Ownership Structure and Corporate Decisions: Capital Structure, M&A Activity, and Acquisition Financing

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Für Antje

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List of Abbreviations

ACWI	All Country World Index
Adj.	Adjusted
AG	Aktiengesellschaft
BV	Book Value
Capex	Capital expenditures
EBITDA	Earnings before Interests, Taxes, Depreciation and Amortization
EU	European Union
IPO	Initial Public Offering
KGaA	Kommanditgesellschaft auf Aktien
Log	Logarithm
M&A	Mergers & Acquisitions
Max	Maximum
Min	Minimum
MSCI	Morgan Stanley Capital International
MV	Market Value
OLS	Ordinary Least Squares
PLC	Public Limited Company
PP&E	Property, Plant and Equipment
ROA	Return on Assets
SD	Standard Deviation
SEO	Seasoned Equity Offering
SEW	Socioemotional Wealth
SIC	Standard Industrial Classification
SMEs	Small and Medium-sized Enterprises
U.S.	United Staates of America
UK	United Kingdom

1   Introduction

1.1   Motivation and Research Question

The traditional view of Berle and Means (1932) on ownership structure considers listed firms to be widely held, meaning that ownership is dispersed among many small shareholders that do not monitor management. Accordingly, firms are assumed to be controlled by managers which are "unaccountable to shareholders" (La Porta, Lopez-De-Silanes, and Shleifer, 1999, p. 1) as they may pursue their own goals when not being monitored (Jensen and Meckling, 1976). This image of how corporations are controlled has later been questioned by many empirical studies that find ownership to be highly concentrated in firms around the world (La Porta, Lopez-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Faccio and Lang, 2002; Aminadav and Papaioannou, 2020). For instance, La Porta, Lopez-De-Silanes, and Shleifer (1999) analyze the ownership structure of large firms in 27 wealthy economies to show that only 24% of their sample firms are widely held. Claessens, Djankov and Lang (2000) focus on firms from East Asian countries and produce comparable results as most firms are controlled by one single shareholder. Similar findings are reported by Faccio and Lang (2002) for Western European countries. Aminadav and Papaioannou (2020) reaffirm the previous results by using a large-scale sample of 42,720 listed firms from 127 countries over 2004 to 2012 and further provide evidence that ownership is more concentrated in civil law countries such as France and Germany in comparison to common law countries like the U.S. Overall, these research findings suggest that large shareholders are important actors in corporate governance since ownership seems to be highly concentrated in most countries.

This concentration of ownership has recently been observed to increase around the world. The results of the MSCI (2022) research report visualized in Figure 1 show that in 2022 almost 46% of all firms within the MSCI ACWI Index were controlled by a single entity holding more than 30% of the voting rights, while the portion was only 32% in 2015, which corresponds to an increase of 44%. The number of principal firms, where the largest shareholder holds between 10%

and 30% of voting rights, has increased from 27% in 2015 to 31% in 2022. Additionally, the portion of widely held firms, i.e., firms where no shareholder or shareholder group holds more than 10% of the voting rights, has dropped from 41% in 2015 to 23% in 2022. When considering the market capitalization share, a similar development can be observed. While controlled firms accounted for 26% of the total MSCI ACWI market capitalization in 2015, the share has increased to 35% in 2022. Altogether, the numbers emphasize the current trend towards a higher concentration of voting rights in corporations.

Figure 1: Ownership Structure of MSCI ACWI Constituents.

This figure visualizes the ownership structure of firms within the MSCI ACWI Index by number of firms and by market capitalization. The firms are categorized within three groups of ownership, i.e., controlled firms, principal firms and widely held firms. Adapted from MSCI (2022).
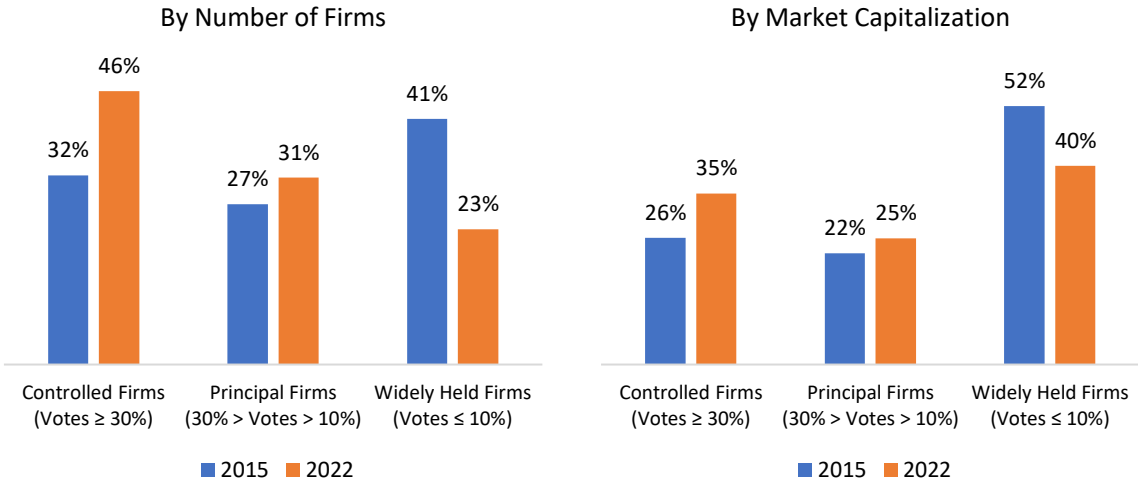
This trend of an increasing concentration of voting rights may be further boosted by the proposed Listing Act of the European Commission (European Commission, 2022). At the end of 2022, they published a proposal with several measures to improve the attractiveness of the European Capital Markets Union and to facilitate access to market-based financing for small and medium-sized companies (SMEs). One key measure of the Listing Act is the reintroduction of multiple-vote shares which will enforce a high concentration of voting rights in the respective firms and thus expand the power of controlling shareholders in strategic corporate decisions to pursue their own objectives.

While the objectives and factors considered by large shareholders may be diverse, their decision-making process is primarily characterized by trading off risk-reduction and control motives. On the one hand, research has found that controlling shareholders concentrate a substantial fraction of their wealth in one single firm (Demsetz and Lehn, 1985; Dyck and Zingales, 2004; Holmen, Knopf, and Peterson, 2007; Bodnaruk et al., 2008), which results in a low degree of diversification and thus high firm-specific risk (Ødegaard, 2009). Accordingly, several studies provide evidence for an overly risk-averse behavior of controlling shareholders (e.g., Shleifer and Vishny, 1986; Admati, Pfleiderer, and Zechner, 1994; Zhang, 1998; Bodnaruk et al., 2008; Faccio, Marchica, and Mura, 2011). On the other hand, several authors have emphasized the importance of large shareholders to maintain control over the firm. For instance, Fama and Jensen (1983b) as well as Shleifer and Vishny (1997) suggest that firms controlled by families may forgo profitable investment opportunities in favor of maintaining control. Similarly, Schmid (2013) argues that controlling shareholders are motivated to take advantage of the non-diluting effect of debt to inflate their control stake and to prevent hostile takeovers. Consistently, Faccio and Masulis (2005) show that large shareholders are less likely to pay for acquisitions by stock to prevent the loss of control over the firm. Overall, these research findings highlight that in some situations risk-reduction motives dominate, while in others control considerations appear to overweight for large shareholders.

As the general trend towards higher concentration of voting rights described within the research report of MSCI (2022) will alter corporate governance structures of firms by making large shareholders more powerful, which may be further amplified through the proposed regulation of the European Commission, it is of upmost importance to better understand large shareholder's motives and considerations by assessing how they behave in specific situations. Therefore, the overarching research question of this dissertation can be formulated as follows:

How does the largest shareholder's voting stake affect corporate decisions?

To approach this overarching question, the dissertation is divided into three independent studies of which each focuses on one specific and important corporate decision to investigate in detail how it is affected by the level of voting rights held by the largest shareholder:

- *Study 1: Capital Structure*

- *Study 2: M&A Activity*

- *Study 3: Acquisition Financing*

By focusing on these corporate finance decisions to approach the overarching question, this dissertation contributes to research in various respects. First, our findings provide new evidence on decision making of large shareholders to better understand how they behave in specific situations. This should not only be insightful for researchers but also for practitioners, for instance when advising corporate clients on financing and growth strategies. Second, results show that a high level of concentration of voting rights leads to lower leverage and M&A activity and increases the aversion of large shareholders to use equity financing for acquisitions. This emphasizes the potential negative consequences a further increase in ownership concentration, which is documented in the MSCI (2022) research report, may have on corporate growth and thus economic development. Third, our results have some important policy implications as they provide valuable insights on the potential side effects of the European Commission's proposal to reintroduce multiple-vote shares, which will result in a further increase in concentration of voting rights. As an increase in concentration of voting rights has the potential to limit corporate growth, our findings provide a solid basis for policymakers to carefully evaluate potential indirect effects of the current proposal of the European Commission.

1.2   Dissertation Structure

The dissertation covers three individual studies each dealing with one of the research questions raised in the previous subsection. To give an overview, Table 1.1 illustrates the structure of

the dissertation and Table 1.2 provides a summary of the respective studies, which will both be outlined in the following.

Chapter 2 covers the first study "*Voting Stake of the Largest Shareholder, Ownership Concentration and Leverage*" published in the Journal of Risk Finance, in which we investigate the impact of the largest shareholder's voting stake on leverage. The question how ownership concentration affects capital structure remains controversial as prior research on this topic provides mixed results (e.g., Céspedes, González, and Molina, 2010; De la Bruslerie and Latrous, 2012; Santos, Moreira, and Vieira, 2014; Lo et al. 2016; Amin and Liu, 2020). We suspect that the mixed results stem from heterogenous institutional backgrounds (Bancel and Mittoo, 2004; Cheng and Shiu, 2007; Alves and Ferreira, 2011) and, more importantly, from the respective measure of ownership concentration used. Existing research has primarily used some sort of aggregated ownership of the largest shareholders to proxy for ownership concentration (e.g., Brailsford, Oliver, and Pua, 2002; Céspedes, González, and Molina, 2010; Amin and Liu, 2020), even though the largest shareholder appears most powerful to influence capital structure decisions. Therefore, we differentiate by focusing on the largest shareholder's voting stake. Additionally, we consider the identity of large shareholder and investigate the moderating effect of family control on the association between ownership concentration and leverage. This is particularly important because families are among the most prevalent types of controlling shareholders around the world (La Porta, López-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Faccio and Lang, 2002). To approach these research questions, we gather a large sample of 814 German exchange-listed firms over the period from 1995-2014 and run several regression analyses. Furthermore, we acknowledge that ownership structure may not be exogenous (Demsetz, 1983) and hence undertake several tests to attenuate endogeneity concerns. We assess how a decrease in the voting stake of the largest shareholder of at least 5% affects leverage in the following year. Moreover, we use a difference-in-difference specification to explore whether widely held firms set their leverage differently than controlled firms during the unexpected and exogenous liquidity shock of the euro

crisis in 2010-2011. With that, we aim to alleviate reverse causality concerns und provide more confidence on a causal effect of ownership concentration on leverage.

Chapter 3 comprises the second study titled "*Corporate Control and M&A Activity – The Role of the Largest Shareholder's Voting Stake*", which deals with the question whether higher concentration of voting rights reduces acquisition activity. Even though several studies have questioned how family control, a particular type of ownership concentration, affects M&A activity (e.g., Miller, Le Breton-Miller, and Lester, 2010; Gomez-Mejia, Patel, and Zellweger, 2018; Diéguez-Soto, Lopez-Delgado, and Marino-Garrido, 2021), much less is known about ownership concentration in general. An attempt to shed some light on the association between ownership concentration and M&A likelihood has been made by Caprio, Croci, and Del Giudice (2011), who focus on a sample of very large firms in a multi-country setting due to limited data availability. As M&A activity is highly influenced by firm size (Basu, Dastidar, and Chawla, 2008; Gorton, Kahl, and Rosen, 2009), we complement this line of research by covering a larger variety of firms with respect to size. We overcome the existing issue of data availability by taking advantage of the Hoppenstedt Aktienführer, which provides detailed information on the ownership structure of many German exchange-listed firms. Accordingly, we combine this ownership data with financial and M&A data to model the acquisition likelihood of our sample firms and assess whether it is affected by the concentration of voting rights. Further, we investigate if family-controlled firms show a different acquisition behavior than non-family-controlled firms, since family firms are the most prevalent type of corporations in Germany and hence significantly contribute to the national economic development (Faccio and Lang, 2002).

Chapter 4 contains the third study on "*Ownership Concentration and the Aversion to Dilution – Evidence from Acquisition Financing*". This study raises the question of how important maintaining control is for large shareholders in financing decisions and thus investigates whether the level of voting rights affects the likelihood to finance an acquisition with equity. Existing research has primarily focused on M&A payment method to proxy for acquisition financing and found a

negative association between the likelihood to pay for an acquisition by stock and ownership concentration, i.e., managerial ownership (Amihud, Lev, and Travlos, 1990; Martin, 1996; Ghosh and Ruland, 1998; Yook, Gangopadhyay, and McCabe, 1999), family ownership (André and Ben-Amar, 2009; Bouzgarrou and Navatte, 2014; Teti, Dallocchio, and Currao, 2022), and ownership concentration in general (Faccio and Masulis, 2005). Accordingly, these studies suggest that control consideration appear to dominate the payment choice in acquisitions, and they assume that the same is true for the actual source of acquisition financing for which they proxy. However, the importance to differentiate between method of payment and source of financing has been highlighted by several authors (Bharadwaj and Shivdasani, 2003; Martynova and Renneboog, 2009; Vladimirov, 2015; Fischer, 2017). For instance, Martynova and Renneboog (2009) show that in their sample 33.7% of the acquisitions are equity-financed, while only 18.1% are stock-paid. Consequently, studies using method of payment as a proxy may be inaccurate since they underestimate the actual use of equity financing and thus may attest a potential aversion towards equity capital that may not be existent. Therefore, this study contributes to research by explicitly focusing on the actual source of financing to examine the relevance of the largest shareholder's voting stake. To gather information on source of financing and to overcome the limited data availability that caused prior researchers to use method of payment as a proxy, we follow the approach of some existing studies to take advantage of the acquirer's accounting data and analyze acquisition-induced changes in their equity position (Schlingemann, 2004; Harford, Klasa, and Walcott, 2009; Elsas, Flannery, and Garfinkel, 2014). This procedure allows us to accurately detect any potential aversion of large shareholders towards equity financing by using a logit regression that models the likelihood of equity financing for a sample of 400 German publicly listed firms with 1,490 acquisition-years over the period from 1995 to 2014. Further, we execute several additional analyses to understand the acquisition financing decision of large shareholders in more detail. First, we investigate whether large shareholders accept dilution in equity-financed acquisitions or whether they provide new equity capital themselves to maintain their control stake. For this, we evaluate changes in voting rights held by the largest shareholder occurring through an equity-

financed acquisition. Second, we study whether high interest rates have the potential to attenuate the aversion of large shareholders towards equity financing, which may be particularly relevant as the interest rate has been increased significantly in 2022 within the European Union. Finally, we explore whether family firms differ in their aversion towards equity financing in acquisitions, as previous research has pointed out that family firms may be particularly concerned about losing control (Anderson and Reeb, 2003; Croci, Doukas, and Gonec, 2011).

In Chapter 5, the key findings of the dissertation are summarized, and the contributions as well as the implications are highlighted. Moreover, potential limitations of the studies are discussed, and an outlook for future research is given.

Table 1.1: Structure of the dissertation

1. Introduction
  -   Motivation and related literature
  -   Research questions
  -   Structure of dissertation

2. Study 1: Voting Stake of the Largest Shareholder, Ownership Concentration and Leverage
  -   How does the largest shareholder's voting stake affect leverage of firms?
  -   Do family firms behave differently in their capital structure decision?

3. Study 2: Corporate Control and M&A Activity – The Role of Ownership Concentration
  -   Does the level of ownership concentration influence acquisition activity?
  -   How important are risk-reduction and monitoring incentives of large shareholders?

4. Study 3: Ownership Concentration and the Aversion to Dilution – Evidence from Acquisition Financing
  -   Do large shareholders avoid equity financing in acquisitions to prevent dilution?
  -   Is the aversion towards equity attenuated in times of high interest rates?
  -   Do large shareholders dilute when they finance acquisitions with equity or do they provide additional equity capital to maintain their control stake?

5. Conclusion
  -   Key results
  -   Contributions to literature and practice
  -   Limitations and outlook

Table 1.2: Summary of studies

	Study 1	Study 2	Study 3
Title	Voting Stake of the Largest Shareholder, Ownership Concentration and Leverage	Corporate Control and M&A Activity – The Role of Ownership Concentration	Ownership Concentration and the Aversion to Dilution – Evidence from Acquisition Financing
Research Question	How does the largest shareholder's voting stake affect the leverage of firms?	Does the level of ownership concentration influence acquisition activity?	Do large shareholders avoid equity financing in acquisitions to prevent dilution?
Methodology	Empirical study using multiple and difference-in-difference regression (incl. entropy balancing) to assess the effect of ownership concentration on leverage	Empirical study using logit regressions to model acquisition likelihood	Empirical study using logit regressions to model the likelihood to finance an acquisition with equity
Data	Ownership and financial data of German firms: 7,731 firm-year observations, covering 814 firms	Ownership, financial, and M&A data of German firms: 7,731 firm-year observations, covering 814 firms and 1,490 acquisitions	Ownership, financial, and M&A data of German firms: 1,490 acquisitions
Contribution	Points out that the voting stake of the largest shareholder as well as their identity are important determinants of capital structure	Emphasizes that high levels of ownership concentration result in lower acquisition activity and thus have the potential to limit corporate growth	Shows the aversion of large shareholders towards equity financing in acquisitions by replacing the inaccurate proxy of M&A payment method previously used in research through actual acquisition financing
Status	Published in Journal of Risk Finance	Not yet submitted to a scientific Journal (Working Paper)	Not yet submitted to a scientific Journal (Working Paper)

2   Study 1: Voting Stake of the Largest Shareholder, Ownership Concentration and Leverage[1]

Abstract

This study aims to investigate the impact of the largest shareholder's voting stake on the firm's capital structure decision. To empirically analyze the influence of the voting stake on leverage, a large sample of 814 exchange-listed firms is applied. The baseline regression analysis is complemented by several robustness tests and a difference-in-difference regression analysis to mitigate endogeneity concerns. We find a negative relationship between the voting stake of the largest shareholder and leverage, consistent with the notion that large undiversified shareholders have the incentive to reduce risk. Additionally, results reveal that family control has a positive moderating effect, indicating that the negative relationship is less pronounced for family-controlled firms. We contribute to the research by suggesting ownership concentration as another determinant of capital structure. Further, we add to the literature by showing how the association between ownership concentration and leverage is moderated by family control and that the identity of the largest shareholder is of great importance. The study provides important insights to the current debate on the proposal of the European Commission to reintroduce shares with multiple votes as part of the Listing Act. We expect the regulation to exacerbate the concentration of voting rights, which results in lower leverage and thus limits corporate growth. We differentiate from previous studies by focusing the largest shareholders' voting stake, instead of using the ownership stake, to assess the impact of ownership concentration on leverage.

2.1 Introduction

In December 2022, the European Commission released a proposal for a directive aimed at enhancing the appeal of the European Capital Market Union and easing access to market-based financing for small and medium-sized enterprises (European Commission, 2022). This proposed regulation encompasses the reintroduction of multiple-vote shares, a practice that has not been permitted in many European countries for decades. If enacted, the possibility for controlling shareholders to employ multiple-vote shares could result in a significant concentration of voting rights within these firms and thereby boosting the influence of controlling shareholder in critical corporate decisions, including those related to capital structure. Recognizing the potential indirect consequences inherent in such a regulatory shift, we investigate the impact of the largest shareholder's voting stake on leverage using a large sample of 814 German exchange-listed firms over the period from 1995 to 2014.

Since Modigliani and Miller (1958) have argued that under certain strict assumptions capital structure holds no significance for a firm's value, a large body of literature has emerged to demonstrate that capital structure indeed plays a crucial role in the presence of market frictions like taxes, bankruptcy costs and asymmetric information (e.g., Kraus and Litzenberger, 1973; Jensen and Meckling, 1976; Myers, 1984; Harris and Raviv, 1991). One notable source of information asymmetry stems from the separation of ownership and control, leading to conflicts of interest between managers and shareholders (Berle and Means, 1932; Jensen and Meckling, 1976). For instance, in widely held firms, managers enjoy an information advantage, because for small shareholders it is unfeasible to amass the necessary information for effective management oversight. Conversely, in firms characterized by a high level of ownership concentration, these agency conflicts are mitigated, as the largest shareholders possess both the incentives and the power to monitor and discipline management (Grossman and Hart, 1980; Shleifer and Vishny, 1986; Friend and Lang, 1988). As a result, the level of information asymmetry appears to vary depending on the firm's ownership structure, potentially influencing its capital structure. Nevertheless, the precise

manner in which ownership concentration impacts capital structure remains unclear, as previous studies only provide inconsistent results (e.g., Céspedes, González, and Molina, 2010; De la Bruslerie and Latrous, 2012; Lean, Ting, and Kweh 2015; Lo et al., 2016; Amin and Liu, 2020). Amin and Liu (2020) conducted a study on a sample of Singaporean firms, revealing a negative association between the aggregated voting stake of the largest ten shareholders and leverage. For Malaysian firms, Lean, Ting, and Kweh (2015) found a negative relationship when examining the largest five shareholders, while De la Bruslerie and Latrous (2012) analyzed 112 French firms over the period 1998-2009 and reported a negative but insignificant association between the largest shareholder's ownership stake and leverage. Meanwhile, Céspedes, González, and Molina (2010) focus on Latin American countries, employing the Herfindahl index to measure ownership concentration and find an inverted U-shaped relationship. Similarly, Lo et al. (2016) conduct a study using Taiwanese firms by examining the percentage of directors controlled by the owner, which also uncovers a non-linear inverted U-shaped relationship.

These conflicting outcomes in prior empirical studies may be partially attributed to heterogenous country characteristics, as research has shown that country-specific institutional backgrounds significantly affect firms' financing decisions (Bancel and Mittoo, 2004; Cheng and Shiu, 2007; Alves and Ferreira, 2011). More importantly, though, the mixed results highlight the complexity of ownership and suggest that the relation between ownership concentration and leverage likely hinges on the specific ownership measure applied. While the largest shareholder, holding the majority of voting rights, appears most influential in shaping capital structure decisions, previous studies have primarily used ownership instead of voting stake or some form of aggregated ownership of the largest shareholders as a proxy for ownership concentration (e.g., Brailsford, Oliver, and Pua, 2002; Céspedes, González, and Molina, 2010, Paramanantham, Ting, and Kweh, 2018; Amin and Liu, 2020). Our approach differentiates by focusing on the voting stake of the largest shareholder, who wields the most influence in corporate decisions. This allows us to provide a more comprehensive understanding of firms' financing choices and to evaluate the

potential indirect impact of the proposed reintroduction of multiple-vote shares within the European Union on capital structure.

Moreover, given that families represent one of the most prevalent types of controlling shareholders globally (La Porta, López-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Faccio and Lang, 2002) and possess several unique characteristics and considerations, we expect that there is a specific effect on leverage. To assess whether the family-identity of the largest shareholder impacts leverage, we adapt an approach akin to that of Hooy, Hooy, and Chee (2020), who explore the interplay between owner identity and control mechanism on firm performance. So far, only few studies consider the identity of controlling shareholders and investigate how family control may moderate the relationship between concentration of voting rights and leverage. While Lo et al. (2016) and Amin and Liu (2020) find that family control negatively moderates this positive relation for Taiwanese and Singaporean firms, respectively, Lean, Ting, and Kweh (2015) have identified a positive moderating effect for firms in Malaysia. These disparate findings could stem from distinct country-specific institutional backgrounds that influence the decision-making process of families. Since these studies have primarily focused on Asian countries, which feature different institutional environments compared to European counterparts, we seek to fill this research gap by examining the moderating effect of family control within Germany. Our approach further distinguishes by focusing on the largest shareholder's voting stake, rather than relying on the aggregated ownership of the largest shareholders used in previous studies.

The institutional background of Germany as the largest European economy is characterized by firms which rely more on bank financing than firms in countries with market-based systems (Vitols, 2005). In bank-based systems like Germany, market-based financing is not consistently accessible, especially for smaller firms. This limitation can significantly restrict the financing options available, potentially resulting in a heightened reliance on debt rather than equity financing. Consequently, the financial system can exert a notable influence on the firms' capital structure decisions. Additionally, the average exchange-listed German corporation shows high

concentration of ownership while it is dispersed in market-based countries like the U.S. or the UK (La Porta, López-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Faccio and Lang, 2002). This concentration of ownership may lead to a preference of debt as it allows owners to maintain control over the firm (De La Bruslerie and Latrous, 2012). Finally, most listed firms in Germany have been public for many decades and are controlled by families with sticky ownership structures (La Porta, López-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Faccio and Lang, 2002). These characteristics distinguish Germany from other developed countries and thus yield an ideal setting to examine the influence of both the voting stake and the family identity of the largest shareholder on leverage decisions.

To address the concern that ownership structure may not be exogenous and that the results stem from reverse causality (Demsetz, 1983), we investigate the impact of a decrease in the voting stake of the largest shareholder of at least 5% on leverage in the subsequent year. Additionally, we take advantage of the unexpected and exogenous liquidity shock that occurred during the euro crisis 2010-2011 to investigate the effect of ownership concentration on leverage in a difference-in-difference specification. These complementary empirical strategies are designed to alleviate concerns related to reverse causality and to provide more confidence in establishing a causal relationship between ownership concentration on leverage.

This study makes several significant contributions to existing literature. First, previous studies have identified numerous determinants that exert a significant influence on capital structure, including factors such as taxes (e.g., MacKie-Mason, 1990; Graham, 1996; Heider and Ljungqvist, 2015), cost of financial distress (e.g., Andrade and Kaplan, 1998; Davydenko, Strebulaev and Zhao, 2012), profitability (e.g., Titman and Wessels, 1988; Rajan and Zingales, 1995; Shyam-Sunder and Myers, 1999; Frank and Goyal, 2009) and firm size (e.g., Titman and Wessels, 1988; Rajan and Zingales, 1995; Fama and French, 2002). In advancing this line of research, our study provides compelling evidence demonstrating that the voting stake of the largest

shareholder negatively affects leverage. This finding emphasizes the strategic inclination of controlling shareholders to reduce corporate risk.

Second, there is a large stream of literature examining the effect of ownership on capital structure. This literature encompasses examinations of managerial ownership (Kim and Sorensen, 1986; Friend and Lang, 1988; Jensen, Solberg, and Zorn, 1992; Mehran, 1992), pyramid ownership structures (e.g., Faccio and Lang, 2002; Bianco and Nicodano, 2006; Manos, Murinde, and Green, 2007; Ellul, 2008; King and Santor, 2008; Paligorova and Xu, 2012) and control-ownership divergences through dual-class shares (e.g., Hagelin, Holmén, and Pramborg, 2006; Dey, Wang, and Nikolaev, 2009; Boubaker, Nguyen, and Routabi, 2016). Additionally, there is a vast number of studies analyzing the effect of family ownership on leverage, with some reporting a positive relationship (e.g., Ellul, 2008; King and Santor, 2008; Setia-Atmaja, 2010; Croci, Doukas, and Gonenc, 2011; Gottardo and Moisello, 2014; Baek, Cho, and Fazio, 2016), while others find a negative association (e.g., Mishra and McConaughy, 1999; Anderson, Mansi, and Reeb, 2003; Margaritis and Psillaki, 2010; Gama and Galvão, 2012; Ampenberger et al., 2013; Schmid, 2013). We add to this literature by revealing that the negative link between the voting stake of the largest shareholder and leverage is positively moderated by family control. This substantiates the contention that family-driven motives, such as maintaining control over the firm, prompt firms to choose relatively higher levels of leverage. This insight underscores the significance of the largest shareholder's identity in capital structure decisions and advocates for its consideration in future research in this field.

Third, the study carries substantial policy implications and offers valuable insights to evaluate the current proposal by the European Commission to reintroduce multiple-vote shares. As the reintroduction of shares with multiple votes is poised to increase the concentration of voting rights, we provide empirical evidence illustrating how this could impact the leverage decision of European firms. Our results suggest that an increase in concentration of voting rights triggered by the EU regulation is likely to result in a significant reduction in firm leverage. This has the

potential to reduce the overall financial risk within the European economy and may also elevate the cost of capital through a greater reliance on costly equity, which could dampen investment activities.

