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# Dynamic Aspects in Corporate Governance and Corporate Leadership

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# Chapter 1 – Introduction and Motivation

The belief of key legislators and regulators that corporate governance failures were at the heart of the corporate scandals in the early 2000 and the more recent 2007 financial crisis has led to increasing scrutiny and considerable interest in questions on corporate governance and corporate leadership among practitioners, academic research and corporate shareholders. As a result, corporate governance as a collection of control mechanisms that an organization adopts to ensure suppliers of financial capital to obtain a return on their investment (Shleifer and Vishny, 1997) has experienced far-reaching, frequently static and rather inflexible regulatory interventions over the last decades. Still today, there is an ongoing debate about further regulatory actions related to the separation of the CEO and chairman position or the introduction of mandatory age and term limits for executives and directors (see e.g., Milne, 2016; Whitehead, 2011; Subramanian, 2015).

The majority of the existing literature in corporate finance typically identifies certain governance attributes that either improve or harm the ability of corporate boards to effectively monitor the firms' management. A significant body of the literature typically relates managerial entrenchment and CEO power, or other dimensions of the structure and composition of corporate boards to firm performance. Agency theory suggests that managerial power and entrenchment lead to impaired monitoring of the firms' management and has therefore ultimately adverse effects for shareholders and corporate outcomes (see e.g., Fama and Jensen, 1983, Jensen and Meckling, 1976; Jensen, 1993). Several empirical studies on the relation between specific corporate governance structures, such as board size (see e.g., Yermack, 1996), CEO duality or the composition of boards (see, e.g., Hermalin and Weisbach, 1998; Agrawal and Knoeber, 1996; Klein, 1998; Fich and Shivdasani, 2006), and corporate performance

provide support for the hypothesis that stronger corporate governance is associated with higher firm valuation (see e.g., Gompers et al., 2003; Bebchuk et al., 2009).

More recently, the literature has started to emphasize that optimal governance structures likely depend on the specific circumstances of the firm. Hence, the selection of optimal governance structure requires a deliberate consideration of the inherent trade-off of potential benefits and costs that are associated with certain governance or leadership structures (see e.g., Brickley, Coles, and Jarell, 1997; Adams and Ferreira, 2007; Harris and Raviv, 2008). In this context, Adams, Almeida, and Ferreira (2005) provide empirical evidence consistent with potential costs and benefits of CEO power by documenting that more powerful CEOs are associated with higher variability in corporate performance, i.e., they are associated with the best and worst performing firms. Analyzing differences in optimal board structuring and composition across simple and complex firms, Linck, Netter, and Yang (2008) as well as Coles, Daniel, and Naveen (2008) document that firms determine optimal board size and board independence consistent with potential costs and benefits of monitoring and advising by the board. Faleye, Hoitash, and Hoitash (2011) further find that too intensive monitoring by the board has adverse effects on acquisition performance, corporate innovation, and ultimately firm value, particularly for firms that are more complex and for those whose value is strongly based on acquisitions and innovations. Overall, the empirical evidence provided by those studies casts doubt on the static framework regarding corporate governance and that, for example, smaller and more independent boards are necessarily positively associated with corporate performance.

Although the literature provides various insights that significantly improved economists' understanding on optimal governance and leadership structures, so far, only few studies investigate the dynamic changes over time and interdependences of governance and leadership structures with the economic environment. In a nonstationary world, optimal governance and

leadership structures likely depend on the dynamics of the firms' economic environment. First, sudden exogenous shocks to the firms' business environment, such as the 2007 financial crisis, or the dynamics of the business environment might affect the appropriateness of certain corporate governance mechanisms and leadership structures over time. Erkens, Hung, and Matos (2012) and Aebi, Sabato, and Schmid (2012) provide first empirical evidence. The authors find that higher governance standards, i.e., higher board independence, smaller boards or higher institutional ownership, are typically negatively related to the performance of financial institutions during the 2007 financial crisis. The authors argue that the adverse relation of corporate governance and firm performance in worse economic situations is attributable to excessive risk taking of banks with higher institutional ownership prior to the crisis. More independent boards are found to be associated with greater wealth transfer from shareholders to debtholders due to more intensive increases in equity capital during the crisis. Using the 1989 Canada-United States Free Trade Agreement as an exogenous shock to the competitive environment of U.S. firms, Yang and Zhao (2014) document that firms with where the CEO simultaneously serves as the chairman of the board, i.e., CEO duality, are associated with better post-shock financial performance than non-duality firms. Li, Lu, and Phillips (2017) show that granting a firm's CEO more power can be particularly beneficial in more dynamic business environments since more powerful CEOs are found to be associated with superior financial performance in more rapidly changing and more competitive business environment, more product introductions as well as higher investment and advertising activity.

Second, some empirical studies address dynamic situations related to the evolution and maturity of managers. These studies typically analyze how managerial behavior, risk taking or corporate investment policies change as managers become older or evolve over time. For example, Pan, Wang, and Weisbach (2016) analyze how CEOs' investment and disinvestment behavior varies over their time in office, documenting that the firm's net investment quantity

increases over the CEO's time in office while investment quality decreases. Brookman and Thistle (2009) document that termination risk of CEOs steadily increases during the first thirteen years in office before it starts to slightly decrease with the CEO's tenure on the job. Coles, Daniel, and Naveen (2014) study how an increasing proportion of directors who are appointed by the CEO over her tenure might impact managerial compensation and CEO turnover decisions of corporate boards. Analyzing the relation between CEO age and corporate risk-taking, Serfling (2014) documents that CEOs take significantly fewer risks as they mature over time. Older CEOs are negatively related to research and development expenses and operating leverage, while CEO age is found to be positively related to the firms' degree of diversification across business segments. While Yim (2013) shows that CEOs' acquisition activity declines as CEOs become older, Serfling (2014) finds that older CEOs are more likely to conduct risk-reducing diversifying acquisitions.

Third, dynamic situations can alternatively emerge in the context of feedback situations with corporate shareholders and financial markets. A large strand of the literature uses event study methodology to analyze investor reactions around, for example, announcements of corporate acquisitions, changes in the firms' governance or leadership structure or following the introduction of new governance reforms or disclosure regulations. Kau, Linck, and Rubin (2008) examine whether managers listen to the feedback from financial market before conducting an acquisition. The empirical findings indicate that managers are more likely to refrain from the transaction if the stock market reaction to the announcement the acquisition is less favorable. Dey, Engel, and Liu (2011) analyze shareholder reactions to the announcements of forced separations of the CEO and chairman positions due to shareholder pressure. The empirical results suggest that investors seem to dislike forced separations since such announcements are found to be associated with lower announcement returns. Yermack (2006) and Yermack and Wei (2011) use the introduction of two SEC disclosure reforms to study

investor reactions around the initial disclosure of personal aircraft use of CEOs as well as following the disclosure of CEOs' deferred debt incentives. The studies find that the first disclosure of both CEO perquisites and sizable CEO debt incentives lead to significant drops in the firms' share prices.

The objective of this dissertation is to contribute to the scarce literature on dynamic aspects in corporate governance and corporate leadership. The dissertation focuses less on cross-sectional differences and more on the question how dynamic changes over time and interactions with the economic environment in a nonstationary world might alter the effects and help assessing optimal governance and leadership structures.[1] The dissertation incorporates the three previously outlined forms of dynamics to analyze the relation of age and tenure of corporate managers as well as the choice of board leadership structure of public companies. First, dynamics induced by changes in the business and industry environment or suddenly changing economic market conditions (see Chapter 2 and 3); second, dynamics due to the evolution and maturity of individuals over time (see Chapter 2 and 3), and third, dynamics related to interactions and feedback situations with corporate shareholders (see Chapter 4). Each chapter's motivation, contribution and main findings are outlined and summarized below.

Starting with Bertrand and Schoar (2003), a vast literature documents that heterogeneity in the characteristics and attributes across managers, such as differences in age, gender, education, work experience or personality traits, help explain differences in corporate policies and financial performance value across firms. Despite the increasing trend towards the separation of the CEO and chairman position in many countries with unitary boards, such as the United

[1] The dissertation does not focus on the dynamic, reverse nature of the internal governance-performance relation, i.e., that certain governance structures might improve performance and past performance in turn might lead to the selection of these governance structures which has largely been addressed by Wintoki, Linck, and Netter (2012).

Kingdom or the United States of America[2] and the fact that major countries like Germany have mandatory two-tier boards, the role and characteristics of the chairman of the board has gained surprisingly less attention in the academic literature. The discussions on the role of the chairman have so far predominantly focused on either the existence of a separate chairman or the independence of the chairman (Coles and Hesterly, 2000). Empirical studies on the characteristics of the chairman and how these characteristics might affect the monitoring effectiveness and the performance of the firm are almost non-existent. Given the importance and particular nature of the CEO and the chairman's monitoring role, it is critical to understand how similarity and dissimilarity in the characteristics of the chair and the CEO might impact the optimal CEO-chair relation and, most importantly, whether and how the relation and the interaction between the two changes with the dynamics of the economic environment.

Chapter 2 of this dissertation attempts to address the aforementioned open research question. The chapter examines the relation between the chair of the board and the CEO, and how the relation is affected by sudden changes in the economic environmental conditions during the financial crisis. Building on the psychological and sociological literature, the chapter focuses on the age relation between the CEO and the chair and investigates whether substantial age dissimilarity between the two, which gives rise to cognitive conflict, increases board monitoring and ultimately firm value for firms with greater monitoring needs. The analysis is based on a sample of the 130 largest German public companies listed on the DAX, MDAX or SDAX during the time period from 2005 to 2010. Because German law and the mandatory two-tier board structure prevents CEO duality and also restricts CEO power in other ways, using data on German companies considerably mitigates endogeneity concerns. Overall, the chapter documents robust empirical evidence for a positive relation between substantial chair-

[2] The UK's Financial Reporting Council (2016) reports that today 99 percent of the UK FTSE 350 companies separate the CEO-chairman positions. Spencer Stuart (2016) report that about 48 percent of the S&P 500 companies have a separate chairman, up from 33 percent in 2006.

CEO age dissimilarity and the number of board meetings as well as firm value (Tobin's Q). Using the 2007 financial crisis as an exogenous shock to the monitoring needs of firms, the chapter shows that during the crisis, when fast decision making and managerial discretion were needed, the relation between age dissimilarity and firm value reverses entirely and substantial age dissimilarity is associated with significant value destruction during the crisis. The negative relation almost cancels out the positive effect observed during economic good times, i.e., non-crisis years. Hence, the chapter's findings therefore suggest that firms should mind the gap.

Given the aforementioned importance of top executives for corporate policies and financial performance, particularly of CEOs, it is of major interest to understand how CEOs evolve over their time in office and whether the effect of CEOs on the firms they run varies over their tenure. Theoretical models of entrenchment and CEO-job match make ambiguous or even no prediction regarding the relation between CEO tenure and firm value. Economic models in the finance literature that are based on agency theory and CEO entrenchment argue that as CEOs become more entrenched in their positions over time and are therefore less likely to be replaced, firm performance is expected to deteriorate over the CEOs' time in office. Shleifer and Vishny (1989), for example, argue that CEOs attempt to reduce the probability of dismissal by conducting manager-specific investments that are more profitable under them than any replacement CEO. Although such manager-specific investment behavior might improve the match between the CEO and the firm, it is not necessarily value-maximizing for the firm. Models related to job match theory suggest that CEO dismissals are less likely for CEOs who constitute good matches for the firm because they are characterized by superior productivity and therefore better firm performance over their tenure (Jovanovic, 1979; Fee and Hadlock, 2000; Allgood and Farrell, 2003). Hermalin and Weisbach (1998) develop a theoretical model that incorporates both uncertain match quality and agency costs, i.e., monitoring. According to their model, CEO tenure and the monitoring ability of the board, i.e., board independence, are

endogenous outcomes of a negotiation process between the CEO and the board. More specifically, CEO tenure and board independence are the result of the board's estimate about the ability of the CEO and the future CEO-firm match. The model predicts that firms with long-tenured CEOs may be associated with either continuous high performance due to superior match quality or alternatively with deteriorating firm performance due to agency costs of reduced monitoring which offset the positive effects of a high match quality. The management literature, in particular Hambrick and Fukutomi (1991), proposes an alternative conceptual framework on the dynamics of CEO tenure which is based on five distinct seasons that CEOs typically go through over their time in office. According to the framework, CEO tenure and firm performance are expected to exhibit a hump-shaped relation over time which arises dynamically over time as the net effect of potential benefits of tenure, e.g., gaining experience and on-the-job learning, and potential costs of tenure, e.g., increasing CEO power, a fixed CEO paradigm and the costs of an increasing probability of a CEO-firm mismatch (see also Miller, 1991; Prendergast and Stole, 1996). Consistent with this descriptive framework, Miller and Shamsie (1991) find empirical evidence for an inverse U-shaped relation between executive tenure and the financial performance for firms in the film industry. Henderson, Miller, and Hambrick (2006) provide similar evidence on the tenure-performance relation for 98 CEOs in the food industry from 1955 to 1994. Analyzing 228 CEOs in the computer industry, the authors document that CEO tenure exhibits a negative relation with organizational profitability.

Although the empirical literature already provides some evidence on the relation between CEO tenure and firm performance, the studies typically focus solely on single industries and do not generally address whether and how CEOs matter for firm performance over their tenure. In addition, only few studies investigate the potential channels and factors that might dynamically render the tenure-performance relation over time which likely render CEOs more or less

valuable for the firm. In addition, there is no empirical study that incorporates theoretical aspects of both CEO-firm match quality and CEO entrenchment.

Chapter 3 of this dissertation takes an empirical approach to investigate the dynamics of the relation how CEOs perform over their time in office and how the tenure-performance relation is dynamically influenced by the characteristics of the firms' economic environment. Using a large sample of S&P1500 companies from 1998 to 2011, the chapter documents that, on average, CEO tenure and firm performance exhibits a hump-shaped relation. Several tests for various alternative explanations, semi-parametric estimations and the analysis of announcement returns to sudden CEO deaths support the finding. However, the chapter shows that the hump-shaped relation is subject to meaningful variation depending on the dynamics of the industry and the conditions of the firm's economic environment, i.e., the macroeconomic business cycle and the exogenous takeover threat. Further, the empirical results also suggest that the relation strongly depends on the CEO's ability to adapt to change which counteracts the deterioration in the match quality between the CEO and the firm over time. The findings of the chapter are most consistent with a decline in CEO-firm match quality and increasing CEO entrenchment over time which are both expected to induce a decline in firm value, especially during the late years of the CEOs' time in office.

Finally, one of the probably most controversial issues in corporate governance is whether the CEO of the company should also serve as the chairman of the board. Despite a significant trend towards the separation of the two roles over the last decade, today, still more than half of the largest public U.S. companies combine the principal roles of the CEO and the chairman of the board (see e.g., Spencer Stuart, 2016). Extensive research on the effects of board leadership structure, in particular CEO duality, on managerial entrenchment, risk taking, and whether CEO duality promotes or hurts corporate performance resulted in mixed and rather inconsistent

evidence (see e.g., Dalton et al., 1998; Krause, Semandeni, and Cannella, 2014). Although there is little empirical support for requiring a separation of the two roles, shareholder activists, institutional investors, and proxy advisory firms urge companies to separate their leadership roles. For example, the chief executive officer of the Norwegian oil fund, the world's largest sovereign wealth fund and one of the largest shareholder in many U.S. banks, officially criticized U.S. financial institutions for their leadership practices given the history of the 2007 financial crisis and pressures them to split the dual leadership structure (Milne, 2016). In 2015, the fund used its ownership stake to initiate and vote for shareholder proposals against combining the roles at many large U.S. companies, such as the Bank or America, JPMorgan, Morgan Stanley, Wells Fargo, General Electric or ExxonMobil. A major concern in the academic literature is that endogeneity issues involved in the selection of governance structures exacerbate reliable inference about the effects and the quality of board leadership structure choices (Hermalin and Weisbach, 1998; Roberts and Whited, 2013). Hence, understanding the rationales behind the decision of corporate boards to combine or separate the CEO and chairman position is an essential and integral part in assessing firms' choices of governance and leadership structure. Although the existing literature provides evidence on the determinants that are correlated with the observable board leadership structure choices of companies (see e.g., Faleye, 2007; Linck, Netter, and Yang, 2008; Wintoki, Linck, and Netter, 2012), so far, there is no research on the qualitative determinants and rationales behind the firms' decision to combine or separate the CEO and chairman position. It is an open empirical research question whether and to what extent the qualitative rationales for the decision matter for investors and shareholders and whether they help assessing the governance quality of the firm.

Using the dynamic nature of the 2009 change in the SEC disclosure regulation which required firms to disclose the reasons for combining or separating the CEO and chairman positions, Chapter 4 of this dissertation provides valuable insights into the endogenous choice of the

firms' board leadership structure. By systematically identifying the disclosed rationales and the analysis of investors' stock market reactions to the disclosure of yet unobserved qualitative board leadership reasons for a sample of S&P 500 companies, the chapter presents a novel approach to study the decision of board leadership structure of large public companies. The results from analyzing two-day abnormal returns to equity holders following the disclosure of firms' rationales indicate differences in the information value of individual leadership reasons for market participants. Heterogeneity in investors' stock market reactions to the disclosed rationales for both board leadership types suggests that investors likely evaluate the disclosed reasons conditional on the specific circumstances and characteristics of the firm. Overall, shareholder reactions are largely consistent with potential benefits and costs of both board leadership types which are based on agency and organization theory, respectively. Analyzing textual similarity of firms' current and subsequent year disclosures on board leadership structure indicates that firms change their sections over time but the empirical results do not support the notion that firms disclose leadership rationales strategically.

The remainder of this dissertation is organized as follows: Chapter 2 ("Mind the Gap: The Age Dissimilarity between the Chair and the CEO") focuses on the relation between the CEO and chairman by focusing on the effects and dynamics of significant age dissimilarity between the two for a sample of the largest German listed firms. Chapter 3 ("Do CEOs Matter? Corporate Performance and the CEO life cycle) investigates whether CEOs' impact on the firms they run varies over their time in office and which factors dynamically render CEOs more or less valuable over time. Chapter 4 ("On the Choice of Board Leadership Structure: Evidence from a Mandatory Disclosure Regulation") deals with the endogenous choice of board leadership structure of public companies and analyzes stock market reactions following the disclosure of the qualitative rationales of corporate boards for the decision to combine or separate the CEO and chairman position. Chapter 5 concludes and provides an outlook for future research.

# Chapter 2 - Mind the Gap: The Age Dissimilarity between the Chair and the CEO[3]

## 2.1. Introduction

To date, very little is known about the impact on corporate governance of the chair's characteristics and the interaction between non-executive and executive directors via the chair and CEO. Yet, there is a great need for a sound understanding of the chair's impact on governance and the form of the optimal chair-CEO relation. This need arises not only because many countries have a two-tier board system under which the roles of the chair and CEO are separated, but also because an increasing fraction of firms operating under the single-tier board system are abandoning CEO duality.[4] We address this gap in the literature by studying the relationship between the chair of the supervisory board and the CEO under the German two-tier board system.

Under the German system, the chair plays a key role as he or she presides over the supervisory board, schedules its meetings, sets the meeting agendas, distributes material in advance of meetings, leads the board's discussions, and is expected to be kept informed by the CEO about any relevant firm issues (see the German Stock Corporation Act (AktG), paragraphs 95-116, and the German Corporate Governance Code (GCGC), section 5.2). According to German Co-determination law (paragraph 29(2), MitbestG), which applies to firms with at least 2,000

[3] This chapter is joint work with Prof. Dr. Marc Goergen (Cardiff School of Business) and Dr. Peter Limbach (Karlsruhe Institute of Technology).

[4] The 2014 U.S. Spencer Stuart Board Index reports that 47% of S&P 500 companies split the role of the CEO and the chair, and another 24% have planned a split of these two roles over the following five years. For the U.K., Renneboog and Zhao (2011) report a separate CEO and chair for 87% of their observations between 1996 and 2007.

employees, the chair is also the only member of the supervisory board who has two voting rights in case of a voting tie.

We suggest that the relation between the chair and the CEO is shaped by the age similarity between the two. Age affects an individual's attitude, behavior, and thinking, (see, e.g., Rhodes, 1983; Serfling, 2014; Taylor, 1975). Hence, directors of a similar age are likely to hold similar attitudes, opinions and beliefs (Wagner et al., 1984; Westphal and Zajac, 1995a) as they have witnessed the same historical events and social trends. In other words, directors of a similar age are likely to be mentally connected and similarly minded.

We therefore hypothesize that increasing age dissimilarity between the chair and the CEO reduces mutual attraction between the two and thereby fosters the chair's cognitive independence and gives rise to cognitive conflict (Amason, 1996; Forbes and Milliken, 1999; McPherson et al., 2001). This leads to more intensive monitoring in the form of more scrutinizing and critical judgment of the CEO's decisions and proposed actions. In addition, more scrutinizing forces the CEO to provide more information to convince the chair and the board of her plans, which makes the chair and the board better informed and hence even better able to monitor the CEO more intensively (Adams and Ferreira, 2007). The positive relation between chair-CEO age dissimilarity and monitoring intensity is expected to increase firm value. As age-induced dissimilarities between individuals are most evident across different generations (e.g., Pilcher, 1994), we argue that a generational difference, i.e., a generational age gap, between the chair and the CEO has the strongest impact on monitoring intensity and ultimately firm value.

We find strong empirical support for the hypothesis about the effects of chair-CEO age dissimilarity on monitoring intensity and firm value. The two key results are as follows. First, we find a significantly positive effect of chair-CEO age dissimilarity on firm value, as

measured by Tobin's Q, particularly when there is a generational age gap. Second, we find that substantial age dissimilarity between the chair and the CEO increases the number of board meetings, which likely proxies for the level of monitoring (see Adams, 2005; Brick and Chidambaran, 2010).[5] In line with Adams and Ferreira (2007) who argue that the optimal level of board monitoring varies across firms, we only observe the aforementioned positive effects of the number of board meetings on firm value for firms with greater monitoring needs (i.e., those with high free cash flows, dispersed control, and low intangibles).

Importantly, all regressions control for other dissimilarities between the chair and the CEO, including differences in education, gender and nationality. They also control for similarities such as those stemming from the time the two have been working together and family relations. They also adjust, among others, for the chair's and the CEO's experience and power as measured by, e.g., their tenure and whether they have founded the firm.

As we use data on German two-tier boards, the results are also less likely to suffer from endogeneity caused by CEO power. Importantly, they do not suffer from endogeneity caused by CEO duality. This is the case as, according to German law (paragraph 105, AktG), the duties of the management board ("Vorstand") are clearly delineated from decision control and monitoring as well as nominating activities that are performed by the supervisory board ("Aufsichtsrat"). The supervisory board's independence is further strengthened as German law prohibits membership by the same individual of both boards, thereby enforcing a strict separation of the roles of the chair and the CEO. Importantly, the CEO is not allowed to be involved with the nomination and appointment of members of the supervisory board.[6] In

[5] Under the German two-tier governance system, board meetings are particularly likely to reflect (board) monitoring intensity because the supervisory board's main responsibility is to monitor management on behalf of the shareholders as prescribed by German law (see paragraph 111(1), AktG, and, e.g., Andres et al., 2014).
[6] Paragraph 124(3) of the German Stock Corporation Act (AktG) prohibits executives from nominating members of the supervisory board. The firm's nomination committee nominates candidates for the supervisory board as well as candidates for the CEO position. Importantly, the CEO cannot be a member of this committee.

contrast, evidence for the U.S. one-tier system suggests that CEOs typically influence the composition of the board of directors (Fracassi and Tate, 2012; Hermalin and Weisbach, 1998; Shivdasani and Yermack, 1999), leading to increased demographic similarity (Westphal and Zajac, 1995a).

Although the use of German data mitigates endogeneity caused by CEO power and prevents endogeneity caused by CEO duality, we nevertheless use CEO-firm as well as chair-firm fixed effects and dynamic panel Generalized Method of Moments (GMM) regressions to address potential endogeneity. Furthermore, we use the return on assets (ROA), a measure of firm performance, as an alternative to firm value, measured by Tobin's Q. All of these robustness tests confirm the results. Further, the hypothesis is confirmed when age dissimilarity is measured more broadly, i.e., when we consider age dissimilarity between the chair and the entire management board or between the CEO and the entire supervisory board.

The most important endogeneity test consists of treating the 2007 financial crisis as an exogenous shock, altering the optimal levels of monitoring. The results indicate that chair-CEO age dissimilarity has a causal relation, as hypothesized, with monitoring intensity and firm value. Specifically, we find that firms with substantial chair-CEO age dissimilarity hold significantly fewer board meetings, i.e., they reduce their monitoring levels during the crisis. We further find that during the crisis substantial chair-CEO age dissimilarity destroys firm value, consistent with the increased need for managerial discretion and fast decision making (see, e.g., De Jonghe and Öztekin, 2015; Faleye et al., 2011; Li et al., 2017). Importantly, the negative effect on firm value during the crisis almost cancels out the positive effect observed during the non-crisis years. We hence conclude that firms should *mind the gap*.

Importantly, the dataset benefits from sufficient time-series variation, necessary for parameter identification. In particular, for 14% (15%) of all observations there is a CEO (chair) change.

During the financial crisis, a change of either the CEO or the chair (or both) occurs in 29% of the firm-year observations. This percentage varies between 22% and 25% for the sub-samples of firms with high and those with low monitoring needs. Further, the use of random effects as an alternative to firm-fixed effects, as one way to address potentially low time-series variation (see, e.g., Andres, 2008), confirms the results.

This chapter makes a major contribution to the as yet very limited literature about the effects of the chair's characteristics on firm value. To the best of our knowledge, the only other study that explicitly examines the role of the chair is Waelchli and Zeller (2013). They use survey data on unlisted Swiss firms and report that chair age is negatively related to firm performance. They argue that this reduction in performance is caused by a drop in the chair's cognitive abilities and motivation. However, they do not find such a relation for their control sample of listed firms. Likewise, we do not find an impact of chair age on firm value and on the number of board meetings for the sample of listed German firms.

We also contribute to the emerging literature on the effects of (dis)similarities between the CEO and the board of directors. For the U.S., Fracassi and Tate (2012), Hwang and Kim (2009), and Lee et al. (2014) provide evidence that social ties between the CEO and the other directors reduce firm value as they weaken the intensity of monitoring by the board. Ngyuen (2012) finds similar results for large French firms. While the aforementioned studies focus on the entire board as well as similarity stemming from social ties, this chapter is concerned with demographic similarity and focuses on the important relation between the chair and the CEO.

This chapter has policy implications for regulation pertaining to the composition of the board of directors, with particular reference to the age of the chair. Indeed, the results on the effect of age dissimilarity between the chair and CEO on monitoring intensity and firm value suggest that in terms of corporate governance *one size does not fit all*. These findings are in direct

contrast with recommendations from corporate governance codes to limit the age of corporate board members.

The results are not only relevant to the two-tier governance system, but also to an already large and still increasing fraction of firms operating under the single-tier board system, which have moved towards the separation of the roles of the chair and the CEO. Hence, there is an increasing need to understand the relation between the chair and the CEO. We provide evidence that demographic characteristics, age in particular, significantly shape this relation and, importantly, that this relation matters for firm value.

The remainder of this chapter is structured as follows. The next section reviews the existing literature and derives the main hypothesis. Section 2.3 discusses the methodology and presents the data. Section 2.4 provides the results of the regressions on firm value. Section 2.5 addresses the following two important questions. First, does substantial age dissimilarity between the chair and CEO indeed result in more monitoring? Second, is the positive effect of chair-CEO age dissimilarity on monitoring and firm value limited to firms with greater monitoring needs? Section 2.6 tests the robustness of the results. Conclusions follow.

## 2.2. Literature Review and Hypothesis Development

### 2.2.1. Age and age similarity

Demographic attributes – including age, educational level, ethnicity and gender – affect individual behavior, decision-making, thinking, etc. (Pfeffer, 1983). Among these demographic attributes, age and gender are the most clearly discernible ones. Contrary to gender and most other demographic attributes, age is a multifarious and dynamic collection of personal characteristics which encompass the experiences that have been made during an individual's life. As such, aging constitutes a diverse set of factors that progressively shape the

personality of a human being (Medawar, 1952), thereby continuously affecting behavior, communication, (strategic) decision making, information processing and usage, risk-taking, thinking and commitment to work (e.g., Child, 1974; Hambrick and Mason, 1984; Rhodes, 1983; Serfling, 2014; Taylor, 1975; Verhaeghen and Salthouse, 1997; Vroom and Pahl, 1971; Zenger and Lawrence, 1989).[7]

Further, Stangor et al. (1992) find that age *per se* constitutes a salient basis for group categorization, independent of whether there are underlying attitudinal or behavioral differences. In this regard, Ferris et al. (1991) argue that "age plays a major role in establishing the social context in which organizational members interact" (p. 617). Wagner et al. (1984) extend this to members of boards of directors. Directors of a similar age are likely to share experiences, and are hence likely to hold similar attitudes, opinions and beliefs. Moreover, as they have witnessed the same historical events and social trends, which have shaped their life experiences and moral values, directors and managers of a similar age are likely to be mentally connected and similarly minded.

### 2.2.2. Similarities among directors and corporate governance

Forbes and Milliken (1999) argue that, to ensure its effectiveness, the board should be cognitively independent and critically minded such that different points of views are able to emerge and the decisions proposed by the executives are scrutinized sufficiently. However, this is unlikely to be the case if board members – particularly the chair and the CEO – are demographically similar, such as of similar age.

[7] For example, older directors and executives have been found to use more information in their decision making process and to provide a more accurate assessment of that information (Taylor, 1975). They are also associated with less risk-taking behavior, while younger directors and executives tend to take more and partly excessive risks (see, e.g., Serfling, 2014; Vroom and Pahl, 1971).

This can be explained by the "similar attraction" phenomenon or homophily (e.g., Byrne, 1971; Byrne and Griffitt, 1973; see also McPherson et al., 2001). Human beings prefer to interact and communicate with individuals that are similar to them. The reason is that similarity ensures more affirmative feedback while limiting disagreement as well as the emergence of alternative opinions. As a consequence, (demographic or social) similarity between the CEO and board members can lead to less effective corporate governance.

In support of this argument, Fracassi and Tate (2012), Hwang and Kim (2009), and Lee et al. (2014) find that U.S. boards where the CEO has social ties with the other directors – in the form of shared networks, similar regional or educational background or similar political orientation – are associated with weaker corporate governance and reduced firm value. Ngyuen (2012) finds comparable results for large French firms. Furthermore, Westphal and Zajac (1995a) find that CEOs who are able to influence the nomination process tend to appoint directors with similar demographic characteristics.[8] They find that demographic similarity is associated with increased CEO compensation. Westphal and Zajac (1995b) find that, when the board is demographically similar to the CEO, it is more likely to use human-resource based explanations (i.e., attracting and retaining managerial talent) rather than agency based explanations (i.e., alignment of interest) to justify the adoption of long-term incentive plans for the CEO.

### 2.2.3. Age dissimilarity, monitoring intensity and firm value

We hypothesize that substantial age dissimilarity between the chair and the CEO increases board monitoring effectiveness, and ultimately firm value. Specifically, we argue that greater age dissimilarity increases cognitive independence of the chair and gives rise to

[8] In a related study concerned with executive careers in German banks, Berger et al. (2013) find that homophily, based on age and gender as well as social ties, increases the chances of an outsider appointment to banks' management boards.

cognitive conflicts between the chair and the CEO. This should lead to more scrutinizing and critical judgment of the actions and decisions proposed by the latter, forcing the CEO to provide more information to convince the chair and the board of her plans. Put differently, the CEO is forced to increase transparency by providing more detailed and value-relevant information regarding her proposed actions (Amason, 1996; Forbes and Milliken, 1999). [9]

We expect a certain level of age dissimilarity between individuals to be necessary for cognitive conflict to arise. In other words, we expect the relation between age dissimilarity on the one side and monitoring intensity and firm value on the other side to be strongest for large chair-CEO age differences. Particularly, as age-induced dissimilarities between individuals (such as the chair and the CEO) are most evident across different generations (e.g., Pilcher, 1994), we argue that a generational difference, i.e., a generational age gap, between the chair and the CEO has the strongest impact on monitoring intensity and firm value.

### 2.3. Methodology, Sample Selection and Descriptive Statistics

#### 2.3.1. Methodology and measures for the chair-CEO age dissimilarity

The main model is as follows:

$$\begin{aligned} y_{it} = {} & \alpha + \beta_1 * \text{Gap20 chair-CEO}_{it} + \beta_2 * \text{other chair-CEO dissimilarities}_{it} \\ & + \beta_3 * \text{CEO characteristics}_{it} + \beta_4 * \text{chair characteristics}_{it} \\ & + \beta_5 * \text{supervisory board characteristics}_{it} + \beta_6 * \text{firm characteristics}_{it} \\ & + \text{year dummies} + \mu_i + \varepsilon_{it} \end{aligned} \quad \textbf{(1)}$$

[9] Consistent with the importance of cognitive conflict and critical questions, the 2012 U.S. Business Roundtable's Principles of Corporate Governance state: "Board independence depends not only on directors' individual relationships and outlook but also on their ability to question management, exercise constructive skepticism and express their views even when those views may differ from those of management or other directors" (p. 14).

As dependent variables, we use *Tobin's Q* to measure firm value and the number of supervisory board meetings (*Board meetings*) to measure monitoring intensity.

*Gap20 chair-CEO* is the primary measure for the chair-CEO age dissimilarity. This dummy variable is set to one if the age difference between the chair and the CEO is a generational gap. In line with the sociology literature (e.g., Strauss and Howe, 1997), we define a generational age gap as an age difference of at least 20 years. Again, the rationale for using a generational age gap is that cognitive conflict between the chair and the CEO should be strongest if both are from different generations.

