3.10) | (6.43) |
| Expected Inflation Rate | 0.032* | 0.21** | -0.011 | 0.031* | 0.21** | -0.012 | 0.039** | 0.22** | -0.0021 | 0.030* | 0.20** | -0.012 |
| | (1.83) | (2.29) | (-0.86) | (1.74) | (2.22) | (-0.92) | (2.19) | (2.39) | (-0.16) | (1.69) | (2.12) | (-0.92) |
| Constant | -0.21* | -0.98*** | -0.50*** | -0.19 | -0.96*** | -0.49*** | -0.18 | -0.92*** | -0.46*** | -0.20* | -0.96*** | -0.49*** |
| | (-1.75) | (-3.30) | (-3.19) | (-1.52) | (-3.22) | (-3.11) | (-1.46) | (-3.17) | (-2.94) | (-1.68) | (-3.25) | (-3.09) |
| Observations | 2088 | 2088 | 2088 | 2088 | 2088 | 2088 | 1985 | 1985 | 1985 | 2088 | 2088 | 2088 |
| Number of clusters | 393 | 393 | 393 | 393 | 393 | 393 | 380 | 380 | 380 | 393 | 393 | 393 |
| Adj. R-squared | 0.21 | 0.23 | 0.83 | 0.21 | 0.22 | 0.83 | 0.22 | 0.23 | 0.84 | 0.21 | 0.23 | 0.83 |
| Model | OLS | BE | FE | OLS | BE | FE | OLS | BE | FE | OLS | BE | FE |

Note: A detailed description of the variables can be found in table 2. OLS is a pooled OLS regresion model, BE is a "between" effects panel model and FE is a "within" effects panel model. Time and industry dummies are included. The standard errors of the coefficients are corrected for serial correlation on a firm level and for heteroscedasticity using the Huber-White-Sandwich estimator based on White (1980). T-statistics are presented in parentheses. ***, ** and * indicate significance on the 1%-, 5%- and 10%-level respectively.