The structure of this study is as follows. Chapter 2.2 reviews relevant literature and outlines our hypotheses. Chapter 2.3 discusses our research design, sample and data characteristics. In chapter 2.4 we present our empirical results, provide robustness tests and address potential endogeneity concerns. Finally, chapter 2.5 concludes our study.

2.2   Literature Review and Hypotheses

2.2.1   Ownership Concentration and Leverage

Various studies on the association between ownership concentration and leverage have produced inconsistent and mixed results. Brailsford, Oliver, and Pua (2002) show for a small sample of 49 Australian publicly listed firms that aggregated equity ownership of the largest five shareholders is positively associated with leverage. Similarly, Kharabsheh, Suwaidan, and Elfaitouri (2019) compile a sample of 60 Jordanian firms for the period of 2010 to 2015 and reveal a positive relationship between controlling shareholders aggregated ownership and leverage, considering all shareholders that hold more than 10% of equity. Feng, Hassan, and Elamer (2020) adopt a different approach, focusing on the ownership stake of the largest shareholder, rather than multiple large shareholders and discover a positive association within a sample of listed Chinese real estate firms. Conversely, Wang, Manry, and Rosa (2019) find a negative association between the largest shareholder's ownership stake and leverage in their study of Chinese listed firms. Amin and Liu (2020) examine the association for 316 Singaporean firms from 2008 to 2016 and find a negative association between the aggregated voting stake of the largest ten shareholders and leverage. Consistent results are found by Céspedes, González, and Molina (2010), Santos, Moreira, and Vieira (2014) and Lean, Ting, and Kweh (2015), for Latin American, Western European and Malaysian firms, respectively. De la Bruslerie and Latrous (2012) analyze 112 French

firms over the period 1998 to 2009 and find a negative but insignificant association between the largest shareholder's ownership stake and leverage. When they restrict the sample to controlling majority shareholders (equity stake above 40%), they reveal a significant negative association. They further examine a non-linear relationship and find an inverted U-shaped association for their sample. This inverted U-shaped relationship is further corroborated by Céspedes, Gonzáles, and Molina (2010) for Latin American firms, by the results of Liu, Tian, and Wang (2011) for Chinese firms and by Lo et al. (2016) for firms from Taiwan. Further, Paramanantham, Ting, and Kweh (2018) focus on debt structure to show that the ownership of the largest five shareholders negatively affects both long-term debt and total debt ratios using a sample of publicly listed firms from Malaysia.

The relation between ownership concentration and leverage is not only empirically inconsistent as described above, but also theoretically ambiguous. So far, there is no comprehensive, self-contained capital structure theory, but rather several theoretical approaches aiming to explain how firms chose their capital structure. In the following paragraphs, we discuss these theories and outline which relation between ownership concentration and leverage they predict to develop our hypothesis.

De La Bruslerie and Latrous (2012) as well as Schmid (2013) argue that controlling shareholders are motivated to maintain control over the firm and therefore take advantage of the non-diluting effect of debt. For instance, if a firm is about to undertake an investment, it can be financed by internal funds, equity, or debt. If no internal funds are available, the largest shareholder can decide to invest more equity into the firm. This, however, leads to a further increase in under-diversification of the largest shareholder and may thus be undesirable. Alternatively, the firm could resort to external equity, but this would dilute the control stake of the largest shareholder. Debt provides a solution to this dilemma, as it allows the firm to finance the investment without requiring more equity from the largest shareholder and without diluting its control stake. Therefore, these entrenchment considerations of the controlling shareholder may lead to a preference

for debt as it provides them with an opportunity to inflate their control stake and to prevent hostile takeovers (Harris and Raviv, 1988; Stulz, 1990; Ellul, 2008). Accordingly, the entrenchment theory suggests that large shareholders may choose a higher level of debt to maintain control, indicating a positive association between ownership concentration and leverage.

Berle and Means (1932) argue that the separation of ownership and control results in conflicts of interests between managers and shareholders. Managers can act in their own interest and extract private benefits if they are not monitored (Jensen and Meckling, 1976; Fama and Jensen, 1983a; Fama and Jensen, 1983b). In widely held firms, small shareholders will not monitor management due to the free-rider problem. Empirical research shows, however, that ownership tends to be concentrated instead of being dispersed (La Porta, Lopez-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang 2000). This ownership concentration is particularly severe in European countries like Germany. Accordingly, higher ownership concentration reduces agency costs related to conflicts of interest between management and shareholders, because it is worthwhile for large shareholders to monitor management (Grossman and Hart, 1980; Shleifer and Vishny, 1986; Friend and Lang, 1988). Thus, the agency theory implies an improvement in firm performance. Consistently, several studies find ownership concentration to be positively associated with firm performance (e.g., Hegde, Seth, and Vishwanatha, 2020; Iwasaki and Mizobata, 2020; Alkurdi et al., 2021). According to the trade-off theory, this enhanced firm performance should result in higher leverage because the likelihood of financial distress is lower and the marginal benefit of the tax shield is higher (Kraus and Litzenberger, 1973). The pecking order theory, however, predicts a lower leverage because more internal funds are available to finance investments without resorting to debt (Myers, 1984; Myers and Majluf, 1984).

On the other hand, the dominance of the largest shareholder gives rise to the principal-principal conflict between the controlling shareholder and minority shareholders. This conflict of interests may result in expropriation of small shareholders in environments with weak investor protection (Young et al., 2008). Accordingly, the increase in profitability and internal funds caused

by the attenuated principal-agency conflict may vanish because of the expropriation by controlling shareholders. Consistently, a meta-study by Wang and Shailer (2015), that reviews existing research in this domain, reveals that ownership concentration is associated with weaker firm performance. As weaker firm performance should leave less internal funds available to fund investments and operating activities, firms with higher levels of ownership concentration should rely more heavily on debt according to the pecking order theory. Additionally, prior research emphasizes that controlling shareholders take advantage of higher debt ratios to gather more financial resources which facilitates tunneling activities (Paligorova and Xu, 2012; Amin and Liu, 2020). Overall, the principal-principal conflict as a component of the agency theory indicates a positive relationship between ownership concentration and leverage.

Furthermore, it has been documented that controlling shareholders hold a substantial fraction of their wealth in one firm (Demsetz and Lehn, 1985; Dyck and Zingales, 2004; Holmen, Knopf, and Peterson, 2007; Bodnaruk et al., 2008). Their under-diversification leads to high firm-specific risk and thus creates substantial costs (Ødegaard, 2009). Therefore, many authors claim that this under-diversification results in an overly risk-averse behavior of the controlling shareholder (e.g., Shleifer and Vishny, 1986; Admati, Pfleiderer, and Zechner, 1994; Zhang, 1998; Bodnaruk et al., 2008; Faccio, Marchica, and Mura, 2011). As leverage is associated with higher risk, the risk aversion theory suggests that higher ownership concentration leads to lower leverage.

Altogether, the theoretical prediction on the relation between largest shareholder's voting stake and leverage is complex and ambiguous. In this study, we attempt to further investigate this association for German firms and hypothesize the following:

Hypothesis 1: *The voting stake of the largest shareholder is negatively associated with leverage.*

2.2.2   Family Control

Most exchange-listed firms in Germany are controlled by families (Faccio and Lang, 2002). Not only in Germany, but also around the world, several studies have identified families as the most prevalent type of controlling shareholders (La Porta, López-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Faccio and Lang, 2002). As family ownership is a particular case of ownership concentration with distinct properties and considerations, it is likely that there is a specific effect on leverage.

On the one hand, control enhancement motives appear to be particularly pronounced in family firms (Kim and Sorensen, 1986; Ellul, 2008; De La Bruslerie and Latrous, 2012). Fama and Jensen (1983b) as well as Shleifer and Vishny (1997) suggest that family firms may forgo profitable investment opportunities in favor of maintaining control over the firm. Also, families have the desire to inherit the firm to subsequent generations and are therefore keen on not to lose control (Becker, 1991; Casson, 1999). Accordingly, family firms are likely to use more debt in comparison to non-family firms due to its non-dilutive and takeover-preventing effect. Additionally, debtholders often consider family firms to be less risky, which may lead to lower cost of debt and thus make debt more attractive for family firms (Barth, Guldbrandsen, and Schonea, 2005; Margaritis and Psillaki, 2010).

On the other hand, various studies have pointed out that family firms are extraordinarily risk-averse (e.g., Ellul, 2008; Hiebl, 2013; Santos, Moreira, and Vieira, 2014). Anderson, Mansi, and Reeb (2003) attribute this risk-aversion primarily to the limited diversification of family wealth, because it is heavily concentrated within a single firm. Moreover, the desire to inherit the firm to subsequent generations intensifies families' aversion to risk in order to avert the threat of bankruptcy (Becker, 1991; Casson, 1999; Anderson, Mansi, and Reeb, 2003; Burkart, Panunzi, and Shleifer, 2003). This deep-rooted multi-generational connection fosters a profound emotional attachment to the firm (Villalonga and Amit, 2006), leading them to prioritize the preservation of their reputation and identity as an integral part of their risk mitigation strategy (Dyer and

Whetten, 2006; Zellweger, Eddleston, and Kellermanns, 2010; Deephouse and Jaskiewicz, 2013; Zellweger et al., 2013). Furthermore, family firms are considered to have a long-term orientation, where excessive debt levels can create financial instability and limit their ability to invest in the long-term sustainability and existence of the firm (Barclay and Holderness, 1989; James, 1999). Given these special features of family firms, one may expect that they prefer lower debt levels.

Overall, existing theories and empirical studies discussed above describe a trade-off between control considerations and risk-aversion in capital structure decisions of family firms. Hence, it is not surprising that empirical results on the relationship between family control and capital structure are also mixed. There are studies reporting a positive association (e.g., Ellul, 2008; King and Santor, 2008; Setia-Atmaja, 2010; Croci, Doukas, and Gonenc, 2011; Gottardo and Moisello, 2014; Baek, Cho, and Fazio, 2016), whereas others find a negative relation (e.g., Mishra and McConaughy, 1999; Anderson, Mansi, and Reeb, 2003; Margaritis and Psillaki, 2010; Gama and Galvão, 2012; Ampenberger et al., 2013; Schmid, 2013). In a comprehensive meta-analysis, Hansen and Block (2021) examine 613 studies and reveal a statistically significant and slightly negative relationship between family firm status and leverage.

While these studies focus on the overall effect of family control on leverage, only a few examine the moderating effect of family control on the association between ownership concentration and leverage. Lo et al. (2016) show for Taiwanese firms that the relation between ownership concentration and leverage is reversed U-shaped, but this association is negatively moderated by a family firm indicator. Recently, Amin and Liu (2020) provided corroborating evidence for Singaporean firms that the positive association between controlling shareholders' ownership stake and leverage is negatively moderated by family ownership. Lean, Ting, and Kweh (2015) find a negative association between ownership concentration and leverage for Malaysian firms and reveal that this relation is positively moderated by family control. As control enhancement considerations appear to be particularly pronounced in German family firms, we hypothesize the following:

Hypothesis 2: *Family control positively moderates the association between the voting stake of the largest shareholder and leverage.*

2.3   Data and Methodology

2.3.1   Data

To obtain large-scale ownership data for German exchange-listed firms from 1995 until 2014, the Hoppenstedt Aktienführer is used. Following Santos, Moreira, and Vieira (2014), we impute several missing values of voting stake to reduce the number of missing observations, if the previous and following entry had the same shareholder and value of voting stake. As shown in Table 2.1, Panel A, the database provides ownership structure data for 2,736 firms of which 1,651 are excluded because they are duplicates, foreign firms, or firms with incomplete ownership data. This yields a sample of 1,085 firms with complete ownership data. Consequently, the ownership data is combined with financial data from Refinitiv's Datastream database. Firms with missing financial data for the relevant dependent and independent variables as well as financial institutions (2-digit SIC code 60-62), which tend to have distinct capital structures due to legal requirements, are excluded. Overall, the final sample is composed of 814 firms with 7,731 firm-year observations.

The number of sample firms by year fluctuates between 249 and 472 firms (see Table 2.1, Panel B), indicating that the panel data is unbalanced. We observe a steady increase in public firms from 1998 until 2001 followed by drop until 2004, which reflects the reactions to the Dotcom bubble. Even though the Hoppenstedt Aktienführer provides data until 2017, we only consider years prior to 2015 because the Federal Constitutional Court declared parts of the privileging of business assets in the inheritance tax law unconstitutional in December 2014 (Bundesverfassungsgericht, 2014). The legislator responded to that decision at the end of 2016 by adapting the law accordingly to assure the privileging of business assets (Bundesfinanzministerium, 2016). As passing the firm to the next generation is of high importance for family firms (Becker, 1991;

Casson, 1999; James, 1999) and this period of uncertainty may have affected ownership decisions, we do not consider years from 2015 until 2017.

The industry distribution of the sample firms appears to be clustered in manufacturing (44%), services (21%) and financial sector (17%), as shown in Table 2.1, Panel C. Accordingly, it is meaningful to control for industry-specific effects in the regression specification. Altogether, these numbers are broadly in line with what Barontini and Caprio (2006) find for publicly listed firms in Germany.

Table 2.1, Panel D analyzes the type of the largest shareholder of the sample firms. In 63% of the cases, the firm is controlled by a family. This is consistent with Faccio and Lang (2002) who show that 65% of their sample firms in Germany are controlled by families. Moreover, corporations appear to be the second most common type of largest shareholders with 9%. This is similar to La Porta, Lopez-de-Silanes, and Shleifer (1999) who find that 10% of their sample firms are controlled by corporations.

Table 2.1, Panel E shows that only 6% of the firms are widely held, while 16% have a controlling minority shareholder and 78% a controlling majority shareholder. Laeven and Levine (2008) find that in 91% of their firm-year observations a controlling shareholder (threshold of 10%) is present, which corresponds to 94% in this sample. Moreover, Faccio and Lang (2002) show that 10% of firms in Germany are widely held using a threshold of 20%. Consequently, the distribution by type of control appears to be largely in line with studies using similar data.

The analysis of the ownership variables reveals that the largest shareholder on average holds 51.7% of votes and 49.3% of equity (see Table 2.1, Panel F). Barontini and Caprio (2006) find that in German publicly listed firms the controlling shareholder on average holds 40.8% of votes and 36.0% of equity. In the sample of Faccio and Lang (2002), a mean voting stake of around 55% and a mean equity stake of 49% is found for German publicly listed firms. Similarly, Santos, Moreira and Vieira (2014) report a mean voting stake of 50% and a median of 49,6% for German

firms. Altogether, these numbers seem consistent with previous research and indicate that ownership is highly concentrated in German exchange-listed firms.

Table 2.1, Panel G provides summary statistics of the relevant financial variables, which have been winsorized at the 1 and 99% level to ensure that outliers do not influence the results. The average firm exhibits a leverage, measured as long-term debt divided by total assets, of 16.0% and a profitability of 8.6%. Heider and Ljungqvist (2015) find an average leverage (measured as long-term debt divided by total assets) of 17.2% and a return on assets (ROA) (measured as operating profit divided by total assets) of 3.4% for U.S. firms, while Barontini and Caprio (2006) find an average ROA of 3.8% for German firms. De La Bruslerie and Latrous (2012) find an average leverage (measured as total debt divided by total assets) of 22.0% and an EBITDA margin of 7.0%. Overall, the summary statistics of this sample appear to be plausible in comparison to other studies.

Table 2.1: Sample selection and descriptive statistics

Definition of variables: long term debt divided by total assets (Leverage); voting stake of largest shareholder (Votes); natural logarithm of total assets (Firm size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); cash holdings divided by total assets (Cash); market divided by book value per share (Market to Book). Panel A describes the sample selection process. Panel B shows the number of firms by year. Panel C reports the industry distribution of the sample firms. Panel D exhibits the firm-years by shareholder type. Panel E presents the percentage of firms that are widely held, controlled by a minority shareholder or by a majority shareholder. Panel F and G provide the summary statistics of the ownership and financial variables (the financial variables are winsorized at the 1% and 99% level).

Panel A: Sample selection				*Panel B*: Firms by year	
	Firms	**Firm-years**		**Year**	**Firms**
Hoppenstedt Output	2,736	23,125		1995	249
- Duplicates, Foreign Firms, Funds, Incomplete Data	-1,651	-8,968		1996	313
= Sample from Hoppenstedt	**1,085**	**14,157**		1997	307
- Missing Financials from Refinitiv/Datastream	-207	-5,622		1998	320
- Exclusion of Financial Institutions (SIC 60-62)	-64	-804		1999	381
= Total Sample	**814**	**7,731**		2000	419
				2001	465
Panel C: Firms by 1-digit SIC-industries				2002	441
Industry	**Firms**	**%**		2003	418
Manufacturing	359	44.1%		2004	396
Construction Industries	17	2.1%		2005	407
Financial, Insurance, and Real Estate	137	16.8%		2006	436
Retail Trade	28	3.4%		2007	472
Service Industries	169	20.8%		2008	446
Transportation, Communications, and Utilities	60	7.4%		2009	426
Wholesale Trade	35	4.3%		2010	411
Others	9	1.1%		2011	392
Total	814	100%		2012	376
				2013	344
Panel D: Firm-years by shareholder type				2014	312
	Firm-years	**%**		Total	7,731
Bank	265	3.4%			
Corporation	675	8.7%			
Family	4,899	63.4%			
Government	564	7.3%			
Institutional	587	7.6%			
Insurance	289	3.7%			
Management	137	1.8%			
Others	315	4.1%			
Total	7,731	100%			

Table 2.1: Sample selection and descriptive statistics (continued)

Panel E: Firm-years by type of control

	Firm-years	%
Widely held (voting stake ≤ 10%)	481	6.3%
Controlling minority shareholder (10% < voting stake ≤ 25%)	1,202	15.5%
Controlling majority shareholder (voting stake > 25%)	6,048	78.2%
Total	7,731	100%

Panel F: Summary statistics of ownership variables

	N	Mean	Median	Lower quartile	Upper quartile	SD	Min	Max
Equity Stake of Largest Shareholder	7,731	49.3%	50.0%	26.0%	69.7%	26.8%	2.1%	100.0%
Voting Stake of Largest Shareholder	7,731	51.7%	51.0%	26.8%	74.6%	28.0%	2.1%	100.0%
Free-float (Equity Stake)	7,731	36.8%	34.5%	18.5%	52.1%	23.9%	0.0%	97.5%
Free-float (Voting Stake)	7,731	34.2%	30.9%	14.2%	50.0%	24.4%	0.0%	97.5%

Panel G: Summary statistics of financials

	N	Mean	Median	Lower quartile	Upper quartile	SD	Min	Max
Leverage (Long Term Debt / Total Assets)	7,731	0.160	0.118	0.039	0.232	0.154	0.000	0.689
Firm Size (Log of Total Assets)	7,731	12.361	12.082	10.859	13.575	2.191	7.978	18.627
Profitability (EBITDA / Total Assets)	7,731	0.086	0.100	0.046	0.149	0.130	-0.517	0.405
Capex (Capital Expenditures / Total Assets)	7,731	0.054	0.037	0.015	0.070	0.059	0.000	0.328
Tangibility (PP&E / Total Assets)	7,731	0.294	0.246	0.113	0.411	0.232	0.000	0.947
Cash Holdings (Cash / Total Assets)	7,731	0.114	0.067	0.024	0.155	0.129	0.000	0.653
Market to Book Ratio (MV Share / BV Share)	7,731	2.151	1.520	0.890	2.550	2.364	-1.270	12.540

2.3.2 Methodology

To explore the association between the concentration of voting rights and leverage, the following baseline regression will be applied (t = time, i = firm, s = shareholder type):

$$Leverage_{i,t} = \beta_0 + \beta_1\, Votes_{i,t} + \beta_2\, CONTROLS_{i,t} + \propto_t + \propto_i + \propto_s + \varepsilon_{i,t}$$

$Leverage_{i,t}$ is defined as the ratio of long-term debt to total assets since it is common in capital structure research (e.g., Moon and Tandon, 2007; Liu, Tian, and Wang, 2011; Heider and Ljungqvist, 2015). Moreover, long-term debt is more stable in comparison to total debt as short-term debt suffers from seasonality and industry specifics.

The main independent variable is $Votes_{i,t}$, which will be measured as the percentage of voting rights held by the largest shareholder. In accordance with prior studies, we look at the ultimate controlling shareholder and cumulate the ownership of shareholders within the same family or if they belong to the same institution (La Porta, López-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Faccio and Lang, 2002; Maury and Pajuste, 2002; Amin and Liu, 2020). Despite the largest shareholder appears to be most powerful to influence capital structure decisions, little is known about its effect on leverage. Only Santos, Moreira, and Vieira (2014) and Liu, Tian, and Wang (2011) use the largest shareholder's ownership stake to examine the impact of ownership concentration on leverage. Therefore, we use this measure to shed further light on the impact the largest shareholder has on leverage.

Moreover, as done in other capital structure studies (e.g., Serfling, 2016; Klasa et al., 2018; Kim, 2020), various firm-level controls will be included that have been identified as determinants of capital structure in prior research: size, tangibility, profitability, capital expenditures, cash holdings and market to book ratio (Titman and Wessels, 1988; Rajan and Zingales, 1995; Frank and Goyal, 2009; Heider and Ljungqvist, 2015). In addition, shareholder type ($\propto_s$), year ($\propto_t$) and firm ($\propto_i$) fixed effects are added to control for unobserved time, firm, and shareholder type specific differences in capital structure. The error term is clustered at the firm level.

To shed further light on the impact of largest shareholder's voting stake on leverage, we analyze the moderating effect of family control, using the following regression function:

$$Leverage_{i,t} = \beta_0 + \beta_1\,Votes_{i,t} + \beta_2\,Family\,Control_{i,t}$$
$$+ \beta_3\,Votes_{i,t}\,x\,Family\,Control_{i,t} + \beta_4\,CONTROLS_{i,t} + \propto_t + \propto_i + \propto_s$$
$$+ \varepsilon_{i,t}$$

To test this moderating effect, we interact a family control dummy ($Family\,Control_{t,i}$) with the voting stake of the largest shareholder ($Votes_{t,i}$). In line with previous research, which argues that considering only the voting stake of the family is sufficient to proxy for family influence, we define the family control dummy ($Family\,Control_{t,i}$) as an indicator variable that equals one if the largest shareholder is a family or an individual that holds at least 10% of the voting rights and zero otherwise (e.g., La Porta, Lopez-de-Silanes, and Shleifer, 1999; Maury, 2006; Ellul, 2008; Caprio, Croci, and Del Giudice, 2011). This approach can additionally be justified by the circumstance that other control mechanisms of families, like advisory board seats, can usually only be obtained by holding a sufficiently high voting stake.

2.4   Results

2.4.1 Ownership Concentration and Leverage

Table 2.2 summarizes the results of the baseline regression. We find that the voting stake of the largest shareholder ($Votes_{t,i}$) is significantly negatively associated with leverage. In terms of magnitude, a one standard deviation increase in voting stake is associated with a 1.1%-point decrease in leverage (0.280 * -0.041 = -0.011). This corresponds to an average leverage of 16.0% within this sample, indicating that the concentration of voting rights is also economically significant. The findings are consistent with the notion that controlling shareholders are exposed to high risk due to their under-diversification and therefore tend to choose a lower leverage (Shleifer and Vishny, 1986; Admati, Pfleiderer, and Zechner, 1994). This negative association is also in line with

the pecking order theory (Myers, 1984; Myers and Majluf, 1984). In cases where large shareholders actively monitor management, firm performance improves, resulting in more internal funds available for investments, ultimately leading to lower leverage. Furthermore, the results align with the agency theory, which posits that debt and monitoring by a large shareholder serve as substitutes (Moon and Tandon, 2007). A single dominant shareholder can effectively exert control and closely monitor management, reducing the necessity for high leverage to mitigate agency conflicts. This dynamic change results in the observed negative association between ownership concentration and leverage. However, the results do not indicate that controlling shareholder take advantage of the non-diluting effect of debt to maintain control over the firm (De La Bruslerie and Latrous, 2012; Schmid, 2013).

Our findings, which reveal a negative association between the largest shareholder's voting rights and leverage, are consistent with prior research conducted by Céspedes, Gonzáles, and Molina (2010) for Latin American firms, Liu, Tian, and Wang (2011) for Chinese publicly listed firms, Santos, Moreira, and Veira (2014) for Western European firms, Lean, Ting, and Kweh (2015) for Malaysian firms and Amin and Liu (2020) for Singaporean firms. These studies primarily examine ownership measures like the aggregate voting stake of the largest shareholders or the largest shareholder's ownership stake. In our study, we specifically consider the voting stake of the single largest shareholder, and our findings align with this previous research, reinforcing the negative association between ownership concentration and leverage. Moreover, our results are in line with Boubaker, Nguyen, and Routabi (2016), who show that the presence of a large controlling shareholder is associated with significantly lower corporate risk-taking. However, our results oppose to the findings of Brailsford, Oliver, and Pua (2002) who identify a positive association for a small sample of Australian publicly listed firms. Additionally, our findings differ from De la Bruslerie and Latrous (2012) and Kharabsheh, Suwaidan, and Elfaitouri (2019), who report an inverted U-shaped relationship for French and Jordanian firms, respectively.

The results are robust to various alternative specifications (model (2) to (4) in Table 2.2) where we vary the fixed effects applied and find similar results. Further, the control variables are largely statistically significant and have the expected signs (Friend and Lang, 1988; Titman and Wessels, 1988): Higher firm size, higher market to book ratio and higher tangibility as collateral lead to higher leverage; Higher profitability and cash holdings allow to finance investments internally, leading to lower leverage; Higher capital expenditures, that proxy for growth, result in a more conservative and thus lower leverage. Additionally, we run our baseline regressions with lagged control variables to mitigate simultaneity bias concerns and find similar results (see Table 7.1 in Appendix).

Table 2.2: Impact of the largest shareholder's voting stake on leverage

This table reports the OLS results of the baseline regression on leverage. Definition of variables: long term debt divided by total assets (Leverage); voting stake of the largest shareholder (Votes); natural logarithm of total assets (Firm size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); cash holdings divided by total assets (Cash); market value per share divided by book value per share (Market to Book). The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Leverage Independent variable	(1)	(2)	(3)	(4)
Votes	-0.041*** (0.008)	-0.035*** (0.006)	-0.034*** (0.008)	-0.041*** (0.007)
Firm Size	0.014** (0.023)	0.003 (0.101)	0.003 (0.120)	0.015*** (0.010)
Profitability	-0.083*** (0.000)	-0.095*** (0.000)	-0.097*** (0.000)	-0.086*** (0.000)
Tangibility	0.236*** (0.000)	0.272*** (0.000)	0.273*** (0.000)	0.235*** (0.000)
Capex	-0.107*** (0.006)	-0.134*** (0.004)	-0.146*** (0.001)	-0.112*** (0.004)
Cash	-0.080*** (0.000)	-0.167*** (0.000)	-0.159*** (0.000)	-0.070*** (0.001)
Market to Book	0.002 (0.128)	0.002* (0.095)	0.002* (0.098)	0.002 (0.122)
Shareholder type fixed effects (α_s)	yes	yes	yes	yes
Year fixed effects (α_t)	yes	yes	yes	yes
Firm fixed effects (α_i)	yes	no	no	yes
Industry fixed effects (α_j)	no	yes	yes	no
Industry-Year fixed effects ($\alpha_{j,t}$)	no	no	yes	yes
N	7,731	7,731	7,731	7,731
Adj. R²	0.650	0.295	0.301	0.652

2.4.2   Family Blockholders

Table 2.3 reports the results of the analysis of the moderating effect of family control on the relation between largest shareholder's voting stake and leverage. The coefficient of the voting stake of the largest shareholder is found to be negative and significant. This finding is consistent with the results reported in Table 2.2 and suggests that large shareholders prefer lower levels of debt to mitigate risk. Moreover, the coefficient of the interaction term ($Votes_{t,i} \times Family\ Control_{t,i}$) is positive and significant in model (2) and (3), indicating that the negative association between the level of voting rights held by the largest shareholder and leverage is less pronounced for family-controlled firms (moderating effect). The result is in accordance with the control enhancement hypothesis of family firms, suggesting that families are inclined to use debt due to its non-dilutive effect (Kim and Sorensen, 1986; Ellul, 2008; De La Bruslerie and Latrous, 2012). By taking advantage of debt capital, they can maintain control over the firm and fulfil the desire to inherit the firm to subsequent generations (Becker, 1991; Casson, 1999). Furthermore, the finding aligns with the perception that debtholders consider family firms as less risky, making them more willing to provide additional debt capital (Barth, Guldbrandsen, and Schonea, 2005; Margaritis and Psillaki, 2010). However, it contradicts to the belief that controlling families are exceedingly risk-averse, as they concentrate a substantial portion of their wealth in a single firm (e.g., Ellul, 2008; Hiebl, 2013; Santos, Moreira, and Vieira, 2014). Overall, the positive moderating effect coincides with the empirical findings of Lean, Ting, and Kweh (2015) for Malaysian firms and contradicts to the studies of Lo et al. (2016) and Amin and Liu (2020) who find a negative moderating effect of family control for Taiwanese and Singaporean firms, respectively, using different measures of ownership.