In addition, we also use *Chair-CEO age difference (+/-)*, which is the age of the chair minus the age of the CEO, and its square, i.e., *Squared chair-CEO age difference*. In this regard, it is important to note that cognitive conflict, but also communication problems, between the chair and the CEO may not only arise if the former is considerably older than the latter, but also if the former is younger than the latter. If the relation between age difference and firm value is non-linear, as suggested, and if the sign of the age difference does not matter, only the squared term of this functional form (i.e., the second-order polynomial) is expected to be significant. Alternatively, we use *Chair-CEO age difference absolute*, which is the absolute value of the age difference between the chair and the CEO. This alternative measure is used in conjunction with *Chair younger*, a dummy variable, which is set to one if the chair is younger than the CEO, and zero otherwise. Based on the above argument, we do not expect this dummy variable to be significantly different from zero. Finally, whenever we use *Chair-CEO age difference absolute*, we use the natural logarithm of the dependent variable given that we postulate a non-equidistant (i.e., a non-uniform) effect of each year of age difference.

All of the regressions include the following five sets of control variables. All these variables are defined in detail in Appendix 2.A. The first set includes chair-CEO dissimilarities other

than age, i.e., education, gender and nationality, as well as chair-CEO similarities, i.e., the number of years the chair and CEO have been working together in their respective positions (*Chair-CEO joint tenure*) and a dummy variable equaling one if the chair and CEO are from the same family (*Chair-CEO same family*). All of these variables may affect cognitive dissonance and communication between the chair and the CEO, in addition to age dissimilarity.

The following four sets of control variables include CEO characteristics, chair characteristics, supervisory board characteristics and firm characteristics. CEO characteristics include the variables *CEO tenure*, i.e., the number of years the CEO has been serving as the firm's CEO, and *Founder CEO*, a dummy variable equaling one if the CEO founded the firm. These two variables serve as proxies for the CEO's experience and power (see, e.g., Adams et al., 2005). Chair characteristics include *Busy chair*, a dummy variable set to one if the chair holds three or more directorships (Fich and Shivdasani, 2006), *Chair tenure* and *Founder chair* (both defined as above for CEOs) and a dummy variable *Chair is former firm executive*, which is set to one if the chair was an executive of the firm earlier in her career (in the spirit of Fahlenbrach et al., 2011, and Andres et al., 2014). The last three variables attempt to capture the chair's experience and power.

The two dummy variables *CEO change* and *Chair change*, which are set to one for years with a CEO and chair change, respectively, are also included in this set of controls. As the chair-CEO age difference may change due to chair and CEO changes, which are likely to correlate with the firm's performance and number of board meetings, these two controls are necessary to separate the (persistent) effect of the variables measuring the chair-CEO age dissimilarity from the (one-off) effects of changes at the top of the firm.

Supervisory board characteristics include *Board age*, which is the average age of the shareholder representatives on the supervisory board, *Busy board* (as defined in Fich and

Shivdasani, 2006,) and *CV board age*.[10] The latter is the coefficient of variation calculated as the standard deviation of the age of shareholder representatives on the supervisory board divided by *Board age*. *CV board age* controls for age diversity on the supervisory board, which might correlate with the age of the chair and thus with the measures of chair-CEO age dissimilarity.

Firm characteristics include *Book leverage* (i.e., total debt over total assets), the number of a firm's business segments generating at least 10% of the firm's total revenues (*Business segments*), capital expenditures as a fraction of total assets (*CapEx/TA*), a dummy variable *Family firm* (we use the definition from Andres, 2008), *Firm age* (since foundation), *Free float* (of the firm's voting shares), R&D expenses as a fraction of total revenues (*R&D/Sales*), return on equity (*ROE*), *Sales growth* (i.e., the nominal growth rate over the past two years), *Stock volatility* (i.e., the standard deviation of daily stock returns over the past two years) and *Total assets* as used in the existing literature (e.g., Andres, 2008; Bebchuk et al., 2009; Bhagat and Bolton, 2008, Custódio and Metzger, 2014).

Some of the regressions in Table 2.2 and Table 2.3 examine the effects of chair and CEO age (*Chair age* and *CEO age*) on firm value and monitoring intensity, with and without chair and CEO age and the main variable *Gap20 chair-CEO*. This allows us to investigate whether age itself matters and whether the results for age dissimilarity are only reflecting age effects.

The main estimation technique we use is firm-fixed effects regressions. As robustness checks (see Section 2.6.2), we use CEO-firm fixed effects and chair-firm fixed effects as well as

[10] As information about the age of the employee representatives on the supervisory board is not available, we have to limit age-related variables for the supervisory board to the shareholder representatives.

random effects.[11] All the regressions are based on an unbalanced panel of data covering the years 2005 to 2010. We describe this panel in the following sub-sections.

### 2.3.2. Sample selection

We start by gathering information on all firms that are members of the three largest German stock exchange indices – the DAX, MDAX and SDAX – for each year during 2005 and 2010.[12] This results in an unbalanced panel of 780 firm-year observations for 172 firms. We exclude 31 firm-year observations for 7 firms that are not incorporated under German law (e.g., Air Berlin plc and EADS N.V.). For the remaining 165 firms we collect information for the CEO and each shareholder representative on the supervisory board. Following Westphal and Zajac (1995a), we exclude firm-year observations for which the age of more than 25% of the supervisory board members is not available. This leads to the exclusion of 36 firm-year observations. Finally, we exclude another 10 firm-year observations due to missing data. This leaves us with a final unbalanced panel comprising 700 firm-year observations for 150 firms, covering approximately 86% of the market capitalization of all German firms at the end of 2006.

Most of the non-financial information is collected from the annual reports, company filings (e.g., security prospectuses or governance reports) and company websites, Hoppenstedt Aktienführer, Munzinger Biographien, and Standard & Poor's Capital IQ database. Any remaining gaps in the data (particularly age) are filled by contacting the investor relations

[11] Due to changes in CEOs and chairs during the sample period, we have more CEOs (234 distinct CEOs) and more chairs (214 distinct chairs) than sample firms (150 distinct firms).
[12] We include firms from regulated industries (i.e., SIC codes 4000-4999 and 6000-6999). The results do not change when we exclude these firms (see Section 2.6.3).

departments of the firms concerned.[13] Accounting data is retrieved from S&P Capital IQ. Data on stock prices is from Datastream.

### 2.3.3. Descriptive statistics

Table 2.1 presents descriptive statistics for the dataset. Panel A focuses on the age characteristics of the chair and the CEO, the other chair-CEO dissimilarities as well as the CEO characteristics and chair characteristics. The age gap between the chair and the CEO is at least 20 years for 15.2% of all observations. Importantly, for all such cases the chair is older than the CEO. The average CEO age is 54 years, while the average chair age is 63 years. On average, the absolute age difference between the chair and the CEO is 11.3 years. The chair is younger than the CEO for 13% of all observations.[14]

[13] Despite the best efforts, we are not able to gather data on all of the variables for all of the sample firms. In particular, we are not able to obtain information about the chair's age for three firms. We are also not able to obtain full information about board meetings for two firm-year observations and information about active board committees for four firm-year observations.

[14] For chairs that are younger than the CEO, the mean age difference is 6 years with a maximum of 18 years (not tabulated). Appendix 2.B shows the distribution of the age difference between the CEO and the chair.

## Table 2.1: Summary statistics

This table presents the descriptive statistics for the sample of German firms listed on the DAX, MDAX or SDAX in the sample period 2005 to 2010. All variables are defined in Appendix 2.A.

| Variable | mean | 1. quart. | median | 3. quart. | SD | min | max | N |
|---|---|---|---|---|---|---|---|---|
| *Panel A - CEO and chair characteristics* | | | | | | | | |
| ***Age characteristics*** | | | | | | | | |
| Gap20 chair-CEO | 0.152 | | | | | | | 697 |
| Chair-CEO age difference absolute | 11.28 | 5.00 | 10.00 | 16.00 | 7.87 | 0.00 | 40.00 | 697 |
| Chair-CEO age difference (+/-) | 9.68 | 3.00 | 10.00 | 16.00 | 9.77 | -15.00 | 40.00 | 697 |
| Squared chair-CEO age difference | 189.02 | 25.00 | 100.00 | 256.00 | 233.00 | 0.00 | 1,600 | 697 |
| CEO age (yrs) | 53.68 | 49.00 | 54.00 | 59.00 | 7.11 | 33.00 | 71.00 | 700 |
| Chair age (yrs) | 63.37 | 59.00 | 65.00 | 68.00 | 7.67 | 31.00 | 82.00 | 697 |
| Chair younger | 0.13 | | | | | | | 697 |
| ***Other chair-CEO dissimilarities*** | | | | | | | | |
| Chair-CEO different education | 0.58 | | | | | | | 700 |
| Chair-CEO different gender | 0.003 | | | | | | | 700 |
| Chair-CEO different nationality | 0.17 | | | | | | | 700 |
| Chair-CEO joint tenure | 3.85 | 2.00 | 3.00 | 5.00 | 2.87 | 1.00 | 16.00 | 700 |
| Chair-CEO same family | 0.02 | | | | | | | 700 |
| ***CEO characteristics*** | | | | | | | | |
| CEO change | 0.14 | | | | | | | 700 |
| CEO tenure | 6.36 | 3.00 | 5.00 | 9.00 | 5.29 | 1.00 | 38.00 | 700 |
| Founder CEO | 0.05 | | | | | | | 700 |
| ***Chair characteristics*** | | | | | | | | |
| Busy chair | 0.76 | | | | | | | 700 |
| Chair change | 0.15 | | | | | | | 700 |
| Chair tenure | 5.06 | 2.00 | 4.00 | 7.00 | 3.90 | 1.00 | 28.00 | 700 |
| Chair is former firm executive | 0.29 | | | | | | | 700 |
| Founder chair | 0.05 | | | | | | | 700 |

| *Panel B - Supervisory board characteristics* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Variable | mean | 1. quart. | median | 3. quart. | SD | min | max | N |
| Board age | 59.91 | 57.17 | 60.67 | 63.33 | 4.80 | 44.30 | 71.40 | 700 |
| Board meetings | 5.79 | 4.00 | 5.00 | 17.00 | 2.40 | 4.00 | 34.00 | 698 |
| Board size | 12.38 | 6.00 | 12.00 | 17.00 | 5.67 | 3.00 | 21.00 | 700 |
| Busy board | 0.81 | | | | | | | 700 |
| CV board age | 0.13 | 0.09 | 0.13 | 0.17 | 0.06 | 0.01 | 0.34 | 700 |
| Avg. tenure SB members | 5.24 | 4.16 | 5.33 | 6.25 | 1.68 | 1.00 | 11.83 | 700 |
| No. of active committees | 3.07 | 2.00 | 3.00 | 4.00 | 1.66 | 0.00 | 8.00 | 696 |
| Union representatives | 0.24 | 0.00 | 0.33 | 0.43 | 0.22 | 0.00 | 1.00 | 700 |

**Table 2.1: Summary statistics (cont'd)**

| *Panel C - Firm characteristics* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Variable | mean | 1. quart. | median | 3. quart. | SD | min | max | N |
| Book leverage | 0.25 | 0.11 | 0.22 | 0.35 | 1.90 | 0.00 | 0.89 | 700 |
| Business segments | 2.27 | 2.00 | 2.00 | 3.00 | 1.03 | 1.00 | 6.00 | 700 |
| CapEx/TA | 0.04 | 0.02 | 0.04 | 0.06 | 0.04 | 0.00 | 0.22 | 700 |
| Family firm | 0.32 | | | | | | | 700 |
| FCF/Sales | 0.10 | 0.03 | 0.08 | 0.13 | 0.17 | -0.78 | 1.34 | 651 |
| Firm age (foundation) | 87.43 | 35.00 | 87.00 | 130.00 | 56.68 | 1.00 | 262.00 | 700 |
| Free float (%) | 47.82 | 28.99 | 47.56 | 66.36 | 24.55 | 0.00 | 100.00 | 698 |
| Herf. control | 0.17 | 0.02 | 0.10 | 0.27 | 0.20 | 0.00 | 0.97 | 699 |
| Intangible assets | 0.14 | 0.02 | 0.09 | 0.21 | 0.16 | 0.00 | 0.74 | 700 |
| R&D/sales | 0.01 | 0.00 | 0.00 | 0.01 | 0.03 | 0.00 | 0.26 | 700 |
| ROA | 0.11 | 0.06 | 0.10 | 0.14 | 0.08 | -0.25 | 0.40 | 651 |
| ROE | 0.10 | 0.05 | 0.11 | 0.18 | 0.27 | -2.73 | 3.62 | 700 |
| Sales growth | 1.19 | 0.97 | 1.12 | 1.26 | 0.64 | -5.38 | 7.42 | 700 |
| Tobin's Q | 1.46 | 1.01 | 1.20 | 1.54 | 0.84 | 0.59 | 8.46 | 699 |
| Total assets | 49,263 | 936.2 | 2,575 | 13,565 | 184,648 | 50.9 | 2,202,423 | 700 |

| *Panel D – Management board characteristics* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Variable | mean | 1. quart. | median | 3. quart. | SD | min | max | N |
| CV management board age | 0.09 | 0.06 | 0.09 | 0.12 | 0.04 | 0.01 | 0.32 | 618 |
| Management board age | 49.91 | 46.67 | 50.18 | 53.50 | 4.91 | 30.00 | 63.00 | 698 |
| Management board size | 4.59 | 3.00 | 4.00 | 5.00 | 1.86 | 2.00 | 13.00 | 700 |
| Management board tenure | 4.48 | 2.50 | 4.00 | 5.75 | 3.27 | 0.00 | 34.00 | 674 |

In terms of other chair-CEO dissimilarities, the chair and CEO have a different educational background for 58% of the observations and are of different genders for only two observations as virtually all chairs and CEOs are male. Further, the chair and CEO are of a different nationality for 16.7% of all observations. The average length of the (firm-specific) relation between the chair and the CEO (*Chair-CEO joint tenure*) is almost 4 years. Finally, the chair and CEO are from the same family for 2% of all observations.

Moving on to the CEO and chair characteristics, average CEO tenure is about 6 years. The percentage of founder CEOs is 5%, and this is in line with Andres (2008). Turning to the chair characteristics, for 76% of all observations the chair is busy. Average chair tenure is 5 years. The chair is the firm's founder for 5.1% and a former firm executive for 29% of all observations, respectively. There are no cases of deaths of CEOs or chairs in the sample.

Turning to supervisory board characteristics in Panel B, average board size is about 12, with approximately 7 shareholder representatives. Note that, in Germany, board size depends on firm size as prescribed by law (see paragraph 95, AktG). Average board tenure (traced back to 1998) is about 5 years. Average board age (based on shareholder representatives) is about 60 years. The average annual number of board meetings is about 6. Sample firms typically have about 3 active board committees. All supervisory board (and chair) characteristics have values in line with those reported by the Spencer Stuart Board Index for 2007 and 2009.

Panel C reports descriptive statistics for the firm characteristics. On average, book leverage is 25%, the number of business segments is 2.27, capital expenditures amount to 4% of total assets, firm age (since foundation) is 87 years, R&D expenditures are 1.3% of sales, return on equity is 10%, and Tobin's Q is 1.46. The average (median) book value of total assets is 49,263 (2,575) million EUR. Regarding control and ownership, average free float is approximately 48%. About one third of all firm-year observations relate to family firms.[15] These descriptive statistics are similar to those from other studies on Germany, such as Andres (2008), Bermig and Frick (2010), and Dittmann et al. (2010).

Finally, Panel D contains descriptive statistics for the management board characteristics. The management board is younger on average, smaller in size and has lower tenure as compared to the supervisory board (see Panel B).

[15] Compared to Andres (2008), we find a lower percentage of family firms. There are at least two reasons for this. First, Andres (2008) does not restrict his sample to the largest stock listed firms (DAX, MDAX and SDAX) as he uses all firms listed on the Official Market ("Amtlicher Handel") of the Frankfurt Stock Exchange at December 31, 1998. It is then not surprising that we find a lower fraction of family firms given the focus on the largest German firms. Second, Andres (2008) excludes banks and insurance companies which are less likely to be family firms.

## 2.4. Chair-CEO Age Dissimilarity and Firm Value

We now turn to the regression results for the link between chair-CEO age dissimilarity and firm value (i.e., Tobin's Q) shown in Table 2.2. All regressions adjust for firm-fixed and year-fixed effects and include the sets of control variables introduced in Section 2.3.1. The regressions vary in terms of the measure of chair-CEO age dissimilarity. When we use *Chair-CEO age difference absolute*, we use the natural logarithm of Tobin's Q as the dependent variable, as motivated in Section 2.3.1.[16]

**Table 2.2: Chair-CEO age dissimilarity and firm value (Tobin's Q)**

This table reports firm-fixed effects panel regression results of *Tobin's Q* on measures of age dissimilarity between the CEO and the chair of the supervisory board, other CEO-chair characteristics, CEO characteristics, chair characteristics, supervisory board characteristics, and firm characteristics for German firms listed on the DAX, MDAX, or SDAX between the sample period 2005 to 2010. *Tobin's Q* is calculated as sum of the firm's market capitalization and the difference between the book value of total assets and the book value of equity, divided by the book value of total assets. Specifications (1) to (4) and (7) use *Tobin's Q* as the dependent variable, while specifications (5) and (6) use the natural logarithm of *Tobin's Q* as the dependent variable. *Gap20 chair-CEO* is a dummy variable that equals one if the age difference between the chair of the supervisory board and the CEO is at least 20 years, and zero otherwise. *Chair-CEO age difference (+/-)* is the age difference between the chair and the CEO, calculated as the chair's age minus the age of the CEO. *Chair-CEO age difference absolute* is the absolute value of the age difference between the chair and the CEO. All other variables are defined in Appendix 2.A. Robust t-statistics (in parentheses) are based on standard errors clustered by industry (4-digit SIC codes) and year. The constant is included in all regressions, but not reported. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

[16] Using the logarithmic form, we also account for potential outliers and allow the reader to interpret the findings as semi-elasticities.

| | Tobin's Q | | | | ln(Tobin's Q) | | Tobin's Q |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| **Gap20 chair-CEO** | | **0.2693*** ** | **0.3251*** ** | | **0.1496*** ** | | **0.2649*** ** |
| | | **(3.705)** | **(4.054)** | | **(4.052)** | | **(3.193)** |
| **Chair-CEO age difference (+/-)** | | | | **-0.0042** | | | |
| | | | | **(-1.400)** | | | |
| **Squared chair-CEO age difference** | | | | **0.0004*** ** | | | |
| | | | | **(3.371)** | | | |
| **Chair-CEO age difference absolute** | | | | | | **0.0041** ** | |
| | | | | | | **(2.193)** | |
| Chair younger | | | | | | -0.0114 | |
| | | | | | | (-0.335) | |
| CEO age | 0.0309 | | 0.4161* | | | | |
| | (0.157) | | (1.801) | | | | |
| Chair age | 0.1450 | | -0.0605 | | | | |
| | (0.592) | | (-0.269) | | | | |
| ***Other chair-CEO dissimilarities*** | | | | | | | |
| Chair-CEO different education | 0.0114 | -0.0168 | -0.0312 | 0.0107 | -0.0013 | 0.0128 | -0.0200 |
| | (0.259) | (-0.370) | (-0.673) | (0.246) | (-0.056) | (0.563) | (-0.439) |
| Chair-CEO different gender | 0.0343 | -0.0097 | 0.0145 | -0.0317 | 0.0062 | 0.0144 | 0.1228 |
| | (0.231) | (-0.074) | (0.097) | (-0.243) | (0.094) | (0.215) | (0.838) |
| Chair-CEO different nationality | 0.0212 | 0.0319 | 0.0451 | 0.0225 | -0.0012 | -0.0053 | 0.0234 |
| | (0.207) | (0.318) | (0.461) | (0.217) | (-0.031) | (-0.130) | (0.221) |
| Chair-CEO joint tenure | -0.0015 | 0.0082 | 0.0052 | 0.0008 | 0.0016 | -0.0022 | 0.0077 |
| | (-0.120) | (0.577) | (0.372) | (0.064) | (0.259) | (-0.411) | (0.539) |
| Chair-CEO same family | 0.0230 | 0.2442* | 0.2355 | 0.0745 | 0.0975 | 0.0205 | 0.1443 |
| | (0.158) | (1.798) | (1.620) | (0.509) | (1.447) | (0.294) | (0.864) |
| ***CEO characteristics*** | | | | | | | |
| CEO change | -0.0776** | -0.0922** | -0.0890** | -0.0862** | -0.0509*** | -0.0446** | -0.0945** |
| | (-2.118) | (-2.511) | (-2.421) | (-2.341) | (-2.826) | (-2.389) | (-2.256) |
| CEO tenure | -0.0110 | -0.0121* | -0.0164** | -0.0100 | -0.0059* | -0.0029 | -0.0140*** |
| | (-1.525) | (-1.898) | (-2.189) | (-1.485) | (-1.833) | (-0.810) | (-2.730) |
| Founder CEO | 0.3519* | 0.4745*** | 0.4540*** | 0.3707** | 0.3009*** | 0.2650** | 0.5304*** |
| | (1.754) | (2.959) | (2.763) | (2.077) | (3.009) | (2.266) | (3.700) |
| ***Chair characteristics*** | | | | | | | |
| Busy chair | 0.0126 | 0.0167 | 0.0197 | 0.0138 | 0.0103 | 0.0076 | 0.0011 |
| | (0.257) | (0.341) | (0.402) | (0.279) | (0.464) | (0.342) | (0.024) |
| Chair change | 0.0402 | 0.0400 | 0.0416 | 0.0425 | 0.0063 | 0.0073 | 0.0071 |
| | (0.994) | (1.010) | (1.036) | (1.064) | (0.333) | (0.381) | (0.211) |
| Chair tenure | 0.0003 | -0.0079 | -0.0062 | -0.0013 | -0.0053 | -0.0032 | -0.0074 |
| | (0.035) | (-0.745) | (-0.575) | (-0.135) | (-1.217) | (-0.781) | (-0.655) |
| Chair is former firm executive | -0.0675 | -0.0674 | -0.0523 | -0.0505 | -0.0429 | -0.0435 | -0.0625 |
| | (-0.945) | (-1.058) | (-0.800) | (-0.713) | (-1.353) | (-1.298) | (-0.936) |
| Founder chair | 0.1283 | 0.1034 | 0.0785 | 0.1381 | 0.1070** | 0.1429** | 0.1018 |
| | (1.032) | (1.052) | (0.745) | (1.246) | (1.969) | (2.271) | (1.056) |
| ***Supervisory board char.*** | | | | | | | |
| Board age | 0.0116 | 0.0110 | 0.0121 | 0.0117 | 0.0063* | 0.0060* | 0.0133* |
| | (1.483) | (1.458) | (1.542) | (1.507) | (1.741) | (1.674) | (1.707) |
| Busy board | -0.0336 | -0.0645 | -0.0631 | -0.0541 | -0.0282 | -0.0159 | -0.1220* |
| | (-0.510) | (-1.011) | (-0.946) | (-0.847) | (-0.883) | (-0.493) | (-1.749) |
| CV board age | -0.5073 | -0.4260 | -0.4271 | -0.5633 | -0.0170 | -0.0882 | -0.3066 |
| | (-0.940) | (-0.797) | (-0.800) | (-1.056) | (-0.065) | (-0.339) | (-0.549) |
| ***Firm characteristics*** | | | | | | | |
| Book leverage | -0.6507** | -0.6459** | -0.6593** | -0.6654** | -0.3265*** | -0.3196*** | -0.7882*** |
| | (-2.453) | (-2.446) | (-2.491) | (-2.530) | (-2.722) | (-2.687) | (-2.755) |
| Business segments | -0.0851*** | -0.0908*** | -0.0909*** | -0.0845*** | -0.0427*** | -0.0389*** | -0.1030*** |
| | (-2.931) | (-3.194) | (-3.137) | (-2.962) | (-3.166) | (-2.868) | (-3.475) |
| CapEx/TA | -0.9548 | -0.7941 | -0.7527 | -0.9728* | -0.7951** | -0.9208*** | -0.2398 |
| | (-1.625) | (-1.372) | (-1.274) | (-1.649) | (-2.526) | (-2.893) | (-0.455) |

**Table 2.2: Chair-CEO age dissimilarity and firm value (Tobin's Q) (cont'd)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Family firm | -0.3203*** | -0.2703*** | -0.2532*** | -0.2902*** | -0.1245** | -0.1501*** | -0.2557*** |
| | (-2.935) | (-2.826) | (-2.679) | (-2.909) | (-2.386) | (-2.669) | (-3.306) |
| Firm age (foundation) | -0.0800 | -0.1096 | -0.1083 | -0.0715 | 0.0106 | 0.0317 | -0.1653 |
| | (-0.634) | (-0.836) | (-0.803) | (-0.535) | (0.175) | (0.535) | (-0.899) |
| Free float | -0.0029** | -0.0029** | -0.0029** | -0.0028** | -0.0011** | -0.0011** | -0.0012 |
| | (-2.339) | (-2.325) | (-2.287) | (-2.253) | (-1.991) | (-1.973) | (-1.080) |
| R&D/sales | -2.5271 | -2.5928 | -2.9352 | -2.2436 | -1.0152 | -0.7303 | -3.4934 |
| | (-0.754) | (-0.794) | (-0.858) | (-0.696) | (-0.612) | (-0.447) | (-1.158) |
| ROE | 0.0311 | 0.0138 | 0.0147 | 0.0188 | -0.0146 | -0.0083 | 0.0131 |
| | (0.482) | (0.211) | (0.224) | (0.290) | (-0.456) | (-0.259) | (0.197) |
| Sales growth | 0.0007 | 0.0102 | 0.0124 | -0.0014 | -0.0079 | -0.0136 | -0.0095 |
| | (0.030) | (0.436) | (0.511) | (-0.059) | (-0.909) | (-1.526) | (-0.588) |
| Stock volatility | 2.1577 | 1.4166 | 1.5823 | 1.8185 | -0.5760 | -0.2433 | 4.9004** |
| | (0.898) | (0.588) | (0.662) | (0.759) | (-0.398) | (-0.170) | (2.207) |
| Total assets | -0.1611*** | -0.1539*** | -0.1633*** | -0.1554*** | -0.1099*** | -0.1083*** | -0.1140* |
| | (-2.814) | (-2.877) | (-2.987) | (-2.810) | (-3.748) | (-3.517) | (-1.937) |
| ***Management board char.*** | | | | | | | |
| CV management board age | | | | | | | 1.3902** |
| | | | | | | | (2.471) |
| Management board age | | | | | | | -0.0138* |
| | | | | | | | (-1.781) |
| Management board size | | | | | | | -0.2090** |
| | | | | | | | (-1.994) |
| Management board tenure | | | | | | | 0.0150 |
| | | | | | | | (1.476) |
| Number of obs. | 694 | 694 | 694 | 694 | 694 | 694 | 599 |
| Fixed effects | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year |
| Within R-squared | 0.286 | 0.301 | 0.304 | 0.293 | 0.438 | 0.425 | 0.374 |

Regression (1) does not include any measure of chair-CEO age dissimilarity, but includes CEO age and chair age. Neither of these two variables is significant at any of the conventional levels.[17] In contrast, any of the four measures of chair-CEO age dissimilarity (see regressions (2) to (6)) is significant at the 5% level or better. In detail, the main measure of chair-CEO age dissimilarity, i.e., *Gap20 chair-CEO*, is significant at the 1% level in all regressions that include this variable (regressions (2), (3), and (5)), independent of whether we control for the age of the chair and the CEO (regression (3)) or whether we use the natural logarithm of Tobin's Q (*ln(Tobin's Q)*) as the dependent variable (in regression (5)).

[17] This finding is in line with the recent literature. For example, Custódio and Metzger (2014) report that CEO age is not associated with firm value in the U.S. Waelchli and Zeller (2013) find that chair age is not associated with lower firm performance in publicly listed Swiss firms. See also the introduction to the present chapter.

Regressions (4) and (6) include the signed age difference as well as its square and the absolute age difference, respectively, as alternative measures of age dissimilarity. In regression (4), the square of the signed age difference is significant (at the 1% level), while the simple chair-CEO age difference is not significant, as expected. This further supports the reasoning that only the large age differences rather than all age differences create value and that the sign of the age difference does not matter. Regression (6) confirms this conclusion. The regression coefficient on *Chair-CEO age difference absolute* is positive and significant at the 5% level. In contrast, the *Chair younger* dummy variable is not significant. This confirms the argument that what matters is age dissimilarity between the chair and the CEO and not whether the former is older than the latter (or vice-versa). When we interact the variable *Chair-CEO age difference absolute* with the dummy variable *Chair younger* in unreported regressions, we find that the coefficient on the interaction term is not significant, while the coefficient on *Chair-CEO age difference absolute* remains significant. This constitutes another test, in addition to the use of the second-order polynomial of the signed age difference between the chair and the CEO, of the validity of the argument that the age difference between the chair and the CEO, but not the sign of this difference, matters.

Regression (7) of Table 2.2 controls for additional important characteristics of the management board, which capture age variation and experience and are thus likely to correlate with chair-CEO age dissimilarity. These characteristics are the size of the management board, the average age and tenure of its members, and the coefficient of variation (CV) of the ages of its members. These variables, except for management board size, are calculated excluding the CEO (for whose characteristics we control separately). The results remain qualitatively similar when we add the above controls.

To sum up, there is consistent evidence across all seven regressions that chair-CEO age dissimilarity is associated with significantly higher firm value. Importantly and in line with the main hypothesis, differences in firm value are associated with *differences* in age between the chair and CEO, and not with their age levels. Finally, it is the greater age differences – such as a generational age gap – and not age differences of any size that are associated with higher firm value.

As to the different sets of control variables, the regression results confirm the results from previous studies. More specifically, we find that founder CEOs and founder chairs (to a lesser extent) are associated with higher firm value, confirming the results of Andres (2008). Yet, we do not find that the chair and CEO being from the same family has any consistent effect on firm value. We shall return to this result below, when reviewing the regressions on the number of board meetings. As expected, free float and a change in the CEO are associated with lower firm value. Finally and in line with existing research, we find that firm size, leverage and the number of business segments are associated with lower firm value (see, e.g., Andres, 2008; Bebchuk et al., 2009; Custódio and Metzger, 2014; Dittmann et al., 2010).

### 2.5. Chair-CEO Age Dissimilarity, Monitoring Intensity and the Need for Monitoring

We now focus on the following two questions that arise from the previous analysis. First, is the positive relation between chair-CEO age dissimilarity and firm value indeed a reflection of greater monitoring? Second, is the positive relation between chair-CEO age dissimilarity and firm value mainly observed for firms requiring greater monitoring? If the answer to both of these questions is affirmative, this will provide further support for the main hypothesis.

### 2.5.1. Does greater age dissimilarity between the chair and CEO result in more monitoring?

In order to answer this question, we check whether greater age dissimilarity between the chair and CEO results in more board meetings. The number of board meetings is an appropriate metric for the amount of board monitoring as argued, for example, by Adams (2005) and Brick and Chidambaran (2010). In support of this argument, Schwartz-Ziv and Weisbach (2013) document that board meetings devote most of their time to monitoring management. It is important to note that, in what follows, board meetings refer to supervisory board meetings.

The monitoring focus of board meetings is particularly emphasized under the German two-tier board system, where the supervisory board's main responsibility is to monitor the firm's management board on behalf of the shareholders, as prescribed by paragraph 111(1), AktG (see also Adams and Ferreira, 2007). The monitoring responsibilities of the German supervisory board are similar to those of the U.S. board of directors (see paragraphs 84, 87 and 111, AktG). However, according to section 3.6 of the German Corporate Governance Code, board meetings should (and predominantly do) take place *without* any member of the management board (including the CEO). This is in contrast to the U.S. corporate governance system where SOX mandates only one board meeting without the executive directors per year (see Larcker and Tayan, 2013).

The results from the regression analysis are shown in Table 2.3. We run two types of regressions, both include firm-fixed and year-fixed effects. The first type (regressions (1) to (4)) is fixed-effects Poisson count regressions with the number of board meetings as the dependent variable. The second type (regressions (5) and (6)) is fixed-effects OLS regressions

with the natural logarithm of the number of board meetings (i.e., *ln(Board meetings)*) as the dependent variable.

We use the same sets of control variables as for the regressions on Tobin's Q in Table 2.2 and include the following four additional controls. First, we include the number of active board committees (*No. of active committees*) as in Vafeas (1999) to explain board meetings. Ex ante it is not clear how the number of active committees affects board meetings. On the one side, a greater number of active committees will take away some of the business from the board, hence reducing the need for board meetings. On the other side, a greater number of active committees may be a reflection of the greater complexity of the organization, and hence may be positively correlated with the number of board meetings. Second, we add average tenure of the supervisory board members (*Avg. tenure SB members*). Board members who have longer (joint) tenure are likely to require fewer board meetings. There are at least two reasons for this: experience, and hence more efficient decision making, as well as "groupthink", the latter referring to avoidance of conflict by actively foregoing critical questions (Coles et al., 2015; Janis, 1972). Third, we include the fraction of union representatives among the employee representatives (*Union representatives*). This fraction is likely to increase the number of board meetings as union representatives pursue employee interests but tend to have less firm-specific, operational knowledge as they do not work for the firm (e.g., Fauver and Fuerst, 2006). Finally, we also include the Tobin's Q from the previous year to account for past performance as firms with weak performance are likely to hold more board meetings. The regression results shown in Table 2.3 do not change qualitatively when we exclude these four additional controls.