**Table 10: Market Leverage Robustness Tests**

| | Sample composition effects | | | | Timing effects | | Non-linear effects | | | | Lagged variables | Insider ownership | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dummy IPO | Dummy IPO | IPO 98 - 00 | IPO before/after | 95 - 00 | 01 - 06 | Firm Size^2 | Small firms | Large firms | Winsorizing (2.5%) | 1-year lag | No IO | <10% |
| **Dummy Family Firm** | **-0.058*** ** | | **-0.096*** ** | **-0.067** ** | **-0.083*** ** | **-0.067*** ** | **-0.061*** ** | **-0.059** ** | **-0.067*** ** | **-0.050*** ** | **-0.049** ** | **-0.065** ** | **-0.079*** ** |
| | **(-3.04)** | | **(-2.96)** | **(-2.44)** | **(-3.65)** | **(-2.76)** | **(-3.21)** | **(-2.40)** | **(-2.75)** | **(-2.98)** | **(-2.38)** | **(-2.16)** | **(-2.98)** |
| **Dummy High Tech Firm** | **-0.038** | **-0.043*** | | | | | | | | | | | |
| | **(-1.64)** | **(-1.83)** | | | | | | | | | | | |
| **Firm Size ^ 2** | | | | | | | **-0.00076** | | | | | | |
| | | | | | | | **(-0.73)** | | | | | | |
| Firm Size [Ln] | 0.027*** | 0.029*** | 0.028*** | 0.044*** | 0.036*** | 0.031*** | 0.040** | 0.037*** | 0.031*** | 0.039*** | 0.026*** | 0.039*** | 0.038*** |
| | (5.36) | (5.65) | (2.97) | (6.74) | (6.24) | (5.14) | (2.48) | (6.05) | (3.48) | (8.91) | (5.26) | (6.25) | (6.34) |
| Profitability | -0.000080 | -0.000075 | 0.00052 | -0.56*** | 0.00018 | -0.18*** | -0.000076 | -0.72*** | -0.00015** | -0.27*** | -0.027 | -0.30*** | -0.18*** |
| | (-0.94) | (-0.89) | (0.90) | (-4.98) | (0.58) | (-4.42) | (-0.89) | (-7.51) | (-2.38) | (-6.48) | (-1.49) | (-4.08) | (-3.60) |
| Outside Blockholders | -0.036 | -0.0026 | -0.13** | -0.090** | -0.12*** | -0.025 | -0.035 | -0.021 | -0.034 | -0.023 | -0.033 | -0.037 | -0.037 |
| | (-1.44) | (-0.11) | (-2.26) | (-2.38) | (-3.47) | (-0.74) | (-1.40) | (-0.77) | (-0.92) | (-1.08) | (-1.23) | (-1.10) | (-1.17) |
| Firm Specific Risk | 0.14*** | 0.14*** | 0.092* | 0.27*** | 0.20*** | 0.030 | 0.14*** | 0.29*** | 0.073*** | 0.19*** | 0.11*** | 0.087*** | 0.10*** |
| | (4.61) | (4.45) | (1.86) | (3.78) | (4.79) | (0.64) | (4.65) | (6.38) | (4.10) | (7.37) | (4.29) | (2.94) | (2.98) |
| Firm Age [Ln] | 0.0056 | 0.0086 | 0.0010 | -0.0098 | 0.0075 | 0.0038 | 0.0095 | 0.0085 | 0.028** | 0.010 | 0.0010 | -0.0020 | -0.0023 |
| | (0.72) | (1.12) | (0.081) | (-0.87) | (0.83) | (0.45) | (1.26) | (0.98) | (2.40) | (1.43) | (0.13) | (-0.20) | (-0.24) |
| Tangible Assets Ratio | 0.24*** | 0.23*** | 0.40*** | 0.13* | 0.32*** | 0.13** | 0.24*** | 0.19*** | 0.40*** | 0.23*** | 0.21*** | 0.20*** | 0.20*** |
| | (5.06) | (4.88) | (4.62) | (1.82) | (5.32) | (2.11) | (5.06) | (3.18) | (6.68) | (5.06) | (4.08) | (2.66) | (2.71) |
| Market-to-Book | -0.00042 | -0.00043 | -0.0039** | -0.00058 | -0.0033** | -0.0014** | -0.00041 | -0.00036 | -0.00035 | -0.032*** | -0.00046 | 3.0e-07 | -0.00012 |
| | (-0.94) | (-0.93) | (-2.12) | (-0.45) | (-2.22) | (-1.97) | (-0.90) | (-0.73) | (-0.90) | (-10.4) | (-0.92) | (0.00086) | (-0.28) |
| Dummy Accounting Standard | 0.069*** | 0.073*** | 0.048 | 0.18*** | 0.088*** | 0.082*** | 0.075*** | 0.081*** | 0.079*** | 0.091*** | 0.079*** | 0.076*** | 0.084*** |
| | (3.95) | (4.20) | (1.15) | (3.84) | (3.14) | (2.84) | (4.34) | (3.88) | (3.26) | (6.07) | (4.26) | (3.09) | (3.52) |
| Payout Ratio | -0.027* | -0.030* | 0.040 | -0.029 | -0.044 | 0.018 | -0.026 | 0.0023 | -0.072*** | -0.022 | 0.0031 | -0.034* | -0.028 |
| | (-1.72) | (-1.84) | (0.62) | (-0.58) | (-1.09) | (0.50) | (-1.64) | (0.13) | (-3.19) | (-1.54) | (0.19) | (-1.84) | (-1.49) |
| Median Industry Leverage | 0.55*** | 0.57*** | 0.21 | 1.00** | -0.64 | 0.83* | 0.55*** | 0.40*** | 0.48*** | 0.35*** | 0.057 | 0.079 | 0.15 |
| | (6.71) | (6.83) | (0.45) | (1.98) | (-0.98) | (1.78) | (6.58) | (3.63) | (3.38) | (4.43) | (0.67) | (0.49) | (0.96) |
| Expected Inflation Rate | 0.045*** | 0.049*** | 1.93 | -0.023 | -0.28** | 0.12 | 0.043*** | 0.037** | 0.022 | 0.039*** | 0.00047 | -0.0037 | 0.011 |
| | (3.80) | (4.08) | (1.15) | (-0.078) | (-2.07) | (1.07) | (3.59) | (2.48) | (1.16) | (4.00) | (0.040) | (-0.19) | (0.57) |
| Constant | -0.18* | -0.25** | -3.33* | -0.71 | 1.07 | -0.46 | -0.26** | -0.17 | -0.32** | -0.11 | 0.25** | 0.22 | 0.14 |
| | (-1.65) | (-2.32) | (-1.67) | (-1.30) | (1.54) | (-1.19) | (-2.14) | (-1.35) | (-2.31) | (-1.13) | (2.33) | (1.40) | (0.90) |
| Observations | 3855 | 3855 | 1624 | 2231 | 2428 | 1431 | 3859 | 2248 | 1611 | 3859 | 3303 | 1624 | 1794 |
| Number of clusters | 589 | 589 | 303 | 286 | 528 | 413 | 591 | 299 | 292 | 591 | 541 | 304 | 335 |
| Adj. R-squared | 0.26 | 0.25 | 0.17 | 0.43 | 0.31 | 0.41 | 0.26 | 0.35 | 0.31 | 0.38 | 0.22 | 0.30 | 0.30 |
| Model | OLS | OLS | BE | BE | BE | BE | OLS | OLS | OLS | OLS | OLS | OLS | OLS |