Table 2.3: The moderating effect of family control

This table reports the OLS regression results for the moderating effect of family control. Definition of variables: long term debt divided by total assets (Leverage); voting stake of the largest shareholder (Votes); indicator variable equal to one if largest shareholder is family or individual and holds at least 10% of voting rights, and zero otherwise (Family Control); natural logarithm of total assets (Firm size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); cash holdings divided by total assets (Cash); market value per share divided by book value per share (Market to Book). The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Leverage Independent variable	(1)	(2)	(3)	(4)
Votes	-0.048** (0.011)	-0.070*** (0.000)	-0.063*** (0.001)	-0.045** (0.015)
Family Control	-0.012 (0.291)	-0.009 (0.507)	-0.007 (0.588)	-0.009 (0.416)
Votes × Family Control	0.013 (0.558)	0.054** (0.023)	0.047** (0.046)	0.008 (0.712)
Firm Size	0.014** (0.023)	0.001 (0.773)	0.001 (0.786)	0.015*** (0.010)
Profitability	-0.081*** (0.000)	-0.093*** (0.000)	-0.094*** (0.000)	-0.084*** (0.000)
Tangibility	0.237*** (0.000)	0.279*** (0.000)	0.280*** (0.000)	0.236*** (0.000)
Capex	-0.108*** (0.006)	-0.132*** (0.004)	-0.145*** (0.002)	-0.113*** (0.004)
Cash	-0.080*** (0.000)	-0.162*** (0.000)	-0.154*** (0.000)	-0.070*** (0.001)
Market to Book	0.002 (0.114)	0.002* (0.094)	0.002* (0.095)	0.002 (0.111)
Shareholder type fixed effects (α_s)	no	no	no	no
Year fixed effects (α_t)	yes	yes	yes	yes
Firm fixed effects (α_i)	yes	no	no	yes
Industry fixed effects (α_j)	no	yes	yes	no
Industry-Year fixed effects ($\alpha_{j,t}$)	no	no	yes	yes
N	7,731	7,731	7,731	7,731
Adj. R^2	0.262	0.278	0.283	0.651

2.4.3 Robustness Tests

To underline the robustness of the results, the following tests are executed. First, an alternative measure for ownership concentration is applied which has been used in some studies (e.g., Moon and Tandon, 2007; Ellul, 2008; Céspedes, Gonzáles, and Molina, 2010). Instead of the largest shareholder's voting stake, its equity stake is included into the regression. As depicted in Table 2.4, the equity stake of the largest shareholder ($Equity_{t,i}$) is significantly negatively associated with leverage. In terms of magnitude, a one standard deviation increase in cash flow stake leads to a reduction in leverage of 1.2%-points (0.268 * -0.045 = -0.012). These results are comparable to those of the baseline regression, indicating that the results are not sensitive to alternative measure of ownership.

Second, to ensure that our results are not diluted by small, non-controlling shareholders in widely held firms, we re-run the baseline regression and only consider firms where the largest shareholder controls the firm. In line with prior studies, the control threshold is set at a voting stake of at least 10% (La Porta, Lopez-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Poletti-Hughes and Ozkan, 2014). The results are similar to the baseline regression (see Table 2.5), suggesting that our findings are not affected by small, non-controlling shareholders below the control cut-off of 10%.

Third, as suggested by Boeker and Goodstein (1993) and Lo et al. (2016), we replace our leverage measure by an indicator variable equal to one if the leverage of a firm is above the industry median in the respective year and zero otherwise. Subsequently, the regression is re-run using a logistic regression model. The estimates are reported in Table 2.6 and do not appear to deviate qualitatively from the baseline regression.

Fourth, there is the concern that the association between ownership concentration is not only linear, but also non-linear as found in some previous studies (Liu, Tian, and Wang, 2011; De la Bruslerie and Latrous, 2012; Lo et al., 2016). Therefore, we re-run our baseline regression and include a squared variable of the voting stake of the largest shareholder ($Votes^2_{t,i}$). This squared

variable is centered to mitigate multicollinearity between $Votes_{t,i}$ and $Votes^2{}_{t,i}$. The results in model (1) to (4), Table 2.7 show a non-significant coefficient of $Votes^2{}_{t,i}$, suggesting that there is no non-linear association between ownership concentration and leverage. Further, a non-linear relationship would propose that the association between ownership concentration and leverage varies depending on the level of concentration. Thus, we restrict our baseline regression to firms with a largest shareholder that holds at least 25% of voting stake in model (5) and at least 50% in model (6). The coefficients of $Votes_{t,i}$ remain largely unchanged in model (5) and (6) in comparison to our baseline regression, indicating that the relation does not differ for varying levels of ownership concentration. Similar conclusions can be drawn from Table 7.2 in Appendix where we look at each voting stake quartile. Overall, the evidence suggests that the association between ownership concentration and leverage is not non-linear. This finding contradicts to the results of Liu, Tian, and Wang (2011), De la Bruslerie and Latrous (2012) and Lo et al. (2016) who find a non-linear relation between ownership concentration and leverage.

Table 2.4: Robustness tests (1)

This table reports the OLS regression results on the association between the equity stake of the largest shareholder (alternative measure of ownership) and leverage. Definition of variables: long term debt divided by total assets (Leverage); ownership stake of the largest shareholder (Equity); natural logarithm of total assets (Firm size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); cash holdings divided by total assets (Cash); market value per share divided by book value per share (Market to Book). The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Leverage Independent variable	(1)	(2)	(3)	(4)
Equity	-0.045*** (0.005)	-0.046*** (0.001)	-0.043*** (0.001)	-0.044*** (0.005)
Firm Size	0.014** (0.022)	0.003 (0.157)	0.003 (0.178)	0.015*** (0.010)
Profitability	-0.083*** (0.000)	-0.094*** (0.000)	-0.097*** (0.000)	-0.086*** (0.000)
Tangibility	0.236*** (0.000)	0.272*** (0.000)	0.273*** (0.000)	0.235*** (0.000)
Capex	-0.107*** (0.006)	-0.133*** (0.004)	-0.145*** (0.002)	-0.112*** (0.004)
Cash	-0.080*** (0.000)	-0.170*** (0.000)	-0.162*** (0.000)	-0.070*** (0.001)
Market to Book	0.002 (0.117)	0.002* (0.072)	0.002* (0.076)	0.002 (0.114)
Shareholder type fixed effects (α_s)	yes	yes	yes	yes
Year fixed effects (α_t)	yes	yes	yes	yes
Firm fixed effects (α_i)	yes	no	no	yes
Industry fixed effects (α_j)	no	yes	yes	no
Industry-Year fixed effects ($\alpha_{j,t}$)	no	no	yes	yes
N	7,731	7,731	7,731	7,731
Adj. R^2	0.650	0.297	0.302	0.652

Table 2.5: Robustness tests (2)

This table reports the OLS regression results on the association between the voting stake of the largest shareholder and leverage including only largest shareholders that hold at least 10% of voting shares. Definition of variables: long term debt divided by total assets (Leverage); voting stake of the largest shareholder (Votes); natural logarithm of total assets (Firm size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); cash holdings divided by total assets (Cash); market value per share divided by book value per share (Market to Book). The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Leverage Independent variable	(1)	(2)	(3)	(4)
Votes	-0.037** (0.016)	-0.033** (0.014)	-0.032** (0.018)	-0.037** (0.014)
Firm Size	0.015** (0.016)	0.003 (0.105)	0.003 (0.117)	0.017*** (0.006)
Profitability	-0.077*** (0.000)	-0.095*** (0.000)	-0.096*** (0.000)	-0.078*** (0.000)
Tangibility	0.229*** (0.000)	0.270*** (0.000)	0.271*** (0.000)	0.227*** (0.000)
Capex	-0.109*** (0.006)	-0.130*** (0.005)	-0.142*** (0.002)	-0.115*** (0.004)
Cash	-0.086*** (0.000)	-0.163*** (0.000)	-0.155*** (0.000)	-0.077*** (0.000)
Market to Book	0.002 (0.102)	0.002 (0.137)	0.002 (0.141)	0.002* (0.094)
Shareholder type fixed effects (α_s)	yes	yes	yes	yes
Year fixed effects (α_t)	yes	yes	yes	yes
Firm fixed effects (α_i)	yes	no	no	yes
Industry fixed effects (α_j)	no	yes	yes	no
Industry-Year fixed effects ($\alpha_{j,t}$)	no	no	yes	yes
N	7,731	7,731	7,731	7,731
Adj. R²	0.652	0.293	0.298	0.653

Table 2.6: Robustness tests (3)

This table reports the logistic regression results on a dummy variable for above-median leverage firms. Definition of variables: long term debt divided by total assets (Leverage); voting stake of the largest shareholder (Votes); natural logarithm of total assets (Firm size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); cash holdings divided by total assets (Cash); market value per share divided by book value per share (Market to Book). The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Leverage dummy Independent variable	(1)	(2)	(3)	(4)
Votes	-1.123***	-1.042***	-1.152***	-1.237***
	(0.000)	(0.000)	(0.000)	(0.000)
Firm Size	0.533***	0.205***	0.209***	0.544***
	(0.000)	(0.000)	(0.000)	(0.000)
Profitability	-1.018***	-1.087***	-1.226***	-1234***
	(0.002)	(0.001)	(0.000)	(0.000)
Tangibility	3.585***	4.558***	4.929***	3.979***
	(0.000)	(0.000)	(0.000)	(0.000)
Capex	-1.250*	-1.412**	-1.139	-0.909
	(0.086)	(0.048)	(0.124)	(0.232)
Cash	-2.427***	-2.900***	-3.042***	-2.548***
	(0.000)	(0.000)	(0.000)	(0.000)
Market to Book	0.030	0.031*	0.032*	0.034*
	(0.102)	(0.074)	(0.073)	(0.078)
Shareholder type fixed effects ($\propto_s$)	yes	yes	yes	yes
Year fixed effects ($\propto_t$)	yes	yes	yes	yes
Firm fixed effects ($\propto_i$)	yes	no	no	yes
Industry fixed effects ($\propto_j$)	no	yes	yes	no
Industry-Year fixed effects ($\propto_{j,t}$)	no	no	yes	yes
N	7,731	7,731	7,731	7,731
Pseudo R^2	0.066	0.168	0.1806	0.093

Table 2.7: Robustness tests (4)

This table reports the OLS regression results on leverage. Definition of variables: long term debt divided by total assets (Leverage); voting stake of the largest shareholder (Votes); natural logarithm of total assets (Firm size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); cash holdings divided by total assets (Cash); market value per share divided by book value per share (Market to Book). The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Leverage Independent variable	(1)	(2)	(3)	(4)	(5) Votes >25%	(6) Votes >50%
Votes	-0.041*** (0.008)	-0.033*** (0.009)	-0.032** (0.013)	-0.040*** (0.000)	-0.047*** (0.009)	-0.058* (0.079)
Votes^2	0.008 (0.870)	-0.051 (0.228)	-0.054 (0.202)	-0.022 (0.634)		
Firm Size	0.014** (0.023)	0.003* (0.089)	0.003 (0.105)	0.015** (0.011)	0.016** (0.020)	0.011 (0.230)
Profitability	-0.083*** (0.000)	-0.096*** (0.000)	-0.099*** (0.000)	-0.086*** (0.000)	-0.078*** (0.000)	-0.069** (0.014)
Tangibility	0.237*** (0.000)	0.272*** (0.000)	0.273*** (0.000)	0.235*** (0.000)	0.212*** (0.000)	0.150*** (0.001)
Capex	-0.107*** (0.006)	-0.134*** (0.004)	-0.147*** (0.001)	-0.112*** (0.004)	-0.077* (0.064)	-0.049 (0.293)
Cash	-0.080*** (0.000)	-0.166*** (0.000)	-0.159*** (0.000)	-0.070*** (0.001)	-0.084*** (0.001)	-0.103*** (0.001)
Market to Book	0.002 (0.128)	0.002* (0.085)	0.002* (0.087)	0.002 (0.120)	0.002* (0.070)	0.002 (0.193)
Shareholder type fixed effects (α_s)	yes	yes	yes	yes	yes	yes
Year fixed effects (α_t)	yes	yes	yes	yes	yes	yes
Firm fixed effects (α_i)	yes	no	no	yes	yes	yes
Industry fixed effects (α_j)	no	yes	yes	no	no	no
Industry-year fixed effects ($\alpha_{j,t}$)	no	no	yes	yes	no	no
N	7,731	7,731	7,731	7,731	6,145	4,198
Adj. R^2	0.650	0.295	0.301	0.652	0.656	0.662

2.4.4 Endogeneity

A major concern of this study is that ownership structure may not be exogenous (Demsetz, 1983). Even though the fixed effects in the baseline regression can mitigate endogeneity concerns with respect to omitted variable bias, it is not possible to rule out reverse causality. Put differently, even though we find a significant negative association between ownership concentration and leverage, it may still be possible that leverage affects ownership and not the other way around. For instance, a high leverage may increase bankruptcy risk and thus large shareholders may react by reducing their ownership stake. Therefore, the following analyses aim to create more confidence that the results are not affected by reverse causality.

According to the results of the baseline regression, a decrease in ownership concentration should result in higher leverage. Hence, we take advantage of changes in ownership within our sample to investigate its effect on leverage. In line with prior research, we use a first difference approach to measure the effect of a change in ownership concentration on leverage (MacKie-Mason, 1990; Berger, Ofek, and Yermack, 1997; Heider and Ljungqvist, 2015):

$$\Delta\,Leverage_{i,t} = \beta_0 + \beta_1\,\Delta^-\,Votes_{i,t} + \beta_2\,\Delta\,CONTROLS_{i,t} + \propto_j + \propto_t + \propto_s + \varepsilon_i$$

Our main independent variable ($\Delta^-\,Votes_{i,t}$) is an indicator set equal to one if the largest shareholder has decreased its voting stake by more than 5%-points in the previous year. As depicted in Table 2.8, the indicator variable for a decrease in ownership concentration is significantly positively associated with change in leverage. Put differently, a material decrease of 5%-points in the voting stake of the largest shareholder increases leverage by around 30.6% in the following year, which is in line with the results of the baseline regression. When considering a mean leverage of 16.0% in our sample, a 5%-point voting stake decrease leads to an increase in leverage of 4.9%-points (16.0% * 0.306 = 4.9%). Altogether, this analysis further mitigates reverse causality concerns.

Table 2.8: First difference regression of a decrease in ownership concentration

This table reports the OLS regression results on change in leverage. Definition of variables: long term debt divided by total assets (Leverage); dummy variable equal to one if the voting stake of the largest shareholder has decreased by at least 5% in comparison to last year (Δ- Votes); natural logarithm of total assets (Firm size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); cash holdings divided by total assets (Cash); market value per share divided by book value per share (Market to Book). The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level respectively.

| **Dependent variable: Change in leverage** | |
Independent variable	**(1)**
Δ^- Votes	0.306*** (0.004)
Δ Firm Size	7.167*** (0.001)
Δ Profitability	-0.024 (0.123)
Δ Tangibility	0.747*** (0.000)
Δ Capex	-0.010 (0.436)
Δ Cash	0.012 (0.365)
Δ Market to Book	0.229*** (0.000)
Shareholder type fixed effects ($\propto_s$)	yes
Year fixed effects ($\propto_t$)	yes
Industry fixed effects ($\propto_j$)	yes
N	6,491
Adj. R²	0.035

Moreover, we follow the approach by Lins, Volpin and Wagner (2013) to show that firms with a controlling shareholder make different financing decisions than widely held firms by taking advantage of the financial crisis as a natural experiment. While Lins, Volpin and Wagner (2013) consider the 2008-2009 financial crisis, we examine the effect of the consequent euro crisis in 2010-2011 since it appears more relevant to German firms as part of the European Union.

The euro crisis provides an ideal setting of a natural experiment because it entails an unexpected and exogenous liquidity shock resulting in a need of capital for firms, while the ownership structure of a firm remains constant in the short run (Lins, Volpin and Wagner, 2013). Consistently, Campello et al. (2012) show that European firms have increased their leverage to manage their liquidity needs in response to the crisis. In line with our baseline regression results, we argue that firms with a controlling shareholder did not increase their leverage during the crisis in comparison to widely held firms, because large controlling shareholders tend to be under-diversified and overly-risk averse (e.g., Shleifer and Vishny, 1986; Admati, Pfleiderer, and Zechner, 1994;

Zhang, 1998; Bodnaruk et al., 2008; Faccio, Marchica, and Mura, 2011). Both these aspects become more relevant within a crisis since financial risk is at a peak and threatens the survival of the firm. We therefore expect that controlling shareholders act more conservatively by taking survival-oriented actions and do not increase leverage since it further increases the firm's risk.

We use a difference-in-difference approach to explore whether firms with a controlling shareholder make different financing decisions during the euro crisis in comparison to widely held firms:

$$Leverage_{i,t} = \beta_0 + \beta_1 \ Treatment_{i,t} + \beta_2 \ Crisis_t + \beta_3 \ Treatment_{i,t} \ \times \ Crisis_t \\ + \ \beta_4 \ CONTROLS_{i,t} + \propto_i + \propto_s + \ \propto_s + \varepsilon_i$$

$Treatment_{i,t}$ is a dummy variable equal to one for firm-years where the largest shareholder holds a voting stake of more than 10% and zero otherwise, which is in line with previous research (La Porta, Lopez-de-Silanes, and Shleifer, 1999; Laeven and Levine, 2008; Caprio, Croci, and Del Giudice, 2011). $Crisis_t$ is an indicator variable equal to one for 2010 and 2011 and zero for the preceding years 2007-2009. We chose this period since the starting point of the euro crisis is considered to be the beginning of 2010 when Greece had to apply for grants from the European Union to avoid national bankruptcy. Our main independent variable is the interaction term $Treatment_{i,t} \ \times \ Crisis_t$ which captures the difference in leverage during the crisis between the treatment firms with a controlling shareholder and the control firms that are widely held.

To ensure that treatment and control firms are comparable, and the regression results are not driven by group differences, we use entropy balancing on observable characteristics such as firm size, profitability, tangibility, capex, cash holdings, and market to book ratio to improve covariate balance (Hainmueller, 2012; Hainmueller and Xu, 2013). We balance our variables over the full sample and use three moments of all covariates, i.e., mean, variance and skewness. The three moments of the treatment and control subsamples are compared before and after entropy balancing in Table 7.3. The figures indicate a high degree of similarity with respect to the three moments after balancing which was not existent before. Furthermore, Figure 2 provides graphical

evidence for the parallel trend in leverage of the treatment and control firms before the crisis. Overall, the groups seem sufficiently similar to allow the difference-in-difference analysis on the treatment effect.

Figure 2: Parallel trend assumption

This figure exhibits the pre-crisis parallel trend of the entropy balanced control and treatment group. Firms are defined as widely held if the firm's largest shareholder's voting stake is lower than or equal to 10% (control group). Firms are considered to be controlled if the largest shareholder's voting stake is above 10% (treatment group). The vertical line splits the years into pre-crisis (2007-2009) and crisis years (2010-2011). Leverage is defined as the ratio of long-term debt divided by total assets.
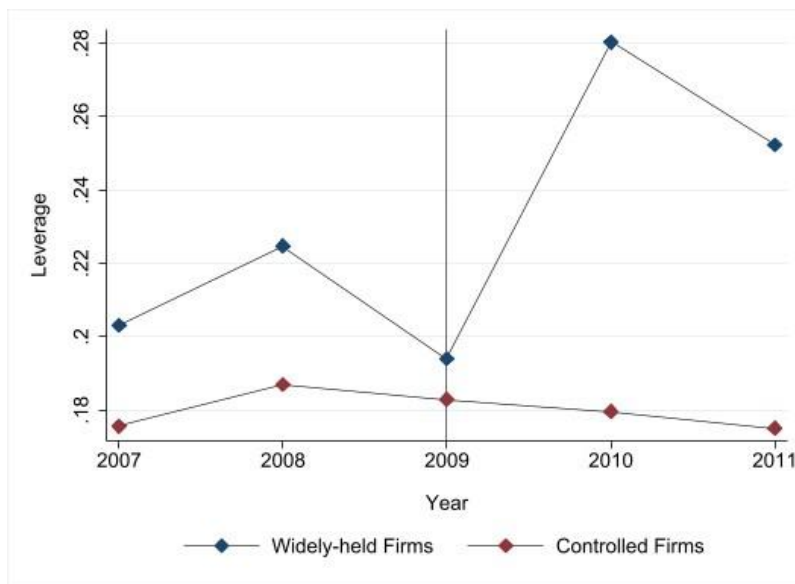
In accordance with our baseline results, the difference-in-difference model in Table 2.9 reveals a significant negative coefficient of the $Treatment_{i,t} \times Crisis_t$ interaction term in various alternative specifications, while the coefficient of $Crisis_t$ is positive and significant. The positive coefficient of $Crisis_t$ indicates that firms appear to significantly increase their leverage during crisis by approximately 4.4%-points, which corroborates the results of Campello et al. (2012) who find that European firms increase debt during crisis. The increase in leverage within the crisis period, however, is significantly negatively moderated by a decrease in leverage of 4.9%-points for controlled firms, altogether resulting in a decrease in leverage of 0.5%-points (4.4% - 4.9% = -0.5%) for firms with a controlling shareholder during crisis. This is in line with our argument that firms with a large, under-diversified, and risk-averse shareholder refrain from using debt to avoid risk. To corroborate the robustness of the analysis, we re-run the same difference-in-difference

regression but use a different control cut-off at 15% of voting rights and achieve similar results (see Table 7.4 in Appendix). Accordingly, our results further mitigate endogeneity concerns by providing supplementary evidence that ownership concentration affects financing decisions of firms and thus appears to be a significant determinant of leverage.

Table 2.9: Difference-in-difference – controlled vs. widely held firms during euro crisis

This table reports the results of the difference-in-difference regression on leverage. Definition of variables: long term debt divided by total assets (Leverage); indicator variable equal to one, if the firm's largest shareholder's voting stake is above 10% and zero otherwise (Treatment); indicator equal to one for the duration of the euro crisis 2010-2011 and zero for 2007-2009 preceding the crisis (Crisis); natural logarithm of total assets (Firm size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); cash holdings divided by total assets (Cash); market value per share divided by book value per share (Market to Book). The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Leverage			
Independent variable	(1)	(2)	(3)
Treatment	0.016	0.017	0.012
	(0.338)	(0.321)	(0.477)
Crisis	0.044***		
	(0.003)		
Treatment × Crisis	-0.049***	-0.050***	-0.040***
	(0.002)	(0.002)	(0.001)
Firm Size	-0.013	-0.011	-0.017
	(0.503)	(0.535)	(0.236)
Profitability	-0.040	-0.041	0.032
	(0.342)	(0.345)	(0.408)
Tangibility	0.280***	0.277***	0.275***
	(0.000)	(0.000)	(0.000)
Capex	-0.041	-0.041	-0.041
	(0.756)	(0.753)	(0.716)
Cash	0.014	0.013	0.027
	(0.776)	(0.793)	(0.524)
Market to Book	0.004	0.004	0.003
	(0.292)	(0.369)	(0.434)
Shareholder type fixed effects ($\propto_s$)	yes	yes	yes
Year fixed effects ($\propto_t$)	no	yes	yes
Firm fixed effects ($\propto_i$)	yes	yes	yes
Industry fixed effects ($\propto_j$)	no	no	no
Industry-Year fixed effects ($\propto_{j,t}$)	no	no	yes
N	2,147	2,147	2,147
Adj. R²	0.884	0.885	0.891

2.5 Conclusion

The relation between ownership structure and leverage is complex. This study investigates the association between ownership concentration and leverage for a sample of 814 exchange-listed firms in Germany from 1995 until 2014. Germany provides an ideal setting to examine this relation as it is characterized by high ownership concentration and the prevalence of family-controlled firms. Our findings reveal a negative association between largest shareholder's voting stake and leverage. This supports the risk-reduction hypothesis, suggesting that large shareholders aim to reduce risk since they have most of their wealth concentrated in one firm. The results are also in line with the monitoring hypothesis and pecking order theory. Large shareholders have an incentive to monitor management, resulting in higher profitability. Therefore, more internal funds are available to finance investments, which leads to a lower leverage.

Moreover, this study examines the moderating effect of family control on the association between the largest shareholder's voting stake and leverage. The analysis reveals that family control has a positive moderating effect, indicating that the negative association between ownership concentration and leverage is less pronounced for family-controlled firms. This result is in accordance with the control enhancement hypothesis of family firms, suggesting that families prefer to use debt due to its non-dilutive effect which helps them to maintain control over the firm.

In addition, we perform various robustness tests and show that the results appear to be not influenced by endogeneity. We provide evidence that our results are robust to alternative measures of ownership concentration and leverage, reveal that they are not sensitive to the exclusion of small, non-controlling shareholders below the control cut-off of 10% and show that there is no non-linear relationship. Further, we take advantage of variation in ownership structure within our sample to mitigate endogeneity concerns. As expected by the negative association found in our main analysis, we show that a 5%-point decrease in the voting stake of the largest shareholder leads to a significant increase of leverage in the following year. Additionally, we exploit the euro crisis 2010-2011 as a natural experiment to show that the capital structure reaction

to the unexpected liquidity shock differs by the level of ownership concentration. This provides further confidence on a causal effect of ownership concentration on leverage and alleviates reverse causality concerns.

This study makes several important contributions to literature. First, it shows that not only firm characteristics but also ownership structure appears to influence capital structure decisions. Thereby, a link between ownership concentration and leverage is established and thus adds to a more wholistic understanding of capital structure decisions. Second, the positive moderating effect of family control on the association between ownership concentration and leverage found in this study emphasizes the importance of families in corporate finance decisions. Finally, the results have important policy implications. It has been shown that ownership concentration has a negative impact on leverage. With that, changes in ownership concentration have the potential to significantly change risk within an industry or even an entire economy. Therefore, it may be meaningful for policymakers to consider this relation when deciding on incentives or disincentives for large shareholders. This is particularly important with respect to the plan of the European Commission to reintroduce multiple-vote shares. As the regulation will most likely be followed by an increase in concentration of voting rights, our results indicate that this will lead to a significant decrease in leverage. This reduction in leverage may lead to increased cost of capital because firms must rely more heavily on costly equity capital to finance its operations and investments. Overall, this may cause reduced investment activities resulting from lower net present values by higher discount factors and therefore has the risk of attenuating corporate growth.

The study is faced by some important limitations. Although our empirical strategy is designed to mitigate endogeneity concerns, it is not possible to rule them out entirely. Additionally, the sample is restricted to exchange-listed firms, which are generally larger than the average firm in Germany. Hence, our findings may not necessarily apply to small firms and firms from other countries with different institutional backgrounds. These limitations may be addressed in future research by considering ownership structures of non-listed firms and firms from other countries.

Furthermore, the effect of ownership structure on the type or duration of debt as well as how equity is used to finance investments may be investigated in future studies. Another interesting avenue for research may be to investigate how ownership of institutional investors affects capital structure, since such investors experience an increasing importance in corporations, and it is therefore essential to better understand their decision-making process.

3 Study 2: Corporate Control and M&A Activity – The Role of Ownership Concentration[2]

Abstract

This study finds a negative relationship between the voting stake of the largest shareholder and M&A likelihood, using a large sample of 814 exchange-listed firms. We argue that large shareholders hold hardly diversified portfolios and are therefore often very risk-averse and actively monitor management to prevent inefficient investments, resulting in lower acquisition activity. Results further indicate that family firms do not deviate from non-family firms in their acquisition behavior, which contradicts to the socioemotional wealth theory. Overall, our main contribution is to provide evidence that the reintroduction of multiple-vote shares, proposed by the European Commission in 2022, may lead to lower M&A activity and thus attenuate economic growth.

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[2] This chapter is based on a working paper co-authored by Dirk Schiereck.