## Table 2.3: Chair-CEO age dissimilarity and board monitoring (number of meetings)

This table reports firm-fixed effects panel regression results of board meetings on measures of age dissimilarity between the CEO and the chair of the supervisory board, other CEO-chair characteristics, CEO characteristics, chair characteristics, supervisory board characteristics, and firm characteristics for German firms listed on the DAX, MDAX, or SDAX in the sample period 2005 to 2010. *Board meetings* is the number of board meetings held by the supervisory board during the fiscal year. Specifications (1) to (4) use *Board meetings* as the dependent variable, while specifications (5) to (7) use the natural logarithm of *Board meetings* as the dependent variable. *Gap20 chair-CEO* is a dummy variable that equals one if the age difference between the chair of the supervisory board and the CEO is at least 20 years, and zero otherwise. *Chair-CEO age difference (+/-)* is the age difference between the chair and the CEO, calculated as the chair's age minus the age of the CEO. *Chair-CEO age difference absolute* is the absolute value of the age difference between the chair and the CEO. All other variables are defined in Appendix 2.A. Robust t-statistics (in parentheses) in specifications (1) to (4) are based on standard errors clustered by firm. Standard errors in regressions (5) to (7) are based on industry (4-digit SIC codes) and year clustering. The constant is included in all regressions, but not reported. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

| | **Poisson** | | | | **OLS** | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| **Gap20 chair-CEO** | | **0.1184**<br>**(2.192)** | **0.1347**<br>**(2.146)** | | **0.1019**<br>**(2.074)** | | **0.1477***<br>**(3.175)** |
| **Chair-CEO age difference (+/-)** | | | | **-0.0030**<br>**(-1.012)** | | | |
| **Squared chair-CEO age difference** | | | | **0.0003**<br>**(2.192)** | | | |
| **Chair-CEO age difference absolute** | | | | | | **0.0055**<br>**(2.421)** | |
| Chair younger | | | | | | 0.0174<br>(0.399) | |
| CEO age | -0.1361<br>(-0.632) | | 0.0151<br>(0.064) | | | | |
| Chair age | -0.0536<br>(-0.264) | | -0.1531<br>(-0.715) | | | | |
| ***Other chair-CEO dissimilarities*** | | | | | | | |
| Chair-CEO different education | -0.0308<br>(-0.873) | -0.0486<br>(-1.377) | -0.0472<br>(-1.337) | -0.0391<br>(-1.096) | -0.0536*<br>(-1.819) | -0.0490*<br>(-1.679) | -0.0607**<br>(-2.145) |
| Chair-CEO different gender | -0.2180<br>(-1.444) | -0.1833<br>(-1.438) | -0.2298<br>(-1.485) | -0.2074<br>(-1.579) | -0.1399*<br>(-1.718) | -0.1460*<br>(-1.712) | -0.2697***<br>(-2.991) |
| Chair-CEO different nationality | -0.0380<br>(-0.605) | -0.0166<br>(-0.292) | -0.0230<br>(-0.376) | -0.0214<br>(-0.382) | -0.0152<br>(-0.330) | -0.0145<br>(-0.309) | -0.0047<br>(-0.106) |
| Chair-CEO joint tenure | 0.0058<br>(0.645) | 0.0097<br>(1.047) | 0.0098<br>(1.067) | 0.0068<br>(0.828) | 0.0099<br>(1.637) | 0.0075<br>(1.290) | 0.0176***<br>(2.696) |
| Chair-CEO same family | -0.4247***<br>(-4.022) | -0.3132***<br>(-2.850) | -0.3335***<br>(-3.052) | -0.3691***<br>(-3.552) | -0.2862**<br>(-2.409) | -0.3060***<br>(-2.626) | -0.2581**<br>(-2.250) |
| ***CEO characteristics*** | | | | | | | |
| CEO change | 0.0872***<br>(2.823) | 0.0829***<br>(2.679) | 0.0794**<br>(2.554) | 0.0840***<br>(2.759) | 0.0758***<br>(2.734) | 0.0799***<br>(2.871) | 0.0744**<br>(2.455) |
| CEO tenure | 0.0089<br>(1.583) | 0.0063<br>(1.238) | 0.0058<br>(0.987) | 0.0077<br>(1.445) | 0.0046<br>(1.242) | 0.0080*<br>(1.959) | 0.0004<br>(0.097) |
| Founder CEO | -0.3641***<br>(-3.398) | -0.3023***<br>(-2.807) | -0.3080***<br>(-2.892) | -0.3492***<br>(-3.346) | -0.2936**<br>(-2.173) | -0.3240**<br>(-2.387) | -0.2610*<br>(-1.828) |

## Table 2.3: Chair-CEO age dissimilarity and board monitoring (number of meetings) (cont'd)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Chair characteristics*** | | | | | | | |
| Busy chair | -0.0168 | -0.0165 | -0.0143 | -0.0177 | -0.0273 | -0.0308 | -0.0252 |
| | (-0.408) | (-0.401) | (-0.348) | (-0.427) | (-0.856) | (-0.963) | (-0.779) |
| Chair change | -0.0164 | -0.0103 | -0.0127 | -0.0096 | 0.0222 | 0.0232 | 0.0468* |
| | (-0.404) | (-0.249) | (-0.308) | (-0.233) | (0.847) | (0.886) | (1.732) |
| Chair tenure | -0.0033 | -0.0078 | -0.0062 | -0.0059 | -0.0069 | -0.0065 | -0.0131** |
| | (-0.451) | (-1.026) | (-0.849) | (-0.829) | (-1.403) | (-1.365) | (-2.508) |
| Chair is former firm executive | 0.1092 | 0.1049 | 0.1151 | 0.1175 | 0.0938* | 0.0962* | 0.1222** |
| | (1.463) | (1.434) | (1.569) | (1.579) | (1.657) | (1.687) | (2.075) |
| Founder chair | 0.1196 | 0.1096 | 0.0863 | 0.1346 | 0.1074 | 0.1422 | 0.1837 |
| | (0.727) | (0.689) | (0.549) | (0.840) | (0.836) | (1.070) | (1.306) |
| ***Supervisory board char.*** | | | | | | | |
| Board age | 0.0050 | 0.0041 | 0.0049 | 0.0043 | 0.0067 | 0.0060 | 0.0080* |
| | (0.824) | (0.714) | (0.816) | (0.727) | (1.428) | (1.281) | (1.705) |
| Busy board | -0.0742 | -0.0828 | -0.0896 | -0.0805 | -0.0618 | -0.0552 | -0.0080 |
| | (-1.336) | (-1.498) | (-1.638) | (-1.465) | (-1.522) | (-1.371) | (-0.214) |
| CV board age | 0.6242 | 0.6823 | 0.6883 | 0.5687 | 0.5817* | 0.4904 | 0.5244* |
| | (1.382) | (1.521) | (1.528) | (1.272) | (1.928) | (1.624) | (1.875) |
| Avg. tenure SB members | -0.0447*** | -0.0393*** | -0.0395*** | -0.0404*** | -0.0368*** | -0.0378*** | -0.0373*** |
| | (-3.398) | (-2.819) | (-2.837) | (-3.085) | (-3.409) | (-3.552) | (-3.236) |
| No. of active committees | 0.0439* | 0.0423* | 0.0438* | 0.0446* | 0.0342* | 0.0353* | 0.0447** |
| | (1.771) | (1.717) | (1.742) | (1.810) | (1.854) | (1.937) | (2.418) |
| Union representatives | 0.3021** | 0.2733* | 0.2814* | 0.2667* | 0.3091*** | 0.2965*** | 0.2617** |
| | (2.015) | (1.864) | (1.927) | (1.801) | (2.888) | (2.768) | (2.392) |
| ***Firm characteristics*** | | | | | | | |
| Book leverage | -0.3754* | -0.3775* | -0.3910* | -0.3846* | -0.3133** | -0.3070* | -0.4424*** |
| | (-1.830) | (-1.817) | (-1.901) | (-1.879) | (-1.985) | (-1.953) | (-2.709) |
| Business segments | 0.0671*** | 0.0652*** | 0.0637*** | 0.0693*** | 0.0447*** | 0.0479*** | 0.0491*** |
| | (2.762) | (2.733) | (2.623) | (2.886) | (2.841) | (3.047) | (3.004) |
| Firm age (foundation) | 0.2892 | 0.2646 | 0.2671 | 0.2812 | 0.1894* | 0.2092** | 0.2702* |
| | (1.418) | (1.333) | (1.364) | (1.471) | (1.776) | (1.988) | (1.933) |
| CapEx/TA | -0.6596 | -0.5821 | -0.5279 | -0.6677 | -0.6448 | -0.7585* | -0.6950* |
| | (-1.273) | (-1.074) | (-0.973) | (-1.278) | (-1.591) | (-1.837) | (-1.698) |
| Family firm | -0.0292 | -0.0071 | 0.0131 | -0.0204 | -0.0381 | -0.0536 | 0.0252 |
| | (-0.276) | (-0.060) | (0.129) | (-0.190) | (-0.315) | (-0.446) | (0.209) |
| Free float | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0004 | 0.0004 | 0.0006 |
| | (1.100) | (1.103) | (1.156) | (1.169) | (0.598) | (0.627) | (0.914) |
| R&D/sales | -1.4256 | -1.6034 | -1.5783 | -1.3719 | -1.4168 | -1.0866 | -2.4760*** |
| | (-1.115) | (-1.197) | (-1.184) | (-1.066) | (-1.318) | (-1.037) | (-3.163) |
| ROE | -0.0215 | -0.0323 | -0.0314 | -0.0357 | -0.0104 | -0.0096 | -0.0266 |
| | (-0.489) | (-0.681) | (-0.665) | (-0.746) | (-0.236) | (-0.219) | (-0.634) |
| Sales growth | -0.0817** | -0.0709** | -0.0720** | -0.0786** | -0.0533** | -0.0583** | -0.0397 |
| | (-2.225) | (-2.004) | (-2.011) | (-2.219) | (-2.146) | (-2.271) | (-1.450) |
| Stock volatility | 4.7652* | 4.6603* | 4.7428* | 4.7165* | 4.6311** | 4.7455** | 4.2346* |
| | (1.684) | (1.688) | (1.702) | (1.690) | (2.134) | (2.198) | (1.765) |
| Tobin's Q | 0.0116 | 0.0074 | 0.0051 | 0.0079 | 0.0046 | 0.0077 | -0.0183 |
| | (0.486) | (0.312) | (0.222) | (0.341) | (0.256) | (0.436) | (-0.551) |
| Total assets | 0.1187** | 0.1162** | 0.1141* | 0.1190** | 0.0967** | 0.1023** | 0.1064*** |
| | (2.028) | (1.987) | (1.959) | (2.056) | (2.321) | (2.484) | (2.613) |
| ***Management board char.*** | | | | | | | |
| CV management board age | | | | | | | -0.4187 |
| | | | | | | | (-1.136) |
| Management board age | | | | | | | 0.0059 |
| | | | | | | | (1.239) |
| Management board size | | | | | | | 0.0039 |
| | | | | | | | (0.054) |

**Table 2.3: Chair-CEO age dissimilarity and board monitoring (number of meetings) (cont'd)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Management board tenure | | | | | | | -0.0056<br>(-0.921) |
| Number of obs. | 680 | 680 | 680 | 680 | 690 | 690 | 598 |
| Fixed effects | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year |
| Within R-squared | – | – | – | – | 0.223 | 0.226 | 0.278 |

We find no evidence in regressions (1) and (3) that CEO age and chair age *per se* affect board meeting frequency. However, we find that *Gap20 chair-CEO* has a significant (at the 5% level) and positive impact on the number of board meetings. This is the case for all three regressions, which contain this dummy variable, i.e., regressions (2), (3) and (5). We further find that the squared chair-CEO age difference (see regression (4)) and the absolute chair-CEO age difference (see regression (6)) have a significant (at the 5% level) and positive effect on the number of board meetings. Finally, we obtain similar results when we include the additional controls for management board characteristics (see regression (7)).

We now turn to the control variables. In line with the argument that more board meetings mean more intensive monitoring, we find that firms with a founder CEO as well as those with their CEO being related to the chair hold fewer board meetings. This suggests that a chair who is related to the CEO is less likely to monitor the latter. In contrast, a change in the CEO increases the number of board meetings. As per the expectations, we also find that supervisory boards with greater average tenure meet less frequently, whereas boards with more union representatives as well as more active committees meet more frequently. Finally and similar to Adams (2005), more complex organizations, as reflected by greater firm size, and more business segments hold more board meetings. We also find a positive effect of stock volatility on the number of board meetings.

To sum up, we find strong evidence that age dissimilarity between the chair and the CEO is associated with significantly more intensive board monitoring. This is consistent with the

general argument and the results for firm value shown in Section 2.4. The results also suggest that what matters is the age difference between the chair and the CEO, and not the actual chair and CEO ages. Similar to the regressions on firm value, we find that only the large age differences matter in terms of the number of board meetings.

### 2.5.2. The need for monitoring

While the results so far suggest that greater monitoring creates value, Adams and Ferreira (2007) predict that too much monitoring may destroy firm value. They argue that less monitoring, or more "friendly boards", may be optimal for firms whose CEO needs advice rather than monitoring. In turn, this suggests that greater age dissimilarity between the chair and CEO only creates value in firms with relatively high monitoring needs. We investigate the validity of this conjecture by conducting a sub-sample analysis where we attempt to distinguish between firms with relatively high and firms with relatively low monitoring needs. We expect that firms with greater free cash flows relative to their sales (measured by the variable *FCF/Sales*), more dispersed control (as reflected by a below average Herfindahl index of ownership of voting stock (*Herf. control*) and the absence of a majority shareholder (the dummy variable *Blockholder 50%* being equal to zero)), and below average intangible assets as a fraction of total assets (measured by the variable *Intangible assets*) are more likely to require more monitoring than other firms.

The regressions for each sub-sample are identical to those in Table 2.2. The results are reported in Table 2.4. For brevity, we only report the regression coefficient on the main variable of interest, *Gap20 chair-CEO*. The regressions suggest that the positive effect of the chair-CEO age dissimilarity is only observed for those firms that are likely to have more monitoring needs. These are the firms with above average free cash flows (regression (2)), with a below average Herfindahl index of control (regression (3)), without a majority shareholder (regression (5)),

and with below average intangibles (regression (7)). The coefficient on the variable *Gap20 chair-CEO* is significant at the 1% level in all of these regressions, while it is statistically insignificant – as expected – in the four regressions for the sub-samples of firms with relatively low monitoring needs.

For the same sub-samples, we also repeat the regression analysis from Table 2.3, which focused on the link between the chair-CEO age dissimilarity and the number of board meetings. This analysis can be found in Table 2.5. In line with the previous table, we find that *Gap20 chair-CEO* has a positive and significant effect (at the 10% level or better) on the number of board meetings for firms with above average free cash flows (regression (2)), a lower control concentration (regressions (3)) and (5)) and below average intangibles (regression (7)). It is insignificant for firms with lower monitoring needs.

To conclude, the results shown in both Table 2.4 and Table 2.5 provide strong support for the main hypothesis that a considerable age difference between the chair and the CEO positively affects firm value as it leads to more intensive monitoring. Importantly, the positive relation between chair-CEO age dissimilarity on the one side and firm value and board meetings on the other side is mainly observed for firms requiring relatively greater monitoring.

**Table 2.4: Need for Monitoring - Chair-CEO age dissimilarity and firm value (sub-sample analysis)**

This table shows firm-fixed effects panel sub-sample regression results of *Tobin's Q* on the indicator variable *Gap20 chair-CEO* and control variables as in Table 2.2 for German firms listed on the DAX, MDAX, or SDAX in the sample period 2005 to 2010. *Tobin's Q* is calculated as the sum of the firm's market capitalization and the difference between the book value of total assets and the book value of equity, divided by the book value of total assets. *Gap20 chair-CEO* is a dummy variable that equals one if the age difference between the chair of the supervisory board and the CEO is at least 20 years, and zero otherwise. All other variables are defined in Appendix 2.A. Robust t-statistics (in parentheses) are based on standard errors clustered by industry (4-digit SIC codes) and year. The constant is included in all the regressions, but not reported. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

| | **Tobin's Q** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | FCF/sales ≤ mean | FCF/sales > mean | Herf. control ≤ mean | Herf. control > mean | Blockholder 50% = 0 | Blockholder 50% = 1 | Intangible assets ≤ mean | Intangible assets > mean |
| **Gap20 chair-CEO** | **0.0559** | **0.6647*****| **0.1909***** | **0.1152** | **0.3052***** | **0.0630** | **0.2946***** | **0.0344** |
| | **(0.768)** | **(3.686)** | **(2.501)** | **(0.740)** | **(3.664)** | **(0.292)** | **(3.342)** | **(0.393)** |
| *Other chair-CEO dissimilarities* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *CEO characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Chair characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Supervisory board characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Firm characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Number of observations | 398 | 248 | 438 | 256 | 503 | 191 | 458 | 236 |
| Fixed effects | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year |

**Table 2.5: Need for Monitoring - Chair-CEO age dissimilarity and board meetings (sub-sample analysis)**

This table contains Poisson firm-fixed effects panel sub-sample regression results *Board meetings* on the indicator variable *Gap20 chair-CEO* and control variables as in Table 2.3 for German firms listed on the DAX, MDAX, or SDAX in the sample period 2005 to 2010. *Board meetings* is the number of board meetings held by the supervisory board during the fiscal year. *Gap20 chair-CEO* is a dummy variable that equals one if the age difference between the chair of the supervisory board and the CEO is at least 20 years, and zero otherwise. All other variables are defined in Appendix 2.A. Robust t-statistics (in parentheses) are based on standard errors clustered by firm. The constant is included in all regressions, but not reported. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

| | **Board meetings** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | FCF/sales ≤ mean | FCF/sales > mean | Herf. ownership ≤ mean | Herf. ownership > mean | Blockholder 50% = 0 | Blockholder 50% = 1 | Intangible assets ≤ mean | Intangible assets > mean |
| **Gap20 chair-CEO** | **0.0442** | **0.2869*** ** | **0.1732** ** | **0.1884** | **0.1482** ** | **0.0392** | **0.1037*** | **0.0689** |
| | **(0.503)** | **(3.134)** | **(2.514)** | **(1.525)** | **(2.104)** | **(0.355)** | **(1.753)** | **(0.529)** |
| *Other chair-CEO dissimilarities* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *CEO characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Chair characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Supervisory board characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Firm characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Number of observations | 379 | 230 | 428 | 225 | 493 | 170 | 446 | 226 |
| Fixed effects | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year |

## 2.6. Identification and Robustness

This section tests the robustness of the previous results. In Section 2.6.1, we present an identification strategy, using the 2007 financial crisis as an exogenous shock to optimal monitoring levels, to provide results that allow for causal inference with respect to the main hypothesis stating that considerable age differences between the chair and the CEO lead to more monitoring of the latter. Section 2.6.2 raises and addresses several endogeneity concerns. Section 2.6.3 contains additional robustness tests.

### 2.6.1. The financial crisis and the reduced need for monitoring

In this section, we investigate whether and how the 2007 financial crisis affected the link between chair-CEO age dissimilarity and the number of board meetings. We repeat the same exercise for the link between the chair-CEO age dissimilarity and firm value. The 2007 financial crisis constitutes an exogenous shock (see, e.g., Erkens et al., 2012). We expect that in the immediate aftermath of the financial crisis, i.e., in the years 2008 and 2009, there was considerably less need for monitoring, more need for fast decision making (De Jonghe and Öztekin, 2015, provide evidence in support of this), including an increased need for managerial discretion (see e.g., Li et al., 2017, for empirical evidence on this), as well as potentially more advice seeking from the CEO. Beltratti and Stulz (2012) find that banks with more shareholder-friendly boards performed worse during the 2007 crisis. In other words, while the work load of both the management and the supervisory board was likely to be greater during the crisis (for example, due to strategy changes and an increased need for communication with banks and suppliers), the need to monitor the CEO was likely to be lower. The reason is that in the recession years 2008 and 2009 the agency problem of managerial discretion over free cash flow (Jensen and Meckling, 1976; Jensen, 1986) was significantly lower. On the one hand, earnings

and cash flows declined significantly, leaving less cash in the hands of the CEO.[18] On the other hand, there was less corporate investment during the crisis (see, e.g., Campello, Graham, and Harvey, 2010).

We test the above conjecture by including the interaction between *Gap20 chair-CEO* and *Financial crisis*, a dummy variable, which equals one for the years 2008 and 2009, and zero otherwise. We expect this interaction to have a negative impact on the number of board meetings. In particular, the negative coefficient should (more or less) cancel out the positive effect from chair-CEO age dissimilarity observed during the non-crisis years. Put differently, if the main hypothesis is correct and chair-CEO age dissimilarity intensifies monitoring, then there will be a significant reduction in board meetings when the need for monitoring declines.

Yet, while it is possible to reduce the number of board meetings at relatively short notice (down to a minimum of four meetings per year as prescribed by German law), it likely takes longer to change chair-CEO age dissimilarity. Thus, at the start of the crisis the cognitive dissonance between the chair and the CEO is likely to remain for firms where there is a considerable age difference pre-crisis. It is unlikely that two persons with a (very) different age – reflecting, e.g., different experiences that may conflict with each other and a different language – can simply adjust their behavior and way of thinking given the exogenous shock caused by the crisis. Consequently, the chair may reduce his or her monitoring as much as possible, but cognitive conflicts and communication problems (or the greater effort to communicate) will likely remain. This may in turn hamper fast decision making and advice giving/seeking as argued in the literature (see, e.g., Westphal 1999; Adams and Ferreira, 2007; Li, Lu, and Phillips, 2017).

[18] This assertion is backed up by the data as we find that the percentage of firm-year observations with negative net income during the crisis years is 27% compared to only 8% during the non-crisis years. Further, (EBITDA-based) ROA during the crisis years is lower by -2.4% (i.e., a decline of -22% relative to the sample mean). These differences are statistically significant.

Given the particular importance of fast decision making and advice during crises, we expect the interaction to have a negative impact on firm value.

Given the exogeneity of the 2007 financial crisis, the results of this analysis allow for causal inferences. Table 2.6 reports the regressions on the number of board meetings. The results confirm the previous finding of a positive and significant effect of *Gap20 chair-CEO* on the number of board meetings. In support of the above argumentation, the interaction between *Gap20 chair-CEO* and *Financial crisis* is also significant, and has a negative sign. The normally positive effect of chair-CEO age dissimilarity is now virtually cancelled out, or to the very least heavily reduced, during the financial crisis. This is the case not only for the full sample (regression (1)), but also for the sub-samples of firms with greater monitoring needs as reflected by above average free cash flows (regression (3)), a below average Herfindahl index of control (regression (4)), and without a majority shareholder (regression (6)). The results are somewhat more nuanced for the sub-samples of firms with below average intangibles (regression (8)) and those with above average intangibles (regression (9)). For the former, we find that the interaction term is negative but not significant, while it is significantly negative for firms with a high fraction of intangible assets, i.e., with particularly high needs for advice.

## Table 2.6: Chair-CEO age dissimilarity and board meetings during the financial crisis

This table contains Poisson firm-fixed effects panel sub-sample regression results of *Board meetings* on the indicator variable *Gap20 chair-CEO* and control variables as in Table 2.3 for German firms listed on the DAX, MDAX, or SDAX in the sample period 2005 to 2010. *Board meetings* is the number of board meetings held by the supervisory board during the fiscal year. *Gap20 chair-CEO* is a dummy variable that equals one if the age difference between the chair of the supervisory board and the CEO is at least 20 years, and zero otherwise. *Financial crisis* is an indicator variable set to one if the observation year is either the year 2008 or the year 2009, and zero otherwise. All regression specifications include year dummies for each of the non-crisis years, i.e., 2005, 2006, 2007, and 2010. All other variables are defined in Appendix 2.A. Robust t-statistics (in parentheses) are based on standard errors clustered by firm. The constant is included in all regressions, but not reported. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

| | **Board meetings** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| | Full sample | FCF/sales ≤ mean | FCF/sales > mean | Herf. control ≤ mean | Herf. control > mean | Blockholder 50% = 0 | Blockholder 50% = 1 | Intangible assets ≤ mean | Intangible assets > mean |
| **Gap20 chair-CEO** | **0.1915*** ** | **0.0581** | **0.3124*** ** | **0.3110*** ** | **0.1962** | **0.2549** ** | **0.0574** | **0.1823** ** | **0.1883** |
| | **(2.682)** | **(0.600)** | **(3.077)** | **(2.813)** | **(1.578)** | **(2.556)** | **(0.449)** | **(2.157)** | **(1.171)** |
| **Gap20 chair-CEO*Financial crisis** | **-0.1754** ** | **-0.0339** | **-0.1996** | **-0.2970** ** | **-0.0018** | **-0.2616** ** | **-0.0078** | **-0.1766** | **-0.2206** ** |
| | **(-2.083)** | **(-0.522)** | **(-1.625)** | **(-2.303)** | **(-0.033)** | **(-2.289)** | **(-0.110)** | **(-1.563)** | **(-2.411)** |
| **Financial crisis** | **-0.0163** | **-0.0781** | **-0.0243** | **0.0322** | **-0.0897*** | **0.0114** | **-0.0993*** | **0.0068** | **-0.0152** |
| | **(-0.349)** | **(-1.599)** | **(-0.386)** | **(0.629)** | **(-1.678)** | **(0.0236)** | **(-1.770)** | **(0.119)** | **(-0.267)** |
| *Other chair-CEO dissimilarities* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *CEO characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Chair characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Supervisory board charac.* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Firm characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Number of observations | 680 | 379 | 230 | 428 | 225 | 493 | 170 | 446 | 226 |
| Fixed effects | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year |

## Table 2.7: Chair-CEO age dissimilarity and firm value during the financial crisis

This table shows firm-fixed effects panel sub-sample regression results of *Tobin's Q* on the indicator variable *Gap20 chair-CEO* and control variables as in Table 2.2 for German firms listed on the DAX, MDAX, or SDAX in the sample period 2005 to 2010. *Tobin's Q* is calculated as the sum of the firm's market capitalization and the difference between the book value of total assets and the book value of equity, divided by the book value of total assets. *Gap20 chair-CEO* is a dummy variable that equals one if the age difference between the chair of the supervisory board and the CEO is at least 20 years, and zero otherwise. *Financial crisis* is an indicator variable set to one if the observation year is either the year 2008 or the year 2009, and zero otherwise. All regression specifications include year dummies for each of the non-crisis years, i.e., 2005, 2006, 2007, and 2010. All other variables are defined in Appendix 2.A. Robust t-statistics (in parentheses) are based on standard errors clustered by industry (4-digit SIC codes) and year. The constant is included in all regressions, but not reported. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

| | **Tobin's Q** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| | Full sample | FCF/sales ≤ mean | FCF/sales > mean | Herf. control ≤ mean | Herf. control > mean | Blockholder 50% = 0 | Blockholder 50% = 1 | Intangible assets ≤ mean | Intangible assets > mean |
| **Gap20 chair-CEO** | **0.3906*** (4.684)** | **0.0697 (0.853)** | **0.7121*** (3.763)** | **0.2255** (2.260)** | **0.1983 (1.284)** | **0.3715*** (3.735)** | **0.1815 (0.890)** | **0.4675*** (4.556)** | **0.0099 (0.102)** |
| **Gap20 chair-CEO*Financial crisis** | **-0.3258*** (-3.832)** | **-0.0643 (-1.016)** | **-0.1772 (-1.464)** | **-0.1251 (-1.197)** | **-0.3676*** (-2.837)** | **-0.2258** (-2.359)** | **-0.3083** (-2.151)** | **-0.4418*** (-3.974)** | **-0.1326** (-2.028)** |
| **Financial crisis** | **-0.2069*** (-3.278)** | **-0.1113*** (-3.060)** | **-0.2864*** (-2.932)** | **-0.1934*** (-3.962)** | **-0.1158 (-1.484)** | **-0.2335*** (-4.847)** | **-0.2163 (-1.626)** | **-0.1791** (-3.153)** | **-0.1214 (-1.597)** |
| *Other chair-CEO dissimilarities* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *CEO characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Chair characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Supervisory board charac.* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Firm characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Number of observations | 694 | 398 | 248 | 438 | 256 | 503 | 191 | 458 | 236 |
| Fixed effects | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year | Firm, year |

Table 2.7, which reports the equivalent regressions on Tobin's Q, suggests a similar effect of the financial crisis on firm value. The table confirms the previous result of a positive and significant effect of *Gap20 chair-CEO* on Tobin's Q. As expected, the interaction between *Gap20 chair-CEO* and *Financial crisis* is significantly negative. The normally positive effect of chair-CEO age dissimilarity is heavily reduced during the financial crisis for both the full sample (regression (1)) and the sub-samples with greater monitoring needs (regressions (3), (4), (6) and (8)). The only exception to the rule is observations with a below average Herfindahl index of control (regression (4)) where the coefficient on *Gap20 chair-CEO* is positive and significant, but the interaction of the former with *Financial crisis* is not significant. The *overall* effect of chair-CEO age dissimilarity, i.e., *Gap20 chair-CEO + Gap 20 chair-CEO*Financial crisis*, is still positive as suggested by regression (1) and regressions (3), (4), (6) and (8), i.e., for those firms (with high monitoring needs) for which the age gap is generally expected to have a positive effect on firm value. We find that the interaction term and hence also the overall effect are significantly negative for the sub-sample of firms with a high fraction of intangible assets (regression (9)), consistent with regression (9) in Table 2.6, and for those firms which have already a potentially high monitoring level due to their concentrated control structure (regressions (5) and (7)). These results further suggest that considerable age dissimilarity between the chair and the CEO destroys firm value when firms have particularly high needs for advice or when their needs for additional monitoring are low. This conclusion is consistent with the literature that shows that (too) intensive board monitoring can be costly (see, e.g., Faleye et al., 2011). [19]

[19] We note that for the firms with concentrated control age dissimilarity between the chair and CEO is greatest. Indeed, the 95$^{th}$ percentile for the variable *Chair-CEO age difference (+/-)* has a value of 39 for these firms, while it is only 32 for the full sample. As the disadvantages of age dissimilarity are more likely to kick in at very high levels, this might also explain why the overall effect is negative.

**Figure 2.1: Gap20 chair-CEO and firm value (Tobin's Q) over time**

This figure shows a plot of annual average values of *Tobin's Q* for firms with and without an age difference between the chair of the supervisory board and the CEO of at least 20 years.

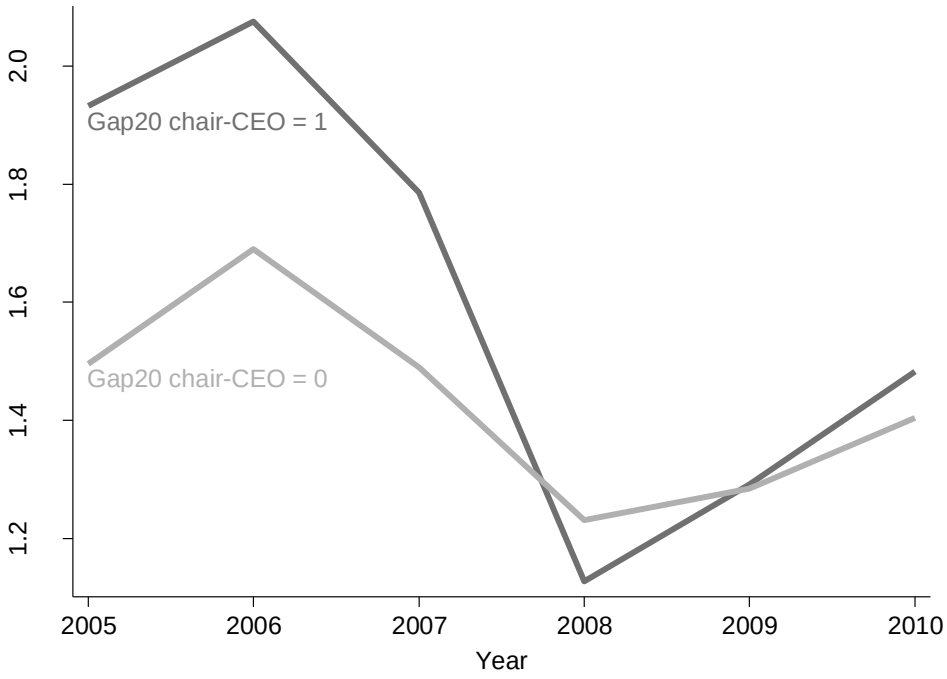



Figure 2.1 visualizes the effects of the financial crisis on Tobin's Q. The figure shows that there was a decrease in the average Tobin's Q for firms with a generational age gap between the chair and CEO during 2008, which was greater than that for firms without such a gap. This would suggest that, during a major economic crisis, management-friendlier boards create more value than less friendly boards. This is consistent with Beltratti and Stulz (2012).

To sum up, as conjectured we find evidence that the 2007 financial crisis reduced the emphasis on board monitoring. This is reflected by the significant reduction in the positive effect of age dissimilarity between the chair and CEO during the crisis for those firms with greater monitoring needs and, for firms with lower monitoring needs, the emergence of a negative effect of age dissimilarity on firm value during the crisis. These results suggest the following three important conclusions. First, firms should *mind the gap* as one size does not clearly fit all. While considerable age dissimilarity between the chair and CEO creates value for firms

with greater monitoring needs, intensive monitoring may destroy firm value when firms need more managerial discretion and advice to react to shocks. Second, the full-sample results (see Tables 2.2 and 2.3) tend to misrepresent the true effects of age dissimilarity on board monitoring and firm value. Finally, the fact that the financial crisis – an exogenous shock – had a significant impact on the relationship between age dissimilarity on the one side and monitoring and firm value on the other side suggests that the relationship is unlikely to be spurious. Nevertheless, we perform additional endogeneity tests in the next sub-section to further test the robustness of the results.

### 2.6.2. Potential endogeneity concerns

This sub-section addresses two types of endogeneity concerns. The first is unobserved CEO and chair heterogeneity. Specifically, certain CEO and/or chair characteristics might be significantly correlated with the measures of chair-CEO age dissimilarity, leading to spurious regression results. For example, the *Gap20 chair-CEO* dummy variable might be correlated with the chair's or the CEO's prior industry and/or management experience. While the analyses in Sections 2.5 and 2.6 include some measures of the chair's and the CEO's experience, such as tenure and whether one of them is the founder of the company, we do not fully adjust for experience and other time-invariant heterogeneity.[20]

We use CEO-firm and chair-firm fixed effects to address potential unobserved heterogeneity and endogenous matching. We proceed by rerunning the regressions from Table 2.2 (Tobin's Q) and Table 2.3 (board meetings). The results are reported in Table 2.8. Both the regressions adjusting for CEO-firm fixed effects (see regressions (1) and (2)) and the regressions adjusting

[20] In earlier analyses, we used a number of dummy variables indicating whether the CEO and chair have a degree in law, economics or sciences, and/or have a doctorate. We also included another set of variables, which measured the fraction of supervisory board members with a background in academia, finance, auditing, law, and manufacturing. While some of these variables were significant, importantly they did not qualitatively affect the key result of a positive effect of chair-CEO age dissimilarity on firm value.

for chair-firm fixed effects (see regressions (3) and (4)) confirm the previous results. There is a positive and significant effect of *Gap20 chair-CEO* on both Tobin's Q and the number of board meetings. Hence, it seems very unlikely that the results can be attributed to unobserved heterogeneity or endogenous matching.