Note: A detailed description of the variables can be found in table 2. OLS is a pooled OLS regresion model, BE is a "between" effects panel model and FE is a "within" effects panel model. Time and industry dummies are included. The standard errors of the coefficients are corrected for serial correlation on a firm level and for heteroscedasticity using the Huber-White-Sandwich estimator based on White (1980). T-statistics are presented in parentheses. ***, ** and * indicate significance on the 1%-, 5%- and 10%-level respectively.

**Table 11: Market Leverage Robustness Tests**

| | Sample composition effects | | | | Timing effects | | Non-linear effects | | | | Lagged variables | Insider ownership | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dummy IPO | Dummy IPO | IPO 98 - 00 | IPO before/after | 95 - 00 | 01 - 06 | Firm Size^2 | Small firms | Large firms | Winsorizing (2.5%) | 1-year lag | No IO | <10% |
| **Founder CEO** | **-0.058**** | | **-0.066**** | **-0.12***** | **-0.080***** | **-0.077**** | **-0.060***** | **-0.081*** | **-0.070***** | **-0.061***** | **-0.043*** | **-0.13**** | **-0.11**** |
| | **(-2.56)** | | **(-2.23)** | **(-2.82)** | **(-3.16)** | **(-2.53)** | **(-2.59)** | **(-1.93)** | **(-2.99)** | **(-2.96)** | **(-1.69)** | **(-2.25)** | **(-2.16)** |
| **Dummy High Tech Firm** | **-0.049**** | **-0.043*** | | | | | | | | | | | |
| | **(-2.08)** | **(-1.83)** | | | | | | | | | | | |
| **Firm Size ^ 2** | | | | | | | **-0.00034** | | | | | | |
| | | | | | | | **(-0.29)** | | | | | | |
| Firm Size [Ln] | 0.026*** | 0.029*** | 0.025** | 0.039*** | 0.035*** | 0.030*** | 0.033* | 0.036*** | 0.028*** | 0.037*** | 0.026*** | 0.038*** | 0.037*** |
| | (4.67) | (5.65) | (2.57) | (5.77) | (5.80) | (4.75) | (1.81) | (5.60) | (3.03) | (8.10) | (4.82) | (5.63) | (5.63) |
| Profitability | -0.00012 | -0.000075 | 0.00048 | -0.71*** | 0.000094 | -0.17*** | -0.00011 | -0.81*** | -0.00021*** | -0.29*** | -0.026 | -0.31*** | -0.19*** |
| | (-1.37) | (-0.89) | (0.80) | (-6.02) | (0.31) | (-4.20) | (-1.35) | (-7.38) | (-3.34) | (-6.79) | (-1.42) | (-3.63) | (-3.41) |
| Outside Blockholders | -0.020 | -0.0026 | -0.072 | -0.090** | -0.079** | -0.017 | -0.016 | -0.0073 | -0.020 | -0.013 | -0.019 | -0.042 | -0.033 |
| | (-0.80) | (-0.11) | (-1.40) | (-2.51) | (-2.50) | (-0.52) | (-0.67) | (-0.29) | (-0.54) | (-0.63) | (-0.74) | (-1.20) | (-1.01) |
| Firm Specific Risk | 0.14*** | 0.14*** | 0.11** | 0.14** | 0.20*** | 0.069* | 0.14*** | 0.29*** | 0.067*** | 0.19*** | 0.11*** | 0.080** | 0.093** |
| | (4.03) | (4.45) | (2.19) | (2.46) | (4.77) | (1.69) | (4.03) | (6.11) | (3.36) | (6.94) | (3.74) | (2.48) | (2.49) |
| Firm Age [Ln] | 0.0042 | 0.0086 | -0.0040 | -0.020* | 0.0050 | 0.012 | 0.0095 | 0.0054 | 0.029** | 0.0086 | 0.0018 | -0.0023 | -0.0020 |
| | (0.52) | (1.12) | (-0.30) | (-1.79) | (0.53) | (1.34) | (1.21) | (0.62) | (2.32) | (1.15) | (0.21) | (-0.22) | (-0.20) |