3.1 Introduction

While the traditional view of Berle and Means (1932) considers listed firms to be widely held, recent research has provided evidence that ownership outside the U.S. is highly concentrated, especially in European countries (La Porta, Lopez-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Faccio and Lang, 2002; Aminadav and Papaioannou, 2020). This concentration is expected to increase if the current proposal of the European Commission to reintroduce multiple-vote shares is implemented (European Commission, 2022). Accordingly, large shareholders of the respective firms will be able to hold higher voting stakes and thus become more powerful to steer corporate decisions to achieve their own objectives. We therefore aim to assess the potential indirect effects of the regulation by answering the question whether higher concentration of voting rights reduces acquisition activity. This question is particularly important in current times of global uncertainty and the desired transformation towards more digitalization and sustainability, as acquisitions have the potential to fuel and accelerate transitional processes.

Since the presence of large shareholders significantly affects corporate governance structures of firms, some studies have investigated the effect of family control, as a particular type of ownership concentration, on M&A activity (e.g., Miller, Le Breton-Miller, and Lester, 2010; Gomez-Mejia, Patel, and Zellweger, 2018; Diéguez-Soto, Lopez-Delgado, and Marino-Garrido, 2021). Much less, however, is known about ownership concentration in general. Caprio, Croci, and Del Giudice (2011) study the association between ownership concentration and acquisition likelihood using a sample of large firms in a multi-country setting. As M&A activity is highly influenced by culture (Coisne, 2013; Ahern, Daminelli, and Fracassi, 2015; Chan and Cheung, 2016), institutional environment (La Porta et al., 2000; Rossi and Volpin, 2004; Franks et al., 2012; Requejo et al., 2018), and firm size (Basu, Dastidar, and Chawla, 2008; Gorton, Kahl, and Rosen, 2009), it is possible that the relation between ownership and M&A activity differs among countries as well as size cohorts. The sample of Caprio, Croci, and Del Giudice (2011) consists primarily of very large firms and their

sample's mean market value is several times higher than their median, indicating a high level of skewness. As stated by Aminadav and Papaioannou (2020) "given such skewness, merely controlling for market capitalization may be inadequate" (p. 1225). Since firms with different sizes deviate in various aspects (Gabaix, 2009), their M&A activity may differ as well. Accordingly, while Caprio, Croci, and Del Giudice (2011) consider "only a subset of the whole universe of non-financial listed companies" (p. 1639) due to limited availability of ownership data in Europe, we overcome this issue by taking advantage of the Hoppenstedt Aktienführer which provides detailed information on the ownership structure of a large number of German exchange-listed firms. Thereby, we are able to cover a large variety of firms especially with regard to size by including almost six times more German firms in our sample.

Moreover, since family firms are the most prevalent type of corporations in Germany and hence significantly contribute to the national economic development, we further investigate whether family firms exhibit a different acquisition behavior than non-family firms. We thereby follow the call for further research by Diéguez-Soto, López-Delgado, and Marino-Garrido (2021) to explore the M&A activity of family firms "in different institutional settings […] to understand better the effects of family involvement on acquisitions" (p. 844). So far, only few studies consider the family identity to investigate its effect on M&A activity in the U.S. (Bauguess and Stegemoller, 2008; Miller, Le Breton-Miller, and Lester, 2010; Gomez-Mejia, Patel, and Zellweger, 2018), Switzerland (Eugster, 2017), the Asia-Pacific Region (Diéguez-Soto, López-Delgado, and Marino-Garrido, 2021), and in a multi-country study of Continental European countries (Caprio, Croci, and Del Giduice, 2011).

According to Oaklins (2022), the German M&A market has grown by 56% to 2,910 deals in 2021 and thus underlines the importance of M&As to fuel corporate growth. Apart from the desire to grow, there are various other motives for acquisitions, such as synergies and monopoly building (Stigler, 1950; Manne, 1965; Steiner, 1975; Porter, 1985; Andrade, Mitchell, and Stafford, 2001), but also managerial incentives may drive acquisition activity (Rhoades, 1983; Jensen,

1986a; Morck, Shleifer, and Vishny, 1990). Jensen (1986a) argues that managers have the incentive to expand and diversify the assets of the firm and thus are more likely to undertake value-destroying acquisitions if not monitored appropriately. As for large shareholders it is worthwhile to monitor and discipline management (Grossman and Hart, 1980; Shleifer and Vishny, 1986), ownership concentration may influence M&A activity. Additionally, risk-aversion and under-diversification (Bodnaruk et al., 2008; Faccio, Marchica, and Mura, 2011) as well as financing considerations (Uysal, 2011; Signori and Vismara, 2017) of large shareholders may affect a firm's acquisition decision. As these factors could have a different relevance depending on the institutional background, and given the increasing volume of acquisitions, it is surprising that little is known about M&A activity of family firms and firms with concentrated ownership in Germany as the largest European economy.

The German institutional environment is special in various respects. First, Germany is a civil law country with low investor protection (La Porta et al., 2000). Rossi and Volpin (2004) as well as Franks et al. (2012) show that M&A activity is lower in countries with weak protection of minority shareholders. Second, Germany is a bank-based system with a less developed financial market in comparison to other developed countries (Vitols, 2005). This circumstance may affect acquisition financing considerations and opportunities of large shareholders and thus have an impact on M&A activity. Additionally, the power of risk-averse banks may impede acquisitions (Shleifer and Vishny, 1997). Third, German listed firms are characterized by a high level of ownership concentration as well as family control (La Porta, López-de-Silanes, and Shleifer, 1999) and thereby yield an ideal setting to investigate the effect of the concentration of voting rights and family ownership on M&A activity.

Our main contribution is to broaden the understudied research on ownership concentration and M&A activity. Using a large-scale sample of German public firms, we show that a high concentration of voting rights result in a lower likelihood to acquire. We thereby complement the research of Caprio, Croci, and Del Giudice (2011) by providing evidence that the same conclusions

can be drawn for medium and small listed firms as well as in bank-based systems like Germany. Next, we advance literature on M&A activity of family firms (Worek, 2017; Galavotti, 2022). We complement this stream of research by providing evidence that German family firms do not seem to acquire differently than non-family firms. Furthermore, we add to the literature exploring the impact of ownership structure on investment decisions of firms (e.g., Connelly et al., 2010; Desender et al., 2013) by showing that firms with a high concentration of voting rights are hesitant to undertake acquisitions. Finally, this study has some important practical and policy implications. Practitioners such as bankers and consultants should consider that firms with concentrated voting rights are less likely to acquire due to their largest shareholder's risk-aversion and under-diversification. Therefore, they should pay extraordinary attention to such aspects when advising companies on their strategic growth options. Additionally, policymakers should be aware of these decision processes when developing policies that affect the concentration of voting rights, such as the proposal of the European Commission to reintroduce multiple-vote shares. Our results point out that this regulation may lead to lower M&A activity and thus impair economic growth within the European Union.

The study is structured as follows. In chapter 3.2, related literature is reviewed, and our hypotheses are developed. In chapter 3.3, our research design and data are described before we present our empirical results in chapter 3.4. In chapter 3.5, the study is discussed and concluded.

3.2   Literature Review and Hypotheses

3.2.1 Related Literature

The early M&A literature has developed several theories on why firms engage in acquisitions, such as the efficiency theory (Manne, 1965; Jensen, 1986b), the monopoly theory (Stigler, 1950; Steiner, 1975), and the empire building theory (Rhoades, 1983; Jensen, 1986a; Morck, Shleifer, and Vishny, 1990). While the efficiency and monopoly theories focus on the value

creation for shareholders, the empire building theory builds upon the principal-agent model to provide evidence that acquisitions are driven by managerial incentives.

Subsequent studies identify determinants of M&A activity at the country and industry level. For instance, Ahern, Daminelli, and Fracassi (2015) show that the value of cross-border mergers is higher if the countries' cultures are more similar. Also, geography, bilateral trade, and accounting disclosure quality have been found to affect cross-border acquisition volume (Erel, Liao, Weissbach, 2012). Within a country, Rossi and Volpin (2004) find that regulatory environment significantly affects M&A activity. They argue that countries with stronger shareholder protection and better accounting standards exhibit higher M&A volumes, because transparency may mitigate agency problems and thus result in lower transaction costs. Similar results have been reported by Requejo et al. (2018) when analyzing the country's legal system. Another relevant determinant is stock market valuation since Rhodes-Kropf, Robinson, and Viswanathan (2005) show that misvaluations drive acquisitions. Moreover, unexpected industry shocks, such as deregulation, increased foreign competition or financial innovations result in industrial restructuring and thus seem to drive M&As (Mitchell and Mulherin, 1996; Powell and Yawson, 2005).

Simultaneously, another stream of research explored the determinants of M&A activity at the firm level.[3] While many studies focus on firm characteristics of the target to predict takeover likelihood (e.g., Hasbrouck, 1985; Palepu, 1986; Mitchell and Lehn, 1990; Billett, 1996), some studies investigate factors influencing the likelihood of a firm to undertake an acquisition. Among others, cash holdings (Harford, 1999), firm size (Gorton, Kahl, and Rosen, 2009), and leverage (Uysal, 2011; Hu and Yang, 2016) have been detected to influence acquisition likelihood. Further, Owen and Yawson (2010) show that a firm's life cycle significantly determines the probability of becoming a bidder. In a similar vein, Haleblian, Kim, and Rajagopalan (2006) provide evidence that acquisition experience and previous acquisition performance are positively associated with

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[3] See Haleblian et al. (2009) for a literature review on the determinants of M&A activity and performance.

subsequent acquisition likelihood. Besides those firm characteristics, behavioral aspects of management appear to be relevant. In line with the finding of Jensen (1986a) and Harford (1999) that cash holdings positively affect acquisition activity, Gompers, Ishii, and Metrick (2003) show that anti-takeover provisions result in higher M&A likelihood, because it protects managers from being replaced through the market for corporate control when engaging in empire building. In accordance with those studies, Doukas and Petmezas (2007), Ferris, Jayaraman, and Sabherwal (2013) and Chan and Cheung (2016) document that psychological characteristics of managers, such as overconfidence, significantly affect a firm's M&A decisions.

Apart from managers, shareholders are another important group of decision makers within a firm and thus may influence acquisition behavior. In this respect, many studies have analyzed the M&A activity of family firms.[4] Miller, Le Breton-Miller, and Lester (2010) use a sample of publicly listed U.S. firms to reveal that the level of family ownership is negatively associated with the number of acquisitions. Corroborating results are provided by Diéguez-Soto, López-Delgado, and Marino-Garrido (2021) for listed manufacturing firms in the Asia-Pacific region. While these studies consider the level of family ownership to investigate its effect on the number of acquisitions, Bauguess and Stegemoller (2008) as well as Gomez-Mejia, Patel, and Zellweger (2018) use a family firm dummy to explore the effect on the likelihood to engage in acquisitions using sample firms from the U.S. They find that family firms are less likely to acquire, which is in accordance with the findings of Eugster (2017) for Swiss listed firms. Moreover, Caprio, Croci, and Del Giudice (2011) analyze 777 Continental European companies over the period of 1998-2008. They provide evidence that family firms are less likely to engage in acquisitions. They further show that the largest shareholder's voting stake is negatively associated with the probability of launching a takeover bid. Similar results are found by Nogueira and Kabbach de Castro (2020) for Brazilian firms.

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[4] Galavotti (2022) and Worek (2017) provide a review of literature on M&A activity of family firms.

Additionally, there are some studies exploring cross-border (Ossorio, 2019; Chen, Hobdari, and Kellermanns, 2022) and industry-diversifying M&A activity of family firms. The studies on cross-border acquisition activity indicate that family firms are less likely to engage in international acquisitions, because they tend to be riskier due to cultural differences and difficulties in the integration of the target (Sales and Mirvis, 1984). With respect to industry-diversifying acquisitions, evidence appears to be mixed to some extent. On the one hand, some authors find that family firms are more likely to acquire firms operating in different industries (Miller, Le Breton-Miller, and Lester, 2010; Aktas, Centineo, and Croci, 2016; Schierstedt, Henn, and Lutz, 2020). They argue that these industry-diversifying acquisitions allow large shareholders to diversify their wealth without selling shares and thus losing control over the firm. On the other hand, Bauguess and Stegemoller (2008) provide evidence that family firms do not differ in their industry-diversifying acquisition behavior. Defrancq, Huyghebaert, and Luypaert (2016) even show that family firms are less likely to acquire targets from other industries, but that the likelihood to engage in industry-diversifying acquisition increases with the ownership stake of the family.

3.2.2 Hypotheses

Firms with large shareholders are likely to deviate from widely held firms in three regards and may thus show a different acquisition behavior. First, agency conflicts arising through the separation of ownership and control may vary in their severity (Berle and Means, 1932). In a firm with dispersed ownership, self-oriented managers can undertake inefficient and value-destroying acquisitions, because it is not worthwhile for small shareholders to monitor management (Jensen and Meckling, 1976; Fama and Jensen, 1983a; Rhoades, 1983). In comparison to small shareholders, large shareholders have both the incentive and power to monitor management (Grossman and Hart, 1980; Demsetz and Lehn, 1985; Shleifer and Vishny, 1986) and thus prevent managers from engaging in value-destroying empire building through acquisitions (Jensen, 1986a; Morck, Shleifer, and Vishny, 1990). Accordingly, high concentration of voting rights should lead to a lower probability of acquisitions because managers will be monitored and disciplined.

Second, firms with a large shareholder tend to have a different level of risk appetite, which may affect their likelihood to engage in acquisitions. Prior research has revealed that large shareholders concentrate a substantial part of their overall wealth in one firm, resulting in a high level of under-diversification and an overly risk-averse behavior (Demsetz and Lehn, 1985; Dyck and Zingales, 2004; Holmen, Knopf, and Peterson, 2007; Bodnaruk et al., 2008; Faccio, Marchica, and Mura, 2011). As the outcome of an acquisition is uncertain and acquisitions result in a significant increase in default risk (Furfine, 2011), potential gains and losses are weighed against each other (Bromiley, 2009; Worek, 2017; Gomez-Mejia, Patel, and Zellweger, 2018). We expect that large shareholders, due to their high degree of wealth concentration within one single firm, perceive a higher risk of acquisitions and therefore weigh the potential losses more heavily. Accordingly, the under-diversification and risk-aversion of large shareholders should lead to a lower likelihood to engage in acquisitions to minimize risk. On the other hand, it is possible that large shareholders use acquisitions to diversify their wealth and thus obtain a lower level of risk (Miller, Le Breton-Miller, and Lester, 2010; Faccio, Marchica, and Mura, 2011; Aktas, Centineo, and Croci, 2016; Schierstedt, Henn, and Lutz, 2020).

Third, firms with a high level of concentration of voting rights may differ in their M&A activity due to their distinct financing considerations. One reason is that large shareholders have the incentive to maintain control over the firm and may therefore be inclined to use debt to finance acquisitions (Harris and Raviv, 1988; Stulz, 1988; Ellul, 2008; Schmid, 2013). Corroborating evidence has been provided by Faccio and Masulis (2005) who show that large shareholders prefer to pay acquisitions by cash rather than stock to avoid dilution. However, as acquisitions regularly require substantial financial resources, debt alone may not be sufficient. Providing further equity may prevent dilution but exacerbates the under-diversification problem of the large shareholder. Since both dilution and under-diversification are undesirable, they may not undertake an acquisition if it is not possible to finance it entirely with debt. Additionally, large shareholders are risk-averse and may therefore be hesitant to substantially increase their leverage (e.g., Bodnaruk et al., 2008; Faccio, Marchica, and Mura, 2011). In accordance with that, several studies provide

evidence that high ownership concentration is associated with a lower level of leverage (De la Bruslerie and Latrous, 2012; Santos, Moreira, and Vieira, 2014; Amin and Liu, 2020; see chapter 2 or Gödecke and Schiereck, 2024). Consequently, large shareholders may refrain from acquisitions to avoid dilution and minimize financial risk, resulting in a lower likelihood to acquire.

Altogether, due to the weakened agency problem, the high level of under-diversification and risk aversion as well as the distinct financing considerations of large shareholders, we hypothesize the following:

Hypothesis 1: The voting stake of the largest shareholder is negatively associated with the likelihood to acquire another firm.

Families are a very common but also specific type of large shareholders with some distinct considerations and peculiarities (La Porta, López-de-Silanes, and Shleifer, 1999; Faccio and Lang, 2002; Aminadav and Papaioannou, 2020). While most of the peculiarities of firms with a large shareholder discussed above also apply to family firms, there are some additional aspects to consider with respect to their acquisition activity.

One important particularity is that family firms may derive greater gains from pursuing non-financially motivated goals to improve their socioemotional wealth (SEW) than from enhancing shareholder value (Anderson and Reeb, 2003; Berrone, Cruz, and Gomez-Mejia, 2012). This implies that family firms do not only consider financial gains and losses, but also the effect on their SEW when making business decisions. SEW encompasses dimensions such as emotional attachment to the firm, preservation of family reputation, ties within the family and family control over generations.

Family members have usually been related to the firm since young age and are regularly directly involved in the firm's management, resulting in a strong emotional connection with the firm (Villalonga and Amit, 2006). Due to this strong connection and involvement, family firms are more concerned about its reputation and identity which they aim to preserve (Dyer and Whetten, 2006; Zellweger, Eddleston, and Kellermanns, 2010; Deephouse and Jaskiewicz, 2013; Zellweger

et al., 2013). Since acquisitions can potentially bring about change in the firm's identity through an extension of the product or brand portfolio and may thus jeopardize the firm's reputation, family firms may be more hesitant to undertake acquisitions (Deephouse and Jaskiewicz, 2013).

Additionally, the strong emotional attachment to the firm results in a long-term orientation (Barclay and Holderness, 1989; James, 1999). Therefore, it is not surprising that several researchers argue that families are particularly concerned with retaining control to inherit the firm to the next generation (Becker, 1991; Casson, 1999; James, 1999), resulting in an overly risk-averse behavior (Becker, 1991; Casson, 1999; Anderson, Mansi, and Reeb, 2003; Burkart, Panunzi, and Shleifer, 2003). For instance, Bianco, Golinelli, and Parigi (2009) show that family firms are more sensitive to uncertainty, leading to less investments. Similarly, value-enhancing acquisitions may not be realized by family firms, because they aim to minimize bankruptcy risk to ensure the long-term survival of the firm. However, it is also possible that family firms use acquisitions to diversify their wealth and thus reduce the firm's overall risk through lower earnings volatility (Bauguess and Stegemoller, 2008; Aktas, Centineo, and Croci, 2016; Defrancq, Huyghebaert, and Luypaert, 2016; Schierstedt, Henn, and Lutz, 2020).

Moreover, acquisitions regularly require considerable amounts of capital. While additional debt increases bankruptcy risk (Furfine, 2011), equity issues dilute the controlling stake of the family. Prior research provides evidence that families prefer non-dilutive debt to fund new investments (Ellul, 2008; Croci, Doukas and Gonenc, 2011). As family firms are sometimes unwilling to undertake investments financed by equity issues to avoid dilution and maintain control over the firm (Harris and Raviv, 1988; Israel, 1991; Shleifer and Vishny, 1997), they may also pass attractive acquisition opportunities that require additional equity.

Since the aspects discussed for large shareholders also apply for families and the peculiarities of family firms seem to reinforce them, we expect that family firms are less likely to engage in acquisitions and therefore hypothesize the following:

Hypothesis 2: Family firms have a lower likelihood to undertake acquisitions in comparison to non-family firms.

3.3   Data and Methodology

3.3.1   Data Collection and Variable Definitions

We use the Hoppenstedt Aktienführer to obtain ownership data of German exchange-listed firms from 1995 to 2014 and match it with financial variables from Refinitiv's datastream database.[5] Firms with missing financial data to run our analyses as well as financial institutions (2-digit SIC code 60-62), who tend to be highly regulated and thus exhibit a different M&A activity, are excluded. Next, we use Refinitiv's deal database to extract all completed majority acquisitions made by our sample firms (e.g., Yilmaz and Tanyeri, 2016; Nogueira and Kabbach de Castro, 2020). This yields a final sample of 814 firms and 7,731 firm-years covering 3,208 acquisitions over the period from 1995 to 2014.

Although the Hoppenstedt Aktienführer reports ownership data until 2017, we only cover years until 2014 for two reasons. First, this period captures the most current merger waves before 2017 and is thus ideal to investigate the probability of firms to engage in acquisitions (Gregoriou and Renneboog, 2007; Cho and Chung, 2022). Second, at the end of 2014 the Federal Constitutional Court of Germany has declared parts of the inheritance law with respect to the privileging of business assets unconstitutional (Bundesverfassungsgericht, 2014). Accordingly, the legislator adjusted the law at the end of 2016 to ensure the appropriate privileging of business assets (Bundesfinanzministerium, 2016). Since for families it is essential to inherit the firm to the next generation (Becker, 1991; Casson, 1999; James, 1999), this period of uncertainty may have altered the considerations of large shareholders and may thus lead to inconsistencies.

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[5] The ownership and financial data is identical to that of study 1 in chapter 2 of this dissertation (i.e., Gödecke and Schiereck, 2024).

In line with prior research, we define our dependent variable ($Acquirer_{i,t}$) as an indicator equal to one if the firm completed at least one acquisition within the respective year, and zero otherwise (Bauguess and Stegemoller, 2008; Caprio, Croci, and Del Giudice, 2011; Shim and Okamuro, 2011; Gomez-Mejia, Patel, and Zellweger, 2018). This transformation to a binary variable is necessary to allow the use of a logit regression and thus to model the probability of a firm to engage in an acquisition.

Our main independent variable is the voting stake of the largest shareholder ($Votes$), which has also been used by Caprio, Croci, and Del Giudice (2011), Liu, Tian, and Wang (2011) and Santos, Moreira, and Vieira (2014), among others. To appropriately capture the actual voting stake, we trace the control chain up to the ultimate owner and accumulate the respective voting stake (La Porta, López-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Faccio and Lang, 2002). Further, we expect families to act in unity and therefore aggregate their voting rights (Aminadav and Papaioannou, 2020).

Additionally, we use a family firm dummy to test our second hypothesis ($Family\ Firm$).[6] In line with prior research, we set the dummy variable equal to one if the largest ultimate shareholder is a family or an individual holding at least 10% of the voting rights, and zero otherwise (e.g., La Porta, Lopez-de-Silanes, and Shleifer, 1999; Maury, 2006; Ellul, 2008; Basu, Dimitrova, and Paeglis, 2009; Caprio, Croci, and Del Giudice, 2011).

3.3.2 Descriptive Statistics

The number of firms per year oscillates between 249 and 472 (see Table 3.1, Panel A). We note a continuous growth in sample firms from 1995 to 2001 followed by a decline until 2004, reflecting the effects of the Dotcom bubble. Similarly, the number of acquisitions by year fluctuate between 98 and 293, having its peak in 2000 and reaching new highs in 2007 and 2011. This is in

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[6] Although family firms have been subject to numerous studies, there is no commonly accepted definition. See Worek (2017) for a review and discussion of definitions of family firms used in prior literature.

accordance with the studies of Gregoriou and Renneboog (2007) and Cho and Chung (2022) who show that the fifth merger wave occurred through the economic boom at the end of the century followed by the sixth wave after the market downturn at the early 2000s as well as the seventh wave after the global financial crisis 2007-2009. The number of acquirers within each year moves analogously but is generally lower than the number of acquisitions since some firms undertake more than one acquisition within a year. Further, the total number of acquirers (1,490) exceeds the total number of sample firms (814), because several firms undertake acquisitions in more than one year and thus appear in each of the years as an acquirer. Consistently, existing studies emphasize that several firms are serial acquirers since they undertake several acquisitions in consecutive years (Klasa and Stegemoller, 2007). The percentage of firms engaging in at least one acquisition within a year (% Acquirers) is highest in 2000 with 28.6% and reaches a new peak in 2007 with 24.8%, which correspond to the fifth and sixth merger waves. Overall, the average probability of a firm to undertake an acquisition within a given year in our sample period is 19.3%, which is close to the mean probability of 23% found by Bauguess and Stegemoller (2008) for their sample of S&P 500 firms from 1994 until 2005.

Table 3.1, Panel B reports the type of the largest shareholder of our sample firms. Families are most prevalent reaching a proportion of 63.4%. The second largest group of shareholders are (widely held) corporations with 8.7%. We further examine the ownership structure of the firms in Table 3.1, Panel C. We note that widely held firms, i.e., those where the largest shareholder holds not more than 10% of the voting rights, make up 6.2% of all firm-years while in 93.8% of the firm-years the largest shareholder holds more than 10%. In 61.5% of all cases, the firm is controlled by a family holding more than 10% of voting rights. These finding are in accordance with prior research documenting a high level of ownership concentration and family control in Germany (La Porta, Lopez-de-Silanes, and Shleifer, 1999; Faccio and Lang, 2002).

When looking at acquiring firms in Table 3.1, Panel C, we reveal that widely held firms are significantly more likely to undertake an acquisition than controlled firms (two-sided t-test on

difference of means). While 31.6% of the widely held firms engage in acquisitions within a given year, the proportion is only 18.5% for controlled firms. We further observe that family firms have a significantly lower likelihood to acquire, with 17.0% of family-controlled firms and 22.9% of non-family-controlled firms being acquirers. This is in line with Defrancq, Huyghebaert, and Luypaert (2016) who show that approximately 18% of family-controlled firms are acquirers in their sample of Continental European countries.

In Table 3.1, Panel D the summary statistics of the ownership and financial variables are reported. We observe that the mean (median) voting stake of the largest shareholder is 51.7% (51.0%), reflecting the high level of ownership concentration in German firms recorded in prior studies. For instance, Faccio and Lang (2002) and Aminadav and Papaioannou (2020) report a mean voting stake of around 55% and 45%, respectively, for German publicly listed firms. When comparing the voting stake of the largest shareholder of the acquiring firms with that of non-acquiring firms, we note that it is significantly lower for acquiring firms with an average of 40.8% in comparison to 54.3% for non-acquiring firms. This provides a preliminary indication that acquisition activity may depend on the voting rights held by the largest shareholder. When we turn to the summary statistics of the financial variables, we see that the sample firms exhibit a leverage, measured as long-term debt to total assets, of 16.0% and a profitability, measured as EBITDA to total assets of 8.6%. The average tangibility of 29.4%, measured as property, plant, and equipment to total assets, reflects the prevalence of manufacturing firms in Germany. The univariate analysis comparing the financial variables between acquiring and non-acquiring firms shows, among others, that acquirers are larger, have a higher profitability, and their assets are less tangible (all significant at 1% level).

Table 3.1, Panel E reports the correlation matrix of the relevant variables. The matrix shows that most variables are significantly correlated with the probability of a firm to undertake an acquisition. The voting stake of the largest shareholder is negatively correlated with acquisition likelihood exhibiting a coefficient of -0.191, while firm size shows a positive correlation coefficient of

0.279. The coefficient of leverage is negative, indicating that highly levered firms are less able to undertake an acquisition. Leverage is further negatively correlated with the voting stake of the largest shareholder (coefficient of -0.010), which is in line with the notion that large shareholders are risk averse and therefore chose a lower leverage (Shleifer and Vishny, 1986; see chapter 2 or Gödecke and Schiereck, 2024). Next, we note that profitability and firm size are significantly positively associated with a correlation coefficient of 0.153, indicating that large firms have greater market power to operate more profitable. Finally, tangibility and capital expenditures show a significant positive correlation, which is plausible considering that asset-rich firms invest more.