The second endogeneity concern is dynamic endogeneity. To address this issue, we use the Generalized Method of Moments (GMM) regression technique (e.g., Blundell and Bond, 1998). As Wintoki et al. (2012) argue, dynamic endogeneity is a major issue in corporate governance research. It consists of previous realizations of the dependent variable affecting current levels of some or all of the independent variables. Wintoki et al. illustrate this via the link between firm value and board structure. While past board structure may have an impact on current firm performance, current board structure may also be the result of past firm performance. Indeed, poor past performance may cause changes to the board of directors. Why might dynamic endogeneity be an issue? It may be the case that shareholders of underperforming companies call for changes to the board. Such changes might be in the form of replacing the incumbent chair with an older individual, which would then increase age dissimilarity between the chair and the CEO, which in turn would intensify board monitoring of the CEO as well as the other executives.

**Table 2.8: Unobserved CEO or chair heterogeneity – CEO-firm and chair-firm fixed effects**

This table shows panel regression results for the indicator variable *Gap20 chair-CEO* and control variables for German firms listed on the DAX, MDAX, or SDAX in the sample period 2005 to 2010 using CEO-firm-fixed effects (specification (1) and (2)) or chair-firm-fixed effects (specification (3) and (4)). *Tobin's Q* is calculated as the sum of the firm's market capitalization and the difference between the book value of total assets and the book value of equity, divided by the book value of total assets. *Board meetings* is the number of board meetings held by the supervisory board during the fiscal year. The dependent variable in regressions (1) and (3) is *Tobin's Q*, specification (2) and (4) use the natural logarithm of *Board meetings* as the dependent variable. *Gap20 chair-CEO* is a dummy variable that equals one if the age difference between the chair of the supervisory board and the CEO is at least 20 years, and zero otherwise. If not stated otherwise, control variables in specification (1) and (3) follow Table 2.2, controls in specification (2) and (4) are identical to Table 2.3. Differences in the set of control variables result from omitting time invariant variables for the CEO (i.e., *Founder CEO*) or the chair of the supervisory board (i.e., *Founder chair*, *Chair is former firm executive*), respectively. All other variables are defined in Appendix 2.A. Robust t-statistics (in parentheses) are based on standard errors clustered by industry (4-digit SIC codes) and year. The constant is included in all regressions, but not reported. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

| | **Tobin's Q** | **Board meetings** | **Tobin's Q** | **Board meetings** |
|---|---|---|---|---|
| | CEO-firm FE | | Chair-firm FE | |
| | (1) | (2) | (3) | (4) |
| **Gap20 chair-CEO** | **0.3101*** (3.152)** | **0.2992*** (3.169)** | **0.2324** (2.265)** | **0.1100* (1.890)** |
| *Other chair-CEO dissimilarities* | Yes | Yes | Yes | Yes |
| *CEO characteristics* | CEO change, CEO tenure | CEO change, CEO tenure | Yes | Yes |
| *Chair characteristics* | Yes | Yes | Busy chair, Chair change, Chair tenure | Busy chair, Chair change, Chair tenure |
| *Supervisory board characteristics* | Yes | Yes | Yes | Yes |
| *Firm characteristics* | Yes | Yes | Yes | Yes |
| Number of observations | 694 | 690 | 694 | 690 |
| Fixed effects | CEO-firm, year | CEO-firm, year | Chair-firm, year | Chair-firm, year |

The results from the GMM regressions are shown in Table 2.9. We still find that *Gap20 chair-CEO* has a positive and significant impact (at the 5% level or better) on both firm value and the number of board meetings. *Chair-CEO age difference absolute* also has a positive and significant (at the 5% level) impact on both dependent variables. Hence, the main results are unlikely to be driven by omitted variable bias and/or dynamic endogeneity.

## Table 2.9: Dynamic panel data models (system GMM estimations)

This table contains results of the dynamic, system Generalized Method of Moments (GMM) regressions of *Tobin's Q, ln(Tobin's Q),* and *Board meetings* on measures of age dissimilarity between the CEO and the chair of the supervisory board for German firms listed on the DAX, MDAX and SDAX in 2005 and 2010. *Tobin's Q* is calculated as the sum of the firm's market capitalization and the difference between the book value of total assets and the book value of equity, divided by the book value of total assets. *Board meetings* is the number of board meetings held by the supervisory board during the fiscal year. *Board meetings* used in regression (4) and (5) is the natural logarithm of the number of firm's board meetings in a given year. Control variables for the specifications (1) to (3) are identical to Table 2.2, while control variables for specification (4) and (5) follow those used in Table 2.3. *Gap20 chair-CEO* is a dummy variable that equals one if the age difference between the chair of the supervisory board and the CEO is at least 20 years, and zero otherwise. All other variables are defined in Appendix 2.A. The system GMM includes two sets of regressions: (i) regressions in levels with the lagged differences (t-2) of the dependent and independent variables as instruments and (ii) regressions in first differences with the lagged levels (t-3) of the dependent and independent variables as instruments. We use the year dummies as strictly exogenous variables. The GMM style variables are the respective dependent variable as well as *Gap20 chair-CEO, CEO-chair different education, CEO-chair different gender, CEO-chair different nationality, Board age, Free float, Book leverage, CapEx/TA, R&D/sales, ROE, Sales growth, Stock volatility,* and *Total assets*. We use the small sample option (similar to Wintoki et al., 2012). Running the dynamic panel estimations without this option, all results remain significant. AR(1) and AR(2) are tests for first-order and second-order serial correlation, respectively, in the first differenced residuals under the null of no serial correlation. The Hansen test of over-identification is based on the null that all instruments are valid. The Diff-in-Hansen test of exogeneity is based on the null that the instruments used for the equations in levels are exogenous. The constant is included in all regressions, but not reported. All t-statistics are based on robust standard errors clustered at the firm level. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

| | **Tobin's Q** | **ln(Tobin's Q)** | **ln(Tobin's Q)** | **Board meetings** | **Board meetings** |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| **Gap20 chair-CEO** | **0.6007**<br>**(2.397)** | **0.2783***<br>**(2.661)** | | **0.4227***<br>**(2.912)** | |
| **Chair-CEO age difference absolute** | | | **0.0077**<br>**(2.127)** | | **0.0157**<br>**(2.381)** |
| Chair younger | | | -0.0252<br>(-0.335) | | 0.0298<br>(0.299) |
| Board meetings $_{t-1}$ | | | | 0.3082***<br>(2.856) | 0.3154***<br>(3.242) |
| ln(Tobin's Q $_{t-1}$) | | 0.5315***<br>(5.171) | 0.5774***<br>(6.154) | | |
| Tobin's Q $_{t-1}$ | 0.3532**<br>(2.112) | | | -0.0033<br>(-0.053) | 0.0301<br>(0.558) |
| ***Other chair-CEO dissimilarities*** | | | | | |
| Chair-CEO different education | 0.0494<br>(0.370) | -0.0187<br>(-0.334) | -0.0039<br>(-0.078) | -0.1234*<br>(-1.726) | -0.1163*<br>(-1.660) |
| Chair-CEO different gender | -0.5043<br>(-0.411) | -0.4065<br>(-0.640) | -0.0486<br>(-0.115) | -0.3180<br>(-0.543) | -0.0947<br>(-0.184) |
| Chair-CEO different nationality | -0.0669<br>(-0.406) | -0.0216<br>(-0.268) | -0.0526<br>(-0.649) | 0.0991<br>(1.020) | 0.0813<br>(0.971) |
| Chair-CEO joint tenure | 0.1123**<br>(2.278) | 0.0432**<br>(2.119) | 0.0342*<br>(1.775) | 0.0166<br>(0.633) | 0.0040<br>(0.190) |

## Table 2.9: Dynamic panel data models (system GMM estimations) (cont'd)

| | | | | | |
|---|---|---|---|---|---|
| Chair-CEO same family | -1.1853* | -0.5086* | -0.3479 | -0.5567* | -0.3721 |
| | (-1.703) | (-1.776) | (-1.531) | (-1.685) | (-1.102) |
| ***CEO characteristics*** | | | | | |
| CEO change | 0.0491 | -0.0057 | -0.0056 | -0.0799 | -0.0172 |
| | (0.367) | (-0.084) | (-0.101) | (-0.731) | (-0.199) |
| CEO tenure | -0.0359 | -0.0159 | -0.0112 | -0.0227* | -0.0103 |
| | (-1.633) | (-1.590) | (-1.420) | (-1.893) | (-0.995) |
| Founder CEO | 2.3047* | 0.7378* | 0.4975 | 0.7632* | 0.3479 |
| | (1.849) | (1.820) | (1.423) | (1.692) | (0.890) |
| ***Chair characteristics*** | | | | | |
| Busy chair | -0.1053 | -0.0140 | -0.0426 | 0.0478 | 0.0247 |
| | (-0.480) | (-0.155) | (-0.545) | (0.419) | (0.229) |
| Chair change | 0.0066 | 0.1028 | 0.0809* | -0.0144 | -0.0491 |
| | (0.048) | (1.632) | (1.666) | (-0.148) | (-0.544) |
| Chair tenure | -0.0457 | -0.0128 | -0.0069 | -0.0087 | -0.0113 |
| | (-1.493) | (-1.010) | (-0.689) | (-0.434) | (-0.704) |
| Chair is former firm | -0.2944 | -0.1500 | -0.2072** | -0.1035 | -0.1768 |
| executive | (-1.133) | (-1.400) | (-2.008) | (-0.897) | (-1.451) |
| Founder chair | 0.9425 | 0.2897 | 0.2885 | 0.1636 | 0.0850 |
| | (1.509) | (1.087) | (1.272) | (0.634) | (0.348) |
| ***Supervisory board charac.*** | | | | | |
| Board age | 0.0030 | 0.0066 | 0.0034 | -0.0065 | 0.0014 |
| | (0.127) | (0.699) | (0.436) | (-0.459) | (0.121) |
| Busy board | 0.0031 | -0.0211 | 0.0155 | -0.1895 | -0.1616 |
| | (0.014) | (-0.232) | (0.234) | (-1.417) | (-1.543) |
| CV board age | 0.0335 | 0.0841 | 0.1455 | -0.4224 | 0.6048 |
| | (0.021) | (0.106) | (0.234) | (-0.443) | (0.669) |
| Avg. tenure SB members | | | | 0.0074 | 0.0094 |
| | | | | (0.243) | (0.386) |
| No. of active committees | | | | -0.0239 | -0.0072 |
| | | | | (-0.783) | (-0.277) |
| Union representatives | | | | -0.0249 | 0.0434 |
| | | | | (-0.072) | (0.150) |
| ***Firm characteristics*** | | | | | |
| Book leverage | -0.2948 | -0.2050 | -0.2111 | 0.2073 | 0.3131 |
| | (-0.785) | (-1.103) | (-1.491) | (0.965) | (1.445) |
| Business segments | -0.1727** | -0.0438 | -0.0155 | -0.0164 | 0.0292 |
| | (-2.001) | (-0.989) | (-0.421) | (-0.334) | (0.686) |
| CapEx/TA | 2.2758 | 0.9613 | 0.8183 | 0.1563 | 0.1158 |
| | (1.316) | (1.327) | (1.088) | (0.145) | (0.128) |
| Family firm | 0.3601* | 0.1838* | 0.0889 | 0.0083 | -0.0336 |
| | (1.805) | (1.666) | (0.982) | (0.052) | (-0.277) |
| Free float | -0.0017 | 0.0009 | 0.0005 | 0.0002 | 0.0001 |
| | (-0.472) | (0.652) | (0.440) | (0.110) | (0.070) |
| Firm age (foundation) | 0.1098 | 0.0440 | 0.0223 | 0.0650 | -0.0178 |
| | (0.905) | (0.817) | (0.504) | (1.073) | (-0.328) |
| R&D/sales | 3.7106 | 1.1760 | 1.0331 | -0.3028 | -0.6896 |
| | (1.388) | (0.921) | (0.926) | (-0.189) | (-0.463) |
| ROE | -0.2226* | -0.1621*** | -0.1163** | -0.0773 | -0.0578 |
| | (-1.873) | (-2.798) | (-2.195) | (-1.006) | (-0.722) |
| Sales growth | -0.1059 | -0.0367 | -0.0478 | -0.0047 | -0.0299 |
| | (-1.231) | (-1.186) | (-1.615) | (-0.096) | (-0.643) |
| Stock volatility | 6.7823 | 1.1845 | 0.1588 | 5.4007 | 4.0891 |
| | (1.242) | (0.437) | (0.067) | (1.586) | (1.236) |
| Total assets | 0.0386 | 0.0129 | 0.0038 | 0.0556 | 0.0185 |
| | (1.183) | (0.915) | (0.267) | (1.581) | (0.700) |
| Year controls | Yes | Yes | Yes | Yes | Yes |
| Number of observations | 539 | 539 | 539 | 536 | 536 |

**Table 2.9: Dynamic panel data models (system GMM estimations) (cont'd)**

| | | | | | |
|---|---|---|---|---|---|
| Arellano-Bond test for AR(1) (p-value) | 0.019 | 0.000 | 0.000 | 0.000 | 0.000 |
| Arellano-Bond test for AR(2) (p-value) | 0.644 | 0.460 | 0.459 | 0.528 | 0.525 |
| Hansen test for overidentification restrictions (p-value) | 0.467 | 0.593 | 0.523 | 0.568 | 0.416 |
| Diff-in-Hansen test GMM (p-value) | 0.249 | 0.400 | 0.346 | 0.611 | 0.403 |

### 2.6.3. Additional robustness tests

In the following, we discuss the results of additional robustness tests. For brevity, most of these tests are not reported in tabular form. First, despite sufficient time-series variation in the data (see the introduction of this chapter), we use random effects, as motivated and used in Andres (2008), to address the potential concern that parameter identification may be limited given that chair-CEO age dissimilarity only changes when the CEO or the chair (or both) change. When we rerun all of the regressions using random instead of firm-fixed effects, the results are confirmed. Table 2.10 shows the results of these regressions for the main analyses. The results for the sub-samples are not shown for the sake of brevity. In additional unreported regressions, we restrict the sample to observations for which *CEO change* or *Chair change* or both dummy variables equal one and then consider the effect of the main variable, *Gap20 chair-CEO*, on firm value and the number of board meetings. We also consider the effect of this variable when we focus on those observations without CEO and chair changes. The regression coefficient on the *Gap20 chair-CEO* dummy variable remains positive and statistically significant in all regressions, independent of whether we focus on CEO and chair changes or whether we exclude them.

Second, we use the return on assets (ROA), a measure of firm performance, as an alternative to firm value, measured by Tobin's Q. More specifically, we rerun the regressions shown in

Table 2.2 and Table 2.8 using ROA instead of Tobin's Q as the dependent variable. The results (shown in Appendix 2.C) strongly support the previous results. We find a consistently positive relation between chair-CEO age dissimilarity and firm profitability. This relation remains significant even when we control for CEO-firm and chair-firm fixed effects and also when we run dynamic panel system GMM estimations. It also remains significant when we use random effects (not reported).

**Table 2.10: Random effects regressions**

This table reports random effects panel regression results of *Tobin's Q* and *Board meetings* on measures of age dissimilarity between the CEO and the chair of the supervisory board, other CEO-chair characteristics, CEO characteristics, chair characteristics, supervisory board characteristics, and firm characteristics for German firms listed on the DAX, MDAX, or SDAX between the sample period 2005 to 2010. Specifications (1) and (2) use *Tobin's Q* as the dependent variable. Specification (3) uses the natural logarithm of *Tobin's Q*. Specifications (4) and (5) use *Board meetings* as the dependent variable. Specification (6) uses the natural logarithm of *Board meetings* as the dependent variable. *Gap20 chair-CEO* is a dummy variable that equals one if the age difference between the chair of the supervisory board and the CEO is at least 20 years, and zero otherwise. *Chair-CEO age difference (+/-)* is the age difference between the chair and the CEO, calculated as the chair's age minus the age of the CEO. *Chair-CEO age difference absolute* is the absolute value of the age difference between the chair and the CEO. All other variables are defined in Appendix 2.A. Robust t-statistics (in parentheses) are based on standard errors clustered by industry (4-digit SIC codes) and year. The constant is included in all regressions, but not reported. Specifications (2) and (5) include year dummies for each of the non-crisis years, i.e., 2005, 2006, 2007, and 2010. Industry-fixed effects are based on the Fama and French 12 industries. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

| | **Tobin's Q** | | | **Board meetings** | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| **Gap20 chair-CEO** | **0.2348*** (3.124)** | **0.3487*** (4.049)** | | **0.1286** (1.972)** | **0.1870** (2.090)** | |
| **Gap20 chair-CEO * Financial crisis** | | **-0.3143*** (-3.742)** | | | **-0.1479* (-1.680)** | |
| **Financial crisis** | | **-0.1618*** (-3.320)** | | | **-0.0519 (-1.053)** | |
| **Chair-CEO age difference absolute** | | | **0.0051*** (3.031)** | | | **0.0045** (2.152)** |
| Chair younger | | | -0.0015 (-0.042) | | | -0.0073 (-0.191) |
| *Other chair-CEO dissimilarities* | *Yes* | *Yes* | *Yes* | *Yes* | *Yes* | *Yes* |
| *CEO characteristics* | *Yes* | *Yes* | *Yes* | *Yes* | *Yes* | *Yes* |
| *Chair characteristics* | *Yes* | *Yes* | *Yes* | *Yes* | *Yes* | *Yes* |
| *Supervisory board characteristics* | *Yes* | *Yes* | *Yes* | *Yes* | *Yes* | *Yes* |
| *Firm characteristics* | *Yes* | *Yes* | *Yes* | *Yes* | *Yes* | *Yes* |
| Number of observations | 694 | 694 | 694 | 690 | 690 | 690 |
| Fixed effects | Industry, year | Industry, year | Industry, year | Industry, year | Industry, year | Industry, year |

Third, in unreported regressions we examine whether the positive relation between age dissimilarity and firm value also holds when we consider age dissimilarities more broadly. More specifically, we use the variable *Gap20 chair-management board*, which equals one if there is a generational age gap between the chair and the entire management board (based on the average age of its members), and the variable *Gap20 supervisory board-CEO*, which equals one if there is a generational gap between the entire supervisory board (based on the average age of the shareholder representatives) and the CEO. When we use either of these variables instead of *Gap20 chair-CEO* as well as the same control variables as in Table 2.2, we find that the corresponding regression coefficients are positive and significant at the 1% and 5% level, respectively. However, when we add *Gap20 chair-CEO* to these regressions, neither of the two broader measures of age dissimilarity remains significant, while the coefficient on *Gap20 chair-CEO* is significant at the 1% level. Overall, these results provide further support for the reasoning that age dissimilarities create value and suggest that age dissimilarity between the chair and the CEO matters most.

Fourth, we perform several additional analyses to check the robustness of the findings. The corresponding regression results are not shown for the sake of brevity. We control for firms which are majority-controlled by other firms. The majority shareholder is likely to be represented on the supervisory board and may influence the choice of its chair. Using both fixed effects and random effects, the results for the measures of chair-CEO age dissimilarity remain qualitatively similar, while the coefficient on the added dummy variable for majority-controlled firms is statistically insignificant. Next, when we substitute the variable *Chair is former firm CEO* for the variable *Chair is former firm executive*, the results remain qualitatively similar. This is also the case when we exclude either those chairs who were CEOs or, more generally, those chairs who were executives of the firms they now oversee. Finally, the results do not change when we winsorize the variable *Tobin's Q* at the $5^{th}$ and $95^{th}$ percentile, when

we exclude all firms from regulated industries (i.e., firms with SIC codes 4000-4999 and 6000-6999), or when we exclude firms with less than four firm-year observations.

### 2.7. Conclusion

Despite the importance of the chair on corporate boards under both the one-tier and the two-tier governance systems, the literature has remained relatively silent about how chair characteristics affect corporate governance effectiveness. Also, little is known about the determinants of the important relation between the chair and the CEO.

This chapter focuses on the chair-CEO relation and how it affects monitoring and firm value. We hypothesize that substantial age dissimilarity leads to cognitive conflict between the chair and the CEO, which results in more intensive monitoring of the latter and ultimately higher firm value and performance. To test the hypothesis, we examine the relation between the chair of the supervisory board and the CEO in the German two-tier board system. Using Germany as a laboratory considerably mitigates endogeneity problems as German law prohibits CEO duality as well as the CEO's involvement with the nomination and appointment of the members of the supervisory board.

We provide evidence that greater age dissimilarity between the chair and the CEO, particularly in the form of a generational age gap, leads to more intensive monitoring and higher firm value. Specifically, substantial age dissimilarity creates value in firms expected to rely more heavily on monitoring. These are firms with greater free cash flows, less concentrated control and fewer intangibles. We find that these firms also hold significantly more board meetings. Thus, we find strong support for the hypothesis.

The findings are robust to a variety of robustness tests including CEO- and chair-firm fixed effects, dynamic panel data estimations, and the use of ROA as an alternative to Tobin's Q.

Most importantly, we employ the 2007 financial crisis as an exogenous shock to the optimal levels of monitoring. We find that firms with substantial chair-CEO age dissimilarity significantly reduce the number of board meetings in the immediate aftermath of the crisis. We further find that during the crisis substantial chair-CEO age dissimilarity destroys firm value, consistent with the increased need for managerial discretion and fast decision making during the crisis. The negative effect during the crisis almost cancels out the positive effect during the non-crisis years. We hence conclude that firms should *mind the gap*.

The results of the effect of chair-CEO age dissimilarity on the number of board meetings and firm value suggest that in terms of corporate governance regulation *one size does not fit all*. The findings can be interpreted as evidence that is in contrast with corporate governance codes, which recommend age limits for the members of corporate boards. In fact, the results suggest that for some firms age limits might be suboptimal as they prevent such firms from achieving the optimal age dissimilarity between the chair and the CEO.

Finally, we believe that the insights from this chapter are not only relevant for the two-tier board system, but also for the one-tier board system prevailing, for example, in the U.K. and the U.S., where a steadily increasing number of firms are abandoning CEO duality. For these firms as well as for their shareholders, a sound understanding of the optimal chair-CEO relation is likely to be of great relevance.

# Chapter 3 – Do CEOs Matter? Corporate Performance and the CEO Life Cycle[21]

## 3.1. Introduction

Starting with Bertrand and Schoar (2003), a vast literature suggests that differences across CEOs explain differences in firm policies and value. A similarly important, but so far largely neglected, question is whether CEOs' impact on the firms they run varies over time. Specifically, are CEO fit and performance conditional on the tenure at the firm? And which factors render CEOs more or less valuable over time? This chapter addresses these questions by analyzing the relation between CEO tenure, firm value, and environmental dynamics. We provide novel evidence on how CEOs matter for firm value and present insights that add to the ongoing debate about CEO term limits.[22] The results help explain why even very successful CEOs can be associated with declining firm value over the later course of their tenure.

In theory, the board of directors hires the best available CEO whose skill set is expected to maximize firm value given its estimated fit with the managerial skill needs of the firm which depend on the firm's industry and technology (e.g., Eisfeldt and Kuhnen, 2013). While uncertainty about the CEO's skills resolves over her tenure as the board learns about the CEO, the likelihood that the firm's skill needs change (as its environment evolves), rendering the CEO's skill set less optimal, increases (Miller, 1991; Garrett and Pavan, 2012). Each period the board decides whether to fire or keep the incumbent CEO following a simple decision rule:

[21] This chapter is joint work with Prof. Dr. Markus Schmid (University of St. Gallen) and Dr. Peter Limbach (University of Cologne).

[22] See, e.g., "The case for CEO term limits" (*Fortune*, June 23, 2014), "How long is too long to be CEO?" (*The Washington Post*, April 16, 2014), "CEO term limits" (*The Washington Post*, May 26, 2009), and "Been a CEO for ten years? Your time's about up?" (*Business Insider*, April 16, 2007). For the discussion about CEO term limits among legal scholars, we refer the reader to Whitehead (2011).

it fires the CEO if future firm value under the CEO is expected to be lower than under the best alternative CEO less adjustment costs (e.g., search costs, severance pay). However, due to horizontal and vertical differentiation across managers and competition for talent, each period only a limited number of CEO candidates, if any, represent appropriate matches for a firm. Thus, even absent adjustment costs or labor market frictions a candidate under whom the firm would be worth more may not always be available. In fact, CEOs may remain in office although they are associated with declining firm value.

According to this general framework, the relation between CEO tenure and firm value will be either positive or hump shaped. Yet, as industries and technologies evolve over time leading to changes in firms' skill needs and the CEO-firm fit, a hump-shaped relation appears more plausible unless the average CEO has a broad skill set that enables her to adapt to different, partly unforeseeable changes or can easily be replaced in each period.[23] The more dynamic a firm's environment, the more likely and pronounced is a hump-shaped tenure-firm value relation as incumbent CEOs are expected to lose their fit with the firm at a faster pace. Labor market and corporate governance frictions will further make the hump-shaped relation more likely as they increase adjustment costs – due to, e.g., local CEO-firm matching bias (Yonker, 2017) or CEO entrenchment (e.g., Shleifer and Vishny, 1989; Hermalin and Weisbach, 1998) – which make CEO replacements more costly.[24] Nevertheless, how the tenure-firm value relation looks like remains an empirical question.

We document that for the average S&P 1500 company the relation between CEO tenure and firm value is hump shaped. We use both parametric and semi-parametric estimations, which

[23] In Appendix 3.A, we provide anecdotal evidence on a decreasing CEO-firm fit and value over time which supports the existence of a hump-shaped tenure-firm value relation.
[24] Governance frictions likely reinforce a negative relation between high CEO tenure and firm value as CEOs gain power over their tenure and influence board composition to distort monitoring and avoid turnover (e.g., Coles, Daniel, and Naveen 2014; Fracassi and Tate, 2012; Taylor, 2010), which explains why some CEOs stay even if they destroy value. *Figure 3.1* depicts the relation between CEO tenure, power, and forced turnover.

include CEO, firm, and governance characteristics, and account for concerns of extrapolation and sample selection. The life cycle is economically meaningful: holding controls at their means, we estimate a 4.5% increase in firm value over the early years of tenure and a 4.2% decrease over the same number of years in the later period of tenure. The evidence suggests that a considerable fraction of high-tenure CEOs are no longer the optimal match for their firms and that these firms have difficulties replacing CEOs with candidates of better fit.

Because hiring and firing CEOs are non-random decisions, we perform several tests to address concerns related to initial and contemporary endogenous CEO-firm match which might bias or even explain the results. As the main test, we analyze the stock market reaction to announcements of sudden, unexpected CEO deaths. Because sudden deaths occur randomly and are likely to be exogenous to current firm and market conditions, this approach mitigates endogeneity concerns. As the stock market reaction reflects CEOs' future net contribution to shareholder value, this analysis also constitutes a test of whether the tenure-firm value relation is hump shaped. If so, CEOs' net contribution to shareholder value will decline over their tenure and we can expect to find a positive relation between CEO tenure and abnormal stock returns upon announcement of CEOs' death. The results are in line with this expectation. The relation between CEO tenure and abnormal returns is significantly positive and low (high) tenure values are associated with significantly negative (positive) stock returns, underpinning that a considerable fraction of high-tenure CEOs is no longer the optimal match for their firms. Importantly, the positive stock market reaction found for high-tenure CEOs suggests that corporate governance rather than labor market frictions – i.e., entrenchment rather than a lack of CEO candidates – seem to distort the optimal CEO-firm match, as only the former is consistent with positive stock returns upon sudden deaths.

We provide several additional tests to further account for endogenous CEO-firm matching and turnover as well as unobserved CEO heterogeneity. To address endogenous matching and CEO heterogeneity, we exclude the first years of tenure for each CEO and reestimate the regressions with additional controls for CEOs' abilities, education, and work experience. Alternatively, we use CEO-firm fixed effects. We further measure tenure as a fraction of the CEO's maximum realized tenure to allow life cycles to differ across CEOs. To address endogenous CEO turnover, we estimate hazard rates for different types of turnover and include them as additional controls to account for the endogeneity of most turnover and to capture effects of expected turnover on firm value. Second, we exclude a five-year event window around CEO turnover as performance patterns around these events might explain the results. Third, we address concerns of CEO or firm survivorship bias. For example, CEOs with good performance may get recruited to run bigger companies (Fee and Hadlock, 2003), while poorly performing CEOs may stay with their firms (due to entrenchment). The hump-shaped relation between CEO tenure and firm value is robust to all aforementioned tests.

We run further tests to eliminate several alternative explanations, including non-linear relationships between firm value and CEOs' age, compensation, ownership, power, wealth sensitivity, or (dis)investment decisions which might all be captured by CEO tenure. We also use residuals of CEO tenure which account for hard-to-disentangle variables, such as CEO and firm age, CEO founder status and power, or past performance. Finally, we use return on assets as an alternative measure of firm performance. All these tests confirm the results.

To better understand the relation between CEO tenure and firm value, we provide an additional analysis of corporate (dis)investment behavior over the CEO's time in office. Specifically, we examine the stock market reaction to takeover announcements, which constitute major investments associated with significant value effects, and document a similar hump-shaped

pattern between CEO tenure and abnormal stock returns. To understand how CEOs' ability and willingness to change is related to their tenure, we further examine corporate disinvestments. Consistent with decreasing ability and increasing reluctance to change and to reverse earlier investment decisions (Miller, 1991; Boot, 1992; Prendergast and Stole, 1996), we find that the likelihood of disinvestments decreases with CEO tenure.

The last set of tests is concerned with heterogeneity across industries, CEOs, and the business cycle. In a first step, we examine the role that firms' industry dynamics play for the relation between CEO tenure and firm value. According to the general theoretical framework, firms' managerial skill needs are more (less) likely to change if firms operate in more (less) dynamic industries. Firms in dynamic industries may also find it harder to identify and attract new CEO candidates with better suited skills sets. As a consequence, the more (less) dynamic a firm's industry, the more (less) likely and the faster (slower) will a CEO's skill set become less optimal for the firm. This setting leads to testable empirical predictions. In particular, relative to the average firm we expect to find that CEO tenure is associated with declining firm value at relatively lower (higher) tenure levels if the firm's industry is more (less) dynamic. Put differently, the relation between CEO tenure and firm value is less (more) likely to be hump shaped and more (less) likely to be positive if firms are subject to low (high) dynamism. Using the industry dynamism index proposed by Coles, Daniel, and Naveen (2015), we find empirical support for the predictions. While on average firm value peaks (i.e., starts to decline) after about 10-12 years of CEO tenure, we find that firm value peaks much earlier (after 8.6 years) for firms with above median industry dynamism and much later (after 13.8 years) for firms with below median dynamism. The overall difference in the peak point of firm value amounts to economically meaningful 5.2 years, indicating that heterogeneity across firms' industries plays an important role for the tenure-firm value relation.

In a second step, we consider differences across the business cycle. Because economic activity, technological progress, and industry dynamism typically slow down during recessions, and because competition for CEOs can be expected to be lower when the economy does not do well (which makes it easier to replace incumbent CEOs with new candidates), we expect that relative to the average S&P 1500 company firm value will peak at higher levels of CEO tenure during recessions and at lower levels during non-recession years. We again find empirical support for the prediction.

Lastly, we consider CEOs' adaptability to changes. For those firms that employ CEOs who find it easier to adapt to changes in firms' economic environment, the relation between CEO tenure and firm value is more likely to be positive (instead of hump shaped), i.e., firm value will peak at much higher levels of CEO tenure. We measure CEO adaptability using Custódio, Ferreira, and Matos's (2013) general ability index, which encompasses managerial work experience in different firms, industries, and positions, and find empirical support for the expectation. Specifically, while the tenure-firm value relation is hump shaped and firm value peaks after 10 years of CEO tenure for less adaptable CEOs, we find that the tenure-firm value relation is significantly positive for more adaptable generalist CEOs.

The evidence presented in this chapter has important policy implications. While it suggests that regular CEO turnover can be valuable for shareholders as even successful CEOs may be associated with declining firm value over the later course of their tenure, it does not support a one-size-fits-all policy of CEO term limits given that the tenure-firm value relation differs considerably across firms and CEOs. However, it might make sense to increase the board's flexibility to react to changes in firms' skill needs and to make CEO contract extensions more dependent on actual CEO-firm fit and less on past performance. In this regard, firms should be careful with granting CEOs additional power as a reward for good performance. Finally, the

board of directors should be able and incentivized to frequently monitor the CEO's fit with the firm taking into account industry dynamics and the CEO's skill set. This can require boards to have sufficient independence and industry experience.