| Tangible Assets Ratio | 0.22*** | 0.23*** | 0.43*** | 0.15** | 0.34*** | 0.11 | 0.22*** | 0.20*** | 0.38*** | 0.22*** | 0.19*** | 0.18** | 0.18** |
| | (4.55) | (4.88) | (4.90) | (2.06) | (5.61) | (1.64) | (4.58) | (3.29) | (6.30) | (4.65) | (3.63) | (2.26) | (2.37) |
| Market-to-Book | -0.00035 | -0.00043 | -0.0036** | -0.00054 | -0.0033** | -0.00090 | -0.00033 | -0.00038 | -0.00021 | -0.032*** | -0.00038 | 0.00011 | -0.000028 |
| | (-0.75) | (-0.93) | (-2.01) | (-0.41) | (-2.21) | (-1.15) | (-0.69) | (-0.65) | (-0.53) | (-9.62) | (-0.72) | (0.34) | (-0.064) |
| Dummy Accounting Standard | 0.064*** | 0.073*** | 0.027 | 0.15*** | 0.076*** | 0.10*** | 0.072*** | 0.078*** | 0.077*** | 0.088*** | 0.080*** | 0.076*** | 0.082*** |
| | (3.42) | (4.20) | (0.63) | (3.31) | (2.67) | (3.38) | (3.90) | (3.70) | (3.08) | (5.58) | (4.04) | (2.96) | (3.33) |
| Payout Ratio | -0.026 | -0.030* | 0.081 | -0.088* | -0.042 | 0.0098 | -0.024 | 0.0035 | -0.083*** | -0.021 | 0.0024 | -0.030 | -0.021 |
| | (-1.50) | (-1.84) | (1.27) | (-1.70) | (-1.05) | (0.25) | (-1.39) | (0.19) | (-3.43) | (-1.39) | (0.14) | (-1.54) | (-1.10) |
| Median Industry Leverage | 0.57*** | 0.57*** | 0.26 | 0.88* | -0.30 | 0.60 | 0.57*** | 0.40*** | 0.44*** | 0.33*** | 0.084 | 0.065 | 0.14 |
| | (6.77) | (6.83) | (0.53) | (1.82) | (-0.48) | (1.24) | (6.59) | (3.51) | (3.03) | (4.08) | (0.94) | (0.37) | (0.87) |
| Expected Inflation Rate | 0.047*** | 0.049*** | 0.90 | 0.026 | -0.18 | 0 | 0.043*** | 0.032** | 0.019 | 0.038*** | -0.0012 | 0.0020 | 0.015 |
| | (3.72) | (4.08) | (1.23) | (0.25) | (-1.38) | () | (3.41) | (2.14) | (0.95) | (3.61) | (-0.093) | (0.10) | (0.79) |
| Constant | -0.18 | -0.25** | -2.15 | -0.48 | 0.67 | -0.32 | -0.25* | -0.13 | -0.28** | -0.072 | 0.23** | 0.24 | 0.15 |
| | (-1.58) | (-2.32) | (-1.24) | (-1.06) | (1.01) | (-0.72) | (-1.92) | (-1.02) | (-2.02) | (-0.73) | (2.10) | (1.41) | (0.87) |
| Observations | 3543 | 3855 | 1487 | 2056 | 2263 | 1284 | 3547 | 2122 | 1425 | 3547 | 3027 | 1491 | 1652 |
| Number of clusters | 569 | 569 | 294 | 275 | 513 | 379 | 571 | 289 | 282 | 571 | 518 | 288 | 317 |
| Adj. R-squared | 0.26 | 0.25 | 0.16 | 0.44 | 0.31 | 0.41 | 0.26 | 0.36 | 0.33 | 0.38 | 0.23 | 0.31 | 0.29 |
| Model | OLS | OLS | BE | BE | BE | BE | OLS | OLS | OLS | OLS | OLS | OLS | OLS |

Note: A detailed description of the variables can be found in table 2. OLS is a pooled OLS regresion model, BE is a "between" effects panel model and FE is a "within" effects panel model. Time and industry dummies are included. The standard errors of the coefficients are corrected for serial correlation on a firm level and for heteroscedasticity using the Huber-White-Sandwich estimator based on White (1980). T-statistics are presented in parentheses. ***, ** and * indicate significance on the 1%-, 5%- and 10%-level respectively.