Table 3.1: Descriptive statistics of acquisitions and sample firms

Definition of variables: voting stake of the largest shareholder (Votes); natural logarithm of total assets (Firm Size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); long-term debt divided by total assets (Leverage); cash holdings divided by total assets (Cash); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); market divided by book value per share (Market to Book). Panel A reports the number of acquisitions, firms, and acquirers by year. Panel B breaks down the firm-years by shareholder type. Panel C reports firm-years and acquirers by widely held vs. controlled firms and family vs. non-family firms. Firms are defined to be controlled if voting rights of largest shareholder > 10% and are otherwise considered to be widely held (Controlled Firm). A firm is defined as a family firm if its ultimate shareholder is a family or an individual holding > 10% of the voting rights (Family Firm). Panel D provides summary statistics of the ownership and financial variables. The financial variables are winsorized at the 1% and 99% level. Further, the summary statistics are compared for acquiring vs. non-acquiring firms and differences between means and medians are tested. Panel E reports the correlation matrix of the relevant variables. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Acquisitions and firms by year

Year	# Firms	# Acquisitions	# Acquirers	% Acquirers
1995	249	166	44	17.7%
1996	313	170	58	18.5%
1997	307	107	38	12.4%
1998	320	133	70	21.9%
1999	381	275	98	25.7%
2000	419	293	120	28.6%
2001	465	188	95	20.4%
2002	441	139	71	16.1%
2003	418	130	62	14.8%
2004	396	131	56	14.1%
2005	407	162	68	16.7%
2006	436	191	90	20.6%
2007	472	241	117	24.8%
2008	446	161	90	20.2%
2009	426	125	74	17.4%
2010	411	98	62	15.1%
2011	392	136	75	19.1%
2012	376	127	69	18.4%
2013	344	119	67	19.5%
2014	312	116	66	21.2%
Total	7,731	3,208	1,490	19.3%

Panel B: Shareholder types[7]

Shareholder	# Firm-years	% Firm-years
Bank	265	3.4%
Corporation	675	8.7%
Family	4,899	63.4%
Government	564	7.3%
Institutional	587	7.6%
Insurance	289	3.7%
Management	137	1.7%
Others	315	4.1%
Total	7,731	100.0%

Panel C: Firms and acquirers by type of control

Ownership	# Firm-years	% Firm-years	# Acquirers	% Acquirers
Widely held Firm	481	6.2%	152	31.6%
Controlled Firm	7,250	93.8%	1,338	18.5%***
Non-Family Firm	2,978	38.5%	683	22.9%
Family Firm	4,753	61.5%	807	17.0%***
Total	7,731	100.0%	1,490	19.3%

Table 3.1: Descriptive statistics of acquisitions and sample firms (continued)

Panel D: Summary statistics of ownership and financial variables[7]

Variable	Full sample						non-Acquirers		Acquirers	
	N	Mean	Median	SD	Min	Max	Mean	Median	Mean	Median
Equity Stake of Largest Shareholder	7,731	49.3%	50.0%	26.8%	1.0%	100.0%	51.8%	51.4%	38.8%***	34.6%***
Voting Stake of Largest Shareholder	7,731	51.7%	51.0%	28.1%	1.0%	100.0%	54.3%	53.2%	40.8%***	36.1%***
Free-float (Equity Stake)	7,731	36.8%	34.5%	23.9%	0.0%	99.0%	34.8%	32.0%	45.2%***	45.0%***
Free-float (Voting Stake)	7,731	34.2%	30.9%	24.4%	0.0%	99.0%	32.2%	28.8%	42.9%***	41.9%***
Firm Size (Log of Total Assets)	7,731	12.361	12.082	2.191	7.978	18.627	12.063	11.866	13.613***	13.362***
Leverage (Long-term Debt / Total Assets)	7,731	0.160	0.118	0.154	0.000	0.689	0.161	0.116	0.154*	0.125
Profitability (EBITDA / Total Assets)	7,731	0.086	0.100	0.130	-0.517	0.405	0.083	0.098	0.099***	0.108***
Capex (Capital Expenditures / Total Assets)	7,731	0.054	0.037	0.059	0.000	0.328	0.053	0.036	0.057**	0.041***
Cash (Cash / Total Assets)	7,731	0.114	0.067	0.129	0.000	0.653	0.114	0.062	0.114	0.085***
Tangibility (PP&E / Total Assets)	7,731	0.294	0.246	0.232	0.000	0.947	0.305	0.257	0.246***	0.208***
Market to Book (MV Shares / BV Shares)	7,731	2.151	1.520	2.364	-1.270	12.540	2.140	1.470	2.197	1.69***

Panel E: Correlation matrix

Variable	Acquirer	Votes	Firm Size	Leverage	Profitability	Capex	Cash	Tangibility	Market to Book
Acquirer	1.000								
Votes	-0.191***	1.000							
Firm Size	0.279***	-0.055***	1.000						
Leverage	-0.020*	-0.010	-0.001	1.000					
Profitability	0.049***	0.101***	0.153***	-0.072***	1.000				
Capex	0.025**	0.085***	0.023**	0.047***	0.169***	1.000			
Cash	0.000	-0.142***	0.180***	-0.216***	0.043***	-0.084***	1.000		
Tangibility	-0.101***	0.168***	0.010	0.429***	0.094***	0.347***	-0.303***	1.000	
Market to Book	0.010	0.096***	-0.055***	-0.015	0.142***	0.041***	0.069***	-0.044***	1.000

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[7] Panel B and D are identical to Table 2.1, Panel B and D in study 1, chapter 2 (i.e., Gödecke and Schiereck, 2024), as both are based on the same ownership and financial data.

3.3.3 Methodology

To examine the relationship between the likelihood of a firm to engage in acquisitions and the voting stake of the largest shareholder, we use a logit regression model (e.g., Palepu, 1986; Ambrose and Megginson, 1992; Powell, 1997; Espahbodi and Espahbodi, 2003) of the following form (i = firm, t = year, j = industry, s = shareholder type):

$$Acquirer_{i,t} = \beta_0 + \beta_1 \, Votes_{i,t-1} + \beta_2 CONTROLS_{i,t-1} + \propto_t + \propto_j + \propto_s + \varepsilon_{i,t}$$

Our dependent variable is $Acquirer_{i,t}$ and takes the value of one if a firm undertakes at least one acquisition in year t, and zero otherwise. The voting stake of the largest shareholder ($Votes_{i,t-1}$) is our main independent variable. We further include various control variables that have been found to be correlated with the likelihood to acquire by prior research, i.e., cash holdings (Jensen, 1986a; Harford, 1999), firm size (Gorton, Kahl, and Rosen, 2009), leverage (Hu and Yang, 2016), capital expenditures (Akhtar, 2016), tangibility, profitability, and market to book ratio (Basu, Dastidar, and Chawla, 2008). Similar controls are used by Palepu (1986), Owen and Yawson (2010), Caprio, Croci, and Del Giudice (2011) and Ferris, Jayaraman, and Sabherwal (2013). All independent variables are lagged by one year to ensure that changes of the variables occurring due to the acquisition do not bias the results (Caprio, Croci, and Del Giudice, 2011; Shim and Okamuro, 2011; Diéguez-Soto, López-Delgado, and Marino-Garrido, 2021). For instance, the voting stake of the largest shareholder may decrease in the year of the acquisition if the takeover is financed by stock. Additionally, we include year ($\propto_t$), industry ($\propto_j$), and shareholder type ($\propto_s$) fixed effects to control for unobserved time, shareholder type and industry specifics that may affect acquisition activity (Bauguess and Stegemoller, 2008; Petersen, 2009; Shim and Okamuro, 2011). Finally, we cluster our standard errors by firm (Petersen, 2009).

3.4   Results

3.4.1   Ownership Concentration

In Table 3.2, our results of the logit regression to test hypothesis 1 are reported. We find a significant negative relationship between the voting stake of the largest shareholder ($Votes$) and the probability of a firm to undertake an acquisition. A 10%-points increase in voting rights is associated with a 12.1% decrease in acquisition likelihood, indicating economic significance. Similar results are found in different empirical specifications in model (2) to (4) using alternative combinations of fixed effects. Accordingly, the voting stake of the largest shareholder appears to be of major importance for a firm's acquisition decision process.

The negative relationship is in line with our first hypothesis and the notion that large shareholders mitigate agency conflicts by disciplining management and thus preventing inefficient, value-destroying acquisitions (Jensen, 1986a; Morck, Shleifer, and Vishny, 1990). The negative association is also in agreement with the risk-reduction hypothesis which argues that large shareholders are overly risk averse due to their low level of diversification and thus engage less in risky acquisitions (Demsetz and Lehn, 1985; Dyck and Zingales, 2004; Holmen, Knopf, and Peterson, 2007; Bodnaruk et al., 2008; Faccio, Marchica, and Mura, 2011). Our findings contradict to the argument that large risk-averse shareholders are more active in acquisitions to diversify their wealth (Miller, Le Breton-Miller, and Lester, 2010; Aktas, Centineo, and Croci, 2016; Schierstedt, Henn, and Lutz, 2020). The results are further consistent with the control enhancement hypothesis. As acquisitions regularly require significant amounts of capital, debt may not be sufficient and additional equity is necessary. Accordingly, large shareholders avoid acquisitions because this would either require them to provide additional equity and thus enhance their under-diversification or to accept a dilution of their voting stake (Harris and Raviv, 1988; Stulz, 1988; Faccio and Masulis, 2005; Ellul, 2008; Schmid, 2013). Our results agree with the empirical findings of Caprio, Croci, and Del Giudice (2011).

Among the control variables, we find a positive association between acquisition likelihood and firm size, profitability, cash holdings, capex, and market to book ratio. For leverage and tangibility, we reveal a negative relationship. The signs of the control variables are all in line with our expectations and prior research (Jensen, 1986a; Harford, 1999; Basu, Dastidar, and Chawla, 2008; Gorton, Kahl, and Rosen, 2009).

Table 3.2: Voting stake and the likelihood to acquire

This table reports the logit regression results modeling the likelihood of a firm to undertake an acquisition. Definition of variables: indicator variable equal to one if the firm undertook at least one acquisition in the respective year and zero otherwise (Acquirer); voting stake of the largest shareholder (Votes); natural logarithm of total assets (Firm Size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); long-term debt divided by total assets (Leverage); cash holdings divided by total assets (Cash); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); market value per share divided by book value per share (Market to Book). All independent variables are lagged by one year. The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Acquirer Independent variable	(1)	(2)	(3)	(4)
Votes $_{t-1}$	-1.289*** (0.000)	-1.387*** (0.000)	-1.164*** (0.000)	-1.347*** (0.000)
Firm Size $_{t-1}$	0.424*** (0.000)	0.413*** (0.000)	0.388*** (0.000)	0.403*** (0.000)
Profitability $_{t-1}$	2.661*** (0.000)	2.687*** (0.000)	2.822*** (0.000)	2.704*** (0.000)
Leverage $_{t-1}$	-0.125 (0.792)	-0.011 (0.981)	-0.442 (0.344)	-0.260 (0.581)
Cash $_{t-1}$	1.408*** (0.002)	1.436*** (0.002)	1.155** (0.013)	1.461*** (0.002)
Tangibility $_{t-1}$	-0.745* (0.056)	-0.766** (0.047)	-0.774** (0.042)	-0.868** (0.025)
Capex $_{t-1}$	0.907 (0.316)	0.974 (0.351)	1.917** (0.049)	1.077 (0.299)
Market to Book $_{t-1}$	0.024 (0.316)	0.023 (0.337)	0.059*** (0.010)	0.020 (0.403)
Shareholder type fixed effects ($\propto_s$)	yes	no	yes	yes
Year fixed effects ($\propto_t$)	yes	yes	no	yes
Industry fixed effects ($\propto_j$)	yes	yes	yes	no
N	7,731	7,731	7,731	7,731
Pseudo R^2	0.208	0.202	0.186	0.187

3.4.2 Family Firms

Table 3.3 summarizes the results of the logit regression to test whether family firms differ from non-family firms in their acquisition activity (second hypothesis). Our analysis shows a negative relationship between the family firm dummy and acquisition likelihood in model (1) (significant at 5%-level). We further control for the level of voting rights held by the largest shareholder in model (2), since family firms are likely to have a significantly higher concentration of voting rights than non-family firms, which results in a positive and insignificant coefficient of the family firm dummy. In model (3) we test whether the negative association between the voting stake of the largest shareholder and acquisition likelihood is moderated by the family firm dummy. Results reveal a positive but insignificant moderating effect. In model (4) we restrict our sample to firms where the largest shareholder is a family or an individual, which yields a negative and significant coefficient of the voting stake.

The results in model (1) are in accordance with our second hypothesis, but the analysis does not control for the level of voting rights held by the largest shareholder, even though family firms are likely to have a higher concentration of voting rights than non-family firms. Therefore, model (2) and (3) are more suitable to reveal a potential difference in the acquisition behavior of family firms, as they control for the higher level of concentration of voting rights in family firms. The results of these models contradict to our second hypothesis and the notion that socioemotional wealth (SEW) of families, i.e., the strong emotional attachment to the firm and the desire to inherit the firm to the next generation, is important in acquisition decisions of family firms. Further, model (4) is in accordance with the risk-reduction and control-enhancement hypothesis. Family firms appear to engage less in acquisitions if their wealth is highly concentrated to minimize risk. Also, the regular requirement to fund acquisitions with equity, resulting in a dilution of their voting stake, may drive down the family firms' acquisition activity.

Our findings are in accordance with Bauguess and Stegemoller (2008), Käsbach and Ludwigs (2014), and Nogueira and Kabbach de Castro (2020) who show that family firms do not differ

from non-family firms in their acquisition likelihood when controlling for the level of ownership. The outcomes of our analyses, however, contradict to Caprio, Croci, and Del Giudice (2011) as well as Gomez-Mejia, Patel, and Zellweger (2018) who document that family firms are less likely to acquire. Our results in model (4) are consistent with previous studies which provide evidence for a negative association between family ownership and acquisition likelihood (Miller, Le Breton-Miller, and Lester, 2010; Diéguez-Soto, López-Delgado, and Marino-Garrido, 2021).

Table 3.3: Family firms and the likelihood to acquire

This table reports the logit regression results modeling the likelihood of a firm to undertake an acquisition. Definition of variables: indicator variable equal to one if the firm undertook at least one acquisition in the respective year and zero otherwise (Acquirer); voting stake of the largest shareholder (Votes); dummy variable equal to one if the largest ultimate shareholder is a family or an individual holding at least 10% of the voting rights, and zero otherwise (Family Firm); natural logarithm of total assets (Firm Size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); long-term debt divided by total assets (Leverage); cash holdings divided by total assets (Cash); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); market value per share divided by book value per share (Market to Book). All independent variables are lagged by one year. The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Acquirer	(1)	(2)	(3)	(4) Family firms
Independent variable				
Votes $_{t-1}$		-1.469*** (0.000)	-1.444*** (0.000)	-1.852*** (0.000)
Family Firm $_{t-1}$	-0.329** (0.023)	0.085 (0.634)	-0.064 (0.771)	
Family Firm $_{t-1}$ x Votes $_{t-1}$			0.131 (0.755)	
Firm Size $_{t-1}$	0.418*** (0.000)	0.414*** (0.000)	0.412*** (0.000)	0.455*** (0.000)
Profitability $_{t-1}$	2.687*** (0.000)	2.674*** (0.000)	2.686*** (0.000)	1.828*** (0.001)
Leverage $_{t-1}$	0.119 (0.799)	-0.020 (0.966)	-0.018 (0.967)	-0.255 (0.659)
Cash $_{t-1}$	1.616*** (0.000)	1.427*** (0.002)	1.433*** (0.002)	1.383** (0.015)
Tangibility $_{t-1}$	-0.824** (0.039)	-0.760** (0.049)	-0.764** (0.044)	-0.605** (0.206)
Capex $_{t-1}$	1.201 (0.253)	0.953 (0.361)	0.969 (0.303)	0.511 (0.655)
Market to Book $_{t-1}$	0.015 (0.534)	0.023 (0.335)	0.023 (0.335)	0.019 (0.514)
Shareholder type fixed effects ($\propto_s$)	no	no	no	no
Year fixed effects ($\propto_t$)	yes	yes	yes	yes
Industry fixed effects ($\propto_j$)	yes	yes	yes	yes
N	7,731	7,731	7,731	4,899
Pseudo R²	0.181	0.191	0.202	0.244

3.4.3 Robustness Tests

To provide additional evidence for the accuracy of our results, we undertake several robustness tests. Some studies use the percentage of cash flow rights instead of the voting rights held by the largest shareholder (e.g., Moon and Tandon, 2007; Ellul, 2008; Céspedes, Gonzáles, and Molina, 2010). Therefore, we replace the voting (*Votes*) by the equity stake (*Equity*) in Table 3.4, model (1). Results are comparable to those of our baseline regression and thus point out that our analysis is not sensitive to alternative proxies for ownership concentration.

In Table 3.4, model (2) we restrict the sample to controlled firms, i.e., firms where the largest shareholder holds more than 10% of voting rights (La Porta, Lopez-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Poletti-Hughes and Ozkan, 2014). Thereby, we aim to provide evidence that our results are not primarily driven by the difference in acquisition activity between widely held and controlled firms (below/above 10% threshold), but also hold for different levels of ownership concentration. As expected, the results do not seem to materially deviate from those in our baseline regression.

As families are the most prevalent type of largest shareholder in our sample (see Table 3.1, Panel B), we aim to mitigate concerns that our results are driven by family firms and are not fully applicable to firms with other types of largest shareholders. Thus, we restrict our sample to non-family firms in Table 3.4, model (3). Our results show a significant negative association, which is only slightly lower in magnitude than our baseline regression, indicating that our findings are not primarily driven by family firms.

Next, it is possible that the relation between the voting stake of the largest shareholder and acquisition likelihood differs among size cohorts. As Aminadav and Papaioannou (2020) argue that only controlling for size may be inadequate if the sample is skewed, we take advantage of the great variety of our sample and exclude above-median-sized firms. Then we re-run our baseline regression in Table 3.4, model (4) and continue to find a significant negative relationship between the voting stake of the largest shareholder and acquisition likelihood. Accordingly, our results do

not appear to be sensitive to firm size and provide evidence that the negative association is also valid for smaller and medium-sized listed firms.

In addition, there are different legal forms of public companies in Germany. The most common is the "Aktiengesellschaft (AG)" which is comparable to a public limited company (PLCs) or an US Corporation. In our sample, 99% of all firms are a "Aktiengesellschaft". However, the remaining 1% are different legal forms of public companies, such as a "Kommanditgesellschaft auf Aktien (KGaA)". In Table 3.4, model (5) we exclude all firms that do not have the legal form of a "Aktiengesellschaft" and re-run our baseline regression. The results are very similar to those of our baseline regression and thus indicate that our findings are not biased through firms with unusual and Germany-specific legal forms.

To ensure that the negative association found in our baseline regression is not only present at lower or intermediate levels of ownership concentration, we restrict our sample to firms where the largest shareholder holds more than 50% of voting rights in Table 3.4, model (6) and more than 75% of voting rights in model (7). We continue to find a significant negative relationship between the largest shareholder's voting stake and the likelihood to undertake an acquisition, which suggests that the negative association is also present at higher levels of ownership concentration.

Table 3.4: Robustness tests

This table reports the logit regression results modeling the likelihood of an acquisition. Definition of variables: indicator variable equal to one if the firm undertook at least one acquisition in the respective year and zero otherwise (Acquirer); voting stake of the largest shareholder (Votes); equity stake of the largest shareholder (Equity); natural logarithm of total assets (Firm Size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); long-term debt divided by total assets (Leverage); cash holdings divided by total assets (Cash); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); market value per share divided by book value per share (Market to Book). All independent variables are lagged by one year. The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Acquirer / Independent variable	(1) Equity Stake	(2) Controlled firm	(3) non-Family	(4) Size < Median	(5) Only AGs	(6) Votes > 50%	(7) Votes > 75%
Votes $_{t-1}$		-1.382*** (0.000)	-1.199*** (0.006)	-1.076*** (0.010)	-1.355*** (0.000)	-1.740*** (0.001)	-1.894** (0.029)
Equity $_{-1}$	-1.307*** (0.000)						
Firm Size $_{t-1}$	0.419*** (0.000)	0.435*** (0.000)	0.465*** (0.000)	0.397*** (0.000)	0.425*** (0.000)	0.441*** (0.000)	0.579*** (0.000)
Profitability $_{t-1}$	2.650*** (0.000)	2.966*** (0.000)	3.324*** (0.002)	1.887*** (0.001)	2.685*** (0.000)	3.015*** (0.000)	5.38*** (0.004)
Leverage $_{t-1}$	-0.146 (0.758)	-0.230 (0.648)	0.297 (0.655)	-0.509 (0.451)	-0.105 (0.825)	0.245 (0.724)	1.603 (0.200)
Cash $_{t-1}$	1.419*** (0.002)	1.385*** (0.004)	1.577** (0.044)	0.925* (0.085)	1.446*** (0.002)	1.194* (0.081)	2.530** (0.050)
Tangibility $_{t-1}$	-0.752* (0.054)	-0.756* (0.060)	-1.314** (0.023)	-2.227*** (0.001)	-0.719* (0.065)	-1.277** (0.041)	-0.909 (0.437)
Capex $_{t-1}$	0.939 (0.370)	0.577 (0.597)	1.537 (0.396)	1.327 (0.364)	0.929 (0.374)	0.241 (0.868)	-7.888*** (0.007)
Market to Book $_{t-1}$	0.026 (0.277)	0.034 (0.168)	0.035 (0.435)	0.0233 (0.432)	0.025 (0.294)	-0.016 (0.653)	-0.024 (0.719)
Shareholder type fixed effects ($\propto_s$)	yes	yes	yes	yes	yes	yes	yes
Year fixed effects ($\propto_t$)	yes	yes	yes	yes	yes	yes	yes
Industry fixed effects ($\propto_j$)	yes	yes	yes	yes	yes	yes	yes
N	7,731	7,250	2,978	3,866	7,629	4,078	1,813
Pseudo R^2	0.208	0.223	0.250	0.283	0.211	0.238	0.375

Furthermore, some studies apply a probit instead of a logit regression to model the acquisition activity of firms (Bauguess and Stegemoller, 2008; Shim and Okamuro, 2011). In Table 3.5, we repeat our main empirical analysis using a probit regression (Espahbodi and Espahbodi, 2003). The results are qualitatively the same as in the logit regression, since the coefficient of the largest shareholder's voting stake remains negative and significant.

Additionally, we use a different dependent variable to analyze the influence of the largest shareholder's voting stake on the firm's acquisition activity. As a few studies focus on the number of acquisitions instead of using an acquisition dummy, we run a linear regression model with the number of acquisitions as our dependent variable (e.g., Sanders, 2001; Gamache et al., 2015; Shi, Hoskisson, and Zhang, 2017). We find a negative and significant relationship between the voting stake of the largest shareholder and the number of acquisitions as shown in Table 3.6. When assuming a one standard deviation increase in the voting stake, the firm is expected to undertake 0.185 less acquisitions (0.281 * -0.657 = -0.185). Overall, the results are qualitatively in line with the results of our baseline regression and only deviate in terms of magnitude.

Finally, another concern of this study is that ownership may be endogenous (Demsetz, 1983) and endogeneity may stem from reverse causality, simultaneity, and omitted variable bias. By lagging our independent variables, we combat simultaneity and reverse causality. Additionally, the inclusion of many control variables and several fixed effects attenuates potential omitted variable bias. Nevertheless, we undertake two further analyses to provide additional evidence to mitigate endogeneity concerns. First, we use an indicator variable (*Decrease in Concentration*) which is set equal to one if the voting stake of the largest shareholder has been decreased by more than 10%-points in the previous year, and zero otherwise. According to the negative association found in our baseline regression, a decrease in concentration of voting rights should result in an increase in acquisition likelihood. Consistently, the results in Table 3.7, model (1) show a positive coefficient of the *Decrease in Concentration* indicator, suggesting that a 10%-point increase in the voting

rights held by the largest shareholder results in a higher likelihood to undertake an acquisition in the following year. Hence, this analysis attenuates reverse causality and simultaneity concerns. Second, it is possible that an omitted variable affects both ownership structure and acquisition likelihood and thus contributes to the negative association found in our baseline regression. Therefore, we include an additional control variable that measures changes occurring in the level of voting rights held by the largest shareholder in the year preceding the acquisition. Thereby, potential effects of an omitted variable that influences both the level of voting rights and acquisition likelihood should be captured by these controls and thus be wiped out. In general, the ownership structures of our sample firms are found to be very stable over time, as the voting stake of the largest shareholders has only changed by an average of +0.05% per year. The results in Table 3.7, model (2) reveal that we continue to find a significant negative association between the largest shareholder's voting stake and acquisition likelihood when controlling for changes in concentration of voting rights. Overall, the results mitigate the concern that our results are driven by endogeneity.

Table 3.5: Voting stake and the probability to acquire (probit regression)

This table reports the probit regression results modeling the likelihood of a firm to undertake an acquisition. Definition of variables: indicator variable equal to one if the firm undertook at least one acquisition in the respective year and zero otherwise (Acquirer); voting stake of the largest shareholder (Votes); natural logarithm of total assets (Firm Size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); long-term debt divided by total assets (Leverage); cash holdings divided by total assets (Cash); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); market value per share divided by book value per share (Market to Book). All independent variables are lagged by one year. The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Acquirer	
Independent variable	**(1)**
Votes $_{t-1}$	-0.730*** (0.000)
Firm Size $_{t-1}$	0.236*** (0.000)
Profitability $_{t-1}$	1.384*** (0.000)
Leverage $_{t-1}$	-0.068 (0.796)
Cash $_{t-1}$	0.789*** (0.002)
Tangibility $_{t-1}$	-0.392* (0.067)
Capex $_{t-1}$	0.484 (0.394)
Market to Book $_{t-1}$	0.013 (0.331)
Shareholder type fixed effects ($\propto_s$)	yes
Year fixed effects ($\propto_t$)	yes
Industry fixed effects ($\propto_j$)	yes
N	7,731
Pseudo R²	0.205

Table 3.6: Voting stake and the number of acquisitions (linear regression)

This table reports the results of the linear regression on the number of acquisitions. Definition of variables: indicator variable equal to one if the firm undertook at least one acquisition in the respective year and zero otherwise (Acquirer); voting stake of the largest shareholder (Votes); natural logarithm of total assets (Firm Size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); long-term debt divided by total assets (Leverage); cash holdings divided by total assets (Cash); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); market value per share divided by book value per share (Market to Book). All independent variables are lagged by one year. The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Acquirer **Independent variable**	**(1)**
Votes $_{t-1}$	-0.657*** (0.000)
Firm Size $_{t-1}$	0.188*** (0.000)
Profitability $_{t-1}$	0.120 (0.325)
Leverage $_{t-1}$	-0.083 (0.650)
Cash $_{t-1}$	0.163 (0.304)
Tangibility $_{t-1}$	-0.144 (0.206)
Capex $_{t-1}$	-0.304 (0.277)
Market to Book $_{t-1}$	0.024** (0.017)
Shareholder type fixed effects ($\propto_s$)	yes
Year fixed effects ($\propto_t$)	yes
Industry fixed effects ($\propto_j$)	yes
N	7,731
Adj. R²	0.153

Table 3.7: Endogeneity

This table reports the logit regression results modeling the likelihood of a firm to undertake an acquisition. Definition of variables: indicator variable equal to one if the firm undertook at least one acquisition in the respective year and zero otherwise (Acquirer); indicator variable equal to one if the voting stake of the largest shareholder has decreased by more than 10% in the previous year (Decease in Concentration); voting stake of the largest shareholder (Votes); natural logarithm of total assets (Firm Size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); long-term debt divided by total assets (Leverage); cash holdings divided by total assets (Cash); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); market value per share divided by book value per share (Market to Book); the voting stake of the largest shareholder minus the voting stake in the previous year (Change in Votes). All independent variables are lagged by one year. The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Acquirer	(1)	(2)
Independent variable		
Decrease in Concentration	0.343* (0.063)	
Votes $_{t-1}$		-1.167*** (0.000)
Firm Size $_{t-1}$	0.461*** (0.000)	0.447*** (0.000)
Profitability $_{t-1}$	2.396*** (0.000)	2.433*** (0.000)
Leverage $_{t-1}$	-0.149 (0.766)	-0.261 (0.602)
Cash $_{t-1}$	1.913*** (0.000)	1.741*** (0.001)
Tangibility $_{t-1}$	-0.633 (0.152)	-0.619 (0.144)
Capex $_{t-1}$	-0.123 (0.916)	0.069 (0.953)
Market to Book $_{t-1}$	0.011 (0.690)	0.017 (0.538)
Change in Votes $_{t-1}$		-0.484 (0.417)
Shareholder type fixed effects ($\propto_s$)	yes	yes
Year fixed effects ($\propto_t$)	yes	yes
Industry fixed effects ($\propto_j$)	yes	yes
N	7,731	7,731
Pseudo R^2	0.196	0.214

3.5   Conclusion

Understanding the effects of ownership concentration on corporate decisions is of high importance to assess the potential consequences of regulations affecting ownership structure of firms (European Commission, 2022). Using a large sample of exchange-listed firms in Germany, covering a variety of different size cohorts, we find a negative relationship between the voting stake of the largest shareholder and the likelihood to undertake an acquisition. We run various additional tests to provide evidence for the robustness of our results. These findings are in accordance with the monitoring and risk-reduction hypotheses. Large shareholders monitor management and thus prevent them from undertaking value-destroying and non-efficient acquisitions. They further appear to refrain from acquisitions because their wealth is highly concentrated, resulting in an overly risk-averse behavior.