The two studies closest to the work of this chapter are Guay, Taylor, and Xiao (2015), who examine CEO turnover in reaction to industry shocks, and Pan, Wang, and Weisbach (2016) who analyze CEO power and investment behavior over the CEO's tenure. Guay, Taylor, and Xiao (2015) find that when firms are subject to industry shocks CEO turnover becomes more likely, particularly for those CEOs who possess relatively more firm-specific knowledge. They interpret their results as evidence that CEOs have problems adapting to shocks. In line with the increasing power of CEOs over their time in office, the authors find that high-tenure CEOs are less likely to leave their firm, even after industry shocks. Pan, Wang, and Weisbach (2016) provide evidence that a firm's net investment quantity increases over the CEO's tenure, while investment quality decreases. The authors show that the latter result can be explained by the CEO's control over the board which grows over her time in office. This analysis is broader in scope. In contrast to the aforementioned studies, we make clear predictions for the relation between CEO tenure and firm value and test this relation empirically, while the results in both Guay, Taylor, and Xiao (2015) and Pan, Wang, and Weisbach (2016) are consistent with a positive or hump-shaped relation between CEO tenure and firm value and even with a negative relation in the latter. Moreover, we show that the hump-shaped relation between CEO tenure and firm value as well as acquisition returns holds even when we control for CEO entrenchment and power over the board and firms' investment decisions suggesting that corporate investment quality may decline even absent governance problems (consistent with the framework), and

that actions other than large observable investments taken by the CEO also seem to have value consequences that are conditional on the CEO's tenure.[25]

At a more general level, this chapter extends the literature concerned with CEOs' impact on firm value and performance (e.g., Adams, Almeida, and Ferreira, 2005; Bennedsen, Pérez-González, and Wolfenzon, 2010, 2011; Bertrand and Schoar, 2003; Jenter, Matveyev, and Roth, 2016). Supporting extant work, the results suggest that CEOs matter for firm value as their skills seem to constitute an important input factor in the firm's production process. However, while the existing literature has focused on heterogeneity across different CEOs, this chapter provides evidence for the importance of within-CEO and industry heterogeneity.

The remainder of the chapter is organized as follows. Section 3.2 describes the data and variables. Section 3.3 presents a detailed analysis of the relation between CEO tenure and firm value and various robustness tests. Section 3.4 provides an analysis of the heterogeneity of the relation between CEO tenure and firm value. Section 3.5 concludes.

[25] We note that the management literature has also been concerned with the life cycle of leaders and their impact on organizational performance. In their seminal work, Eitzen and Yetman (1972) find evidence of a hump-shaped relation between the tenure of 58 college basketball coaches and team performance. Providing an explanation for this relation, Hambrick and Fukutomi's (1991) conceptual study on the five seasons of a CEO's tenure suggests that the benefits of tenure (e.g., on-the-job learning) outweigh the costs (e.g., commitment to a fixed paradigm) in the early years of tenure, while this relation likely reverses in later years. Henderson, Miller, and Hambrick (2006) empirically test the aforementioned CEO life cycle. The authors examine two industries, the stable food industry and the more dynamic computer industry, and find that in the former the relation between CEO tenure and firm profitability is hump shaped, while it is negative in the latter. The general theoretical framework we present in this chapter provides an alternative explanation for the findings in Eitzen and Yetman (1972) as well as Henderson, Miller, and Hambrick (2006) which are limited in their scope and do not provide tests to establish causality. In contrast, the chapter provides comprehensive evidence for meaningful heterogeneity across various industries, the business cycle, and different CEOs as well as for corporate (dis)investments and sudden deaths.

## 3.2. Data and Variables

### 3.2.1. Data

The initial sample consists of all S&P 1500 companies over the period 1998 to 2011 as covered by ISS (formerly RiskMetrics).[26] For these firms, we collect governance data from ISS' Governance segment and director-level data from the Director segment. We complement this dataset with data from several databases. First, we match the sample with ExecuComp to obtain information on several CEO characteristics, including tenure, age, gender, and an annual description of titles (i.e., chairman and president). We obtain data on whether the CEO is the company's founder from Board Analyst's The Corporate Library database for the years 2001 to 2011. Data for earlier years is hand-collected from proxy statements. Accounting data and business segment information is retrieved from Compustat. Finally, stock price information stems from the Center for Research in Security Prices (CRSP). After excluding utilities and financial firms (SIC codes 4000-4999 and 6000-6999), because of differences in accounting and regulation, the final sample (with all available data) consists of 12,427 firm-year observations covering 1,782 firms and 3,054 unique CEO-firm pairs.

### 3.2.2. Variables

The main variable of interest is *CEO tenure* calculated as the fiscal year minus the year the CEO became the company's CEO (ExecuComp data item "BECAMECEO"). CEOs are identified using the ExecuComp variable 'CEOANN'. Following Masulis and Mobbs (2014),

[26] ISS provides data from 1996 on. However, due to problems of data availability and consistency for the years 1996 and 1997 (see, e.g., Faleye, Hoitash, and Hoitash, 2011), we choose 1998 as the sample's starting point.

we replace missing observations by the number of years the CEO has been serving on the company's board of directors (provided by ISS).[27]

The main output variable is *Tobin's Q*, defined as the sum of the market value of equity and the book value of total assets minus the book value of equity, divided by the book value of total assets. Other output variables include stock returns to acquisition announcements and to announcements of unexpected CEO deaths, and a firm's return on assets (*ROA*). *ROA* is calculated as earnings before interest expenses, taxes, depreciation and amortization (EBITDA) divided by the book value of total assets at the end of the previous year and is winsorized at the 1st and 99th percentiles. Announcement returns to acquisition announcements and unexpected CEO deaths are defined in Section 3.3.

In the analyses, we control for several additional CEO characteristics, including the age of the CEO in years (*CEO age*), a dummy variable set to one if the CEO is female (*CEO gender*), and a dummy variable set to one if the CEO is the firm's founder (*Founder CEO*). Further, CEOs typically become more powerful as their tenure increases (see, e.g., Hermalin and Weisbach, 1998; Ryan and Wiggins, 2004). To account for effects of CEO power on firm value, and to separate CEO power from CEO tenure, we use the variable *CEO power index*. It is based on the following variables: (i) *CEO ownership*, i.e., the fraction of common shares held by the CEO, (ii) *Co-Option* which is the fraction of directors appointed after the CEO assumed office (Coles, Daniel, and Naveen, 2014), (iii) *Duality* which is a dummy that equals one if the CEO is also the chairman of the board, (iv) *Involved CEO* which is a dummy that equals one if the

[27] We identify the company's CEO in ISS by applying the methodology described in Mobbs (2013). A member of the board of directors is considered to be the CEO of the company if, first, the ISS variable „CLASSIFICATION" states that the director's board affiliation is classified as employee/insider ("E") and, second, if the variable "EMPLOYMENT_CEO" equals one, indicating that her primary employment title is CEO. Using this methodology, we are able to identify a firm's CEO within ISS in 99.8% of the cases in which we could not identify a CEO in ExecuComp. CEO tenure is then calculated as the fiscal year minus the year the CEO has joined the board of directors (ISS variable "DIRSINCE").

board has a separate nominating committee and the CEO is a member or if such a committee does not exist (Shivdasani and Yermack, 1999), (v) *Only insider* which is a dummy that equals one if the CEO serves as the only inside (i.e., executive) director on the board of directors, and (vi) *President* which is a dummy that equals one if the CEO has the title of president of the firm. Adams, Almeida, and Ferreira (2005) use the latter four variables to measure CEO power. The *CEO power index* is the sum of the following dummy variables: *CEO ownership* above median, *Co-Option* above median, *Duality, Involved CEO, President,* and *Only insider*. We separately control for Bebchuk, Cohen, and Ferrell's (2009) E-index to further account for CEO entrenchment.

We control for a series of additional corporate governance and firm characteristics. *Appendix 3.B* provides an overview and detailed definitions of all variables used in this chapter. Except for the variables *Business segments*, *Firm age*, and *Sales growth*, all other firm characteristics (i.e., *Book leverage, CapEx, Firm risk, Operating CF*, *R&D*, and *Total assets*) enter the regressions with one lag. Firm value regressions additionally include Tobin's Q with one lag as an explanatory variable to capture the relation between past performance and tenure as well as unobserved value-relevant CEO and firm heterogeneity.[28]

### 3.2.3. Summary statistics

*Table 3.1* presents summary statistics for the previously defined variables. In terms of *CEO tenure* and *Maximum CEO tenure*, which take on values between 0 and 60 years, the cross-sectional average is about 7.7 and 10.5 years, respectively. *Maximum CEO tenure* is defined as the largest value of CEO tenure in the sample per CEO-firm pair. Based on the 3,054 CEO-firm pairs in the sample (instead of firm-year level data) average *Maximum CEO tenure*

[28] When we exclude the lag of *Tobin's Q* from the regressions, all results remain qualitatively similar.

is 8.2 years. It increases to 10.3 years when we exclude the 22% of all CEOs who leave the firm during their first three years in office, the period often referred to as "honeymoon". Excluding turnover in the honeymoon period, *Maximum CEO tenure* at CEO turnover has a mean of 11.1 years. 31% of all CEOs reach a maximum tenure of at least 10 years, i.e., about a third of all S&P 1500 CEOs stay with their firm for at least a decade. This fraction increases to 39.5% when we exclude CEOs who survive their honeymoon period.

**Table 3.1: Summary statistics**

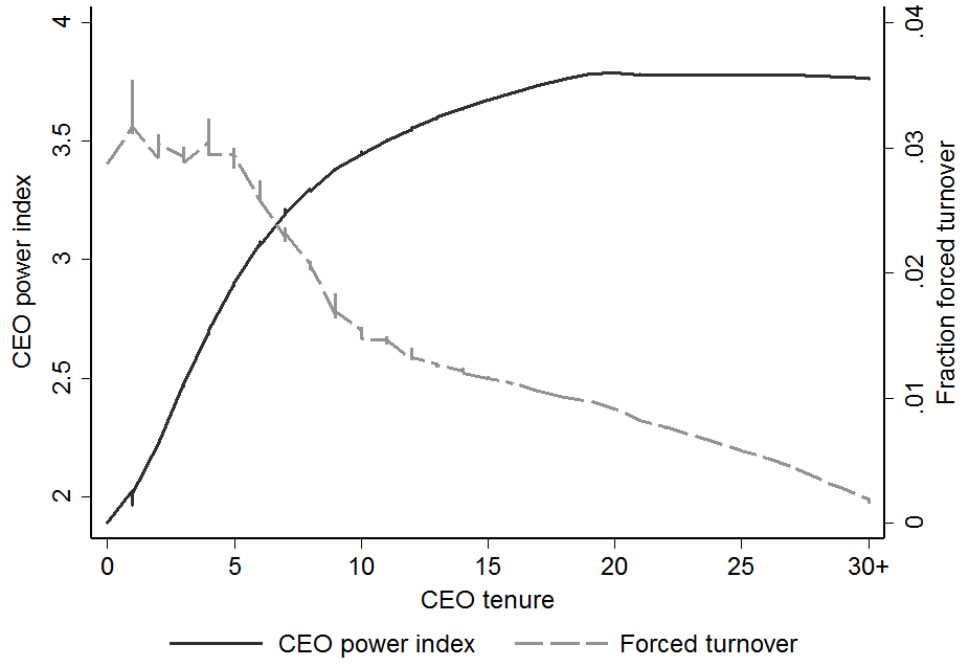
This table presents summary statistics for the sample of S&P 1500 companies (excluding SIC codes 4000-4999 and 6000-6999) comprising 12,427 firm-year observations based on 1,782 unique firms and 3,054 unique CEO-firm pairs over the period 1998-2011. *CEO tenure* is the number of years the CEO has been serving as the firm's CEO. *Max CEO tenure* is the largest value of *CEO tenure* in the sample for each CEO-firm pair. Both *CEO tenure* and *Max CEO tenure* take on integer values between 0 and 60. CEOs leave in their honeymoon period if *Max CEO tenure* is smaller than three years. All other variables are defined in Appendix 3.B.

| | Obs. | Mean | Median | 1. Quartile | 3. Quartile | SD |
|---|---|---|---|---|---|---|
| ***CEO tenure*** | | | | | | |
| CEO tenure (cross-sectional) | 12,427 | 7.67 | 5.00 | 2.00 | 10.00 | 8.02 |
| Max CEO tenure (cross-sectional) | 12,427 | 10.51 | 8.00 | 5.00 | 13.00 | 8.42 |
| Max CEO tenure | 3,054 | 8.22 | 6.00 | 3.00 | 11.00 | 8.01 |
| Max CEO tenure w/o CEOs who leave in honeymoon | 2,367 | 10.28 | 8.00 | 5.00 | 13.00 | 7.98 |
| CEOs who leave in honeymoon (dummy) | 3,054 | 0.22 | | | | 0.42 |
| Max CEO tenure ≥ 10 yrs (dummy) | 3,054 | 0.31 | | | | 0.44 |
| Max CEO tenure at turnover w/o CEOs who leave in honeymoon | 948 | 11.12 | 8.00 | 5.00 | 14.00 | 8.46 |
| ***CEO characteristics*** | | | | | | |
| CEO age | 12,427 | 55.66 | 56.00 | 51.00 | 60.00 | 7.38 |
| CEO gender (dummy) | 12,427 | 0.02 | | | | 0.15 |
| Founder CEO (dummy) | 12,427 | 0.12 | | | | 0.32 |
| CEO power index | 12,427 | 2.90 | 3.00 | 2.00 | 4.00 | 1.21 |
| CEO ownership | 12,427 | 0.03 | 0.010 | 0.003 | 0.026 | 0.06 |
| Co-Option | 12,427 | 0.38 | 0.33 | 0.11 | 0.63 | 0.30 |
| Duality (dummy) | 12,427 | 0.58 | | | | 0.49 |
| Involved CEO (dummy) | 12,427 | 0.18 | | | | 0.38 |
| Only insider (dummy) | 12,427 | 0.57 | | | | 0.49 |
| President (dummy) | 12,427 | 0.58 | | | | 0.49 |
| ***Governance characteristics*** | | | | | | |
| Board age | 12,427 | 60.11 | 60.22 | 57.67 | 62.60 | 3.94 |
| Board size | 12,427 | 9.01 | 9.00 | 7.00 | 10.00 | 2.23 |
| Busy board (dummy) | 12,427 | 0.20 | | | | 0.40 |
| Director ownership | 12,427 | 0.002 | 0.0005 | 0.0002 | 0.001 | 0.005 |
| E-index | 12,427 | 2.47 | 2.00 | 2.00 | 3.00 | 1.35 |
| Independence ratio | 12,427 | 0.71 | 0.75 | 0.63 | 0.83 | 0.16 |
| Outside director tenure | 12,427 | 8.23 | 7.63 | 5.60 | 10.11 | 3.78 |
| ***Firm characteristics*** | | | | | | |
| Book leverage | 12,427 | 0.40 | 0.41 | 0.27 | 0.51 | 0.17 |
| Business segments | 12,427 | 2.81 | 3.00 | 1.00 | 4.00 | 2.29 |
| CapEx | 12,427 | 0.05 | 0.04 | 0.02 | 0.07 | 0.05 |
| Firm age | 12,427 | 25.11 | 19.00 | 11.00 | 35.00 | 19.34 |
| Firm risk | 12,427 | 0.46 | 0.41 | 0.31 | 0.55 | 0.21 |
| Operating CF | 12,427 | 0.13 | 0.12 | 0.07 | 0.17 | 0.10 |
| R&D | 12,427 | 0.03 | 0.01 | 0.00 | 0.05 | 0.06 |
| ROA | 12,402 | 0.16 | 0.15 | 0.10 | 0.21 | 0.12 |
| Sales growth | 12,427 | 0.10 | 0.08 | -0.007 | 0.17 | 0.27 |
| Tobin's Q | 12,427 | 1.99 | 1.59 | 1.22 | 2.26 | 1.35 |
| Total assets | 12,427 | 6,211.67 | 1,355.68 | 556.39 | 3,944.00 | 26,765.89 |

With respect to the other CEO characteristics, we find that mean CEO age is 56 years, 2% of all CEOs are female, and 12% are founders of the firm they lead. The CEO power index has a mean of 3 (relative to a minimum of 0 and a maximum of 6). As can be seen from *Figure 3.1*, CEO power increases significantly with CEO tenure, at least over the first 15 years. Turning to the components of the CEO power index, on average CEO ownership amounts to 3% (with a median of 1%), 38% of directors on the board were appointed after the CEO assumed office (*Co-Option*), 58% of the CEOs also hold the position of the chairman of the board, 18% are involved in director selection, 57% of the CEOs are the only insiders on the board of directors, and 58% hold the title of the firm's president. 25% of CEOs hold both the chairman and the president title.

**Figure 3.1: CEO power and forced turnover as functions of CEO tenure**

This figure shows results from locally weighted regressions (lowess) of the *CEO power index* and *Forced turnover* on *CEO tenure*. Lowess regressions provide a semiparametric way of estimating the relation between CEO power and CEO tenure as well as CEO forced turnover and CEO tenure. The bandwidth is 0.4. *CEO power index* is the sum of the following indicator variables: *CEO ownership* above median, *Co-Option* above median, *Duality*, *Involved CEO*, *President*, *Only insider*. *Forced turnover* is an indicator variable that takes the value of one if the turnover is classified as forced according to Peters and Wagner (2014) and Jenter and Kanaan (2015) who provided the data. *CEO tenure* is the number of years the CEO has been serving as the firm's CEO.



Overall, the summary statistics – also those for the governance or firm characteristics (not discussed here) – compare well to those in recent corporate governance studies (e.g., Adams, Ferreira, and Almeida, 2005; Bebchuk, Cohen, and Ferrell, 2009; Fahlenbrach, 2009; Huang, 2013; Li, Lu, and Phillips, 2017; Masulis and Mobbs, 2014).

### 3.3. The Relation between CEO tenure and Firm value

In this section, we present a detailed examination of the relation between CEO tenure and firm value. In Section 3.3.1, we show the results from parametric and semi-parametric estimations of the baseline regression model. While Section 3.3.2 provides various robustness tests to address concerns of extrapolation and sample selection, CEO heterogeneity, endogenous CEO-firm matching and turnover as well as several alternative explanations, Section 3.3.3 presents additional evidence from firms' (dis)investment decisions.

#### 3.3.1. Firm value analysis

The general theoretical framework outlined at the beginning of the chapter suggests that the relation between CEO tenure and firm value should be either positive or hump shaped. To analyze how the relation between CEO tenure and firm value looks like, we estimate regressions of *Tobin's Q* on different functional forms of *CEO tenure* and a large number of controls for CEO, corporate governance, and firm characteristics (presented in Section 3.2.2). All regressions also include year and firm fixed effects to account for unobserved variables which are either constant across firms or constant over time. Firm fixed effects constitute the baseline estimation approach as it is consistent with the theoretical framework where firms invest in and employ the production factor labor, i.e., CEOs, and where their investments in CEOs depend on their firm-specific needs for managerial skills, and likely on firm-specific hiring/firing policies. Hence, it is crucial to account for unobserved firm-specific heterogeneity. Because CEO-firm fixed effects treat each CEO-firm pair as a separate firm, although the same

firm actually just changes its CEO, they do not accurately account for firm-specific heterogeneity as it is important in the context of this chapter. Furthermore, firm fixed effects allow for sufficient variation in CEO tenure (as changes in tenure are not limited to exactly one unit for each observation), while they allow to control for CEO age as well as for many other CEO characteristics. Still, we employ CEO-firm fixed effects in robustness tests presented in Section 3.3.2.

*Table 3.2* shows regression results for different functional forms of CEO tenure. In regression specifications (1) and (2), we test whether the relation between CEO tenure and firm value is positive. Therefore, in specification (1) we estimate the baseline regression model and assume a logarithmic functional form by using the natural logarithm of CEO tenure, i.e., *ln(CEO tenure)*. This functional form makes the reasonable assumption that the increase in firm value decreases marginally over the CEO's tenure. In specification (2), we assume a basic linear relation and accordingly use the variable *CEO tenure*. To test whether the tenure-firm value relation is hump shaped, we use *CEO tenure* and its squared term, i.e., *CEO tenure squared*, in specification (3). Finally, in specification (4) we use a third-order polynomial of CEO tenure.

**Table 3.2: The relation between CEO tenure and firm value**

This table reports results from firm fixed effects regressions of *Tobin's Q* on different functional specifications of *CEO tenure* along with CEO, firm and corporate governance characteristics. The sample includes S&P 1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). Regression specification (1) uses the natural logarithm of *CEO tenure* (denoted *ln(CEO tenure)*), while specification (2) uses *CEO tenure*. Specifications (3) and (4) show regression results for a second-order and a third-order polynomial of *CEO tenure*, respectively. Specification (5) shows results of reestimating regression specification (3) with interacted year and industry (based on Fama French 48 industries) fixed effects as additional controls. Specification (6) uses the variable *Residual CEO tenure* and its squared term instead of *CEO tenure* and its squared term. *Residual CEO tenure* is the residual from a regression of *CEO tenure* on the variables *CEO age, CEO power index, Firm age, Founder CEO, Tobin's* $Q_{t-1}$ and year-fixed effects. All other variables are defined in Appendix 3.B. An intercept and year dummies are included in all regressions, but not reported. Robust t-statistics adjusted for clustering by firm are reported in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | ***Tobin's Q*** | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| **ln(CEO tenure)** | **0.0162** | | | | | |
| | **(0.706)** | | | | | |
| **CEO tenure** | | **-0.0021** | **0.0146**** | **0.0196**** | **0.0130**** | |
| | | **(-0.483)** | **(2.410)** | **(2.401)** | **(2.162)** | |
| **CEO tenure squared** | | | **-0.0006***** | **-0.0010*** | **-0.0006***** | |
| | | | **(-3.619)** | **(-1.937)** | **(-3.701)** | |
| **CEO tenure cubic** | | | | **0.0000** | | |
| | | | | **(0.926)** | | |
| **Residual CEO tenure** | | | | | | **0.0133**** |
| | | | | | | **(2.252)** |
| **Residual CEO tenure squared** | | | | | | **-0.0006***** |
| | | | | | | **(-3.682)** |
| ***CEO characteristics*** | | | | | | |
| CEO age | 0.0006 | 0.0024 | 0.0019 | 0.0018 | 0.0040 | 0.0023 |
| | (0.239) | (0.828) | (0.652) | (0.613) | (1.393) | (0.801) |
| CEO gender | 0.0362 | 0.0318 | 0.0411 | 0.0429 | 0.0131 | 0.0420 |
| | (0.416) | (0.365) | (0.476) | (0.495) | (0.163) | (0.485) |
| CEO power index | -0.0164 | -0.0080 | -0.0225 | -0.0241 | -0.0252 | -0.0205 |
| | (-0.866) | (-0.425) | (-1.162) | (-1.243) | (-1.302) | (-1.112) |
| Founder CEO | 0.3503** | 0.3802** | 0.4236** | 0.4295** | 0.3783** | 0.4231** |
| | (2.169) | (2.086) | (2.283) | (2.304) | (2.073) | (2.315) |
| ***Governance characteristics*** | | | | | | |
| Board size | -0.2651*** | -0.2606*** | -0.2591*** | -0.2604*** | -0.2160** | -0.2592*** |
| | (-2.758) | (-2.731) | (-2.729) | (-2.739) | (-2.318) | (-2.729) |
| Busy board | -0.0548* | -0.0547* | -0.0527* | -0.0523* | -0.0314 | -0.0527* |
| | (-1.756) | (-1.756) | (-1.698) | (-1.686) | (-1.099) | (-1.700) |
| Director ownership | -3.0998 | -3.1192 | -3.2698 | -3.2242 | -2.6739 | -3.2753 |
| | (-1.395) | (-1.406) | (-1.484) | (-1.466) | (-1.178) | (-1.488) |
| E-Index | 0.0170 | 0.0174 | 0.0163 | 0.0159 | 0.0220 | 0.0163 |
| | (1.036) | (1.070) | (1.006) | (0.983) | (1.335) | (1.005) |
| Independence ratio | -0.0253 | -0.0324 | -0.0426 | -0.0436 | -0.0114 | -0.0415 |
| | (-0.191) | (-0.240) | (-0.315) | (-0.322) | (-0.081) | (-0.307) |
| Firm characteristics | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry*year fixed effects | No | No | No | No | Yes | No |
| Observations | 12,427 | 12,427 | 12,427 | 12,427 | 12,427 | 12,427 |
| R-squared (within) | 0.295 | 0.295 | 0.297 | 0.299 | 0.354 | 0.297 |
| **Turning point (yrs)** | | | **12.2** | **9.8** | **10.8** | **11.1** |

The results suggest that the relation between CEO tenure and firm value is hump shaped. In particular, in specifications (3) and (4) the coefficients of *CEO tenure* and *CEO tenure squared* are significant and their opposite signs indicate a hump shape, while all other functional forms are not statistically supported. The hump shape is also found when we additionally include (Fama French 48) industry*year fixed effects in order to control for time-varying factors particular to an industry as shown in specification (5). In specification (6), we provide estimates that address the concern that *CEO tenure* is correlated with a set of control variables used in the regression model and might therefore capture the effects that these variables may have on firm value. In particular, a CEO's time in office (technically) increases with CEO and firm age and is expected to increase in CEO power and past firm performance, and to be higher if the CEO is the company's founder. Therefore, instead of *CEO tenure*, we use *Residual CEO tenure*, which is the residual from a regression of *CEO tenure* on *CEO age*, *CEO power index*, *Firm age*, *Founder CEO*, *Tobin's Q lagged*, and time fixed effects. The residual no longer captures the effects of the above variables on firm value. The results on *Residual CEO tenure* are qualitatively similar to those on *CEO Tenure* and again support a hump-shaped relation between CEO tenure and firm value. Further, the results of the quadratic specifications suggest that for the average S&P 1500 company firm value peaks (i.e., starts to decline) after about 10-12 years of CEO tenure.

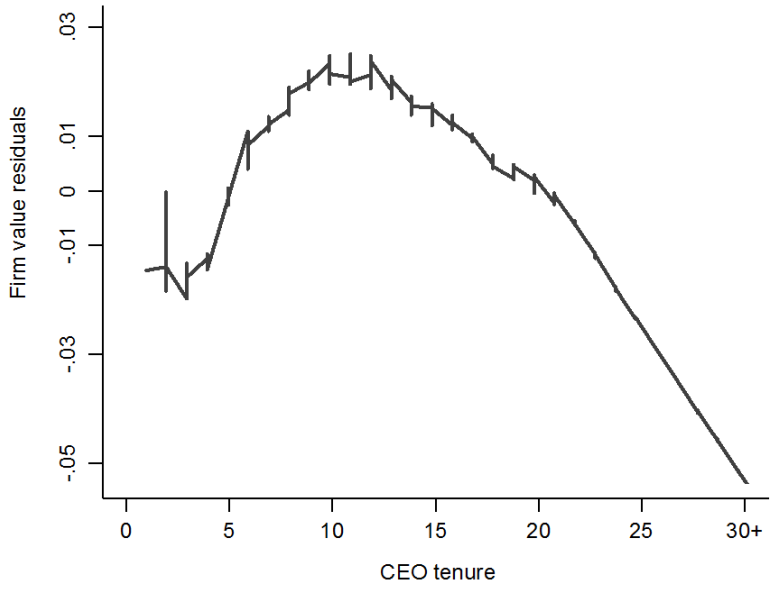
In terms of the control variables, we find founders to be associated with a higher firm value, consistent with, e.g., Fahlenbrach (2009). Supporting previous studies, we also find both board size (e.g., Yermack, 1996) and busy boards (e.g., Fich and Shivdasani, 2006) to be negatively related to firm value. The other CEO and governance characteristics are estimated to be insignificant. Results for firm characteristics are consistent with prior studies.[29]

[29] The coefficients on the firm characteristics and all fixed effects are not reported for space reasons. The coefficients of the variables *Business segments* and *Total assets* are significantly negative, while the coefficients

In addition to the aforementioned parametric estimation results, we provide results from semi-parametric estimations which do not impose any functional form for the tenure-firm value relation. Particularly, we perform locally weighted regressions (lowess) of residuals of *Tobin's Q* on *CEO tenure*. The residuals of *Tobin's Q* are from a regression of the baseline model, shown in specification (3) of Table 3.2, where we omit the variables *CEO Tenure* and *CEO tenure squared*. As can be seen from *Figure 3.2*, the results suggest that the relation between CEO tenure and firm value, apparent in the data, is indeed hump shaped.[30]

**Figure 3.2: Semiparametric estimation of the relation between firm value and CEO tenure**

This figure shows the results from a locally weighted regression (lowess) of residuals of *Tobin's Q* on *CEO tenure*. Lowess regressions provide a semiparametric way of estimating the relation between firm value and CEO tenure. The bandwidth is 0.4. The residuals of *Tobin's Q* are from a regression of the baseline model shown in column (3) of Table 3.2 where we omit the variables *CEO tenure* and *CEO tenure squared*.




of *Operating CF*, *R&D*, *Sales growth* and the lag of *Tobin's Q* (coefficient of 0.222) are significantly positive. When we exclude the lag of *Tobin's Q* from the regressions, the results shown in Table 3.2 remain statistically significant with comparable turning points. When we use two lags of *Tobin's Q* or substitute the lag of *Tobin's Q* for the firm's stock market performance of the previous year, results remain qualitatively similar.

[30] We also obtain a hump-shaped relation between CEO tenure and firm value when we analyze the residuals from the same regression model using CEO-firm fixed effects instead of firm fixed effects. In addition, we follow Mudambi (1997) and run regressions of *Tobin's Q* on polynomials of order 1 to 4 of the variable *CEO tenure* (and control variables). The corresponding test statistics (i.e., adjusted R-squared, AIC and BIC information criteria) suggest the use of the second-order polynomial. Results are not reported for brevity.

### 3.3.2. Tests on the robustness of the firm value analysis

We perform a battery of robustness tests on the results shown in Section 3.3.1. As a first test, we replicate the regressions in Table 3.2 with firm fixed effects replaced by random effects with Fama French 48 industry controls. The results (not reported for brevity) confirm the hump-shaped relation between CEO tenure and Tobin's Q. In the following, we present various other tests in more detail.

#### 3.3.2.1. Extrapolation and sample selection

A statistical concern with the hump shape we document is that the relation between *Tobin's Q* and high values of *CEO tenure* is only based on available observations, i.e., it is based on CEOs who survive until a specific year of tenure. By imposing a specific functional form, such as a second-order polynomial, we might extrapolate (based on slope and curvature parameters) information for CEOs who actually do not survive. This might lead us to find a hump-shaped relation between CEO tenure and firm value although the actual relation is not hump shaped (but, e.g., rather similar to a logarithmic function of CEO tenure).

We address this concern in two ways. First, we use semi-parametric (lowess) estimations, similar to those shown in Section 3.3.1, and restrict the sample to firm-year observations for which CEO tenure either takes on values of 11 years or less (the average turning point found in Table 3.2) or values larger than 11 years. The results are shown in Figures 3.3a and 3.3b, respectively. The figures show that residual firm value increases over the early years of tenure (*Figure 3.3a*), while it clearly decreases over the later years of tenure (*Figure 3.3b*).

**Figure 3.3a:**

**Semiparametric estimation of the relation between firm value and CEO tenure (CEO tenure ≤ 11 yrs)**

This figure shows the results from a locally weighted regression (lowess) of residuals of *Tobin's Q* on *CEO tenure* for all observations with tenure values ≤ 11 years. The bandwidth is 0.4. The residuals of *Tobin's Q* are from a regression of the baseline model shown in column (3) of Table 3.2 where we omit the variables *CEO tenure* and *CEO tenure squared*.

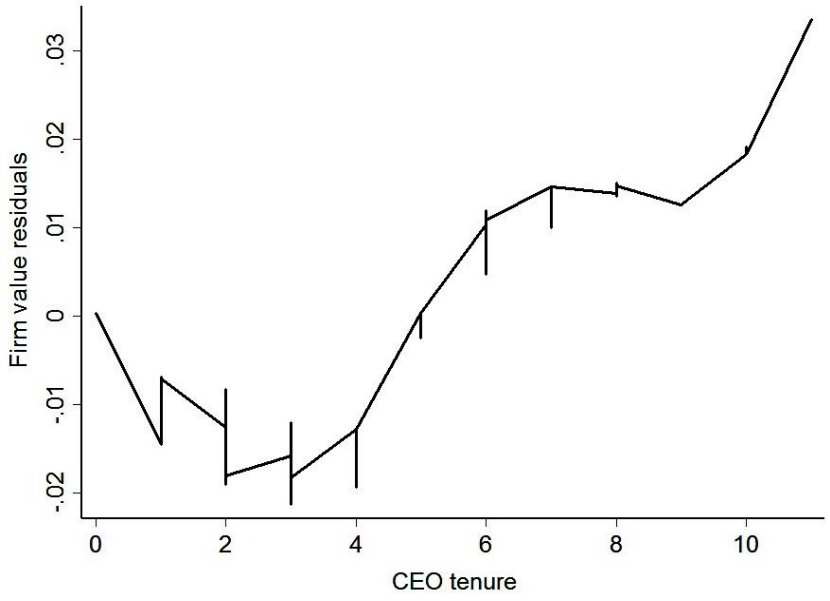
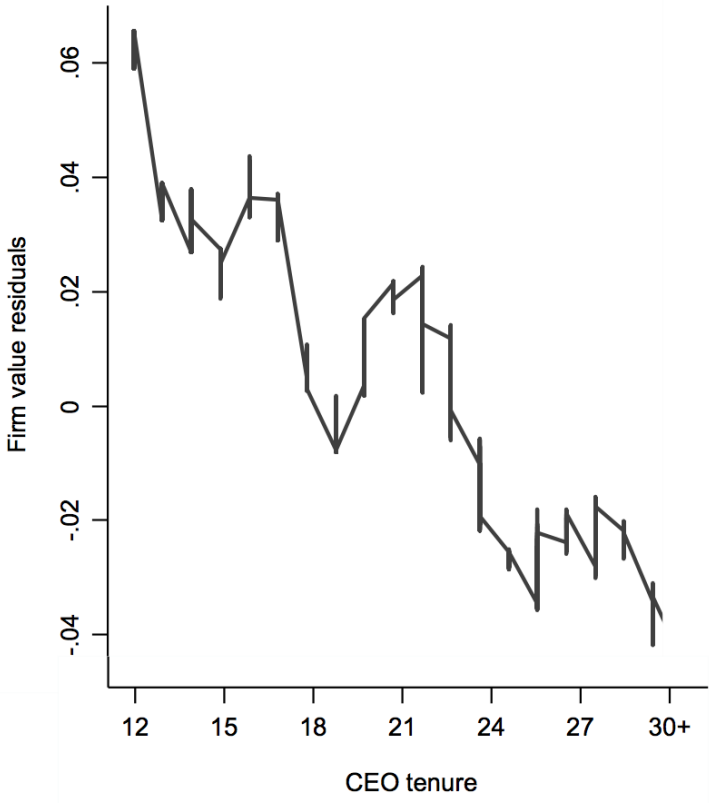



**Figure 3.3b:**

**Semiparametric estimation of the relation between firm value and CEO tenure (CEO tenure > 11 yrs)**

This figure shows the results from a locally weighted regression (lowess) of residuals of *Tobin's Q* on *CEO tenure* for all observations with tenure values > 11 years. The bandwidth is 0.4. The residuals of *Tobin's Q* are from a regression of the baseline model shown in column (3) of Table 3.2 where we omit the variables *CEO tenure* and *CEO tenure squared*.



Second, in *Table 3.3* we reestimate the baseline regression model from specification (3) of Table 3.2 and impose different restrictions with respect to CEO tenure. In specification (1), we restrict the sample to those CEOs who have been at the top of their firm for at least 9 years and who stay no longer than 23 years (i.e., $8 \leq$ *Max CEO tenure* $\leq 22$)[31]. The thresholds equal the median and the 90$^{th}$ percentile of the variable *Max CEO tenure*, respectively. We further restrict the upper threshold by another 5 years (i.e., $8 \leq$ *Max CEO tenure* $\leq 17$) in specification (2). Finally, consistent with the semi-parametric test described above, in specifications (3) and (4) we restrict the sample to observations with CEO tenure smaller/ equal to or larger than 11 years, respectively. To mitigate concerns of extrapolation and outliers, we further restrict the sample in specification (4) to only those CEOs who stay no longer than 18 years. While we find a hump-shaped tenure-firm value relation in specifications (1) and (2), specifications (3) and (4) provide additional support for the semi-parametric results shown in Figures 3.3a and 3.3b. Overall, the findings from Section 3.3.1 appear robust to tests for extrapolation, sample selection, and outliers.

[31] As the smallest value of the variable *Max CEO tenure* is 0, the restriction $8 \leq$ *Max CEO tenure* $\leq 22$ corresponds to CEOs who have been in office for at least 9 and no more than 23 years.

**Table 3.3: Addressing concerns of extrapolation and sample selection**

This table reports results from firm fixed effects regressions of *Tobin's Q* on *CEO tenure* or *CEO tenure* and its squared term along with CEO, firm, and corporate governance characteristics. The sample includes S&P 1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). Regression specification (1) restricts the sample to all observations for which *Max CEO tenure* is between 8 and 22 years (the 50th and 90th percentiles of *Max CEO Tenure*, which ranges from 0 to 60 years), i.e., the respective CEOs stayed with their firm for at least 9 years, but no longer than 23 years. Specification (2) further restricts the sample to all observations for which *Max CEO tenure* is between 8 and 17 years. Specification (3) shows regression results for a subsample of CEOs who stayed with their firm for a maximum of 11 years (*Max CEO tenure* ≤ 11 yrs). Specification (4) shows regression results for a subsample of CEOs who have already been in office for more than 11 years (i.e., CEO tenure > 11 yrs) and who stayed with the firm for a maximum of 13 to 18 years (i.e., 12 ≤ *Max CEO tenure* ≤ 17 yrs). Control variables are identical to those used in regression (3) of Table 3.2. All other variables are defined in Appendix 3.B. An intercept and year dummies are included in all regressions, but not reported. Robust t-statistics adjusted for clustering by firm are reported in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | ***Tobin's Q*** | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| | *8 ≤ Max CEO tenure ≤ 22 yrs* | *8 ≤ Max CEO tenure ≤ 17 yrs* | *Max CEO tenure ≤ 11 yrs* | *CEO tenure > 11 yrs & 12 ≤ Max CEO tenure ≤ 17* |
| **CEO tenure** | **0.0646*** ** | **0.0675** ** | **0.0174** ** | **-0.1965*** ** |
| | **(2.952)** | **(2.146)** | **(2.029)** | **(-5.103)** |
| **CEO tenure squared** | **-0.0021** ** | **-0.0028** ** | | |
| | **(-2.456)** | **(-1.982)** | | |
| ***CEO characteristics*** | | | | |
| CEO age | -0.0171* | -0.0114 | -0.0017 | -0.0067 |
| | (-1.732) | (-1.235) | (-0.502) | (-0.266) |
| CEO gender | 0.0622 | -0.2892 | 0.0692 | _ |
| | (0.196) | (-1.291) | (0.735) | |
| CEO power index | -0.0681** | -0.0718** | -0.0229 | 0.0582 |
| | (-2.088) | (-2.073) | (-0.857) | (1.031) |
| Founder CEO | -0.0072 | -0.2921 | 0.4034 | _ |
| | (-0.018) | (-1.079) | (0.873) | |
| Governance characteristics | Yes | Yes | Yes | Yes |
| Firm characteristics | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes |
| Observations | 5,717 | 4,943 | 8,546 | 817 |
| R-squared (within) | 0.295 | 0.280 | 0.283 | 0.271 |

#### 3.3.2.2. Sudden deaths and endogenous CEO-firm matching and turnover

Because the decision to hire and fire CEOs is not random, the (initial and contemporary) endogenous CEO-firm match and possible unobserved CEO heterogeneity might bias the estimations (perhaps leading us to falsely conclude that the tenure-firm value relation is hump-shaped) or might even provide alternative explanations for the results.

As the main test to address endogenous CEO-firm matching, we analyze the stock market reaction to announcements of sudden and unexpected deaths of incumbent CEOs, similar to, e.g., Johnson et al. (1985), Bennedsen, Pérez-Gonzàlez, and Wolfenzon (2010), Nguyen and Nielsen (2014), and Jenter, Matveyev, and Roth (2016). Because sudden deaths occur randomly and are likely to be exogenous to current firm and market conditions, this approach mitigates endogeneity concerns considerably. As the stock market reaction to sudden deaths reflects CEOs' future contributions to shareholder value (net of the expected successor), this analysis also constitutes a test of whether the relation between CEO tenure and firm value is hump shaped. If so, CEOs' contributions to shareholder value will decline over their tenure and we should find a positive relation between CEO tenure and abnormal stock returns.[32] The sudden death setting further allows distinguishing between labor market and corporate governance frictions as the reason for CEO survival. In fact, a positive stock market reaction to deaths of incumbent high-tenure CEOs, who are still the best match for the firm although they are associated with declining firm value (as due to labor market frictions no value-enhancing replacement is available), seems unlikely and unreasonable. To the contrary, if governance frictions (i.e., entrenchment and power) prevent the replacement of incumbent

[32] A positive stock price reaction suggests a negative contribution to firm value. This reaction is consistent with the hump-shaped tenure-firm value relation which corresponds to a negative relation between a CEO's tenure and the growth rate of firm value (as the derivative function of a hump shape is monotonically decreasing).

CEOs who are no longer the optimal match for their firms, we would expect a positive announcement return upon unexpected deaths of such CEOs.

We hand-collected a sample of CEO deaths between 1992 and 2012 from various sources, mainly LexisNexis, EDGAR online, Google and the Wall Street Journal, by searching for articles disclosing unexpected deaths of CEOs. We use keyword search terms such as "chief executive officer", "CEO" and "accident", "deceased", "death", "heart attack", "passed away", "stroke", "sudden(ly)" and "unexpected" to identify sudden deaths. To ensure that the CEO's death conveys new information, we restrict the sample to unexpected deaths using the definition of Nguyen and Nielsen (2014), i.e., we classify deaths as sudden when the cause of death is a heart attack, stroke, or an accident or when the specific cause is unreported, but the death is described as unexpected. We exclude murders and suicides (which might be related to firm performance) and cases of deaths if they cannot be identified as sudden or unexpected. We only consider CEOs of firms with available data in CRSP. This procedure leaves us with a sample of 80 sudden CEO deaths.[33] For these 80 events, we compute cumulative abnormal stock returns (CARs) over the three-day period from the day before until the day after the announcement date (*CAR [-1,1]*). We use the market model with the CRSP value-weighted index as a proxy for the market return. We winsorize *CAR [-1,1]* and accounting data (from Compustat) at the 1st and 99th percentiles.

The results are reported in *Table 3.4*. Panel A reports results from univariate difference-in-means tests for whether *CAR [-1,1]* differs depending on the deceased CEO's tenure. Specifically, we compare mean CARs across three sub-samples based on whether i) CEO

[33] Comparable to Nguyen and Nielsen (2014), who report a mean market capitalization of US$ 1,260 million, a mean market-to-book ratio of 2.7, a (median) CEO age of 60 years, and a CEO tenure of 9.4 years, we find that the mean market capitalization in the sample is US$ 1,455 million, the market-to-book ratio is 2.8, the median CEO age is 60 years and the median tenure is 8.5 years (with a minimum value of zero). The cause of death is a heart attack in 44% of all cases, a stroke or accident in 25%, and in 31% it is unknown but unexpected.

tenure is above or below (or equal to) the sample median, or ii) above or below (or equal to) 11 years, the average turning point determined in the analyses in Section 3.3.1, or iii) whether tenure is in the first or in the third tercile. The results for all three sub-samples show that abnormal stock returns to announcements of sudden deaths of incumbent CEOs with shorter tenure are significantly lower than announcement returns of CEOs with longer tenure.

**Table 3.4: Using CEO sudden deaths to address endogenous CEO-firm match and turnover**

This table reports three-day abnormal stock returns to announcements of sudden CEO deaths between 1992 and 2012. The methodology and the definition of sudden deaths follow Nguyen and Nielsen (2014). *CAR [-1,1]* is the three-day cumulative abnormal announcement return calculated using the market model with a CRSP value-weighted market index as the market proxy, where the event day t=0 is either the trading day on which the sudden and unexpected death of a CEO is first reported in the news or the next trading day in case a death was announced on a non-trading day. Panel A shows results of left- and two-tailed univariate difference-in-means tests allowing for unequal variances across subsamples (based on CEO tenure). Panel B reports multivariate results for regressions of *CAR [-1,1]* on CEO tenure and additional controls. Dummy variables for each decade (1990s, 2000s, and 2010s) are included in specifications (4) to (7). Specifications (5) to (7) additionally include industry fixed effects based on the Fama and French 12 industries. *Succession plan* is an indicator variable that takes the value of one if the firm has a succession plan in place or announces an interim successor within one week after the announcement of the sudden death. *CAR [-1,1]* and accounting data are winsorized at the 1st and 99th percentiles. The sample size varies across regression specifications (1) to (7) due to data availability. All variables are defined in Appendix 3.B. Robust t-statistics are reported in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

**Panel A: Difference-in-means tests for abnormal stock returns around CEO sudden**

| **Expected sign** | **( - )** | **( + )** | **left-tailed test (diff < 0)** | **two-tailed test (diff ≠ 0)** |
|---|---|---|---|---|
| | **CEO tenure ≤ median** | **CEO tenure > median** | **Difference** | **Difference** |
| CAR [-1,1] | -0.0250<br>(N=40) | 0.0104<br>(N=40) | -0.0354**<br>(-1.826) | -0.0354*<br>(-1.826) |
| | **CEO tenure ≤ 11 yrs** | **CEO tenure > 11 yrs** | **Difference** | **Difference** |
| CAR [-1,1] | -0.0222<br>(N=50) | 0.0174<br>(N=30) | -0.0397**<br>(-1.987) | -0.0397*<br>(-1.987) |
| | **CEO tenure 1st tercile** | **CEO tenure 3rd tercile** | **Difference** | **Difference** |
| CAR [-1,1] | -0.0287<br>(N=29) | 0.0307<br>(N=22) | -0.0594***<br>(-2.574) | -0.0594**<br>(-2.574) |

**Table 3.4: Using CEO sudden deaths to address endogenous CEO-firm match and turnover (cont'd)**

| **Panel B: Multivariate evidence from sudden deaths** | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | ***CAR [-1,1]*** | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| **CEO tenure** | **0.002*** ** | **0.002*** ** | **0.002*** | **0.002**** | **0.003*** ** | | |
| | **(2.773)** | **(2.667)** | **(1.776)** | **(2.241)** | **(2.857)** | | |
| **CEO tenure 1st tercile** | | | | | | | **-0.057*** |
| | | | | | | | **(-1.921)** |
| **CEO tenure 2nd tercile** | | | | | | **0.057*** | |
| | | | | | | **(1.921)** | |
| **CEO tenure 3rd tercile** | | | | | | **0.093*** ** | **0.0353*** |
| | | | | | | **(3.034)** | **(1.722)** |
| ***CEO characteristics*** | | | | | | | |
| CEO age | | 0.002 | 0.002 | 0.002 | 0.003* | 0.003* | 0.003* |
| | | (1.650) | (1.650) | (1.514) | (1.735) | (1.976) | (1.976) |
| Duality | | | 0.020 | 0.024 | 0.021 | 0.010 | 0.010 |
| | | | (1.142) | (1.374) | (1.092) | (0.521) | (0.521) |
| Founder CEO | | | 0.009 | 0.004 | 0.009 | 0.001 | 0.001 |
| | | | (0.395) | (0.195) | (0.409) | (0.053) | (0.053) |
| President | | | 0.008 | 0.010 | 0.014 | 0.022 | 0.022 |
| | | | (0.442) | (0.541) | (0.849) | (1.243) | (1.243) |
| ***Firm characteristics*** | | | | | | | |
| Market-to-book | | 0.001 | 0.000 | 0.000 | 0.001 | 0.002 | 0.002 |
| | | (0.395) | (0.206) | (0.229) | (0.686) | (0.867) | (0.867) |
| ROA | | -0.046 | -0.048 | -0.065* | -0.084** | -0.103** | -0.103** |
| | | (-1.383) | (-1.346) | (-1.883) | (-2.120) | (-2.503) | (-2.503) |
| Succession plan | | | | | 0.015 | 0.015 | 0.015 |
| | | | | | (0.678) | (0.605) | (0.605) |
| Total assets | | 0.012*** | 0.012*** | 0.015*** | 0.016*** | 0.018*** | 0.018*** |
| | | (2.819) | (2.690) | (3.517) | (3.040) | (3.117) | (3.117) |
| Constant | -0.033*** | -0.235*** | -0.254** | -0.239** | -0.228** | -0.329*** | -0.2012* |
| | (-2.732) | (-2.751) | (-2.638) | (-2.556) | (-2.118) | (-2.699) | (-1.826) |
| Decade controls | No | No | No | Yes | Yes | Yes | Yes |
| Industry controls | No | No | No | No | Yes | Yes | Yes |
| Observations | 80 | 73 | 73 | 73 | 73 | 73 | 73 |
| Adj. R-squared | 0.073 | 0.237 | 0.219 | 0.247 | 0.306 | 0.334 | 0.334 |

Consistent with the economic reasoning and the hump-shaped relation between CEO tenure and firm value documented above, we find that the sub-sample means of *CAR [-1,1]* are negative for low tenure values, while they are positive for high tenure values. The positive stock market reaction to sudden deaths of high-tenure CEOs indicates that a considerable fraction of these CEOs is no longer the optimal match for their firms and that governance rather than labor market frictions are likely to distort the CEO-firm match.

Panel B reports additional results from multivariate regressions of *CAR [-1,1]* on *CEO tenure* and controls for CEO and firm characteristics (not available for all observations) as well as

time and industry fixed effects. We add controls successively. Specification (1) only includes *CEO tenure* and a constant, specification (2) adds *CEO age* and firm characteristics, specification (3) adds *Duality*, *Founder CEO*, and *President*, some of the most important CEO power measures (see Adams, Almeida, and Ferreira, 2005), specification (4) adds time fixed effects, and specification (5) adds industry fixed effects and a dummy for whether the firm had a succession plan (using Nguyen and Nielsen's (2014) definition). Finally, in specifications (6) and (7) we replace *CEO tenure* by two dummy variables, one for tenure values in the second or first tercile, respectively, and one for tenure values in the third tercile of the sample's distribution of *CEO tenure*. The results of all regressions are consistent with the univariate findings and suggest a positive relation between abnormal stock returns to announcements of incumbent CEOs' unexpected deaths and CEO tenure. Hence, long tenure periods are (more) negatively perceived by the stock market.

#### 3.3.2.3. Further tests to address endogenous CEO-firm matching, turnover, and unobserved CEO heterogeneity

We provide a number of additional robustness tests – beyond CEO sudden deaths – to further address concerns of endogenous CEO-firm matching and turnover as well as unobserved CEO heterogeneity. *Table 3.5* shows results from regressions which take heterogeneity across CEOs and the endogenous (initial) CEO-firm match into account. In specification (1), we reestimate the baseline regression model from specification (3) of Table 3.2 excluding the first two years of tenure for each CEO. Over the CEO's first years in office, most uncertainty about CEO quality resolves (Jovanovic, 1979; Pan, Wang, and Weisbach, 2015). Hence, the skill set of CEOs who survive their first years in office is likely considered by the board of directors (and investors) to be a good match for the firm's skill needs.

**Table 3.5: CEO heterogeneity and endogenous CEO-firm match: Additional robustness tests**

This table reports results from multivariate regressions of *Tobin's Q* on *CEO tenure* and its squared term or *CEO tenure/Max CEO tenure* and its squared term along with CEO, firm and corporate governance characteristics. The sample includes S&P 1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). Specifications (1) and (2) show firm fixed effects regression results with additional control variables capturing differences between CEOs. These controls are: (i) *Education score* which is measured on a four-point scale reflecting the highest level of education a CEO attained (0 = no college degree or missing, 1 = bachelor's degree, 2 = master's degree or MBA, 3 = Ph.D. degree), (ii) *Inside CEO* which is an indicator variable that takes the value of one if a CEO is classified as an inside CEO according to the definition of Bebchuk, Cremers, and Peyer (2011), zero otherwise. A CEO is considered an insider if the CEO joined the company more than a year before becoming CEO, or if the CEO is classified as the founder of the company (*Founder CEO*), or if the data item "JOINED_CO" is missing, (iii) *Ivy League graduate* which is an indicator variable that takes the value of one if the CEO graduated from an Ivy League college, zero otherwise, (iv) *Managerial ability score* which is a measure of managerial ability developed by Demerjian, Lev, and McVay (2012) (https://community.bus.emory.edu/personal/PDEMERJ/Pages/Download-Data.aspx), (v) *Recession graduate* which is a dummy variable that takes the value of one if the CEO entered the labor market during a recession year, zero otherwise. The definition follows Schoar and Zuo (2017). Market entry of managers is approximated by the manager's year of birth plus 24 years. Recession years are based on the business cycle dating database of the National Bureau of Economic Research (NBER). Results shown in regression specification (1) are obtained from excluding all observations with *CEO tenure* below two years (i.e., *CEO tenure* > 1). Specification (2) uses *CEO tenure* standardized by *Max CEO tenure* (denoted *CEO tenure/Max CEO tenure*) and its squared term as an alternative, CEO-specific measure of CEO tenure for the sample of firm-year observations for which *CEO tenure* is > 1. Specifications (3) and (4) use CEO-firm fixed effects. Regression results in specification (3) are based on all observations for which *CEO tenure* is > 1. Specification (4) shows regression results for the sample of CEOs who stayed with their firm for at least 9 but no longer than 23 years (i.e., $8 \leq$ *Max CEO tenure* $\leq 22$ yrs). All other control variables are identical to specification (3) of Table 3.2. Other variables are defined in Appendix 3.B. An intercept is included in all regressions, but not reported. Robust t-statistics reported in parentheses in specifications (1) and (2) are adjusted for clustering by firm. Robust t-statistics reported in parentheses in specifications (3) and (4) are adjusted for clustering by CEO-firm pair. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | *Tobin's Q* | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| | *CEO tenure > 1 (i.e., w/o first two years of tenure)* | *CEO tenure > 1* | *CEO tenure > 1* | *8 ≤ Max CEO tenure ≤ 22 yrs* |
| **CEO tenure** | **0.0160*** | | | **0.0531***** |
| | **(1.699)** | | | **(2.846)** |
| **CEO tenure squared** | **-0.0008***** | | | **-0.0019**** |
| | **(-3.580)** | | | **(-2.476)** |
| **CEO tenure/Max CEO tenure** | | **0.7144**** | **0.9566***** | |
| | | **(2.323)** | **(3.309)** | |
| **CEO tenure/Max CEO tenure squared** | | **-0.5256**** | **-0.6719***** | |
| | | **(-2.363)** | **(-3.423)** | |
| **Max CEO tenure** | | **-0.0107** | | |
| | | **(-1.194)** | | |
| ***Further CEO characteristics*** | | | | |
| Education score | 0.0267 | 0.0304 | | |
| | (0.698) | (0.795) | | |
| Inside CEO | 0.0067 | 0.0111 | | |
| | (0.089) | (0.150) | | |
| Ivy league graduate | -0.0494 | -0.0426 | | |
| | (-0.788) | (-0.678) | | |
| Managerial ability score | 0.7397*** | 0.7539*** | 0.3985* | 0.7411*** |
| | (3.256) | (3.285) | (1.950) | (3.761) |
| Recession graduate | 0.0026 | 0.0054 | | |
| | (0.074) | (0.152) | | |
| CEO characteristics | Yes | Yes | Yes | Yes |
| Governance characteristics | Yes | Yes | Yes | Yes |
| Firm characteristics | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | No | No |
| CEO-firm fixed effects | No | No | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes |
| Observations | 10,114 | 10,114 | 10,144 | 5,652 |
| R-squared (within) | 0.302 | 0.300 | 0.250 | 0.287 |

Consequently, by focusing on these good matches, we mitigate concerns of endogenous CEO-firm matching, while being able to control for time-varying CEO quality (which may be important in the context of this chapter). In this regard, specification (1) includes additional controls that capture important differences across CEOs. To account for CEO quality, we use the time-varying *Managerial ability score* proposed by Demerjian, Lev, and McVay (2012). Educational differences are captured by a dummy variable *Ivy league graduate*, which is set to one if a CEO graduated (at any level) from an Ivy league college, and by the variable *Education score*, which is a count variable that takes on the values 0 (no college degree), 1 (Bachelor), 2 (Master or MBA) and 3 (Ph.D.). We further control for the two dummy variables *Recession graduate* (Schoar and Zuo, 2017) and *Inside CEO* to account for early-job and firm-specific experience. The definition of the latter variable follows Bebchuk, Cremers, and Peyer (2011). In specification (2), we use the same approach as before but replace *CEO tenure* and its squared term by the variable *CEO tenure/Max CEO tenure* and its squared term, i.e., we measure tenure as a fraction of the CEO's maximum realized tenure. This way, we allow life cycles to differ across CEOs, which is likely to be a relevant source of CEO heterogeneity in the context. For example, CEOs might differ in their ability to learn and adapt and in the amount of time after which they run out of new ideas and become more and more obsolete. In specification (3), we reestimate specification (2) and use CEO-firm fixed effects as an alternative way of addressing unobserved (time-invariant) CEO heterogeneity and endogenous CEO-firm matching.

Finally, in specification (4), we reestimate specification (1) of Table 3.3 replacing firm fixed effects by CEO-firm fixed effects to simultaneously address extrapolation, endogenous matching, and CEO heterogeneity. All aforementioned tests confirm the hump-shaped relation between CEO tenure and firm value.

In the next set of analyses shown in Tables 3.6 and 3.7, we provide additional tests to address concerns of endogenous CEO turnover which might bias or even explain the results. We use CEO turnover data as provided by Peters and Wagner (2014) and Jenter and Kanaan (2015) and apply the authors' definition of forced turnover. All non-forced turnover of CEOs aged 63 or older are defined as planned retirements and all remaining turnover are defined as unclassified turnover. *Panel A of Table 3.6* shows summary statistics for the three types of CEO turnover. In line with expectations we find that tenure values at the time of the turnover differ significantly across the type of turnover. Particularly, CEOs who were forced out of their position only stayed on average for about 4.8 year in office which is significantly less than those CEOs who retired as planned according to, for example, a defined corporate age retirement policy (12.3 years).

**Table 3.6: Endogenous CEO turnover: Additional robustness tests (I)**

Panel A presents summary statistics of *CEO tenure* at the event of CEO turnover for different types of CEO turnover. Panel B presents results of a survival model analysis. Regression specification (1) to (4) report coefficients of a Cox proportional hazard model for different failure events as described at the top of each column. In regression specification (1) the failure event equals *CEO turnover*. *CEO turnover* is an indicator variable equal to one if there is a change in the CEO position in year t+1 for any reason. In regression specification (2), the failure event equals *Forced turnover* which is an indicator variable that equals one if the turnover is classified as forced according to Peters and Wagner (2014) and Jenter and Kanaan (2015) who provided the data. In specification (3), the failure event is *Planned retirement*. *Planned retirement* is an indicator variable that is set to one if the turnover is not classified as forced and the CEO is 63 years or older. Specification (4) shows results for the failure event of an *Unclassified turnover*. *Unclassified turnover* is an indicator variable that takes the value of one if the CEO turnover is not classified as a forced turnover or as a planned retirement. *CEO of retirement age* is an indicator variable that takes the value of one if the age of the CEO is between 63 and 66 years, zero otherwise. *Stock return* is the one-year buy-and-hold return calculated from monthly returns. If not stated otherwise, control variables are for year t. Year and industry-fixed effects (based on Fama-French 48 industry classification) are included in specifications (1) to (4) of Panel B. Panel C reports results of firm fixed effects regressions of *Tobin's Q* on *CEO tenure*, its squared term, and controls for the probability of different CEO turnover types, i.e., the respective hazard rates obtained from the regressions shown in Panel B. Specifications (1), (3), (5) and (7) control for the predicted hazard rate. Specifications (2), (4), (6) and (8) additionally control for the squared term of the hazard rate from Panel B. All other control variables in Panel C are identical to those used in specification (3) of Table 3.2. All other variables are defined in Appendix 3.B. An intercept and year fixed effects are included in all regressions, but not reported. Robust t-statistics adjusted for clustering by firm are reported in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

**Panel A: Max CEO tenure at CEO turnover**

| | Obs. | Mean | Median | 1. Quartile | 3. Quartile | SD |
|---|---|---|---|---|---|---|
| Forced turnover | 263 | 4.77 | 4.00 | 1.00 | 6.00 | 4.97 |
| Forced turnover w/o honeymoon leaver CEOs | 164 | 6.99 | 5.00 | 4.00 | 8.00 | 5.13 |
| Planned retirement | 368 | 12.25 | 10.00 | 6.00 | 18.00 | 10.80 |
| Planned retirement w/o honeymoon leaver CEOs | 327 | 14.76 | 11.00 | 7.00 | 20.00 | 10.52 |
| Unclassified turnover | 471 | 8.53 | 7.00 | 4.00 | 12.00 | 6.47 |
| Unclassified turnover w/o honeymoon leaver CEOs | 402 | 9.82 | 8.00 | 5.00 | 13.00 | 6.14 |

**Table 3.6: Endogenous CEO turnover: Additional robustness tests (I) (cont'd)**

| **Panel B: Cox hazard models** | | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| | *CEO turnover$_{t+1}$* | *Forced CEO turnover$_{t+1}$* | *Planned CEO turnover$_{t+1}$* | *Unclassified CEO turnover$_{t+1}$* |
| CEO gender | -0.0835 | 0.1682 | _ | 0.2067 |
| | (-0.329) | (0.450) | | (0.598) |
| CEO of retirement age | 0.4270*** | -1.3785*** | 2.3260*** | _ |
| | (5.596) | (-4.171) | (19.367) | |
| CEO power index | -0.6319*** | -0.7185*** | -0.6259*** | -0.5739*** |
| | (-19.504) | (-11.519) | (-10.403) | (-11.609) |
| Founder CEO | -1.3609*** | -2.0475*** | -1.3340*** | -1.2728*** |
| | (-11.910) | (-5.179) | (-7.001) | (-7.782) |
| ***Governance characteristics*** | | | | |
| Board size | 0.0937 | -0.2344 | 0.5046* | 0.0384 |
| | (0.596) | (-0.717) | (1.758) | (0.160) |
| Busy board | 0.1893** | 0.0793 | 0.2294* | 0.1961 |
| | (2.381) | (0.488) | (1.659) | (1.580) |
| Director ownership | 6.2416 | 9.8933 | 5.7094 | 8.4524 |
| | (1.008) | (0.872) | (0.431) | (0.920) |
| E-index | 0.0382 | 0.0541 | 0.0218 | 0.0605 |
| | (1.443) | (0.990) | (0.466) | (1.483) |
| Independence ratio | 2.0148*** | 1.7756*** | 1.5985*** | 2.4278*** |
| | (8.221) | (3.617) | (3.656) | (6.327) |
| ***Firm characteristics*** | | | | |
| Board meetings | 0.0965*** | 0.0985*** | 0.0523*** | 0.1107*** |
| | (13.178) | (7.809) | (3.238) | (10.333) |
| Book leverage | 0.5091** | 0.8812** | 0.8465** | 0.1335 |
| | (2.547) | (2.209) | (2.392) | (0.440) |
| Business segments | 0.1214** | 0.1867* | 0.2243** | 0.0172 |
| | (2.246) | (1.656) | (2.323) | (0.206) |
| Firm age | -0.1836*** | -0.1460 | -0.2244*** | -0.1580** |
| | (-3.924) | (-1.601) | (-2.636) | (-2.134) |
| ln(Total Assets) | -0.0706** | -0.1569** | -0.1120* | -0.0025 |
| | (-2.248) | (-2.515) | (-1.941) | (-0.053) |
| ROAEbitda | -1.4325*** | -3.2454*** | 0.6487 | -1.3251* |
| | (-2.974) | (-3.636) | (0.761) | (-1.860) |
| ROAEbitda$_{t-1}$ | 0.5564 | 0.9797 | -0.1791 | 0.5901 |
| | (1.322) | (1.323) | (-0.234) | (0.901) |
| Sales growth | -0.4504*** | -0.7227** | -0.2943 | -0.4093** |
| | (-2.844) | (-2.238) | (-1.011) | (-2.027) |
| Stock return | -0.1713** | -0.9950*** | -0.0601 | -0.0011 |
| | (-2.309) | (-5.321) | (-0.582) | (-0.015) |
| Stock return$_{t-1}$ | -0.0229 | -0.5880*** | -0.0585 | 0.0568 |
| | (-0.384) | (-3.350) | (-0.428) | (1.264) |
| Industry fixed effects | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes |
| Observations | 10,514 | 10,514 | 10,514 | 10,514 |
| Likelihood value | -8279.99 | -1956.44 | -2386.72 | -3559.28 |

## Table 3.6: Endogenous CEO turnover: Additional robustness tests (I) (cont'd)

**Panel C: Controlling for CEO turnover probability**

| | ***Tobin's Q*** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *CEO turnover$_{t+1}$* | | *Forced CEO turnover$_{t+1}$* | | *Planned CEO turnover$_{t+1}$* | | *Unclassified CEO turnover$_{t+1}$* | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| **CEO tenure** | **0.0149**** | **0.0147**** | **0.0147**** | **0.0148**** | **0.0154**** | **0.0161**** | **0.0150**** | **0.0149**** |
| | **(2.145)** | **(2.115)** | **(2.107)** | **(2.128)** | **(2.203)** | **(2.293)** | **(2.159)** | **(2.143)** |
| **CEO tenure squared** | **-0.0006***** | **-0.0006***** | **-0.0006***** | **-0.0006***** | **-0.0006***** | **-0.0006***** | **-0.0006***** | **-0.0006***** |
| | **(-3.378)** | **(-3.300)** | **(-3.354)** | **(-3.283)** | **(-3.470)** | **(-3.556)** | **(-3.393)** | **(-3.359)** |
| Hazard rate | -0.0064** | -0.0193*** | -0.0000** | -0.0000*** | -0.0042 | -0.0138*** | -0.0000* | -0.0000** |
| | (-2.509) | (-5.518) | (-2.102) | (-6.489) | (-1.573) | (-2.831) | (-1.938) | (-2.530) |
| Hazard rate squared | | 0.0001*** | | 0.0000*** | | 0.0002** | | 0.0000** |
| | | (3.883) | | (6.579) | | (2.499) | | (2.279) |
| CEO characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Governance characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 10,514 | 10,514 | 10,514 | 10,514 | 10,514 | 10,514 | 10,514 | 10,514 |
| R-squared (within) | 0.293 | 0.295 | 0.294 | 0.299 | 0.292 | 0.293 | 0.292 | 0.293 |

We first address the possible bias due to endogeneity of turnover and the concern that the hump-shaped relation between CEO tenure and firm value might simply reflect varying managerial incentive structures as job security of many CEOs might increase over the early years of tenure, but decrease afterwards. In this regard, Cziraki and Groen-Xu (2017) find that job security affects corporate risk-taking and investments (which could affect firm value). Therefore, in a first step we perform a survival analysis using a Cox hazard model with CEO turnover and all three types of CEO turnover as failure events. The results are shown in *Panel B of Table 3.6.* Turnover refers to the next year (t+1). As can be seen from Panel B, all types of turnover are less likely if the CEO has more power or if she is the founder of the company, while turnover probability is higher when the board is more independent. Furthermore, higher firm value and accounting performance reduce the likelihood of forced turnover. These results are in line with the literature. In a second step, we run the baseline regression model from specification (3) of Table 3.2 and additionally include the resulting hazard rate (for each type of turnover), or the hazard rate and its squared term, to account for the endogeneity of turnover and for CEO job security. The results, shown in *Panel C of Table 3.6*, remain qualitatively similar.

*Table 3.7* provides further analyses to address concerns of endogenous CEO turnover. All tests use the baseline regression model shown in specification (3) of Table 3.2. First, the hump-shaped relation between CEO tenure and firm value might be the outcome of performance patterns around CEO turnover, especially forced turnover (e.g., Denis and Denis, 1995; Jenter and Kanaan, 2015) in conjunction with the use of firm fixed effects. In this regard, Huson, Malatesta, and Parrino (2004) and Taylor (2010) show that firm profitability tends to decline in the two years prior to forced CEO turnover and increases in the two years after a new CEO took office.