Additionally, we examine whether the identity of the largest shareholder affects acquisition decisions. We find no evidence that firms controlled by a family show different acquisition behaviors than non-family firms. These results contradict to the SEW theory which suggests that, among others, strong emotional connections to the firm and the goal to inherit the firm to the next generation should lead to different acquisition decisions.

We make several important contributions. First, we advance the literature stream on ownership structure and M&A activity by providing evidence that the concentration of voting rights leads to a lower likelihood of a firm to undertake acquisitions. We show that this relationship not only holds for very large, but also for smaller and medium-sized publicly listed firms. Second, this study has some important implications for practitioners. Bankers and consultants should be aware of the different considerations of large shareholders with respect to acquisitions and consider these aspects when advising on strategic growth options. Finally, we provide key insights for policymakers. Our results indicate that concentration of voting rights leads to lower acquisition activity of firms. Policymakers should be aware of these effects when developing regulations that may influence ownership structure. More concretely, our results suggest that the

reintroduction of multiple-vote shares proposed by the European Commission, which is expected to lead to a higher concentration of voting rights, may weaken M&A activity in the European Union and thus attenuate economic growth.

This study has some relevant limitations. Ownership structure is considered to be endogenous, which may be affecting our results (Demsetz, 1983). We take several measures to mitigate these endogeneity concerns, for instance by including fixed effects in our empirical specification and lag all independent variables, but it is not possible to rule them out entirely. Future research may examine the effect of an exogenous shock to ownership concentration on M&A activity to alleviate endogeneity issues.

4 Study 3: Ownership Concentration and the Aversion to Dilution – Evidence from Acquisition Financing[8]

Abstract

Ownership concentration can be dispersed if a company uses new shares to pay for acquisitions. However, the relationship between ownership concentration and method of payment in acquisitions that was documented in prior research lacks on empirical foundation. We show that firms with a high concentration of voting rights are less likely to use equity to finance acquisitions and that this relationship is particularly pronounced in the intermediate range of ownership. This indicates that control enhancement motives dominate risk reduction considerations of large shareholders and may thus limit corporate growth. This result does not depend on a specific group of blockholders. We do not find evidence that family firms behave differently in their acquisition financing decision. These findings provide relevant insights for the debate within the European Union to reintroduce multiple-vote shares, which is expected to result in a higher degree of voting rights concentration and hence may affect acquisition financing.

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[8] This chapter is based on a working paper co-authored by Dirk Schiereck and Florian Kiesel.

4.1   Introduction

In 2022, the European M&A volume has declined by 13% (Institute for Mergers, Acquisitions and Alliances, 2023) as a result of rising uncertainty and several interest rate increases by the European Central Bank (European Central Bank, 2022). Due to the sharp growth in interest rates from 0.0% at the beginning to 2.0% at the end of 2022 (European Central Bank, 2023), debt has become less attractive to finance acquisitions and thus acquirers are likely to depend more heavily on equity. This may be particularly detrimental for firms with concentrated voting rights since controlling shareholders are found to be highly concerned about control dilution through equity issues (Harris and Raviv, 1988; Stulz, 1988; Faccio and Masulis, 2005; Ellul, 2008; Schmid, 2013). This concern about control dilution may be even amplified if the proposal of the European Commission to reintroduce shares with multiple voting rights is implemented, as this will most likely lead to an increase in concentration of voting rights (European Commission, 2022). Accordingly, firms with large blockholders may scale back their acquisition activity as debt becomes more expensive and equity financing is avoided due to its dilutional effect. This, however, raises the question of how important maintaining control really is for large shareholders in their choice of acquisition financing. To provide an answer and to obtain a more holistic understanding of the underlying financing decision, we investigate whether the level of concentration of voting rights affects the likelihood to finance an acquisition with equity.

In general, large shareholders face a trade-off between control and risk-reduction considerations in their choice of acquisition financing: while debt results in higher risk, equity threatens the largest shareholder's control over the firm. Harris and Raviv (1988) as well as Stulz (1988) propose that control motives of managerial shareholders are of great importance in financing decisions of firms. Consistently, subsequent studies empirically show that firms with high managerial ownership are less likely to pay for an acquisition by stock (Amihud, Lev, and Travlos, 1990; Martin, 1996; Ghosh and Ruland, 1998; Yook, Gangopadhyay, and McCabe, 1999). Similar results for family ownership are provided by André and Ben-Amar (2009), Bouzgarrou and Navatte

(2014) and Teti, Dallocchio, and Currao (2022). Faccio and Masulis (2005) take a broader view without focusing on a specific type of largest shareholder. They examine whether the largest shareholder's voting stake affects M&A payment method and provide evidence that firms with a high level of ownership concentration are less likely to pay for acquisitions by stock. Overall, these findings suggest that control considerations appear to dominate risk-reduction motives of large shareholders in the payment method choice of acquisitions.

However, several studies emphasize the importance to differentiate between M&A payment method and the actual acquisition financing (Bharadwaj and Shivdasani, 2003; Martynova and Renneboog, 2009; Vladimirov, 2015; Fischer, 2017). Martynova and Renneboog (2009) argue that using method of payment as a proxy for source of financing is an oversimplification, since they provide evidence that cash deals are regularly financed with equity. These equity-financed cash deals would have been considered debt-financed by studies using method of payment as a proxy, which results in inaccuracies and an underestimation of equity financing in acquisitions. Accordingly, existing studies that use method of payment may be "incomplete or even incorrect" (Martynova and Renneboog, 2009, p. 290) and may attest an aversion towards equity financing that is not existent. Therefore, it is still unclear how the concentration of voting rights affects the actual source of acquisition financing, on which this study explicitly focuses.

The main reason why prior research uses the method of payment as a proxy is the limited data availability on the source of financing in acquisitions (Martynova and Renneboog, 2009; Fischer, 2017). Some studies that directly focus on the financing method overcome this issue by analyzing news announcements and other textual data to collect information on the financing structure of the acquisition (Bouzgarrou and Louhichi, 2014), while others take advantage of the acquirer's accounting data (Schlingemann, 2004; Harford, Klasa, and Walcott, 2009; Elsas, Flannery, and Garfinkel, 2014). As we are primarily interested in the aversion of large shareholders towards equity financing, we take a similar approach as Schlingemann (2004) and examine acquisition-induced changes in the acquirer's equity position on the balance sheet. This procedure has

several distinct advantages. First, accounting data is more reliable and accurate than textual data from news announcements. Second, many firms do not want their acquisition financing structure to be disclosed, entailing the risk of selection bias. Accordingly, accounting data is more readily available, which is beneficial with respect to sample size and further offers the opportunity to capture smaller listed firms that are not intensively covered by media. Third, by looking at accounting data, we capture all possible types of equity financing in acquisitions: stock payment, private equity placements to pay in cash, and seasoned equity offerings (SEO) to pay in cash. Fourth, it allows us to identify equity issues that precede acquisitions. For instance, it may be possible that a firm undertakes a SEO in advance of a takeover to collect the necessary funding to pay for the acquisition in cash (Martynova and Renneboog, 2009). Overall, we perceive this approach to be ideal to identify a potential aversion of large shareholders towards equity financing in acquisitions and thus to investigate the importance of control motives.

We undertake several additional analyses to understand the acquisition financing decision of large shareholders more wholistically. As large shareholders are concerned to lose control, it is possible that they only accept to finance an acquisition with equity if they are themselves willing to provide equity capital to maintain their pre-acquisition level of voting rights. Therefore, we examine changes in the level of the largest shareholder's voting stake through equity-financed acquisitions to observe whether they accept dilution or decide to provide new equity capital themselves. Additionally, we assess whether the aversion of large shareholders towards equity financing may be less severe in times of high interest rates, as we currently experience strong interest rate increases within the European Union. Finally, we investigate whether firms controlled by families differ from firms with other types of large shareholders in their aversion towards equity financing in acquisitions, as previous research has pointed out that family firms are prevalent in Europe (La Porta, López-de-Silanes, and Shleifer, 1999; Faccio and Lang, 2002; Aminadav and Papaioannou, 2020) and may be particularly concerned about losing control (Anderson and Reeb, 2003; Croci, Doukas, and Gonec, 2011).

To undertake these analyses, we use a sample of 400 German publicly listed firms with 1,490 acquisition-years over the period from 1995 to 2014. We focus on Germany for the following reasons. First, for German firms we can take advantage of the unique and large-scale ownership data of the Hoppenstedt Aktienführer. This allows us to compile a large sample of firms with a broad variety, especially with respect to firm size. Second, ownership is highly concentrated in Germany and there is a prevalence of family firms (La Porta, López-de-Silanes, and Shleifer, 1999; Faccio and Lang, 2002; Aminadav and Papaioannou, 2020), yielding an ideal setting to investigate the effect of ownership concentration and family control. Third, Germany as the largest European economy is characterized by a high level of bank-dependence (Vitols, 2005; Ampenberger et al., 2013). Accordingly, our results should be applicable to other countries with bank-based financial systems and high levels of ownership concentration and thus may be transferrable to many other economies around the world.

Our main contribution is to expand literature by addressing the unexplored question whether source of financing in acquisitions, instead of using method of payment as a proxy, is affected by concentration of voting rights. We provide evidence that firms with large shareholders are less likely to use equity capital in acquisitions to avoid dilution of their control stake and thereby further corroborate the strong desire of large shareholders to maintain control over the firm (e.g., Amihud, Lev, and Travlos, 1990; Martin, 1996; Ghosh and Ruland, 1998; Faccio and Masulis, 2005). Moreover, this study provides important insights for policymakers to anticipate potential effects of the current proposal of the European Commission to reintroduce shares with multiple votes (European Commission, 2022). Since the concentration of voting rights is expected to increase through the reintroduction of multiple-vote shares, firms should be less likely to use equity financing in acquisitions to avoid dilution of the largest shareholder's control stake, according to the results of this study. Especially in the current situation of high interest rates within the European Union, this regulation may lead firms to refrain from acquisitions in general because debt is expensive and equity financing results in dilution of the largest shareholder's voting stake.

Accordingly, the regulation and concentration of voting rights in general can potentially reduce investment activities and thus economic growth within the European Union, which should be considered by policymakers.

The study is structured as follows. In chapter 4.2 the related literature is reviewed, and the hypothesis is developed. Chapter 4.3 describes our sample selection process, data characteristics and our research design. Chapter 4.4 provides the results of our empirical analyses as well as our robustness tests. In chapter 4.5, the study is discussed and concluded.

4.2   Literature Review and Hypothesis

4.2.1   Related Literature

Mergers and acquisitions are major corporate investments and have been subject to research for decades. Especially the question how acquisitions are financed has gathered notable interest from scholars to better understand the underlying corporate decisions and to test capital structure theories. To proxy for acquisition financing, most studies focus on the method of payment which differentiates between cash (internal cash and/or debt) and stock payment (equity) (e.g., Amihud, Lev, and Travlos, 1990; Martin, 1996; Ghosh and Ruland, 1998; Faccio and Masulis, 2005).

Early literature addresses the question whether managers time the market and finance acquisitions with stock if the bidder's firm is overvalued. Consistent with the pecking order theory that considers equity issuances to be a signal of overvaluation (Myers, 1984; Myers and Majluf, 1984), several studies observe negative market returns for acquisitions paid by stock, which are interpreted as stock price corrections (Travlos, 1987; Wansley, Lane, and Yang, 1987; Amihud, Lev, and Travlos, 1990; Asquith, Bruner, and Mullins, 1990; Brown and Ryngaert, 1991).[9] Other authors examine whether market valuation affects the likelihood to pay with stock, where some

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[9] For a literature review on the effect of payment method on M&A performance see Haleblian et al. (2009).

find a positive (Martin, 1996; Rhodes-Kropf and Viswanathan, 2004; Rhodes-Kropf, Robinson, and Viswanathan, 2005; Klitzka, He, and Schiereck, 2022) and others a negative relationship (Eckbo, Makaew, and Thorburn, 2018; de Bodt, Cousin, and Officer, 2019). In this context, Vermaelen and Xu (2014) raise the question why target shareholders should accept to be paid in stock if the acquiring firm is overvalued. Their empirical results indicate that stock payment is only accepted if the payment choice can be appropriately justified, for instance by the desire of the acquirer to move towards its target capital structure. In a similar vein, Harford, Klasa, and Walcott (2009) as well as Uysal (2011) investigate whether M&A payment type is affected by the pre-takeover capital structure of the acquirer. They find that firms with leverage ratios above their predicted target leverage are more likely to pay acquisitions with stock. This is in line with the notion that firms reduce leverage to minimize deviations from their target capital structure and thus provides corroborating evidence for the static trade-off theory (Kraus and Litzenberger, 1973; Jensen and Meckling, 1976; Myers, 1977; Stulz, 1990).

Another stream of literature focuses on the effect of ownership structure on M&A payment choice. Generally, large shareholders face a trade-off between control and risk-reduction motives when deciding on the M&A payment method (Demsetz and Lehn, 1985; Harris and Raviv, 1988; Stulz, 1988; Dyck and Zingales, 2004). Paying for an acquisition with stock obviates leverage and thus risk increase but comes at the cost of ownership dilution, while paying with cash increases risk but prevents dilution. Accordingly, Amihud, Lev, and Travlos (1990) investigate the relationship between managerial ownership and method of payment using a sample of US-listed firms. They show that firms with high levels of managerial ownership are less likely to use stock to pay for acquisitions. In a subsequent study, Martin (1996) reveals a non-linear relationship. Firms with managerial ownership in the intermediate range (5-25%) are less likely to use stock to pay for acquisitions, but for small (0-5%) and large (>25%) ranges of ownership no significant effect is found. Similar evidence for a non-linear relationship is provided by Ghosh and Ruland (1998). Both Martin (1996) as well as Ghosh and Ruland (1998) argue that managers with low levels of ownership are not sensitive to dilution and those with high levels do not fear to lose control

through stock payment. Only managers with ownership in the middle range are concerned about losing control and therefore prefer to pay with cash to avoid dilution. Additional evidence for the control motive is provided by Ghosh and Ruland (1998) and Chang and Mais (2000) who show that managers prefer to pay in cash if the ownership of the target firm is highly concentrated to prevent the emergence of a large new shareholder within the acquiring firm.

The aforementioned studies focus on the U.S. where managerial ownership is prevalent. However, research has shown that managerial ownership is less common outside the U.S. and that family ownership is much more frequent in other regions of the world (La Porta, López-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Faccio and Lang, 2002). Therefore, some studies investigate whether family ownership affects M&A payment choice. Bouzgarrou and Navatte (2014) use a sample of 265 acquisitions from 1997 to 2008 made by 177 French firms to show that the level of family voting rights is positively related with the percentage of cash payment in acquisitions. They further reveal that this association between family control and payment method is non-linear (transition points at 17% and 84%). At low and very high levels of family control, the aversion towards dilution through stock payment appears to be non-present. Only at the intermediate level of ownership the families seem to be particularly concerned about losing control and thus avoid stock payment. Teti, Dallocchio, and Currao (2022), on the other hand, find a positive and linear relationship between the level of family ownership and the likelihood to pay an acquisition with cash in a sample of Italian-listed bidders. They conclude that families avoid undertaking acquisitions paid by stock to maintain control over the firm. Similar conclusions are drawn by André and Ben-Amar (2009) who provide comparable results for a sample of 358 Canadian acquisitions.

In contrast to studies examining managerial and family ownership, Faccio and Masulis (2005) do not focus on a specific type of largest shareholder. They assess the impact of the largest shareholder's voting stake on M&A payment choice in a European environment. For their sub-sample of firms from UK and Ireland, they record a non-linear relationship. Firms with ownership

in the intermediate range are found to be more likely to use cash to pay for acquisitions and thus prevent dilution, while firms with lower and higher levels of ownership appear to be less concerned about losing control (transition points 16% and 62%). This finding is consistent with Martin (1996) as well as Ghosh and Ruland (1998) for managerial ownership and Bouzgarrou and Navatte (2014) for family ownership. In their second sub-sample of Continental European countries, on the other hand, Faccio and Masulis (2005) find a positive and linear relationship between the ultimate shareholder's voting stake and the percentage of cash used to pay for acquisitions. They interpret this finding insofar that Continental European firms, which are regularly characterized by higher levels of ownership concentration, may be particularly concerned about losing control in comparison to firms from other regions. In a closely related study, de Bodt, Cousin, and Officer (2022) examine the effect of ownership concentration on M&A payment type in the U.S. context, where ownership is much more dispersed. In contrast to Faccio and Masulis (2005) they find no evidence that the level of ownership concentration affects M&A payment choice.

Although the method of payment seems plausible to proxy for acquisition financing due to poor data availability of source of financing, several authors have yet questioned this approach and argue that this simplification may lead to inaccuracies (Bharadwaj and Shivdasani, 2003; Martynova and Renneboog, 2009; Vladimirov, 2015; Fischer, 2017). Their key critique is that prior research assumes that cash payment is equal to debt financing, but in reality, a cash payment can also be financed by equity. In this respect, Martynova and Renneboog (2009) show that several cash offers in their sample are financed by equity and thereby emphasize the importance to differentiate between payment method and source of financing.[10]

Accordingly, another literature stream emerged that directly focusses on source of financing to ensure more precise measurement. They overcome the limited data availability by analyzing news announcements or other textual data to capture information on acquisition financing

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[10] In the sample of Martynova and Renneboog (2009), 33.7% of all takeovers are financed by equity, while only 18.2% are paid by stock. These numbers show that a large part of actual equity financing will not be captured appropriately if the method of payment is used as a proxy for source of financing.

(Datta and Iskandar-Datta, 1995; Bharadwaj and Shivdasani, 2003; Schlingemann, 2004; Martynova and Renneboog, 2009; Bouzgarrou and Louhichi, 2014; Vladimirov, 2015; Fischer, 2017). Most of these studies investigate the relationship between source of financing and bidder gains. They largely agree that acquisitions financed by debt outperform other means of financing (Datta and Iskandar-Datta, 1995; Bharadwaj and Shivdasani, 2003; Schlingemann, 2004; Martynova and Renneboog, 2009; Bouzgarrou and Louhichi, 2014; Fischer, 2017). Some other studies focus on the determinants of financing sources in acquisitions. Martynova and Renneboog (2009) use a sample of 1,361 domestic acquisitions in 26 European countries over the period 1993-2001. In line with the market timing theory, the authors find that firms with high pre-take-over stock price increases prefer equity financing. Firms with low leverage or insufficient internal funds are found to be more likely to use debt to finance acquisitions, which is consistent with the pecking order theory. In addition, they provide evidence that the corporate governance environment and potential growth opportunities significantly affect the source of financing. Similar results are found by Power, Rani, and Mandal (2022) for India. Bharadwaj and Shivdasani (2003) focus on cash-paid deals and show that large firms or firms with low cash holdings are more likely to finance acquisitions with debt. In addition, Merkoulova and Zivanovic (2022) examine the effect of financial constraints and show that constrained firms are most likely to use equity, followed by internal funds, to finance acquisitions. In a similar vein, Vladimirov (2015) find that firms have a higher likelihood to finance acquisitions with equity if they do not have access to competitive debt financing.

Finally, there are a few studies that examine the effect of ownership structure on the choice of acquisition financing. Bouzgarrou (2014) examines the effect of family control on the acquisition financing method using a sample of 265 acquisitions by French listed bidders from 1997 to 2008. Similar as Martynova and Renneboog (2009), he collects information on the source of financing from news announcements and differentiates between internal funds, debt, equity and a combination of debt and equity. The empirical results reveal a positive relationship between the level of family voting rights and the likelihood to finance acquisitions with debt. This avoidance to

dilution is consistent with the control motive of large shareholders. Quarato (2017), on the other hand, provides different results for a sample of acquisitions undertaken by Italian firms. He differentiates between family and non-family firms to show that family firms use less debt and more equity to finance acquisitions. This finding contradicts to the hypothesis that large family shareholders aim to avoid dilution of their control rights. As 90% of the authors sample firms are owned entirely by family members, it is, however, not surprising that they are less concerned about dilution.

4.2.2 Hypothesis Development

Firms with concentrated ownership are prevalent in most countries outside the U.S. and differ from widely held firms in various aspects (La Porta, Lopez-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Aminadav and Papaioannou, 2020). For instance, prior research has found ownership to affect leverage (Brailsford, Oliver, and Pua, 2002; de la Bruslerie and Latrous, 2012; see chapter 2 or Gödecke and Schiereck, 2024), acquisition activity (Caprio, Croci, and Del Giudice, 2011; Gomez-Mejia, Patel, and Zellweger, 2018; see chapter 3) and M&A payment method (Faccio and Masulis, 2005). One may therefore expect that ownership concentration also has a distinct effect on the source of financing in acquisitions.

In general, an acquisition can be financed by cash, debt, equity, and any combination of the aforementioned sources. According to the pecking order theory, firms will always prefer to finance acquisitions internally if enough cash is available (Myers, 1984; Myers and Majluf, 1984). However, as acquisitions regularly require large amounts of capital and given that most bidders have limited liquid assets, internal funds usually do not suffice to finance acquisitions (Faccio and Masulis, 2005; Elasas, Flanery, and Garfinkel, 2014; Fischer, 2015). Therefore, the financing choice in acquisitions is primarily between debt and equity.

There are several reasons to expect a negative relationship between the likelihood to finance an acquisition by equity and the level of ownership concentration. Stulz (1988) develops a theoretical model on how corporate control affects financing policies. He argues that managerial

shareholders have the desire to maintain control over the firm and are therefore reluctant to finance acquisitions with equity. Consistent results are provided by Amihud, Lev, and Travlos (1990) who show that firms with high managerial ownership are less likely to pay for acquisitions by stock. Similarly, prior research emphasizes that control motives are also relevant in the financing decisions of firms with other types of large shareholders, resulting in a preference for debt over equity financing to avoid dilution (Harris and Raviv, 1988; Faccio and Masulis, 2005; Ellul, 2008; Schmid, 2013). Additionally, de La Bruslerie and Enache (2023) provide evidence that large shareholders use debt financing after acquisitions at the target level to effectively avoid a transfer of value to debtholders, since they may otherwise capture a material part of the synergy gains. Similarly, controlling shareholders may choose to finance an acquisition with debt to prevent this value transfer to debtholders.

Moreover, the market timing hypothesis suggests that firms are particularly prone to finance an acquisition with equity if their market value is high, i.e., when the firm is overvalued (Myers, 1984; Myers and Majluf, 1984; Hansen, 1987; Baker and Wurgler, 2002). The common view in literature is, however, that equity issues are associated with negative market responses, because investors perceive it as a signal of overvaluation. Consistently, numerous empirical studies show that equity-financed acquisitions (e.g., Travlos, 1987; Bharadwaj and Shivdasani, 2003; Martynova and Renneboog, 2009; Bouzgarrou and Louhichi, 2014) and seasoned equity offerings (e.g., Masulis and Korwar, 1986; Mikkelson and Parch, 1986) suffer from negative abnormal returns and thus reduce firm value. According to the monitoring hypothesis (Jensen, 1991), large shareholders should anticipate the negative effect of a stock-financed acquisition on firm value and therefore show a strong aversion towards equity financing to prevent wealth losses. Consequently, both the control and value protecting motives of large shareholders should lead to a lower likelihood to finance acquisitions with equity.

There are, one the other hand, also some arguments for a positive association between the concentration of voting rights and the likelihood to finance an acquisition with equity. Existing

research points out that large shareholders concentrate most of their overall wealth in one single company (Demsetz and Lehn, 1985; Dyck and Zingales, 2004; Holmen, Knopf, and Peterson, 2007; Bodnaruk et al., 2008), resulting in high firm-specific risk (Ødegaard, 2009) and thus an overly risk-averse behavior (Shleifer and Vishny, 1986; Admati, Pfleiderer, and Zechner, 1994; Zhang, 1998; Bodnaruk et al., 2008; Faccio, Marchica, and Mura, 2011). Consistently, Brailsford, Oliver, and Pua (2002), de la Bruslerie and Latrous (2012) as well as Gödecke and Schiereck (2024) (see chapter 2) show that firms with concentrated ownership have lower levels of leverage to minimize risk. As an acquisition usually requires large amounts of funding, a debt-financed deal will lead to a significant increase in risk of financial distress. Consequently, a large, risk-averse shareholder may prefer to finance an acquisition (at least partly) with equity to minimize financial risk.

Furthermore, acquisitions are in general perceived to be risky (Furfine, 2011) and one key concern of bidders is the possibility to overpay for the target. Hansen (1987) develops a theoretical model on the acquisition payment choice under asymmetric information. If the level of information asymmetry is high and the true value of the target uncertain, the model predicts that bidders have strong incentives to pay by stock to share the risk of overpaying with the target's shareholders. Under consideration of the high level of risk-aversion of large shareholders, they may thus be more likely to finance an acquisition by equity through stock payment to share the valuation risk.

Overall, the acquisition financing decision in firms with large shareholders is characterized by a trade-off between control enhancing motives and risk-reduction considerations. While a debt-financed deal leads to higher risk, equity financing posits a threat to the largest shareholder's control over firm. Due to the prevailing evidence in literature that large shareholders are particularly concerned about maintaining control, we hypothesize that firms with a high concentration of voting rights are less likely to finance acquisitions with equity.

Hypothesis: The voting stake of the largest shareholder is negatively associated with the likelihood to finance an acquisition with equity.

4.3   Data and Methodology

4.3.1   Data Collection and Variable Definitions

To obtain the necessary data to test our hypothesis, we combine ownership, M&A, and financial data.[11] For ownership data, we take advantage of the Hoppenstedt Aktienführer database that provides detailed information on the shareholder structure of German publicly listed firms until 2017. Nevertheless, we only focus on the years from 1995 to 2014 for the following reasons. First, this period is not affected by the decision of the Federal Constitutional Court of Germany at the end of 2014 to declare parts of the privileging of business assets within the inheritance law unconstitutional (Bundesverfassungsgericht, 2014). This decision resulted in an adaption of the law at the end of 2016, which again contains significant privileging of business assets (Bundesfinanzministerium, 2016). As this period of uncertainty may have affected ownership as well as corporate decisions and thus may result in inconsistencies, we do not consider the years from 2015 until 2017. Second, it covers the most recent merger waves and is hence likely to capture a large number of acquisitions (Gregoriou and Renneboog, 2007; Cho and Chung, 2022).

Subsequently, we match the ownership data with financial data from Refinitiv's Datastream database and M&A data on completed majority acquisitions from Refinitiv's Deal database. We exclude firms with missing financial data, firms operating in the highly regulated financial sector (2-digit SIC code 60-62) and firms that did not undertake at least one acquisition in the period under consideration. As some firms undertake more than one acquisition per year, the total number of acquisitions is 3,208. We, however, decide to consider acquiring firms only once per year, even though they may have completed several acquisitions, to ensure that serial acquirers do not bias our results and to avoid selection bias.[12] Consequently, our final sample is composed of 400 firms and 1,490 acquisition-years where the respective firm completes at least one acquisition.

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[11] The ownership and part of the financial data is based on the dataset of study 1 in chapter 2 of this dissertation (i.e., Gödecke and Schiereck, 2024).

[12] Klasa and Stegemoller (2007) show that many bidders are regular acquirers that undertake a series of acquisitions over many years.

We define our dependent variable (*Equity Increase*) as an indicator variable equal to one if the firm increases its common stock by at least €0.5 million, and zero otherwise. We incorporate the €0.5 million threshold to ensure that equity increases that coincide with acquisitions but are not connected to it do not bias our results (e.g., employee stock compensation programs). Further, we use this binary variable because we are primarily concerned about whether any equity capital is used to finance the acquisition. This allows us to capture a potential aversion of large shareholders towards equity financing and thus dilution in acquisitions. To gather the necessary information, we use accounting data from the balance sheet as done in some prior studies (Schlingemann, 2004; Harford, Klasa, and Walcott, 2009; Elsas, Flannery, and Garfinkel, 2014). This approach is different from other research that analyzes news announcements to identify whether equity has been used to finance an acquisition (Martynova and Renneboog, 2009; Bouzgarrou and Louhichi, 2014). We opt for examining changes in the firm's common stock due to the following reasons. First, accounting data is readily available and thus helps us to overcome data limitations which have been present in prior studies. Accordingly, we can increase sample size by also capturing smaller listed firms that are not as widely covered by media. Second, data from the firm's balance sheet is very accurate and thus reduces measurement error. Overall, this approach allows us to reliably identify acquisitions which have been financed by any type of equity. With that, we differentiate from prior studies that use the method of payment as a proxy for acquisition financing, which has been found to be inaccurate as there are several cases where firms raise equity to pay an acquisition by cash (Martynova and Renneboog, 2009).