**Table 3.7: Endogenous CEO turnover: Additional robustness tests (II)**

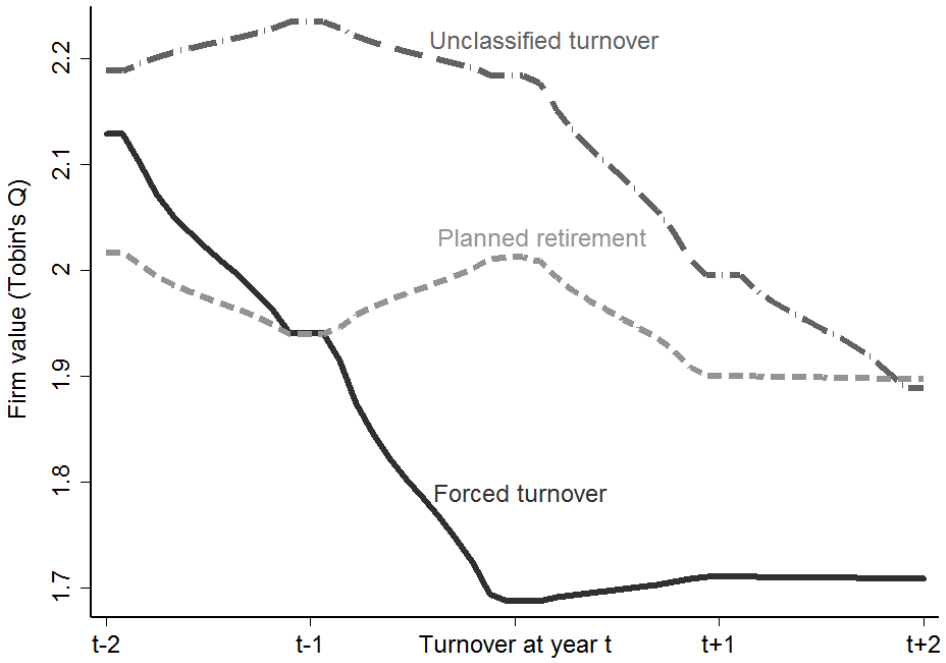
This table reports results from firm fixed effects regressions of *Tobin's Q* on *CEO tenure* and its squared term along with CEO, firm and corporate governance characteristics. The sample includes S&P 1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). Regression specification (1) controls for the different types of CEO turnover and excludes the last observation for each firm. Specification (2) excludes firm-year observations in the [-2, 2]-year window around a forced CEO turnover, while specification (3) excludes firm-year observations in the [-2, 2]-year window around an unclassified CEO turnover. Specification (4) excludes all firm-year observations for which the CEO's age exceeds the general retirement age of 65 years. Specification (5) restricts the sample to S&P 500 companies. Specification (6) restricts the sample to relatively wealthy, better compensated CEOs for which *Cumulative total CEO compensation* is above the sample median. *Cumulative total CEO compensation* is the sum of the value of total annual compensation (ExecuComp item "TDC1") the CEO has received over her tenure until the end of the fiscal year (standardized by CEO tenure). Values of total annual compensation before 2006 are adjusted following the methodology in Walker (2011). Specification (7) excludes firms that have been identified as takeover targets. All variables are defined in Appendix 3.B. An intercept is included in all regressions, but not reported. Robust t-statistics adjusted for clustering by firm are reported in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | ***Tobin's Q*** | | | | | | |
|---|---|---|---|---|---|---|---|
| | (1) *Controlling for turnover type* | (2) *w/o [-2, 2]-year window around forced CEO turnover* | (3) *w/o [-2, 2]-year window around unclassified CEO turnover* | (4) *S&P 500* | (5) *CEO age ≤ 65 yrs* | (6) *Cumulative total CEO compensation > Median* | (7) *w/o takeover target firms* |
| **CEO tenure** | **0.0156**** | **0.0139**** | **0.0146**** | **0.0452***** | **0.0165**** | **0.0597***** | **0.0145**** |
| | **(2.032)** | **(2.106)** | **(2.539)** | **(3.028)** | **(2.052)** | **(3.833)** | **(2.296)** |
| **CEO tenure squared** | **-0.0006***** | **-0.0006***** | **-0.0005***** | **-0.0015**** | **-0.0008***** | **-0.0027***** | **-0.0006***** |
| | **(-3.513)** | **(-3.509)** | **(-2.843)** | **(-2.372)** | **(-2.885)** | **(-2.755)** | **(-3.566)** |
| ***Turnover controls*** | | | | | | | |
| Forced turnover | -0.2171*** | | | | | | |
| | (-3.794) | | | | | | |
| Planned retirement | 0.0373 | | | | | | |
| | (0.780) | | | | | | |
| Unclassified turnover | 0.0332 | | | | | | |
| | (0.455) | | | | | | |
| CEO characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Governance characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 10,644 | 11,369 | 10,477 | 3,994 | 11,462 | 6,238 | 11,690 |
| R-squared (within) | 0.293 | 0.316 | 0.294 | 0.411 | 0.292 | 0.331 | 0.296 |

As *Figure 3.4* illustrates, we find a similar pattern for Tobin's Q around forced turnover while we find no pattern for planned retirements, and a decline in firm value for the group of unclassified turnover (likely due to voluntary or health-related turnover of CEOs with good performance).

**Figure 3.4: Firm value around CEO turnover**

This figure illustrates how firm value (Tobin's Q) changes in the years around CEO turnover. The event window ranges from two years prior (t-2) to two years after (t+2) CEO turnover for three different types of CEO turnover. *Forced turnover* is defined according to Peters and Wagner (2014) and Jenter and Kanaan (2015) who provided the data. *Planned retirement* is defined as any non-forced turnover of a CEO who is 63 years or older. *Unclassified turnover* is defined as any turnover not classified as a forced turnover or as a planned retirement.




To address this concern, in specification (1) we use three dummy variables to control for CEO turnover. In specifications (2) and (3), we exclude from the sample all firm-year observations in the five-year event window starting two years prior to and ending two years after forced or unclassified turnover, respectively. Second, the hump-shaped relation between CEO tenure and

firm value might simply be attributed to CEO or firm survival. Specifically, it might reflect that CEOs with very good performance get recruited to run bigger companies (Fee and Hadlock, 2003), while CEOs with relatively poor performance remain with their firms. The latter may still survive for longer time periods through entrenchment in poorly governed firms and, probably, due to a lack of succession planning. A similar argument is that successful CEOs receive larger compensation and accumulate more wealth resulting in higher opportunity costs of work and earlier retirement. The acquisition of a company, which is usually associated with high returns (see, e.g., Andrade, Mitchell, and Stafford, 2001) while terminating the CEO's tenure with this company through the subsequent delisting of the target firm, may also cause part of the effect. We consider different sub-samples to address these concerns. In specification (4), we restrict the sample to S&P 500 companies as CEOs of these very large companies are less likely to get recruited to run even bigger firms.[34] The focus on the 500 leading U.S. companies also reduces heterogeneity with respect to CEO talent and pay and mitigates concerns of succession problems. In specification (5), we exclude CEOs who have exceeded the typical retirement age of 65 years. These CEOs are more likely to lead companies that lack CEO succession plans, while at the same time they have fewer, if any, career concerns. In specification (6), we focus on wealthier CEOs, i.e., those with a cumulative total CEO compensation (relative to their tenure) above the median. Finally, in specification (7) we exclude firms that have become takeover targets over the sample period. The results of all aforementioned tests confirm the main finding from Section 3.3.1.

[34] Consistent with the general theoretical framework, we find that for the large and well-known S&P 500 companies, which are more likely to find and successfully recruit CEO candidates, firm value starts to decline after about 15 years of tenure, later than for the average S&P 1500 company. However, consistent with the results for sudden deaths, the finding that the relation between CEO tenure and firm value remains hump-shaped even for the large S&P 500 firms suggests that corporate governance rather than labor market frictions distort the optimal match between CEOs and firms, i.e., incumbent CEOs seem to overstay likely due to power and entrenchment rather than because there are no available value-enhancing CEO candidates to replace them.

#### 3.3.2.3. Alternative explanations

As another set of robustness tests, shown in *Appendix 3.C*, we attempt to rule out a number of alternative explanations. First, *CEO tenure* and *CEO tenure squared* may simply pick up the effect of a non-linear relation between CEO age or firm age and firm value. Hence, in specifications (1) and (2), we add *CEO age squared* and *Firm age squared* as an additional control variable to the baseline regression model (as reported in specification (3) of Table 3.2), respectively. When we use a firm's foundation age (obtained from The Corporate Library) instead of its age since IPO in unreported regressions, the result remains qualitatively similar. Second, CEO tenure and its squared term may simply capture a hump-shaped relation between CEO power and firm value as power grows with longer tenure and as it may have both costs and benefits (Adams, Almeida, and Ferreira, 2005; Li, Lu, and Phillips, 2017; Sah and Stiglitz, 1986). Hence, in specification (3), we add the squared term of *CEO power index* to the standard regression. Third, in specification (4), we additionally control for *Board age* and its squared term which might correlate with a CEO's tenure and affect firm value. Fourth, Huang (2013) reports a hump-shaped relation between outside director tenure and firm value. As director tenure may correlate with CEO tenure, in specification (5), we extend the baseline model to include *Outside director tenure* and its squared term. Finally, in specification (6) we include all these additional explanatory variables simultaneously. We find the hump-shaped relation between CEO tenure and firm value to hold across all six regressions.

We investigate further alternative explanations in *Appendix 3.D.* As shown in Pan, Wang, and Weisbach (2016), while firms' disinvestments decrease over CEO tenure, investments increase but with decreasing quality. Under the assumption that disinvestments efficiently reshape the firm, the hump-shaped relation between CEO tenure and firm value might just reflect this investment pattern. Thus, in addition to firms' capital and R&D expenditures already controlled

for in all of the regressions, in specification (1), we include additional controls for firms' acquisition and divestiture activities. Specifically, we use the dummy variables *Acquisition* and *Divestiture* set to one if a firm undertakes an M&A transaction or a divestiture in a given year. In specification (2), we control for *CEO ownership* and its square to address a potential hump shape of equity ownership and firm value (e.g., McConnell and Servaes, 1990). We alternatively include the CEO's fraction of variable to total compensation and its squared term in specification (3). Finally, in specification (4) we control for CEOs' wealth-performance sensitivity using the data from Edmans, Gabaix, and Landier (2009). Specification (5) shows the regression results where we include all additional controls simultaneously. Again, we find the results to hold across all regression specifications with all coefficients on *CEO tenure* and *CEO tenure squared* being statistically significant.

#### 3.3.2.4. Further robustness tests

As an additional test on whether the relation between CEO tenure and firm value is hump shaped, we reestimate the baseline regression model from specification (3) of Table 3.2 and replace *CEO tenure* and its squared term by the indicator variable *CEO tenure plateau [11-13]*, which is set to one for firm-year observations for which *CEO tenure* takes on values between 11 and 13. The regression results are shown in *Appendix 3.E*. Consistent with the results in Section 3.3.1 and the hump-shaped tenure-firm value relation, we find that the coefficient for *CEO tenure plateau [11-13]* is statistically significant and positive in regression specification (1), where we use firm fixed effects, and in specification (2), where we use CEO-firm fixed effects instead.

As a final robustness test on the main results, we replace *Tobin's Q* by return on assets (*ROA*) as an accounting (i.e., non-forward looking) measure of firm performance. The results are reported in *Appendix 3.F*. We estimate a similar regression model as in specification (5) of

Table 3.2 (i.e., with industry*year fixed effects) and use firm fixed effects in specification (1) and CEO-firm fixed effects in specification (2). The results are consistent with the previously documented hump-shaped relation between CEO tenure and firm value.

### 3.3.3. Complementary evidence from corporate investment decisions

In this section, we present additional complementary evidence from corporate investment and disinvestment decisions to provide the reader with a better understanding of the relation between CEO tenure and firm value. In a first step, we investigate a major channel through which CEOs can create and destroy firm value, acquisitions. The hump-shaped relation between CEO tenure and firm value is likely to be driven and reflected by CEOs' investment decisions. Specifically, over the early years of tenure those CEOs with a non-optimal skill set and fit who are likely associated with less successful investment decisions are more likely to be fired by the board of directors. As eventually CEOs' fit with their firms deteriorates in longer tenure, and CEOs become increasingly entrenched and reluctant to change, we expect investment decisions to become worse. Thus, consistent with the general theoretical framework, we expect to find a hump-shaped relation between CEO tenure and abnormal stock returns in reaction to acquisition announcements. An analysis of announcement returns allows for a straightforward market-based assessment of the quality of CEOs' investment decisions. In this regard, acquisitions are an ideal setting to study the quality of CEOs' decisions as they are among the largest and most easily observable investments which tend to be directly influenced by CEOs (see, e.g., Custódio and Metzger, 2013).

We compile a dataset of acquisitions announced by the sample firms during the period 1998-2011. Data on mergers and acquisitions stem from Standard & Poor's Capital IQ database. We only include takeovers with a total transaction value of at least 5 million US dollars in which a majority stake (i.e., at least 50%) of the target firm is acquired. We further require a

transaction's total value to represent at least 5% of the acquirer's market capitalization 20 days prior to deal announcement. These filters result in 2,171 acquisitions made by 1,148 distinct firms for which the basic control variables (those typically used in the M&A literature) are available. The sample is reduced to 1,526 acquisitions made by 806 distinct firms when we use the same control variables as in Section 3.3.1.

We measure acquirer announcement returns over the three-day event window from one day before to one day after the event date (*CAR [-1,1]*), defined as the day of the acquisition announcement in Capital IQ (or the first trading day thereafter if the announcement was made on a non-trading day). Cumulative abnormal announcement returns are calculated using the market model with the S&P 500 market index. In addition to the firm characteristics used in Section 3.3.1, we also control for deal characteristics following previous research (e.g., Custódio and Metzger, 2013; Moeller, Schlingemann, and Stulz, 2004). They include the payment method, target ownership status, relative deal size, industry relatedness, geographic relatedness, and whether the acquisition is hostile. We further control for the number of an acquirer's previous deals in the last five years to account for acquisition experience and the firm's acquisition set. The deal-related variables are defined in the caption of *Table 3.8.* [35]

[35] Mean values of the control variables for deal characteristics are not reported for brevity. They are in line with previous research. For example, relative deal size is 25% and the fraction of public targets is 36%. Custódio and Metzger (2013), for example, report values of 24% and 32%, respectively.

**Table 3.8: Channels (I): Evidence from acquisitions**

This table presents results from regressions of three-day cumulative abnormal returns (*CAR [-1,1]*) and eleven-day cumulative abnormal returns (*CAR [-5,5]*) around acquisition announcements on *CEO tenure* and its squared term along with CEO, acquirer (including corporate governance) and deal characteristics. To estimate abnormal returns, we use the market model with the S&P 500 index as a proxy for the market portfolio. *Cross-border* is a dummy variable whether a deal is cross-border, and zero for domestic deals. *Hostile* is a dummy variable that is set to one for deals defined by Capital IQ as hostile deals, zero otherwise. *Market-to-book* is the acquiring firm's market-to-book ratio defined as the acquirer's market capitalization 20 trading days prior to deal announcement divided by the acquirer´s common equity as of the end of the fiscal year prior the announcement of the M&A deal. *Number previous deals* is the number of acquisitions made by the acquirer in the 5 years prior to deal announcement. *Payment includes stock* is a dummy variable that equals one if the consideration includes stock, and zero otherwise. *Public target* is dummy variable that equals one if the target firm is a listed company, and zero otherwise. *Relative size* is the deal's total transaction value divided by the acquirer's market capitalization 20 days prior to the announcement of the deal. *Same industry* is a dummy variable that equals one if the acquirer and the target belong to the same two-digit SIC industry, and zero otherwise. All other variables are defined in the Appendix 3.B. Regression specification (1) includes year and industry fixed effects (based on Fama-French 48 industries), while specifications (2) to (5) include year and firm fixed effects. Robust t-statistics of the regression coefficients (in parentheses) are based on standard errors clustered by acquirer. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

| | ***CAR[-1,1]*** | | | | ***CAR[-5,5]*** |
|---|---|---|---|---|---|
| Relative size: | *≥ 5%* | *≥ 5%* | *≥ 5%* | *≥10%* | *≥ 5%* |
| | (1) | (2) | (3) | (4) | (5) |
| **CEO tenure** | **0.0013*** ** | **0.0019*** | **0.0028*** | **0.0049** ** | **0.00394*** |
| | **(2.895)** | **(1.671)** | **(1.894)** | **(2.105)** | **(1.796)** |
| **CEO tenure squared** | **-0.00004*** ** | **-0.00008*** | **-0.00011*** | **-0.00022** ** | **-0.00023** ** |
| | **(-2.652)** | **(-1.939)** | **(-1.839)** | **(-2.130)** | **(-2.343)** |
| ***CEO characteristics*** | | | | | |
| CEO age | -0.0057** | -0.0046 | -0.0004 | 0.0004 | 0.01180 |
| | (-2.185) | (-0.952) | (-0.070) | (0.034) | (1.484) |
| CEO age squared | 0.00005** | 0.00005 | 0.00001 | 0.00001 | -0.00011 |
| | (2.364) | (1.099) | (0.124) | (0.071) | (-1.531) |
| CEO gender | | | 0.0091 | -0.0164 | 0.06840 |
| | | | (0.424) | (-0.565) | (1.534) |
| CEO power index | | | 0.0016 | 0.0010 | 0.00647 |
| | | | (0.522) | (0.201) | (1.498) |
| Founder CEO | | | 0.0321 | 0.0996** | 0.07726** |
| | | | (1.175) | (2.369) | (2.246) |
| ***Acquirer characteristics*** | | | | | |
| Book leverage | | | -0.01338 | 0.04114 | -0.01396 |
| | | | (-0.529) | (1.009) | (-0.305) |
| Business segments | | | -0.00465 | 0.00008 | -0.01524 |
| | | | (-0.608) | (0.006) | (-1.450) |
| Firm age | | | -0.01249 | 0.00539 | -0.01161 |
| | | | (-0.821) | (0.185) | (-0.571) |
| Firm risk | | | 0.02363 | 0.01697 | 0.06852* |
| | | | (0.924) | (0.459) | (1.856) |
| Market-to-book | 0.0009* | 0.0009 | -0.0003 | -0.0054** | -0.00272* |
| | (1.941) | (0.563) | (-0.311) | (-2.348) | (-1.665) |
| Operating CF | | | -0.0522 | -0.0332 | -0.10395* |
| | | | (-1.527) | (-0.708) | (-1.951) |

**Table 3.8: Channels (I): Evidence from acquisitions (cont'd)**

| | | | | | |
|---|---|---|---|---|---|
| Total assets | -0.0022* | 0.0045 | 0.0077 | -0.0023 | -0.00132 |
| | (-1.797) | (0.737) | (0.988) | (-0.192) | (-0.124) |
| ***Governance characterisitics*** | | | | | |
| Board size | | | -0.0366 | -0.0728* | -0.01200 |
| | | | (-1.550) | (-1.785) | (-0.402) |
| Busy board | | | 0.0200*** | 0.0217 | 0.03125*** |
| | | | (2.734) | (1.418) | (2.781) |
| Director ownership | | | -1.3644* | -1.6921 | -1.78950 |
| | | | (-1.721) | (-1.320) | (-1.427) |
| E-index | | | 0.0006 | 0.0039 | 0.00577 |
| | | | (0.132) | (0.469) | (1.072) |
| Independence ratio | | | 0.0069 | 0.0026 | 0.01053 |
| | | | (0.253) | (0.065) | (0.266) |
| ***Deal characteristics*** | | | | | |
| Cross-border | 0.0042 | 0.0042 | 0.0018 | 0.0008 | 0.00476 |
| | (1.144) | (0.822) | (0.320) | (0.075) | (0.616) |
| Hostile | -0.0360 | -0.0078 | -0.0149 | -0.0471* | -0.01679 |
| | (-1.075) | (-0.250) | (-0.468) | (-1.869) | (-0.667) |
| Number previous deals | -0.0001 | -0.0008 | -0.0006 | 0.0011 | -0.00135 |
| | (-0.356) | (-0.944) | (-0.596) | (0.723) | (-0.921) |
| Payment includes stock | -0.0067* | -0.0039 | -0.0043 | 0.0042 | 0.00318 |
| | (-1.704) | (-0.723) | (-0.616) | (0.373) | (0.336) |
| Public target | -0.0074** | -0.0060 | -0.0057 | -0.0068 | -0.00641 |
| | (-2.032) | (-1.143) | (-0.921) | (-0.680) | (-0.746) |
| Relative size | -0.0068 | -0.0023 | 0.0086 | 0.0094 | 0.00833 |
| | (-1.111) | (-0.271) | (0.737) | (0.646) | (0.600) |
| Same industry | -0.0034 | -0.0089* | -0.0079 | -0.0115 | -0.01894** |
| | (-0.981) | (-1.781) | (-1.478) | (-1.202) | (-2.501) |
| Industry fixed effects | Yes | No | No | No | No |
| Firm fixed effects | No | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Observations | 2,171 | 2,171 | 1,526 | 922 | 1,526 |

Specifications (1) and (2) of *Table 3.8* report the results from regressions of *CAR [-1,1]* on *CEO tenure, CEO tenure squared,* deal characteristics, a limited set of acquirer characteristics, and year fixed effects. Specification (1) uses industry fixed effects (in order to make the results more comparable to the M&A literature), while specification (2) uses firm fixed effects. In specifications (3) and (4) the extended set of control variables and firm fixed effects are used. The first three specifications report the results for the sample of acquisitions whose total transaction value represents at least 5% of the acquirer's market capitalization, while specification (4) reports the results for acquisitions with a relative size of at least 10%. Additionally, specification (5) uses *CAR [-5,5]* instead of *CAR [-1,1]* as the dependent variable to account for event uncertainty. The results across all five specifications support a hump-

shaped relation between CEO tenure and acquisition announcement returns. Consistent with the results on the relation between CEO tenure and firm value, we find the turning point of CEO tenure to be located in the area of 8.5-14 years when firm fixed effects are used. This evidence is consistent with the notion that high-tenure CEOs have lost too much of their fit with the company and are entrenched, and thus select non-optimal takeover targets (e.g., those with relatively low synergies or low growth prospects). Empire building (Jensen, 1986) or attempts to diversify the personal portfolio (Amihud and Lev, 1981) may aggravate this problem. Overall, the relatively lower returns to acquisition announcements associated with very short or very long CEO tenure support the CEO life cycle we posit.

In a second step, we provide an analysis of corporate disinvestments and CEO tenure. Economic theory suggests that over their tenure CEOs become reluctant to change and to reverse earlier (investment) decisions (e.g., Miller, 1991; Boot, 1992; Prendergast and Stole, 1996), which will make them less responsive and probably also less adaptable to changes. Coupled with increasing power and entrenchment, unresponsive CEO behavior may make the increasing likelihood of a mismatch between CEOs' skill sets and their firms' skill needs due to the evolution of the economy and its industries an even more severe problem. For example, high-tenure CEOs may be likely to divest less than necessary when their industry evolves which likely demands changes to affected firms' technologies. We therefore test whether the probability of corporate divestitures decreases with CEO tenure. The regression results are shown in *Table 3.9*. Supporting Pan, Wang, and Weisbach (2016), we find that corporate divestitures become less likely over CEOs' time in office. In addition, consistent with high-tenure CEOs being reluctant to make necessary changes to their companies, we further find that the probability of divestitures is considerably higher in the first three years of a CEO's tenure.

**Table 3.9: Channels (II): Evidence from corporate disinvestments**

This table reports results from firm fixed effects regressions (regression specification 1) and conditional logistic firm fixed effects regressions (specifications 2 to 4) of the indicator variable *Divestiture* on *CEO tenure* along with CEO, firm and corporate governance characteristics. The sample includes S&P 1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). *CEO tenure [0, 2]* is a dummy variable that equals one for the first three years of a CEO's tenure, zero otherwise. All other variables are defined in Appendix 3.B. An intercept and year fixed effects are included in all regressions, but not reported. For regression specification (1), robust t-statistics adjusted for clustering by firm are reported in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | ***Prob (Divestiture)*** | | | |
|---|---|---|---|---|
| | | | | *CEO tenure ≤ median* |
| | (1) | (2) | (3) | (4) |
| **CEO tenure** | **-0.0016**** | **-0.0319***** | **-0.0237*** | |
| | **(-2.428)** | **(-2.797)** | **(-1.907)** | |
| **CEO tenure [0, 2]** | | | | **0.2171*** |
| | | | | **(1.8128)** |
| ***CEO characteristics*** | | | | |
| CEO age | 0.0005 | 0.0093 | 0.0092 | 0.0186 |
| | (0.6394) | (0.9038) | (0.8941) | (1.4231) |
| CEO gender | -0.0448 | -0.6573 | -0.6297 | -0.2572 |
| | (-1.2521) | (-1.4591) | (-1.3984) | (-0.5050) |
| CEO power index | | | -0.0863 | 0.0158 |
| | | | (-1.631) | (0.213) |
| Founder CEO | 0.0379* | 0.8704** | 0.9324** | -1.7751* |
| | (1.936) | (2.341) | (2.501) | (-1.674) |
| ***Firm characteristics*** | | | | |
| Book leverage | 0.0708*** | 1.3004*** | 1.3219*** | 1.3562** |
| | (2.667) | (2.787) | (2.817) | (2.088) |
| Business segments | -0.0000 | -0.0377 | -0.0489 | -0.0720 |
| | (-0.003) | (-0.336) | (-0.434) | (-0.464) |
| Firm age | 0.0059 | -0.0487 | -0.1625 | -0.1775 |
| | (0.373) | (-0.209) | (-0.686) | (-0.580) |
| Firm risk | 0.0304 | 0.3888 | 0.4184 | 0.7267 |
| | (1.578) | (1.042) | (1.115) | (1.384) |
| Operating CF | -0.0577* | -1.0891 | -1.0717 | -1.8248** |
| | (-1.937) | (-1.611) | (-1.587) | (-1.990) |
| R&D | 0.1682 | 2.2299 | 2.0699 | 3.8980 |
| | (1.617) | (1.230) | (1.133) | (1.237) |
| Sales growth | -0.0294*** | -0.4744** | -0.4870** | -0.5809** |
| | (-3.081) | (-2.478) | (-2.533) | (-2.234) |
| Tobin's $Q_{t-1}$ | 0.0023 | 0.0473 | 0.0496 | 0.0622 |
| | (1.527) | (1.052) | (1.090) | (0.800) |
| Total assets | 0.1682 | 2.2299 | 2.0699 | 3.8980 |
| | (1.617) | (1.230) | (1.133) | (1.237) |
| Governance characteristics | No | No | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes |
| Observations | 12,427 | 4,740 | 4,740 | 2,204 |
| R-squared (within)/ Log likelihood | 0.006 | -1528.24 | -1523.22 | -759.99 |

### 3.4. Heterogeneity of the Relation between CEO tenure and Firm value

In this section, we examine the heterogeneity of the relation between CEO tenure and firm value. On the one hand, the analyses and results we present in the following aim at providing a better understanding of the tenure-firm value relation. On the other hand, they constitute tests of the general theoretical framework. With regard to this framework, we study the role of industry dynamics and general economic dynamism, which alter firms' managerial skill needs, as well as CEOs' abilities to adapt to changes to their firms' business environments.

In a first step, we examine firms' industry dynamics, i.e., how fast industries evolve. We make the reasonable assumption that firms' managerial skill needs are more (less) likely to change if firms operate in more (less) dynamic industries. Further, firms in dynamic industries may also find it harder to identify new CEO candidates with better suited skills sets because predicting the optimal skill set demands can be more difficult and because CEO candidates may have preferences to work in more stable economic environments. As a consequence, the more (less) dynamic a firm's industry, the more (less) likely and the faster (slower) will a CEO's skill set become less optimal for the firm. Thus, relative to the average S&P 1500 firm we expect to find that CEO tenure is associated with declining firm value at relatively lower (higher) tenure levels if the firm's industry is more (less) dynamic. Put differently, the relation between CEO tenure and firm value is less (more) likely to be hump shaped and more (less) likely to be positive if firms are subject to low (high) dynamism.

To measure firms' industry dynamics, we use the industry dynamism index proposed by Coles, Daniel, and Naveen (2015). The index is defined as the sum of the following four indicator variables: (i) a dummy whether the average annual sales growth of all firms in the industry is above the $50^{th}$ percentile, (ii) a dummy whether the average R&D expenses to total assets at the industry level are above the $75^{th}$ percentile, (iii) a dummy whether the average of the fluidity

scores of Hoberg, Phillips, and Prabhala (2014) is above the 50$^{th}$ percentile, and (iv) a dummy whether the number of mergers in the industry divided by the number of firms in the industry (e.g., Harford, 2005) is above the 50$^{th}$ percentile. Industries are defined based on the three-digit SIC codes. The index takes on discrete values between 0 and 4 (with a median value of 2) with higher values indicating higher industry dynamism. The results from reestimating the baseline regression model from specification (3) of Table 3.2 for sub-samples based on whether industry dynamism is high or low are reported in *Panel A of Table 3.10*. Specification (1) reports the results for firm-years with a dynamism index above the median (i.e., more dynamic settings), while specification (2) reports the results for firm-years with a dynamism index below or equal to the median (i.e., less dynamic industries). We provide additional evidence in *Panel B of Table 3.10* where we use each component of the dynamism index to compare more to less dynamic industry settings.

The results support the expectations. While on average firm value is estimated to peak (i.e., starts to decline) after about 12.2 years of CEO tenure in the baseline regression model (Table 3.2), we find that firm value peaks much earlier, namely after 8.6 years (or 30% earlier), for firms with above median industry dynamism and is estimated to peak much later, after 13.8 years (or 13% later), for firms with below median dynamism. The overall difference in the turning point of firm value amounts to 5.2 years, an economically meaningful variation. When we use the components of the dynamism index, in Panel B, the results are confirmed and we find firm value to peak at even higher tenure levels for some low-dynamism firms suggesting that the relation between CEO tenure and firm value becomes less likely to resemble a hump shape (as expected). Yet, for all four low-dynamism sub-samples we test whether the relation can also be described by a positive logarithmic function of *CEO tenure* and find that this is only the case for firms operating in low-growth industries (specification 6). Overall, the results

indicate that heterogeneity with respect to firms' industry dynamics plays an important role for the tenure-firm value relation.

**Table 3.10: Industry dynamics and the relation between firm value and CEO tenure**

This table presents results from firm fixed effects regressions of *Tobin's Q* on *CEO tenure* and its squared term along with CEO, firm and corporate governance characteristics for different industries. The sample includes S&P 1500 firms over the period 1998-2011 excluding regulated financial and utility firms (SIC codes 4000-4999 and 6000-6999). Panel A reports regression results for samples of more versus less dynamic industries. Industry dynamism is measured via the industry dynamism index proposed by Coles, Daniel, and Naveen (2015). Industries are defined based on three-digit SIC clusters. *Dynamism index* is defined as the sum of the following four indicator variables: (i) *R&D industry* that equals one if the average R&D expenses to total assets at the industry level is above the 75$^{th}$ percentile, zero otherwise, (ii) *Merger industry* that is set to one if the number of mergers in the industry divided by the number of firms in the industry (e.g., Harford, 2005) is above the 50$^{th}$ percentile, zero otherwise, (iii) *Growth industry* that equals one if the average annual sales growth of all firms in the industry is above the 50$^{th}$ percentile, zero otherwise, and (iv) *Fluidity industry* which is set to one if the average of the fluidity scores of Hoberg, Philips, and Prabhala (2014) is above the 50$^{th}$ percentile, zero otherwise. The index takes on discrete values between 0 and 4, where higher values indicate higher industry dynamism. Panel B shows regression results for samples based on each of the four index components. The number of observations used for the analyses in Panel B can vary due to data availability. Absolute and relative changes at the bottom of each panel are calculated with respect the turning point of 12.2 years obtained from regression (3) of Table 3.2. All variables are defined in Appendix 3.B. Control variables are identical to those used in specification (3) of Table 3.2. An intercept and year fixed effects are included in all regressions, but not reported. Robust t-statistics adjusted for clustering by Fama-French 48 industry clusters are reported in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| **Panel A: *Dynamism index*** *(Coles, Daniel, and Naveen, 2015)* | | |
|---|---|---|
| | ***Tobin's Q*** | |
| | (1) | (2) |
| | *Dynamism index > median* | *Dynamism index ≤ median* |
| **CEO tenure** | **0.0379**** | **0.0055*** |
| | **(2.373)** | **(1.721)** |
| **CEO tenure squared** | **-0.0022***** | **-0.0002*** |
| | **(-5.003)** | **(-1.954)** |
| CEO characteristics | Yes | Yes |
| Governance characteristics | Yes | Yes |
| Firm characteristics | Yes | Yes |
| Firm fixed effects | Yes | Yes |
| Year fixed effects | Yes | Yes |
| Observations | 3,476 | 8,846 |
| R-squared (within) | 0.374 | 0.394 |
| **Turning point** | **8.6** | **13.8** |
| *Absolute change (yrs)* | *- 3.6* | *+ 1.6* |
| *Relative change (%)* | *- 29.5* | *+ 13.1* |

## Table 3.10: Industry dynamics and the relation between firm value and CEO tenure (cont'd)

**Panel B:** ***Dynamism index components***

| | ***Tobin's Q*** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) *R&D industry = 1* | (2) *R&D industry = 0* | (3) *Merger industry = 1* | (4) *Merger industry =0* | (5) *Growth industry = 1* | (6) *Growth industry = 0* | (7) *Fluidity industry = 1* | (8) *Fluidity industry = 0* |
| **CEO tenure** | **0.0370*** ** | **0.0060** ** | **0.0184*** | **0.0072*** | **0.0116** | **0.0189** ** | **0.0287** ** | **0.0026** |
| | **(2.900)** | **(2.273)** | **(1.865)** | **(1.912)** | **(1.644)** | **(2.409)** | **(2.192)** | **(0.707)** |
| **CEO tenure squared** | **-0.0018*** ** | **-0.0002** ** | **-0.0009*** ** | **-0.0002** ** | **-0.0007*** ** | **-0.0005** ** | **-0.0014*** ** | **-0.0000** |
| | **(-4.943)** | **(-2.255)** | **(-3.026)** | **(-2.158)** | **(-2.957)** | **(-2.419)** | **(-3.754)** | **(-0.602)** |
| CEO characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Governance charac. | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 3,911 | 8,516 | 6,820 | 5,607 | 6,161 | 6,266 | 5,207 | 7,220 |
| R-squared (within) | 0.365 | 0.392 | 0.304 | 0.393 | 0.351 | 0.290 | 0.331 | 0.390 |
| **Turning point** | **10.3** | **15.0** | **10.2** | **18.0** | **8.3** | **18.9** | **10.3** | **-** |
| *Absolute change (yrs)* | *- 1.9* | *+ 2.8* | *- 2.0* | *+ 5.8* | *- 3.9* | *+ 6.7* | *- 1.9* | - |
| *Relative change (%)* | *- 15.6* | *+ 23.0* | *- 16.4* | *+ 47.5* | *- 32.0* | *+ 54.9* | *- 15.6* | - |

In a second step, we examine differences across the business cycle. During recessions, economic activity, technological progress, and industry dynamism typically slow down. Further, competition for CEOs is likely to be lower when the economy does not do well, which facilitates replacing CEOs by candidates with better fit. Accordingly, similar to the previous results shown in Table 3.10, we expect that relative to the average S&P 1500 company firm value will peak at higher levels of CEO tenure during recessions, when CEOs skill sets are less likely to lose their fit with firms' skill needs, and at lower levels during non-recession years. To test this prediction, we define an indicator *Recession* that equals 1 if the observation year is classified as a recession year according to the NBER Business Cycle Expansions and Contractions data (http://www.nber.org/cycles.html). The results, shown in *Table 3.11*, provide empirical support for the expectation. We find a hump-shaped relation between CEO tenure and firm value for both non-recession and recession years. However, in specification (1), where we only consider non-recession years, we estimate the turning point of firm value to be at 10.2 years of tenure, 20% lower than for the average firm, while in specification (2), which is limited to recession years only, firm value is estimated to peak around 14.8 years of tenure, i.e., 21% later. Again, this variation is economically meaningful. Thus, heterogeneity with regard to the business cycle also seems to matter for the tenure-firm value relation.