Our main independent variable is the percentage of voting rights held by the largest shareholder of the firm (*Votes*). We consider both direct and indirect voting rights by following the control chains to accumulate the overall voting rights held by the same ultimate shareholder (e.g., La Porta, López-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Faccio and Lang, 2002). Additionally, we assume that family members decide uniformly and therefore aggregate their voting rights (Aminadav and Papaioannou, 2020). This measure is widely accepted in

research and has been applied, among others, by Faccio and Masulis (2005) and Caprio, Croci, and Del Giudice (2011).

4.3.2 Descriptive Statistics

In Table 4.1, Panel A we analyze the number of acquisitions per year as well as the proportion of deals financed with equity. We observe a fluctuating number of acquisitions between 38 and 120, having its peaks in 2000 and 2007 with 120 and 117, respectively. These peaks correspond to the sixth merger wave at the end of the century, which emerged through the strong economic growth during that time, and the seventh wave before the global financial crisis (Gregoriou and Renneboog, 2007; Cho and Chung, 2022). Furthermore, we note that 32.6% of all deals have been financed with equity. This proportion is in line with prior studies such as Martin (1996) who reports that 29.6% of the acquisitions in his sample of firms from the U.S. are stock-financed and Martynova and Renneboog (2009) who find 33.7% of the deals in their European sample to be equity-financed. Similar to the number of acquisitions, one can observe the proportion of equity-financed deals to fluctuate over time. Especially in phases of strong economic growth at the late 1990s and the years preceding the global financial crisis we see that more deals are financed with equity. This may be due to high market valuations of firms making equity financing more attractive (Martin, 1996; Rhodes-Kropf and Viswanathan, 2004; Rhodes-Kropf, Robinson, and Viswanathan, 2005; Klitzka, He, and Schiereck, 2022). Additionally, the proportions of equity-financed deals are lowest in years with high uncertainty, for instance during the burst of the Dotcom bubble at the beginning of the century and the financial crisis in 2008-2009.

Table 4.1, Panel B summarizes the type of largest shareholder of the acquiring firm. We note that most acquiring firms are controlled by families with 57.0%. This figure is as expected in a country like Germany where family firms are prevalent and is further in line with prior studies such as Faccio and Lang (2002) who report that 65% of the German firms in their sample are family controlled. The second largest type of shareholders are institutional investors with 9.6%. We observe that the least firms are controlled by management with only 2.2%, which stands in

contrast to U.S. firms where managerial ownership and control is much more common (La Porta, López-de-Silanes, and Shleifer, 1999; Faccio and Lang, 2002; Aminadav and Papaioannou, 2020).

We further analyze the type of control of acquiring firms and its acquisition financing behavior in Table 4.1, Panel C. Using a control cutoff of 10%, we find that only 9.2% of acquiring firms are widely held and 90.8% are controlled by a large shareholder with a voting stake of at least 10%. These numbers agree with existing studies who document a high level of ownership concentration in Germany (La Porta, Lopez-de-Silanes, and Shleifer, 1999; Faccio and Lang, 2002; Laeven and Levine, 2008). Of the widely held acquirers, 47.4% use equity to finance the acquisitions, while only 31.0% of the controlled firms take advantage of equity. A two-tailed t-test shows that the mean portion of acquisitions financed with equity significantly differ between those two groups at 1% significance level. This is, of course, only preliminary but emphasizes that controlled firms appear to be less likely to use equity financing in acquisitions to avoid dilution as expected in our hypothesis.

In Table 4.1, Panel D we provide summary statistics of the relevant ownership and financial variables used in our study. Our analysis shows that the voting stake of the acquirer's largest shareholder is on average 41.1%, which emphasizes the high level of ownership concentration in Germany documented in existing studies (e.g., Faccio and Lang, 2002; Aminadav and Papaioannou, 2020). We further differentiate between acquirers that use equity to finance the acquisitions and those that do not. The results show that the average voting stake of acquirers using equity is significantly lower than that of acquirers not using equity financing (36.1% vs. 43.2%, significance level 1%). This, again, gives reason to expect that the level of ownership concentration affects the likelihood of a firm to use equity financing in acquisitions. The summary statistics of the financial variables show an average (median) leverage of 15.3% (12.0%) and a profitability of 10.4% (11.2%), indicating that the sample firms are moderately indebted and exhibit a solid profitability. The prevalence of manufacturing companies in Germany is reflected in the high average tangibility of 25.1%. Similar as with the ownership variables, we investigate differences in the means of

the financial variables between acquirers using equity financing and those that do not. Results show that acquirers using equity financing in acquisitions are larger (significant at 1% level) and more heavily levered (significant at 5% level). This seems plausible as larger firms tend to have better access to equity capital markets and highly levered firms need to tap other financing sources, both leading firms to be more inclined to use equity financing (Titman and Wessels, 1998; Vermaelen and Xu, 2014). Otherwise, the two groups do not appear to differ significantly among other financial dimensions such as profitability, capex, cash holdings, tangibility, and market to book ratio.

In Table 4.1, Panel E the correlation matrix is exhibited. We find that several variables are significantly correlated with the likelihood to use equity financing in an acquisition. The voting stake of the largest shareholder and firm profitability are negatively associated, while leverage, tangibility and the market to book ratio are positively correlated with the equity increase indicator. These preliminary and univariate results are as expected: firms with higher concentration of voting rights are less likely to use equity financing to avoid dilution, firms with high profitability are inclined to use internal cash and debt first according to the pecking order theory, and highly levered firms have to use other financing sources such as equity to undertake acquisitions (Myers and Majluf, 1984; Titman and Wessels, 1998; Faccio and Masulis, 2005; Frank and Goyal, 2009).

Table 4.1: Descriptive statistics

Definition of variables: indicator variable equal to one if firm increases common stock in the acquisition year by at least €0.5 million and zero otherwise (Equity Increase); voting stake of the largest shareholder (Votes); natural logarithm of total assets (Firm Size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); long-term debt divided by total assets (Leverage); cash holdings divided by total assets (Cash); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); market value by stock divided by book value (Market to Book). Panel A reports the number of acquisitions and the nature of financing by year (1995-2014). Panel B breaks down the acquisitions by shareholder type. Panel C reports acquisitions by widely held vs. controlled firms and family vs. non-family firms. Firms are defined to be controlled if voting rights of largest shareholder > 10% and are otherwise considered to be widely held. A firm is defined as a family firm if its ultimate shareholder is a family or an individual holding ≥ 10% of the voting rights. Panel D provides summary statistics of the ownership and financial variables of the firms undertaking the acquisitions (all lagged by one year). The financial variables are winsorized at the 1% and 99% level. Further, summary statistics are compared for acquisitions that are finance (at least partially) by equity vs. non-equity-financed acquisitions. Differences between means and medians are tested. Panel E reports the correlation matrix of the relevant variables. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Acquisitions and source of financing by year

Year	# Acquisitions	# Equity-financed	% Equity-financed
1995	44	24	54.5%
1996	58	17	29.3%
1997	38	18	47.4%
1998	70	21	30.0%
1999	98	30	30.6%
2000	120	42	35.0%
2001	95	27	28.4%
2002	71	19	26.8%
2003	62	15	24.2%
2004	56	17	30.4%
2005	68	29	42.6%
2006	90	37	41.1%
2007	117	45	38.5%
2008	90	21	23.3%
2009	74	21	28.4%
2010	62	18	29.0%
2011	75	24	32.0%
2012	69	16	23.2%
2013	67	22	32.8%
2014	66	22	33.3%
Total	1,490	485	32.6%

Panel B: Shareholder types

Largest shareholder	# Acquisitions	% Acquisitions
Bank	72	4.8%
Corporation	93	6.2%
Family	849	57.0%
Government	137	9.2%
Institutional	143	9.6%
Insurance	81	5.4%
Management	33	2.2%
Others	82	5.5%
Total	1,490	100.0%

Panel C: Acquirers by type of control

Ownership	# Acq.	% Acq.	# Equity-fin.	% Equity-fin.
Widely held Firm	137	9.2%	65	47.4%
Controlled Firm	1,353	90.8%	420	31.0%
Total	1,490	100.0%	485	32.6%

Table 4.1: Descriptive statistics (continued)

Panel D: Summary statistics of ownership and financial variables

Variable	Full sample						Equity-financed		non Equity-financed	
	N	Mean	Median	SD	Min	Max	Mean	Median	Mean	Median
Equity Stake of Largest Shareholder	1,490	39.1%	34.6%	24.0%	2.6%	100.0%	34.6%	28.3%	41.0%***	37.5%***
Voting Stake of Largest Shareholder	1,490	41.1%	36.1%	25.5%	2.6%	100.0%	36.1%	29.3%	43.2%***	39.1%***
Free-float (Equity Stake)	1,490	45.1%	45.0%	24.0%	0.0%	97.4%	48.5%	48.5%	43.7%***	43.7%***
Free-float (Voting Stake)	1,490	42.9%	42.1%	24.9%	0.0%	97.4%	46.5%	45.8%	41.4%***	40.9%***
Firm Size (Log of Total Assets)	1,490	13.535	13.252	2.318	8.961	19.134	14.077	13.908	13.308***	12.871***
Leverage (Long-term Debt / Total Assets)	1,490	0.153	0.120	0.143	0.000	0.620	0.167	0.131	0.147**	0.115*
Profitability (EBITDA / Total Assets)	1,490	0.104	0.112	0.104	-0.428	0.335	0.103	0.108	0.104	0.114*
Capex (Capital Expenditures / Total Assets)	1,490	0.052	0.039	0.050	0.000	0.275	0.055	0.041	0.050	0.038
Cash (Cash / Total Assets)	1,490	0.119	0.087	0.110	0.000	0.603	0.077	0.049	0.081	0.054
Tangibility (PP&E / Total Assets)	1,490	0.251	0.211	0.200	0.002	0.910	0.264	0.219	0.245	0.209
Market to Book Ratio (MV Share / BV Share)	1,490	2.169	1.690	2.003	-2.230	13.260	2.202	1.720	2.154	1.680

Panel E: Correlation matrix

Variable	Equity Increase	Votes	Leverage	Firm Size	Profitability	Cash	Capex	Tangibility	Market to Book
Equity Increase	1.000								
Votes	-0.108***	1.000							
Leverage	0.101***	-0.029	1.000						
Firm Size	0.018	-0.138***	0.050*	1.000					
Profitability	-0.102***	0.120***	-0.070***	0.065**	1.000				
Cash	-0.034	-0.042	-0.262***	-0.278***	0.019	1.000			
Capex	-0.012	0.061**	0.060**	-0.027	0.224***	-0.068***	1.000		
Tangibility	0.054**	0.093	0.442***	0.085***	0.096***	-0.257***	0.421***	1.000	
Market to Book	0.044*	0.077**	-0.079**	0.013	0.214***	0.097***	0.031	-0.136***	1.000

4.3.3 Methodology

To investigate the influence of the voting stake of the largest shareholder on the likelihood of a firm to use equity to finance an acquisition, we use the following logit regression model (Martin, 1966; Amihud, Lev, and Travlos, 1990; Martynova and Renneboog, 2009) (i = firm, t = year, j = industry, s = shareholder type):

$$Equity\ Increase_{i,t} = \beta_0 + \beta_1\ Votes_{i,t-1} + \beta_2\ CONTROLS_{i,t-1} + \propto_t + \propto_j + \propto_s + \varepsilon_{i,t}$$

Our dependent variable is *Equity Increase*, which is an indicator variable equal to one if the firm increases its common stock by at least €0.5 million in the year of the acquisition, and zero otherwise. We select this measure to appropriately capture whether firms use any type of equity financing in the acquisition. *Votes* is our main independent variable and is measured as the percentage of voting rights held by the firm's largest shareholder. Thereby, we aim to assess the role of ownership concentration in acquisition financing. Besides, we consider several firm-level control variables that have been found by prior research to affect the likelihood to use equity financing: firm size, profitability, tangibility/collateral, leverage, cash, and capex/growth opportunities, market to book ratio (Myers, 1984; Martin, 1996; Faccio and Masulis, 2005; Harford, Klasa, and Walcott, 2009; Uysal, 2011). In line with existing studies and to mitigate reverse causality issues, all independent variables are lagged by one year to ensure that changes resulting from the acquisition do not influence our explanatory variables (Palepu, 1986; Faccio and Masulis, 2005; Owen and Yawson, 2010; Caprio, Croci, and Del Giduice, 2011). As omitted variable bias is the principal source of endogeneity in this study, we additionally include industry ($\propto_j$), shareholder type ($\propto_s$), and year ($\propto_t$) fixed effects to minimize the risk that unobserved industry and shareholder type specifics in acquisition financing as well as time-varying business cycle conditions and market valuations bias our results (Taggart, 1977; Choe, Masulis, and Nanda, 1993; Martin, 1996; Rhodes-Kropf, Robinson, and Viswanathan, 2005; Dong et al., 2006; de Bodt, Cousin, and Officer, 2022). Finally, we cluster the standard errors at the firm level.

4.4   Results

4.4.1   Ownership Concentration and Equity Financing of Acquisitions

Table 4.2 reports the results of our main logit regression to test our hypothesis. In model (1) we find the voting stake of the largest shareholder ($Votes_{t-1}$) to be significantly negatively associated with the likelihood to finance an acquisition with equity. In terms of magnitude, an increase in the voting stake by 10%-points is associated with a 12.7% decrease in the likelihood to finance an acquisition with equity. Considering that the average likelihood to finance an acquisition with equity is at 32.6% in this sample, this would result in a 4.1%-point decrease (-0.127 * 0.326 = -0.041) and thus seems to be also economically significant. Our results are consistent with the notion that large shareholders are particularly concerned about maintaining control and therefore avoid financing acquisitions with equity to prevent dilution. This is, among others, consistent with the findings of Faccio and Masulis (2005), André and Ben-Amar (2009), Basu, Dimitrova, and Paeglis (2009), and Bouzgarrou and Navatte (2014) who also document the importance of control motives in acquisition financing decisions of large shareholders.

Since some studies reveal a non-linear relationship between ownership concentration and the method of payment in acquisitions with control concerns being only relevant in the middle range of ownership, we extend our analysis accordingly (Martin, 1996, for managerial ownership; Faccio and Masulis, 2005, for their sample of the UK and Ireland; Bouzgarrou and Navatte, 2014, for family ownership). We therefore follow prior research by including a squared term of the voting stake in Table 4.2, model (2) and a cubic term in model (3) (Faccio and Masulis, 2005; André and Ben-Amar, 2009; Basu, Dimitrova, and Paeglis, 2009; Bouzgarrou and Navatte, 2014). The squared term is found to be positive and insignificant in model (2) and only slightly significant in model (3), while the cubic term is negative and insignificant in model (3). The coefficient of the linear term remains negative and statistically significant in all models, providing corroborating evidence for a linear relationship. This finding is consistent with the results of André and Ben-

Amar (2009) as well as Faccio and Masulis (2005) for their Continental European sample where they do not find evidence for a non-linear association.

We further investigate a potential non-linearity using a spline function, as suggested by Martin (1996), Ghosh and Ruland (1998) and Faccio and Masulis (2005). Since several of these studies reveal that dilution concerns are particularly pronounced at the intermediate level of ownership while it is less relevant at low and very high levels of ownership, we follow prior research and set the cut-off points for the spline function at 20% and 60% of the voting rights of the largest shareholder (Faccio and Masulis, 2005; André and Ben-Amar, 2010; Bouzgarrou and Navatte, 2014; Teti, Dallocchio, and Currao, 2020).[13] Based on these cut-off points, we construct the following three spline variables that measure the slope of the regression in those intervals (Martin, 1996):

Votes (0-20%)	= Votes	if Votes < 20%
	= 20%	if Votes ≥ 20%
Votes (20-60%)	= 0 %	if Votes < 20%
	= Votes – 20%	if 20% ≤ Votes ≤ 60%
	= 40%	if Votes > 60%
Votes (60-100%)	= 0%	if Votes < 60%
	= Votes – 60%	if Votes ≥ 60%

Our results in Table 4.2, model (4) show that the coefficients of all three spline variables are negative, while only the variable of the intermediate range is statistically significant. This corroborates the linear negative association between ownership concentration and the likelihood to use equity to finance acquisitions. It further emphasizes that the aversion towards equity to avoid dilution is particularly pronounced in the middle range of ownership (20-60%) and appears to be

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[13] These cut-off points are close to the transition points found by Bouzgarrou and Navatte (2014) with 17% / 84% and Faccio and Masulis (2005) with 16% / 62% for their overall sample. We find similar results when using alternative cut-off points at 25% and 65%.

less important at low (0-20%) and very high (60-100%) ranges of ownership concentration. This is consistent with Faccio and Masulis (2005) and Bouzgarrou and Navatte (2014) who argue that small shareholders at low levels of ownership are unconcerned about dilution as they do not exert control and very large shareholders' control is not threatened by dilution through equity financing. They emphasize that only shareholders at an intermediate ownership range are threatened by dilution as they are "most vulnerable to a loss of control" (Faccio and Masulis, 2005, p. 1346), leading to an aversion towards equity financing in acquisitions.

Table 4.2: Voting stake and the likelihood to finance an acquisition with equity

This table reports the logit regression results modeling the likelihood of a firm to use equity as part of the acquisition financing structure. Definition of variables: indicator variable equal to one if firm increases common stock in the acquisition year by at least €0.5 million and zero otherwise (Equity Increase); voting stake of the largest shareholder (Votes); natural logarithm of total assets (Firm Size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); long-term debt divided by total assets (Leverage); cash holdings divided by total assets (Cash); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); market value by stock divided by book value (Market to Book). All independent variables are lagged by one year. The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Equity Increase Independent variable	(1)	(2)	(3)	(4)
Votes $_{t-1}$	-1.361*** (0.001)	-2.604** (0.038)	-7.660** (0.024)	
Votes^2 $_{t-1}$		1.305 (0.291)	13.288* (0.078)	
Votes^3 $_{t-1}$			-8.190 (0.105)	
Votes (0-20%) $_{t-1}$				-4.055 (0.103)
Votes (20-60%) $_{t-1}$				-2.066*** (0.005)
Votes (60-100%) $_{t-1}$				-0.433 (0.727)
Firm Size $_{t-1}$	-0.012 (0.829)	-0.014 (0.793)	-0.017 (0.756)	-0.019 (0.727)
Profitability $_{t-1}$	-1.233 (0.199)	-1.213 (0.205)	-1.186 (0.210)	-1.163 (0.215)
Leverage $_{t-1}$	0.549 (0.456)	0.524 (0.477)	0.473 (0.518)	0.475 (0.517)
Cash $_{t-1}$	-0.821 (0.351)	-0.832 (0.344)	-0.792 (0.365)	-0.831 (0.342)
Tangibility $_{t-1}$	0.497 (0.401)	0.481 (0.413)	0.529 (0.367)	0.547 (0.351)
Capex $_{t-1}$	-0.320 (0.852)	-0.237 (0.890)	-0.367 (0.828)	-0.214 (0.901)
Market to Book $_{t-1}$	0.156*** (0.002)	0.157*** (0.002)	0.159*** (0.001)	0.156*** (0.001)
Shareholder type fixed effects ($\propto_s$)	yes	yes	yes	yes
Year fixed effects ($\propto_t$)	yes	yes	yes	yes
Industry fixed effects ($\propto_j$)	yes	yes	yes	yes
N	1,490	1,490	1,490	1,490
Pseudo R^2	0.151	0.149	0.157	0.165

4.4.2 Robustness Tests

We examine the robustness of our results with several additional tests. First, we perceive that some authors who model the likelihood to pay for an acquisition in cash or stock use a probit instead of a logit regression (Faccio and Masulis, 2005; Jindal and Seth, 2019; Teti, Dallocchio, and Currao, 2020). Therefore, we re-run our baseline analysis using a probit regression in Table 4.3, model (1). The probit regression results reveal a negative association between the largest share-holder's voting rights and the likelihood to finance an acquisition with equity, which is in line with our baseline regression results. Only the magnitude seems to differ among both models. While the coefficient of our main independent variable *Votes $_{t-1}$* is -1.361 in the logit regression, it is only -0.807 in the probit model. Accordingly, a 10%-point increase in the voting stake is associated with a decrease in the likelihood to finance an acquisition with equity by 7.8% in the probit regression, corresponding to a 12.7% decrease in the logit regression. Despite this deviation in magnitude, the results appear robust to alternative statistical models.

Second, prior research has pointed out that deal size may affect acquisition financing (Hansen, 1987; Grullon, Michaely and Swary, 1997; Faccio and Masulis, 2005). Hansen (1987) predicts that information asymmetries between acquirers and targets are higher if the target is large. Therefore, acquirers should be more likely to pay for an acquisition with stock if the target value is high to share the risk of overpaying. Further, in a large acquisition, the debt capacity of the acquirer may be insufficient to fund it solely with debt, requiring additional equity. Consistently, Grullon, Michaely and Swary (1997) show that the larger the target's size in comparison to the acquirer, the more likely the acquisition is paid by stock. Similar results are reported by Faccio and Masulis (2005). Martin (1996) as well as Ghosh and Ruland (1998), however, do not find a significant relationship between method of payment and relative deal value.

Accordingly, we undertake a robustness test where we control for the relative deal value in our main regression. As data availability on deal value is limited, especially if targets are private or deal value is rather small, we use the position 'Net Assets from Acquisitions' from the acquirer's

statement of cash flow as a proxy. This approach is similar to Elsas, Flannery, and Garfinkel (2014) who use the acquirer's statement of cash flows to gather information on the financing choice for large investments. We obtain data on deal value for 641 acquisitions and drop all observations with net assets from acquisitions below €1.0 million. This leaves us with a sample of 580 acquisitions for this robustness test. The average deal value is at €335.5 million, which is smaller in comparison to other studies (e.g., Faccio and Masulis, 2005, average deal value is $578 million for European Acquisitions; de Bodt, Cousin, and Officer, 2022, average deal value is $637 million for U.S. acquisitions). This deviation may be due to the circumstance that we intentionally include acquisitions without full information on deal value and financing structure to also cover smaller acquisitions and to capture financing decisions of large shareholders more wholistically. Subsequently, we divide net assets from acquisitions by the acquirer's total assets to obtain the 'Relative Deal Value' which we include as a control variable in our regression in Table 4.3, model (2). In line with previous research, we find the likelihood to finance an acquisition with equity to increase with relative deal value. Moreover, the coefficient of the largest shareholder's voting stake remains negative and significant, which further accentuates the robustness of our results.

Third, there are some firms that undertake more than one acquisition in a year. As the number of acquisitions may affect financing choices, we restrict our sample to firms that undertake only one acquisition per year and re-run our baseline regression. The results in Table 4.3, model (3) are comparable to those of our main regression analysis, suggesting that 'serial acquirers' do not bias our findings.

Fourth, our dependent variable is an indicator variable equal to one if the common stock of the firm has been increased by at least €0.5 million in comparison to the previous year, and zero otherwise (*Equity Increase*). To show that our results are robust to alternative thresholds, we re-estimate our baseline regression using €1.0 million and €2.0 million as thresholds for our *Equity Increase* indicator in Table 4.3, model (4) and model (5) respectively. We continue to find a significant negative association between the voting stake of the largest shareholder and the likelihood

to finance an acquisition with equity, pointing out that our results are robust to alternative thresholds for our *Equity Increase* indicator.

Fifth, we further adjust our dependent variable insofar that we also include equity increases preceding an acquisition, since Martynova and Renneboog (2009) emphasize that some firms raise equity in advance to pay for an acquisition in cash. Within our sample of 1,490 acquisitions, 157 are preceded by an equity increase in the year before. Following Schlingemann (2004) and Eckbo, Makaew, and Thorburn (2018) who consider equity increases that were undertaken in the year prior to the acquisition, we additionally set our dependent indicator variable (*Equity Increase*) equal to one in those 157 cases and re-run our baseline regression. The results in Table 4.3, model (6) are virtually the same as in our baseline regression, indicating that our results are robust to different timings of equity increases to finance acquisitions.

Table 4.3: Robustness tests

This table reports the logit (and in model (1) probit) regression results modeling the likelihood of a firm to finance an acquisition with equity. Definition of variables: indicator variable equal to one if firm increases common stock in the acquisition year by at least €0.5 million and zero otherwise (Equity Increase); voting stake of the largest shareholder (Votes); natural logarithm of total assets (Firm Size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); long-term debt divided by total assets (Leverage); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); market value by stock divided by book value (Market to Book); net assets from acquisitions divided by total assets (Relative Deal Value). All independent variables, except Relative Deal Value, are lagged by one year. The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Equity Increase Independent variable	(1) Probit regression	(2) Controlling for deal value	(3) Only non-serial acquirers	(4) Equity Increase > €1.0 million	(5) Equity Increase > €2.0 million	(6) Including recent Equity Increases
Votes $_{t-1}$	-0.807***	-3.136***	-1.605***	-1.085***	-0.854**	-1.361***
	(0.000)	(0.000)	(0.001)	(0.006)	(0.021)	(0.001)
Firm Size $_{t-1}$	-0.007	-0.021	-0.034	0.016	0.074	-0.012
	(0.833)	(0.797)	(0.613)	(0.758)	(0.126)	(0.829)
Profitability $_{t-1}$	-0.732	-0.401	-1.448	-1.622*	-2.360***	-1.233
	(0.191)	(0.801)	(0.240)	(0.074)	(0.006)	(0.199)
Leverage $_{t-1}$	0.350	0.109	0.833	0.470	0.514	0.549
	(0.419)	(0.919)	(0.397)	(0.505)	(0.450)	(0.456)
Cash $_{t-1}$	-0.477	0.275	-1.195	-0.540	0.499	-0.821
	(0.344)	(0.842)	(0.232)	(0.537)	(0.555)	(0.351)
Tangibility $_{t-1}$	0.268	0.697	0.691	0.593	1.097*	0.497
	(0.443)	(0.471)	(0.371)	(0.305)	(0.052)	(0.401)
Capex $_{t-1}$	-0.122	-3.924	1.006	-0.877	-0.627	-0.320
	(0.904)	(0.228)	(0.659)	(0.605)	(0.711)	(0.852)
Market to Book $_{t-1}$	0.090***	0.106	0.186***	0.115**	0.096**	0.156***
	(0.001)	(0.206)	(0.003)	(0.011)	(0.025)	(0.002)
Relative Deal Value $_t$		6.785**				
		(0.027)				
Shareholder type fixed effects ($\propto_s$)	yes	yes	yes	yes	yes	yes
Year fixed effects ($\propto_t$)	yes	yes	yes	yes	yes	yes
Industry fixed effects ($\propto_j$)	yes	yes	yes	yes	yes	yes
N	1,490	580	818	1,490	1,490	1,490
Pseudo R^2	0.163	0.293	0.208	0.141	0.153	0.151

4.4.3 Further Analyses

To better understand the acquisition financing decision of large shareholders and their aversion towards equity financing to avoid dilution of their control stake, we undertake a number of further analyses.

Prior research has pointed out that most firms in Europe are controlled by families (La Porta, López-de-Silanes, and Shleifer, 1999; Faccio and Lang, 2002; Aminadav and Papaioannou, 2020) and that family firms tend to have an aversion towards equity financing to avoid dilution of their voting power (Anderson and Reeb, 2003; Croci, Doukas, and Gonec, 2011). Consistently, it has been shown that family firms are less likely to pay for acquisitions by stock (André and Ben-Amar, 2009; Basu, Dimitrova, and Paeglis, 2009; Bouzgarrou and Navatte, 2014; Teti, Dallocchio, and Currao, 2022). In this analysis, we do not focus on the acquisition payment method but rather on the acquisitions financing decision. Therefore, we create a family firm dummy equal to one if the firm's largest shareholder is a family or an individual holding at least 10% of the voting rights, and zero otherwise (e.g., Ellul, 2008; Caprio, Croci, and Del Giudice, 2011). In Table 4.4, model (1) we include the family dummy into our baseline regression to assess whether family firms are less likely to finance an acquisition with equity. The results reveal a negative but insignificant coefficient of the family firm dummy. We expand our analysis in model (2) insofar that we interact the family firm dummy with $Votes_{t-1}$ to discover whether the negative association between the largest shareholder's voting stake and the likelihood to finance an acquisition with equity is reinforced by the family identity of the largest shareholder. The coefficient of the interaction term is found to be positive and statistically insignificant. Accordingly, we do not find evidence that family firms differ from other firms in their acquisition financing decision.

Table 4.4: Family firms

This table reports the logit regression results modeling the likelihood of a firm to finance an acquisition with equity. Definition of variables: indicator variable equal to one if firm increases common stock in the acquisition year by at least €0.5 million and zero otherwise (Equity Increase); voting stake of the largest shareholder (Votes); firms where the largest shareholder is an individual or a family holding at least 10% of voting rights (Family Firm); natural logarithm of total assets (Firm Size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); long-term debt divided by total assets (Leverage); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); market value by stock divided by book value (Market to Book). All independent variables are lagged by one year. The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

| Dependent variable: Equity Increase | | |
Independent variable	(1)	(2)
Votes_{t-1}	-1.405*** (0.000)	-1.564*** (0.001)
Family Firm_{t-1}	-0.176 (0.362)	-0.307 (0.361)
$\text{Votes}_{t-1} \times \text{Family Firm}_{t-1}$		0.349 (0.626)
Firm Size_{t-1}	0.000 (0.994)	-0.000 (0.997)
$\text{Profitability}_{t-1}$	-1.254 (0.187)	-1.264 (0.184)
Leverage_{t-1}	0.575 (0.435)	0.552 (0.451)
Cash_{t-1}	-0.828 (0.343)	-0.837 (0.338)
Tangibility_{t-1}	0.516 (0.377)	0.520 (0.373)
Capex_{t-1}	-0.404 (0.815)	-0.419 (0.808)
$\text{Market to Book}_{t-1}$	0.155*** (0.002)	0.157*** (0.002)
Shareholder type fixed effects ($\propto_s$)	no	no
Year fixed effects ($\propto_t$)	yes	yes
Industry fixed effects ($\propto_j$)	yes	yes
N	1,490	1,490
Pseudo R^2	0.142	0.141

Apart from the family identity of the firm's controlling shareholder, there are other factors that may affect the negative association between the largest shareholder's voting stake and the likelihood to finance an acquisition with equity. One such factor that may moderate this association is the interest rate. In years with high interest rates, debt becomes a less attractive alternative to equity financing. Hence, large shareholders may be more likely to overcome their aversion towards equity to finance an acquisition when the alternative debt financing option becomes more expensive. Consequently, we expect the interest rate to positively moderate the association between the voting stake of the largest shareholder and the likelihood to finance an acquisition with equity. To examine this hypothesis, we gather information on the prime interest rate for Germany from 1995 until 2014. For the years 1995-1998 we obtain the data from the German Federal Bank and for 1999-2014 from the European Central Bank.[14] We then interact the interest rate with the voting stake of the largest shareholder and estimate the regression in Table 4.5, model (1). The voting stake of the largest shareholder is negative and significant as in our prior analyses and shows that large shareholders avoid financing acquisitions with equity. The interaction term is found to be positive and significant, indicating that large shareholders are indeed more likely to finance an acquisition with equity if the interest rates are high. We complement this analysis by using an indicator variable *High Interest Rate $_t$* equal to one if the interest rate is higher than 1.5% in the given year and zero otherwise, which we interact with the voting stake in model (2). Results continue to show a significant positive moderation and thus deliver corroborating evidence for the hypothesis that large shareholders are more likely to finance an acquisition with equity if the alternative debt option is less attractive due to high interest expenses. This insight may be particularly informative with respect to the current interest rate increases within the European Union.

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[14] The Euro replaced the German Mark as booking currency in Germany on 1 January 1999 and since then the European Central Bank is responsible for the prime interest rate instead of the German Federal Bank.

Table 4.5: Relevance of interest rates for acquisition financing decisions of large shareholders

This table reports the logit regression results modeling the likelihood of a firm to finance an acquisition with equity. Definition of variables: indicator variable equal to one if firm increases common stock in the acquisition year by at least €0.5 million and zero otherwise (Equity Increase); voting stake of the largest shareholder (Votes); prime rate of Germany (until 1998) and the EU (since 1999) (Interest Rate); indicator variable equal to one if the interest rate is larger than 1.5% (High Interest Rate); natural logarithm of total assets (Firm Size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); long-term debt divided by total assets (Leverage); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); market value by stock divided by book value (Market to Book). All independent variables, except Interest Rate and High Interest Rate, are lagged by one year. The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Equity Increase Independent variable	(1)	(2)
Votes $_{t-1}$	-2.316*** (0.000)	-2.135*** (0.000)
Interest Rate $_t$	-0.158 (0.197)	
Votes $_{t-1}$ × Interest Rate $_t$	0.580** (0.044)	
High Interest Rate $_t$		-0.304 (0.258)
Votes $_{t-1}$ × High Interest Rate $_t$		1.358** (0.027)
Firm Size $_{t-1}$	-0.017 (0.755)	-0.014 (0.791)
Profitability $_{t-1}$	-1.118 (0.240)	-1.143 (0.225)
Leverage $_{t-1}$	0.332 (0.650)	0.353 (0.629)
Cash $_{t-1}$	-0.702 (0.420)	-0.682 (0.431)
Tangibility $_{t-1}$	0.592 (0.310)	0.614 (0.292)
Capex $_{t-1}$	-0.496 (0.772)	-0.618 (0.717)
Market to Book $_{t-1}$	0.159*** (0.001)	0.153*** (0.001)
Shareholder type fixed effects ($\propto_s$)	yes	yes
Year fixed effects ($\propto_t$)	no	no
Industry fixed effects ($\propto_j$)	yes	yes
N	1,490	1,490
Pseudo R^2	0.133	0.136

Furthermore, our main analysis shows that large shareholders are hesitant to use equity financing for acquisitions to prevent dilution of their control rights. But what happens to their voting stake if they decide to undertake an equity increase is not so obvious. An equity-financed acquisition does not necessarily lead to dilution, because it is possible that the largest shareholder decides to participate in the equity increase by providing further capital to maintain its voting stake. This, however, would reinforce the under-diversification of large shareholders since even more capital would be concentrated in one single firm (Demsetz and Lehn, 1985; Dyck and Zingales, 2004; Holmen, Knopf, and Peterson, 2007; Bodnaruk et al., 2008).

So far, little is known about the dilutional effects of equity increases. Prior research has largely focused on the dilution of controlling shareholders in dual class share unifications. For instance, Pajuste (2005) provides evidence that controlling shareholders experience a significant decrease in their level of voting rights in European dual class unifications. Lauterbach and Yafeh (2011), on the other hand, use a sample of Israeli firms in the 1990s to show that controlling shareholders buy shares after and/or prior to the unification to prevent dilution of their control rights. Additionally, Kriaa and Hamza (2021) focus on post-IPO years to assess changes to the level of voting rights held by the initial controlling shareholders. Their results reveal that family shareholders are less likely to dilute, while other large shareholders are more likely to experience a dilution. We aim to complement this research by focusing on equity-financed deals to investigate whether large shareholders accept a dilution of their control stake to avoid a further increase in under-diversification.

To examine the equity increase-induced change in voting rights, the following OLS regression function is applied:

$$Votes_{i,t} = \beta_0 + \beta_1 \ Equity \ Increase_{i,t} + \beta_2 \ Votes_{i,t-1} + \beta_3 \ CONTROLS_{i,t} + \alpha_t + \alpha_i + \alpha_s + \varepsilon_{i,t}$$

We include a lagged dependent variable ($Votes_{t-1}$) to control for autocorrelation and to avoid omitted variable bias (Allison, 1990; Wilkins, 2018). Thereby, we ensure that the coefficient of the

equity increase indicator only captures the changes in Votes $_t$ which are directly caused by the equity raise. The controls and fixed effects are the same as in our baseline model.

In Table 4.6, model (1) we report the regression results. The coefficient of the equity increase indicator is significant and negative, suggesting that large shareholders in general appear to dilute through an equity-financed acquisition. In terms of magnitude, we observe that the largest shareholder's voting stake decreases by approximately 2.4%-points. When considering a mean voting stake of 41.1%, this corresponds to a decrease by 5.8%, which highlights the economic significance. This finding is in line with the notion that large shareholders accept dilution if they decide to use equity as part of their acquisition financing structure and do not provide additional capital to maintain their control stake, which may reinforce their under-diversification. In model (2) to (4) we restrict the sample to different levels of ownership concentration to examine whether certain cohorts are more or less likely to accept dilution (> 10% / > 25% / > 50%). Results indicate, however, that the level of ownership concentration does not appear to affect the equity financing-induced dilution, since the coefficient of the equity increase indicator remains largely unchanged. Only the level of significance deteriorates, which may primarily be due to reduced sample size. In model (5) and (6) we further investigate whether family firms behave differently. We first interact the family firm dummy with the equity increase indicator in model (5). The coefficient of the interaction firm is found to be very small and insignificant, suggesting that family firms do not significantly deviate from non-family firms in the dilutional effects caused by an equity increase to finance an acquisition. Corroborating results are found in model (6) where we restrict the sample to family firms and observe that the coefficient of the equity increase indicator is comparable to the coefficient in model (1). In model (7) we undertake a placebo test to accentuate the robustness of our results regarding the dilutional effects of equity increases. We therefore use an indicator variable *Placebo $_t$* to which we randomly assign a value equal to one or zero. As the values have been assigned randomly to the indicator variable, we should not observe a significant change in the voting stake of the largest shareholder which is caused by this indicator. As expected, the coefficient of the placebo indicator is insignificant and thus accentuates the

robustness of our findings. Overall, the results of these analyses point out that large shareholders, which decide to undertake an equity increase to finance an acquisition, accept to be diluted and do not provide further capital to maintain their control stake.

Table 4.6: Dilution of largest shareholder's voting stake through equity-financed acquisitions

This table reports the regression results modeling the change in the voting stake of the largest shareholder. Definition of variables: voting stake of the largest shareholder (Votes); indicator variable equal to one if firm increases common stock in the acquisition year by at least €0.5 million and zero otherwise (Equity Increase); firms where the largest shareholder is an individual or a family holding at least 10% of voting rights (Family Firm); indicator variable to which value one or zero has been assigned to randomly (Placebo); natural logarithm of total assets (Firm Size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); long-term debt divided by total assets (Leverage); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); market value by stock divided by book value (Market to Book). All independent variables are lagged by one year (except Equity Increase and Placebo). The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Votes Independent variable	(1)	(2) Votes > 10%	(3) Votes > 25%	(4) Votes > 50%	(5) Family firm moderation	(6) Only family firms	(7) Placebo test
Equity Increase $_t$	-0.024*** (0.000)	-0.026*** (0.000)	-0.027*** (0.003)	-0.017 (0.196)	-0.020** (0.026)	-0.026*** (0.009)	
Family Firm $_{t-1}$					0.065*** (0.000)		
Equity Increase $_t$ × Family Firm $_{t-1}$					-0.008 (0.522)		
Placebo $_t$							-0.009 (0.135)
Votes $_{t-1}$	0.887*** (0.000)	0.883*** (0.000)	0.878*** (0.000)	0.842*** (0.000)	0.873*** (0.000)	0.868*** (0.000)	0.893*** (0.000)
Firm Size $_{t-1}$	0.000 (0.858)	0.001 (0.504)	0.002 (0.422)	0.001 (0.760)	0.001 (0.467)	0.004* (0.093)	0.000 (0.840)
Profitability $_{t-1}$	0.001 (0.988)	-0.012 (0.793)	0.026 (0.563)	0.055 (0.412)	-0.010 (0.806)	-0.037 (0.568)	0.012 (0.782)
Leverage $_{t-1}$	-0.022 (0.479)	-0.027 (0.406)	-0.047 (0.143)	-0.025 (0.549)	-0.020 (0.517)	-0.029 (0.444)	-0.026 (0.399)
Cash $_{t-1}$	-0.000 (0.997)	-0.018 (0.576)	-0.005 (0.895)	-0.010 (0.816)	-0.002 (0.940)	-0.033 (0.399)	0.004 (0.905)
Tangibility $_{t-1}$	0.025 (0.336)	0.025 (0.370)	0.028 (0.366)	-0.001 (0.972)	0.023 (0.381)	-0.022 (0.526)	0.024 (0.371)
Capex $_{t-1}$	-0.029 (0.703)	-0.026 (0.747)	-0.044 (0.635)	-0.103 (0.362)	0.032 (0.679)	0.092 (0.299)	-0.032 (0.682)
Market to Book $_{t-1}$	-0.000 (0.987)	-0.000 (0.979)	-0.000 (0.989)	-0.008** (0.028)	-0.000 (0.974)	0.000 (0.970)	-0.001 (0.802)

Shareholder type fixed effects (α_s)	yes	yes	yes	yes	yes	yes	yes
Year fixed effects (α_t)	yes	yes	yes	yes	yes	yes	yes
Industry fixed effects (α_j)	yes	yes	yes	yes	yes	yes	yes
N	1,490	1,338	988	560	1,490	807	1,490
Adj. R^2	0.826	0.802	0.737	0.581	0.827	0.799	0.824

4.5   Conclusion

For large shareholders, the acquisition financing decision is particularly complex because they face a trade-off between control and risk-reduction motives. We find a negative association between the largest shareholder's voting stake and the firm's likelihood to use equity financing in an acquisition. This supports the control enhancement hypothesis, suggesting that large shareholders are primarily concerned about maintaining control over the firm and therefore tend to refrain from equity financing to avoid dilution. Results further show that this aversion towards equity financing is particularly pronounced in the middle range of ownership concentration, where the dilution through equity financing posits the greatest threat to the largest shareholder's control over the firm (Faccio and Masulis, 2005). These findings indicate that high concentration of voting rights can potentially restrain corporate growth, since equity capital is avoided and thus limits corporate development through acquisitions.

Additionally, we show that our results are robust to alternative specifications and undertake several further analyses. We examine whether the type of largest shareholder affects the likelihood to use equity financing in an acquisition, as existing research has pointed out that most firms in Europe are controlled by families that may be particularly concerned about maintaining control. We, however, find no evidence that family firms differ in their aversion towards equity financing of acquisitions from other large shareholders. Moreover, we show that the primary interest rate positively moderates the negative association between ownership concentration and the likelihood to use equity financing in an acquisition. Accordingly, large shareholders are more likely to overcome their aversion towards equity financing of acquisitions if interest rates are high and thus the alternative debt option is less attractive. This insight may be particularly relevant in the current situation of increasing interest rates within the European Union. Finally, we assess whether large shareholders accept a dilution of their control stake in equity-financed deals or whether they provide additional equity to maintain their pre-acquisition level of ownership. Our results show that large shareholders appear to experience a dilution through an equity-financed

deal and that this dilution does not differ by level of ownership. This indicates that large shareholders who decide to use equity financing generally accept to be diluted and do not provide additional equity to maintain their control stake.

The study contributes to the literature on ownership structure and acquisition financing by explicitly focusing on the source of financing instead of following prior research in using method of payment as a proxy. We thereby advance research by providing more accurate and direct evidence on the aversion of large shareholders towards equity financing in acquisitions, which may result in lower corporate growth. With that, we further offer important insights for policymakers with respect to the European Commission's current proposal to reintroduce multiple-vote shares. We expect the reintroduction to result in an increase in concentration of voting rights and thus a reinforcement of the aversion of large shareholders towards equity financing in acquisitions. Especially in periods of high interest rates as now, where debt as an alternative financing source is less attractive, large shareholders may decide to abandon planned acquisitions because they do not want to be diluted. Accordingly, the regulation can potentially limit corporate and thus economic growth in the European Union and should therefore be carefully considered by policymakers.

We recognize that the study has some important limitations. First, our focus is on acquisition financing and therefore the financing preferences we observe do not necessarily hold for other general corporate financing decisions. Second, although we design our empirical specification to minimize endogeneity, we cannot rule out selection, reverse causality and omitted variable bias entirely. As long as we acknowledge that our results are only applicable for firms being involved in a M&A transaction, selection bias should be less of a concern (de Bodt, Cousin, and Officer, 2022). Also, we use accounting data to capture whether firms use equity to finance acquisitions, which increases sample size and alleviates selection bias as we thereby cover smaller listed firms that are not intensively covered by media. Reverse causality seems unlikely to influence our results, but we further endeavor to minimize risk by lagging all independent variables by one year.

The primary endogeneity concern in our study is omitted variable bias. We attempt to mitigate these concerns by including several control variables as well as fixed effects. Despite all these measures, we remain exposed to endogeneity and must be cautious regarding any causal interpretation of our results. Third, our approach to examine changes in book equity has many advantages but also some disadvantages leading to limitations. It is possible that changes in equity within the year of the acquisition are due to other events and not a result of acquisition financing. However, as acquisitions are regularly large investments, they are likely to dominate and primarily determine changes in equity. Furthermore, our approach is ideal to detect a potential aversion towards equity financing but does not allow us to identify the actual mix of acquisition financing, i.e., the percentage of debt, cash and equity used. Consequently, we can only capture if equity capital is used to finance an acquisition, which is sufficient to answer our research question, but cannot make any statement about the usage of other potential additional sources of acquisition financing. Accordingly, future studies could further investigate how ownership structure affects the utilization of other financing sources in acquisitions. In this respect, a particularly promising avenue could be to examine whether firms with concentrated voting rights are more likely to use earnouts as part of their acquisition financing, because it provides them with a non-dilutive mean to finance acquisitions (Bates, Neyland, and Wang, 2018).

5   General Conclusion

The objective of this dissertation is to better understand how large shareholders make decisions since we recently experienced a significant increase in concentration of voting rights around the world, making them more powerful in corporate governance. Therefore, we explore the influence of the largest shareholder's voting stake on corporate decisions in three stand-alone studies and thus emphasize which considerations and motives of blockholders are most relevant.

The first study (Chapter 2) focuses on the capital structure decision and proposes that large shareholders hold hardly diversified portfolios and hence aim to reduce risk by using less debt capital. Consistently, we reveal a negative relationship between the voting stake of the largest shareholder and leverage. However, the results show that this relation is less pronounced in family-controlled firms, indicating that families as a special group of largest shareholders are particularly concerned about maintaining control and thus utilize non-diluting debt capital more heavily. In the second study (Chapter 3), we provide evidence that high concentration of voting rights results in a lower likelihood to undertake an acquisition. This finding is in accordance with the results of the first study, as it further emphasizes the desire of large shareholders to minimize risk. While the first study highlights that the family identity is a relevant determinant for capital structure, we find no evidence that family-controlled firms acquire differently than non-family-controlled firms. The third study (Chapter 4) assesses whether concentration of voting rights affects the acquisition financing decisions. We document that firms with a high concentration of voting rights show a lower likelihood to finance acquisitions with equity, consistent with the notion that large shareholders are concerned about maintaining control and therefore avoid the use of equity to prevent dilution of their voting stake. In accordance with that, we discover that the aversion towards equity financing is particularly strong in the intermediate range of ownership, since these shareholders are most exposed to a potential loss of control. Additionally, our analyses show that the reluctance of large shareholders to use equity is less severe in times of high interest rates, as debt becomes a less attractive alternative and thus, their aversion is attenuated to some extent.

Altogether, these findings imply that the risk-reduction and control motives are of upmost importance for large shareholders and lead them to occasionally avoid the use of equity or debt capital. This shortage of capital appears to limit corporate investments, such as acquisitions, and thus points out that concentration of voting rights can potentially attenuate corporate growth. These insights are especially important when considering that the plan of the European Commission to reintroduce multiple-vote shares is expected to result in higher concentration of voting rights and thus may amplify these adverse effects.

The dissertation extends our understanding of how large shareholders make decisions and contributes to literature as follows. First, we show that the level of voting rights held by the largest shareholder and its identity are important determinants of capital structure. The findings support both researchers and practitioners to understand more wholistically how firms set their financial leverage and that this decision is influenced by risk-reduction motives of the largest shareholder. Second, our results indicate that concentration of voting rights leads to lower M&A activity, because large shareholders aim to reduce risk, and thus impedes corporate growth. We advance existing research by revealing that this phenomenon applies to a variety of firms with respect to size and is not only limited to very large, listed firms. Third, we replace the unprecise and error prone method of payment of acquisitions, which has been used in prior research as a proxy, and directly focus on the source of financing to evaluate the impact of the largest shareholders voting stake. Accordingly, we provide more accurate evidence that large shareholders avoid equity financing in acquisitions to maintain control. Fourth, we obtain relevant insights to evaluate potential side effects of the proposed Listing Act of the European Commission and thus help policymakers to make well-informed decisions. In this respect, our results indicate that the planned reintroduction of multiple-vote shares may lead to reduced corporate growth through higher concentration of voting rights.

The results of this dissertation are faced by some limitations. We acknowledge that ownership can be endogenous and therefore design our empirical strategy to minimize the risk of

endogeneity and undertake several additional tests. However, we cannot rule out endogeneity with complete certainty. Furthermore, we focus on German listed firms and accordingly, our results may not apply to smaller firm or firms operating in other institutional environments. These limitations may be addressed in future research, because understanding how large shareholders make decisions becomes more important when considering that concentration of voting rights is currently increasing around the world and thus makes large shareholder more powerful in corporate governance. One such approach could be to examine the effect of an exogenous shock to ownership on corporate decisions to alleviate endogeneity issues. Another promising avenue for research may be to assess how ownership concentration affects financial structures, e.g., type or duration of debt, and the use of earn-out as a non-dilutive instrument in acquisition financing. Finally, the effect of concentration of voting rights on other important corporate decisions may be investigated, such as investments in research and development or growth strategies.

6   References

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7   Appendix

Table 7.1: Impact of the largest shareholder's voting stake on leverage (lagged controls)

This table reports the OLS results of the baseline regression on leverage with lagged control variables. Definition of variables: long term debt divided by total assets (Leverage); voting stake of the largest shareholder (Votes); natural logarithm of total assets (Firm size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); cash holdings divided by total assets (Cash); market value per share divided by book value per share (Market to Book). The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Leverage Independent variable	(1)	(2)	(3)	(4)
Votes $_t$	-0.051*** (0.002)	-0.040*** (0.003)	-0.038*** (0.005)	-0.051*** (0.002)
Firm Size $_{t-1}$	0.018*** (0.001)	0.003* (0.076)	0.003* (0.089)	0.020*** (0.000)
Profitability $_{t-1}$	-0.056*** (0.002)	-0.099*** (0.000)	-0.104*** (0.000)	-0.059*** (0.002)
Tangibility $_{t-1}$	0.162*** (0.000)	0.253*** (0.000)	0.254*** (0.000)	0.158*** (0.000)
Capex $_{t-1}$	0.061 (0.107)	-0.008 (0.864)	-0.024 (0.591)	0.050 (0.189)
Cash $_{t-1}$	-0.078*** (0.002)	-0.178*** (0.000)	-0.170*** (0.000)	-0.070*** (0.007)
Market to Book $_{t-1}$	0.001 (0.256)	0.002* (0.099)	0.002* (0.084)	0.001 (0.182)
Shareholder type fixed effects ($\propto_s$)	yes	yes	yes	yes
Year fixed effects ($\propto_t$)	yes	yes	yes	yes
Firm fixed effects ($\propto_i$)	yes	no	no	yes
Industry fixed effects ($\propto_j$)	no	yes	yes	no
Industry-Year fixed effects ($\propto_{j,t}$)	no	no	yes	yes
N	7,731	7,731	7,731	7,731
Adj. R^2	0.661	0.288	0.292	0.662

Table 7.2: The relationship between votes and leverage by quartiles of voting stake

This table reports the OLS results of the baseline regression on leverage. Definition of variables: long term debt divided by total assets (Leverage); voting stake of the largest shareholder (Votes); natural logarithm of total assets (Firm size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); cash holdings divided by total assets (Cash); market value per share divided by book value per share (Market to Book). The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Leverage	Voting Stake of Largest Shareholder			
Independent variable	(1) < 25%	(2) 25-49.9%	(3) 50-75%	(4) > 75%
Votes	0.015 (0.850)	0.030 (0.680)	-0.228*** (0.003)	0.021 (0.833)
Firm Size	-0.000 (0.967)	0.027** (0.014)	0.007 (0.575)	0.022 (0.143)
Profitability	-0.053 (0.217)	-0.094** (0.013)	-0.073* (0.060)	-0.066* (0.071)
Tangibility	0.355*** (0.000)	0.385*** (0.000)	0.135** (0.020)	0.132* (0.059)
Capex	-0.201* (0.064)	-0.197*** (0.006)	-0.044 (0.483)	-0.060 (0.374)
Cash				
Market to Book				
Shareholder type fixed effects ($\propto_s$)	yes	yes	yes	yes
Year fixed effects ($\propto_t$)	yes	yes	yes	yes
Firm fixed effects ($\propto_i$)	yes	yes	yes	yes
N	1,586	1,947	2,385	1,813
Adj. R^2	0.713	0.716	0.674	0.702

Table 7.3: Subsamples before and after entropy balancing

This table compares the mean, variance and skewness of the variables for the treatment and control sub-samples before and after entropy balancing. Definition of variables: natural logarithm of total assets (Firm size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); cash holdings divided by total assets (Cash); market value per share divided by book value per share (Market to Book).

	Before entropy balancing		*After entropy balancing*	
Subsample	Treatment group	Control group	Treatment group	Control group
Mean				
Firm Size	12.270	13.720	12.270	12.270
Profitability	0.087	0.064	0.087	0.087
Tangibility	0.297	0.239	0.297	0.297
Capex	0.055	0.042	0.055	0.055
Cash	0.112	0.137	0.112	0.112
Market to Book	2.164	1.954	2.164	2.164
Variance				
Firm Size	4.501	7.375	4.501	4.501
Profitability	0.017	0.017	0.017	0.017
Tangibility	0.055	0.043	0.055	0.055
Capex	0.004	0.002	0.004	0.004
Cash	0.017	0.019	0.017	0.017
Market to Book	5.736	3.348	5.736	5.736
Skewness				
Firm Size	0.650	0.227	0.650	0.650
Profitability	-1.693	-1.992	-1.693	-1.693
Tangibility	0.923	1.491	0.923	0.923
Capex	2.259	2.680	2.259	2.259
Cash	1.959	1.770	1.959	1.959
Market to Book	2.499	2.792	2.499	2.499
N	481	7,250	481	7,250

Table 7.4: Difference-in-difference – controlled vs. widely held firms during euro crisis

This table reports the results of the difference-in-difference regression on leverage using a control cut-off at 15% of voting rights held by the largest shareholder. Definition of variables: long term debt divided by total assets (Leverage); indicator variable equal to one, if the firm's largest shareholder's voting stake is above 10% and zero otherwise (Treatment); indicator equal to one for the duration of the euro crisis 2010-2011 and zero for 2007-2009 preceding the crisis (Crisis); natural logarithm of total assets (Firm size); earnings before interests, taxes, depreciation, and amortization divided by total assets (Profitability); property, plant, and equipment divided by total assets (Tangibility); capital expenditures divided by total assets (Capex); cash holdings divided by total assets (Cash); market value per share divided by book value per share (Market to Book). The p-values appear in parentheses below parameter estimates. ***, **, * indicate significance at 1%, 5%, and 10% level, respectively.

Dependent variable: Leverage Independent variable	(1)	(2)	(3)
Treatment	-0.007 (0.648)	-0.006 (0.699)	-0.004 (0.801)
Crisis	0.022* (0.055)		
Treatment × Crisis	-0.027** (0.036)	-0.025** (0.048)	-0.024* (0.068)
Firm Size	-0.013 (0.423)	-0.014 (0.403)	-0.015 (0.386)
Profitability	-0.048 (0.159)	-0.050 (0.153)	0.053 (0.137)
Tangibility	0.267*** (0.000)	0.271*** (0.000)	0.274*** (0.000)
Capex	-0.094 (0.417)	-0.107 (0.363)	-0.107 (0.318)
Cash	-0.007 (0.866)	-0.006 (0.880)	0.001 (0.978)
Market to Book	0.001 (0.720)	0.001 (0.690)	0.001 (0.741)
Shareholder type fixed effects ($\propto_s$)	yes	yes	yes
Year fixed effects ($\propto_t$)	no	yes	yes
Firm fixed effects ($\propto_i$)	yes	yes	yes
Industry fixed effects ($\propto_j$)	no	no	no
Industry-Year fixed effects ($\propto_{j,t}$)	no	no	yes
N	2,147	2,147	2,147
Adj. R^2	0.866	0.867	0.868

Declaration of Honor

I declare upon my word of honor that the thesis submitted herewith is my own work, with the exception of the help clearly indicated in the dissertation. All sources and aids used have been listed. All references or quotations in any form and their use have been clearly identified. The dissertation has not been submitted for examination purposes to any institution before.

T. Gödecke

Siegburg, Dezember 2023