**Table 3.11: The business cycle and the relation between firm value and CEO tenure**

This table reports results – for recession vs. non-recession years – from firm fixed effects regressions of *Tobin's Q* on *CEO tenure* and its squared term along with CEO, firm and corporate governance characteristics. The sample includes S&P 1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). Regression specification (1) shows results for non-recession years (i.e., the indicator variable *Recession* equals 0), while specification (2) shows results for recession years (i.e., the variable *Recession* equals 1). *Recession* is an indicator variable that equals 1 if the observation year is classified as a recession year according to the NBER Business Cycle Expansions and Contractions data (http://www.nber.org/cycles.html). All other years are defined as non-recession years. All other variables are defined in Appendix 3.B. In Panel A, robust t-statistics adjusted for clustering by industry (Fama French 48 industry classification) are reported in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | ***Tobin's Q*** | |
|---|---|---|
| | Recession = 0 | Recession = 1 |
| | (1) | (2) |
| **CEO tenure** | **0.0122*** | **0.0177*** |
| | **(1.767)** | **(1.931)** |
| **CEO tenure squared** | **-0.0006***** | **-0.0006**** |
| | **(-3.022)** | **(-2.255)** |
| CEO characteristics | Yes | Yes |
| Governance characteristics | Yes | Yes |
| Firm characteristics | Yes | Yes |
| Firm fixed effects | Yes | Yes |
| Year fixed effects | Yes | Yes |
| Observations | 9,603 | 2,824 |
| R-squared (within) | 0.299 | 0.446 |
| **Turning point (yrs)** | **10.2** | **14.8** |
| *Absolute change (yrs)* | *-2.0* | *+ 2.6* |
| *Relative change (%)* | *-19.6* | *+ 21.3* |

In a last step, we consider CEOs' abilities to adapt to changes in firms' economic environment. For those firms that employ adaptable CEOs, who are less likely to lose their fit with the company, the relation between CEO tenure and firm value is more likely to be positive (instead of hump shaped), i.e., firm value will likely peak at much higher levels of CEO tenure as it needs more or more drastic changes to render an adaptable CEO's skill set non-optimal. To measure CEO adaptability, we use Custódio, Ferreira, and Matos's (2013) general ability index, which encompasses managerial work experience in different firms, industries and positions. Because of their broad managerial experience, we expect generalists to be better able to adapt to changes and to be more capable of learning new concepts and solving new problems. This expectation is consistent with Guay, Taylor, and Xiao (2015) who find that CEOs with more general managerial ability are less likely to be fired when their firms are hit by industry shocks. The results, shown in *Table 3.12*, support the expectation. We use the indicator variable *Generalist CEO*, which equals one if the general ability index is above the annual median value for the respective year, and interact it with *CEO tenure* and its squared term in specification (1). We find that non-generalist CEOs are associated with a hump-shaped relation between CEO tenure and firm value which is estimated to peak after 10.3 years. For generalist CEOs, however, we find a positive interaction term with *CEO tenure squared* which suggests that firm value starts to decline much later. Consistently, in specifications (2) and (3) we find no hump shape, but rather a positive tenure-firm value relation for generalists.[36] These findings support the general framework and the existing literature on generalist CEOs and indicate that adaptability is an important CEO attribute.

[36] We obtain similar results for the tenure-performance relation for inside versus outside hired CEOs (see Appendix 3.G).

**Table 3.12: Adaptable CEOs and the relation between firm value and CEO tenure**

This table reports results from firm fixed effects regressions of *Tobin's Q* on *CEO tenure* and its squared term or the natural logarithm of *CEO tenure* (denoted *ln(CEO tenure)*) along with CEO, firm and corporate governance characteristics. The sample includes S&P 1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). Specification (1) shows regression results with interaction effects for generalist CEOs. *Generalist CEO* is an indicator variable that takes the value of one if the General Ability Index (Custódio, Ferreira, and Matos, 2013) is above the annual median value for the respective year, zero otherwise. The data is retrieved directly from the website of the Journal of Financial Economics. The index is available until 2007. Missing index values for the years 2008 to 2011 are filled with the latest available index value of the respective CEO-firm pair. Specifications (2) and (3) show regression results for the sample of *Generalist CEOs*. Specification (2) uses *CEO tenure* and its squared term as the functional form for the relation between *CEO tenure* and *Tobin's Q*, while specification (3) uses *ln(CEO tenure)*. All other variables are defined in Appendix 3.B. Control variables are identical to those used in specification (3) of Table 3.2. An intercept and year fixed effects are included in all regressions, but not reported. Robust t-statistics adjusted for clustering by firm are reported in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | ***Tobin's Q*** | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| | *All CEOs* | *Generalist CEOs* | |
| **ln(CEO tenure)** | | | **0.0999**** |
| | | | **(2.138)** |
| **CEO tenure** | **0.0186**** | **0.0270*** | |
| | **(2.102)** | **(1.812)** | |
| **CEO tenure squared** | **-0.0009***** | **-0.0003** | |
| | **(-3.174)** | **(-0.728)** | |
| **CEO tenure * Generalist CEO** | **-0.0088** | | |
| | **(-0.764)** | | |
| **CEO tenure squared * Generalist CEO** | **0.0007*** | | |
| | **(1.676)** | | |
| Generalist CEO | -0.0209 | | |
| | (-0.410) | | |
| CEO characteristics | Yes | Yes | Yes |
| Governance characteristics | Yes | Yes | Yes |
| Firm characteristics | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes |
| Observations | 10,234 | 5,147 | 5,147 |
| R-squared (within) | 0.289 | 0.313 | 0.313 |
| ***Test of linear hypothesis*** | | | |
| (CEO tenure squared + CEO tenure squared * Generalist = 0) | | | |
| F-statistic | 0.44 | | |
| Prob. > F-statistic | 0.507 | | |

## 3.5. Conclusion

In this chapter, we examine whether CEOs' impact on the firms they run varies over their tenure and which factors render CEOs more or less valuable over time. Consistent with a general theoretical framework that considers environmental dynamics, we document a hump-shaped relation between CEO tenure and firm value for the average S&P 1500 company using both parametric and semi-parametric estimations. This relation is robust to a battery of robustness tests, including CEO sudden deaths, and is subject to economically meaningful variation depending on industry dynamics, the business cycle, and CEOs' adaptability to changes. We provide further results for corporate investment decisions consistent with the hump-shaped tenure-firm value relation. In all, the evidence we provide suggests that a considerable fraction of high-tenure CEOs is no longer the optimal match for their firms and that these firms seem to have difficulties, apparently due to corporate governance frictions, replacing the incumbent CEOs with candidates who have better fitting skill sets.

The results presented in this chapter help explain why even very successful CEOs can be associated with declining firm value after some point in time. They suggest that firms should be careful with granting CEOs additional power as rewards for good performance as this makes it harder to replace the CEO if the fit deteriorates in the future. Results also suggest that regular CEO turnover can be valuable for shareholders, but they do not support a one-size-fits-all policy of CEO term limits. The board of directors should rather frequently monitor the CEO's fit with the firm and have the flexibility to react to changes in firm's skill needs and to make CEO contract extensions more dependent on actual CEO-firm fit and less on past performance.

# Chapter 4 – On the Choice of Board Leadership Structure: Evidence from a Mandatory Disclosure Regulation

## 4.1. Introduction

Probably the most contentious issue in corporate governance, in both academia and practice, is whether the chief executive officer (CEO) of a corporation should simultaneously serve as the chairman of the board of directors (Dalton, Hitt, Certo, and Dalton, 2007; Finkelstein, Hambrick, and Cannella, 2009). Increasing pressure from governance experts and shareholders has led to a significant trend in board leadership structure towards the separation of the two positions over recent years. However, today still more than half of the S&P500 companies (52%) combine the CEO and chairman position (see e.g., Spencer Stuart, 2016), while only about 27% of corporate boards are led by an independent chairman. This raises the questions to why firms actually choose a combined or a separate leadership structure and what are the reasons of corporate boards behind their choice of board leadership structure?

Using a 2009 regulatory change in corporate disclosure requirements on board leadership structure by the Securities and Exchange Commission (SEC) and a set of hand-collected new information on the rationales of board leadership structure decisions of large public companies, the chapter presents a novel approach for understanding leadership structure decisions of public companies by examining the endogenous motives of board leadership structure choices. The chapter systematically identifies the yet unobserved rationales of large U.S. S&P 500 companies for the decision to combine or separate the CEO and chairman position, as disclosed by the companies themselves, and further analyzes investors' stock market reactions following the firm's disclosure of their board leadership structure rationales.

While agency theory argues that combining the CEO and chairman position is detrimental for shareholders as CEO duality fosters managerial entrenchment which leads to impaired monitoring and governance effectiveness (see e.g., Fama and Jensen, 1983; Jensen, 1993), proponents of organization theory emphasize that vesting the two roles in a single person leads to superior performance as the increase in managerial discretion and the promotion of clear and consistent managerial leadership facilitates effective decision-making by the CEO and reduces additional information sharing and coordination costs between the CEO and the chairman (see e.g., Boyd, 1995; Brickley, Coles, and Jarrell, 1997). Despite extensive research on the effects of board leadership structure decisions, the empirical evidence on the consequences of board leadership structure with respect to managerial entrenchment, risk taking and corporate performance is mixed and rather inconclusive (see e.g., Dalton et al. 1998 for a meta-analysis or Krause, Semandeni, and Cannella, 2014 for a recent review of the literature).

Endogeneity issues related to the choice of governance and leadership structures generally exacerbate reliable inference about the effects and quality of firms' governance and leadership structure decisions (see e.g., Hermalin and Weisbach, 1998; Adams, Hermalin, and Weisbach, 2010; Roberts and Whited, 2013). Understanding the endogenous choice of board leadership structure necessitates the knowledge about the unobserved rationales behind the decision of corporate boards to either combine or separate the CEO and chairman position. While firms might choose on average their value-maximizing leadership structure, heterogeneity in the endogenous reasoning for the decision can be important for investors in assessing the firms' board leadership structure decisions as some firms may have good motives for their leadership structure choice while others may have no or rather inappropriate motives. The academic research on the determinants of board leadership structure decisions is very limited and so far there is no systematic evidence on the firms' reasons behind their decision to combine or separate the CEO and chairman position.

In December 2009, the SEC issued a new disclosure rule to Item 407 (h) of Regulation S-K to increase transparency on board leadership structure decisions of corporate boards. The new disclosure regulation which was effective from February 28th, 2010 requires public U.S. companies to provide information about the company's board leadership structure in a separate section in the firm's proxy statement.[37] In particular, the disclosure regulation requires firms to disclose the rationales behind their decision to combine or separate the positions of the CEO and the chairman, and the reasons why the board of directors believes that the leadership structure is the most appropriate leadership structure for the company at the time.

For a sample of 447 companies of the S&P500 index which consists of 282 firms with a combined leadership structure and 165 firms with a separate board leadership structure, we manually collect the individual disclosed rationales from the firms' proxy statement which was filed with the SEC within a one year time period after the new disclosure regulation became effective. Overall, we identify 24 distinct reasons for firms that combine the CEO and chairman position, and a total of 22 individual reasons for firms with a separate leadership structure.

Firms that combine the CEO and chairman position most frequently disclose rationales consistent with organization theory that emphasizes the benefits of a combined leadership structure. For example, firms typically state that the combined leadership structure is chosen because it promotes clear, strong and consistent leadership ("*Unified leadership*"), it allows the firm to leverage the CEO's in-depth knowledge about the company's operations which best positions her to act as the chairman ("*Knowledge as CEO*"), it enables the CEO act as a bridge between management and the board to facilitate the information flow ("*Bridge between management and board*"), the leadership structure contributes to an efficient and effective

[37] SEC Release No. 33-9089; 34-61175 ("Proxy Disclosure Enhancements"), December 16, 2009, is available at www.sec.gov/rules/final/2009/33-9089.pdf. The rules apply to proxy and information statements, annual reports and registration statements under the Exchange Act, and registration statements under the Securities Act of 1933 as well as the Investment Company Act of 1940.

functioning of the board ("*Efficiency and effectiveness of board*"), or because the combined structure has served the company and its shareholders well in the past ("*Leadership structure has served well*"). Firms with a separate leadership structure, on the contrary, make frequently use of reasons that are largely consistent with agency theory. Firms usually state that their leadership structure has been chosen to account for the inherent differences between the tasks and roles of the CEO and chairman ("*Differences between tasks/roles*"), because it facilitates the monitoring of the CEO and management ("*Facilitates monitoring*"), it allows the CEO to focus on managing the day-to-day operations of the company ("*CEO can focus on management*") or because the structure promotes the use of the chair's knowledge and experience with the company ("*Chair's experience with the company*").

Using two-day abnormal returns following the disclosure of the firms' leadership structure reasons, the chapter analyzes investor reactions to individual leadership reasons - separately for firms with a combined or separate leadership structure. Cross-sectional regressions from two-day announcement returns on the five most frequently stated reasons for both leadership subsamples yield overall insignificant estimates for the majority of leadership reasons. The cross-sectional results, however, indicate that the disclosure of the rationale "*Leadership structure has served well*" is negatively related to two-day abnormal stock returns to equity holders for firms with a combined leadership structure. For firms with a separate leadership structure, we find that the rationale "*Differences between tasks/roles*" for splitting the roles tends to be positively related to two-day abnormal returns.

An analysis of heterogeneity in announcement returns for the individual leadership reasons reveals that investors evaluate the disclosed rationales conditional on the specific circumstances of the company and consistent with potential benefits and costs associated with each type of board leadership structure. Specifically, the disclosure of the leadership reason

"*Unified leadership*" yields heterogeneous stock market reactions depending on the economic environment and the size of the firm. Specifically, we find that high-tech firms that are likely operating in more dynamic business environments, where managerial discretion is expected to be most valuable, experience positive abnormal stock returns to the disclosure of this rationale. Bigger and more mature firms are associated with negative abnormal returns following the disclosure of the reason "*Unified leadership*", while stock market reactions for smaller firms are positive. Finally, we find that the negative effect for the reason "*Leadership structure has served well*" is robust to differences in the firms' past stock market or accounting performance. However, the rationale is welcomed by shareholders if it is stated by founder-CEO firms which have been documented to be associated with superior stock market performance (see e.g., Fahlenbrach, 2009).

For firms with a separate leadership structure, we find that shareholder reactions to the disclosure of the rationale "*CEO can focus on management*" also varies based on the size of the firm and the characteristics of the chairman. In particular, separating the roles to allow the CEO to focus on managing the company is welcomed by investors for larger and more mature firms, while it is associated with negative abnormal returns for smaller companies. Further, both leadership rationales "*CEO can focus on management*" and "*Chair's experience with company*" are positively related to two-day abnormal returns and hence welcomed by corporate shareholders if the chairman possesses in-depth knowledge about the company. Consistently, the results further indicate that investors seem to dislike both leadership reasons if stated by firms that have already higher governance standards in place, i.e., an independent chairman or higher board independence.

Finally, studying textual similarity of the sample firms' 2010 and 2011 disclosed sections on board leadership structure suggests that the disclosed texts show only little variation in the

phrasing and the disclosed reasons over time. We find only little evidence that certain leadership rationales encourage firms to revise their sections on board leadership structure to avoid or replace specific reasons strategically. Overall, the results suggest that the disclosed rationales constitute valuable new information for investors to be better able to assess the board leadership structure and corporate governance decisions of public companies.

By providing a systematic analysis of the rationales for board leadership structure decisions of corporate boards, the chapter contributes to the literature in several ways. First, the chapter extends the literature on the determinants of board structures of public firms (see e.g., Boone, Field, Karpoff, and Raheja, 2007; Coles, Daniel, Naveen, 2008; and Harris and Raviv, 2008; Wintoki, Linck, and Netter, 2012) and particularly the scarce literature on the determinants of board leadership structure (Faleye, 2007; Linck, Netter, and Yang, 2008; Wintoki, Linck, and Netter, 2012). Faleye (2007), for example, documents that organizational complexity, CEO reputation, and managerial ownership are positively related with the probability of a combined leadership structure. Linck, Netter, and Yang (2008) and Wintoki, Linck, and Netter (2012) specify empirical models based on CEO, firm, governance and industry characteristics to study determinants of board leadership, board size and board independence. Similarly, Grinstein and Valles (2008) study time trends in the determinants of a separate leadership structure. Dey, Engel, and Liu (2011) use a comparable empirical model of leadership structure determinants to obtain specific predictions for the firms' board leadership structure to test performance and compensation implications of board leadership structure changes. In contrast to this analysis, all of the aforementioned studies are limited to the identification of quantitative factors that are simply correlated with the decision to combine or separate the CEO and chairman position, but are hardly capable of focusing on the endogenous rationales behind firms' board leadership structure decisions.

Second, the chapter extends the strand of the literature that studies the reasons and the effects of changes in board leadership structure of public companies. Dey, Engel, and Liu (2011), show that forced separations due to public pressure are negatively related to abnormal announcement returns as well as future operating performance. Analyzing firm announcements to the decision to separate or combine the CEO and chairman positions, Brickley, Coles and Jarrell (1997) surprisingly find that splitting the roles is associated with negative abnormal returns while announcements to combine the two titles on average experience neither positive nor negative stock market reactions. Palmon and Wald (2002) document that changing from a combined to a separate leadership structure is typically accompanied by positive abnormal returns for larger firms but negative announcement returns for smaller companies.

Third, the chapter adds at a more general level to the literature that studies the discosure of new information of public companies or uses changes in the disclosure regulation to study the effects on shareholder value and firm behavior (see e.g., Hermalin and Weisbach, 2012; Healy and Palepu, 2001, and Leuz and Wysocki, 2016, for a general review of the disclosure literature). The studies closely related to this chapter of the dissertation are Yermack (2006) and Grinstein, Weinbaum, and Yehuda (2015) which both analyze investor reactions and future firm behavior following the disclosure of perquisites of managers of public U.S. companies, as well as Yermack and Wei (2011) who analyze equity and bondholder reactions to the initial disclosure of CEOs' inside debt positions, following a December 2007 SEC regulation reform to the disclosure of CEO pensions and deferred compensation.

Finally, the chapter contributes to the recent discussion about CEO duality and adds to the yet unanswered questions to whether and to what extent board leadership structure matters for corporate shareholders.

The remainder of this chapter is organized as follows. Section 4.2 briefly reviews the theoretically and empirically related aspects of board leadership structure decisions, presents a description of the sample selection process, and describes the data and the main variables. Section 4.3 first provides a systematic identification and documentation of the disclosed leadership rationales. The section then continues with an analysis of two-day abnormal returns. Finally, section 4.3 investigates the determinants of textual similarity of the 2010 and 2011 sections on board leadership and whether certain leadership rationales encourage firms to revise their section on board leadership structure to avoid or replace specific reasons strategically. Section 4.4 concludes.

## 4.2. Board Leadership Structure, Sample Selection, and Data Description

### 4.2.1. Aspects on the choice of board leadership structure

Finkelstein and D'Aveni (1994) referred in their early work to the issue of board leadership structure as a "double-edged sword" metaphor that consists of the inherent trade-off based on agency theory and organization theory arguments.

Agency theory which is likely the most commonly applied framework in corporate finance emphasizes the inherent differences in the tasks and roles of the CEO and the chairman arguing that oversight from management is essential for the effective monitoring to prevent managerial entrenchment. Combining the two leadership positions increases agency costs as it fosters the CEOs' power accumulation and control over the board which leads to higher managerial entrenchment and impaired monitoring (see e.g., Jensen and Meckling, 1976; Fama and Jensen, 1983; Jensen, 1993). Several studies provide empirical evidence consistent with agency theory that increasing CEO power has adverse effects for corporate shareholders regarding managerial entrenchment, risk taking, CEO compensation, and firm performance. Goyal and Park (2002) document that CEO duality reduces the likelihood of CEO dismissal, even after poor

performance. Daily and Dalton (1994) find that firms with a combined leadership structure are more frequently associated with filing for corporate bankruptcy than firms with a separate leadership structure. More powerful CEOs have also been found to increase managerial entrenchment and the ability to influence the director nomination process (see e.g., Westphal and Zajac, 1995a; Shivdasani and Yermack, 1999) that leads to lower turnover-performance sensitivity by corporate boards (see e.g., Coles, Daniel, and Naveen, 2014) and usually more generous and CEO-friendly compensation structures (see e.g., Ryan and Wiggins, 2004; Hwang and Kim, 2009; Morse, Nanda, and Seru, 2011).

Organization theory which is based on stewardship theory (Donaldson and Davis, 1991) and resource dependence theory (Pfeffer and Salancik, 1978) emphasizes the potential benefits of a combined leadership structure. Proponents of organization theory argue that vesting the two roles in a single individual increases managerial discretion and provides clear managerial leadership which facilitates effective decision-making and improves the responsiveness of boards to external events. As CEOs acquire unparalleled specific knowledge from managing the day-to-day operations which is costly to transfer (Fama and Jensen, 1983; Jensen and Meckling; 1995, Brickely, Coles, Linck, 1999), proponents of organization theory also argue that being the company CEO best positions the individual to act as the chairman, to coordinate board actions and to implement strategies more effectively.

Brickley, Coles and Jarrell (1997) extend the theoretical framework on CEO duality, suggesting that the additional chain of command via a separate chairman might incur additional costs of coordination, information acquisition, information processing, additional compensating or other frictions related to the deviation from the traditional CEO succession process. Finkelstein and D'Aveni (1994) and Boyd (1995) hypothesize that the benefits of efficient and fast decision-making of a combined leadership structure should be most valuable

for firms operating in highly dynamic, more competitive, and more complex environments. In support of the information cost and decision-making efficiency hypothesis, Yang and Zhao (2004) document that firms with a combined board leadership structure outperform non-duality firms by about 3-4% using the 1989 Canada-United States Free Trade Agreement as an exogenous shock to industry competition. Li, Lu, and Phillips (2017) provide evidence that powerful CEOs are particularly beneficial in more dynamic and more competitive product markets. More powerful CEOs are found to be associated with more new products introductions, higher investment and advertisement activities, and ultimately higher firm valuation. Analyzing announcements of granting the incumbent CEO also the position as the chairman of the board, the authors show that shareholder reactions are more positive to the unification of the two leadership roles the more dynamic the economic environment of the company is.

Brickley, Coles, and Jarrell (1997) further document that large U.S. companies typically separate the CEO and chairman position during the transition to a new CEO because more successful CEOs are also more likely to remain on the board as the chairman following their retirement as the company's CEO (see e.g., Brickley, Coles, and Linck, 1999; Andres, Fernau, and Theissen, 2014). Finally, firms tend to frequently grant their CEOs the chairman title as an additional reward within the promotion and succession process. Hambrick and Quigley (2012) find empirical evidence that a chairman who is a former company CEO rather creates additional agency problems than alleviating them since she might not be an objective monitor and likely constitutes an obstacle to corporate turnarounds in some circumstances. Overall, corporate boards should ideally weigh the potential benefits and costs contingent on the specific circumstances and characteristics of the firm when determining the company's appropriate leadership structure (Hermalin and Weisbach, 1998, Li, Lu, and Philipps, 2017).

### 4.2.2. Sample selection and data description

The main research strategy uses standard event study methodology to assess stock market reactions to the disclosure of firms' board leadership structure rationales. According to the 2009 SEC disclosure regulation, firms are required to provide detailed information about their choice of board leadership structure in a separate section within their proxy statement. Specifically, firms are required to disclose whether and why the principal executive officer and board chairman positions are combined or separated together with the statement why the board believes that the chosen board leadership is the most appropriate structure for the company at the time.

We focus upon public U.S. companies in the S&P 500 index at the calendar year-end 2009, the time when the SEC's final disclosure requirement passed.[38] We begin by identifying all firms that filed their proxy statement with the SEC effectively between March 01, 2010 and February 28, 2011 which constitutes a one-year time period after the disclosure regulation became effective on February 28, 2010. From the initial sample of the 500 firms, we exclude all firms that filed their proxy statements either before the effective date (5 firms) or after the one-year sample period (15 firms).[39] For the remaining 480 firms, we download each proxy statement from the SEC's EDGAR database and try to identify the respective section on board leadership structure with the statement. Overall, the proxy statements of 16 firms do not contain a specific section on board leadership structure. For one firm there is no 2010 proxy filing available.[40] To ensure that the disclosed information actually represents new information for investors and corporate shareholders, we further check the firms' previous year proxy statement as well as

[38] Hermalin and Weisbach (2012) show that larger firms tend to adopt stricter disclosure rules than smaller firms. To reduce potential heterogeneity in disclosure quality between large and smaller firms, the analysis is based upon the 500 largest U.S. companies.

[39] The large majority of firms that filed their most recent proxy statement after the sample period had changed the end of their fiscal year. This postponed the disclosure of the proxy statements which first contains the information on board leadership structure beyond the sample period.

[40] Unfortunately, the 2010 proxy statement of Expedia Inc. is not available in the SEC's EDGAR database.

past disclosed 8-K filings for potential voluntary disclosure related to the choice of board leadership structure.[41] We identify and exclude three firms that already voluntarily disclosed information in their 2009 proxy statements.

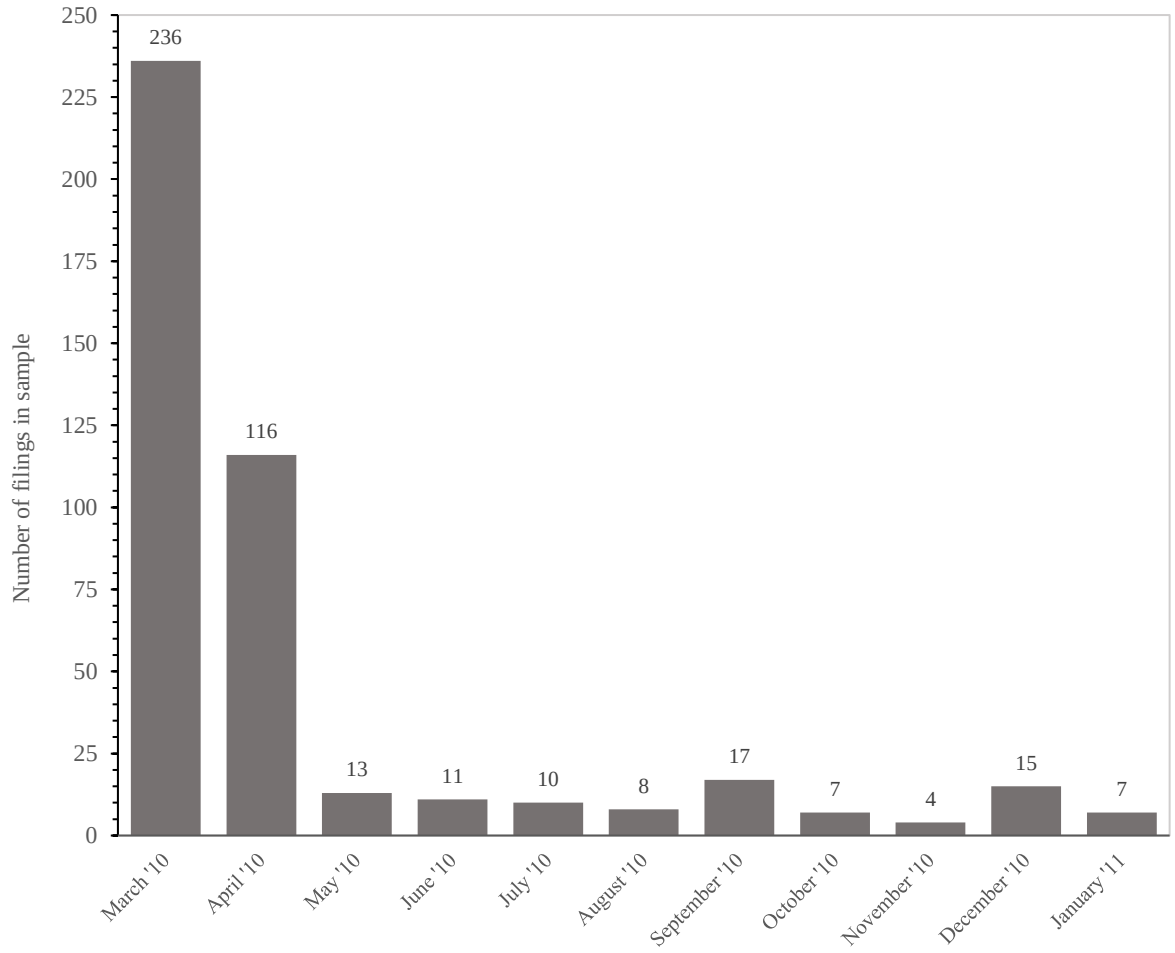
In the following step, we determine the firms' current board leadership structure and exclude all firms with unconventional board leadership structures. In particular, we drop five observations where the firms are led by two Co-CEOs, three firms that explicitly state to be led by an interim CEO, and four observations where the firm explicitly states to have not formally established a chairman position. After excluding one additional firm for which only insufficient historic stock price information is available to calculate abnormal returns, the final sample constitutes of 447 of the 500 largest publicly listed U.S. companies.

Because firms are required to disclose the information on their board leadership structure in their proxy statement, the event date for the analysis is typically the firm's filing date with the SEC. We identify a total of 109 sample firms that already filed a preliminary proxy statement a couple of days prior to their final proxy statement. We find that 106 of the 109 preliminary proxy statements contain the identical section on board leadership structure as the final proxy statement and hence, the event date for the 106 sample firms is set to the filing date of the preliminary proxy statement. Figure 4.1 presents a month-by-month overview of the event dates for the 447 sample firms. Similar to Wei and Yermack (2011), a vast majority (about 79%) of the sample firms file their proxy statements with the SEC within the first two months of the sample period, i.e., March and April 2010.

[41] We check the sample firms' 8-K filings that contain information on Item 5.02 "Departure of Directors or Principal Officers; Election of Directors; Appointment of Principal Officers" under which changes in major corporate positions have to be disclosed, including changes in positions of the CEO and chairman.

**Figure 4.1: Sample company filings by month**

This graph depicts the 12 subsequent months of the sample period in which the first proxy statements were filed with the Securities and Exchange Commission (SEC) after the new disclosure regulation on board leadership structure became effective on February 28, 2010. The sample for the analysis consists of 447 firms that were members of the S&P 500 index at the end of the year 2009. The sample period represents the first year after the effectiveness of the disclosure regulation, i.e., March 01, 2010 to February 28, 2011.



In order to analyze the sample firms' rationales for their choice of board leadership structure, we manually extract the section on board leadership structure from the 2010 proxy statement for each sample firm and read each text paragraph very carefully to identify individual board leadership structure reasons. We obtain the final categorization of board leadership reasons following a two-step methodology: First, we read all 447 sections on board leadership structure and develop a detailed list of rationales that contains textual examples for each individual leadership reason. In a second step, we combine similar reasons to obtain the final set of reasons for a combined and separate leadership structure.[42] To ensure the highest accuracy in the assignment of reason categories and to rule out subjective judgement as far as possible, we ask two individuals to assign reason categories to each section independently. In more than 93% of all cases, the individual assignments of reasons perfectly matched. Each case with deviations in the assignment of reason categories was revisited and reclassified.

The hand-collected data for the 447 sample firms is augmented with fundamental data from Capital IQ. Information on the companies' CEO and chairman, board composition, as well as management and shareholder proposals are also manually collected from the companies' proxy statements. Stock prices for the calculation of abnormal returns are taken from Bloomberg.

[42] We acknowledge that the identification and categorization of reasons may be (at least to some degree) subjective and different researchers may end up with slightly different assignments of reasons.

**Table 4.1: Descriptive statistics and univariate comparisons of firms with combined or separate board leadership structure**

This table gives descriptive statistics for the sample of 282 combined leadership structure firms and 165 firms with a separate leadership structure which were members of the S&P 500 index at the end of the calendar year 2009. The sample period is March 01, 2010 to February 28, 2011. The four sections of the table show information for the company's CEO, chairman, firm characteristics and textual characteristics of disclosed sections on the board leadership structure section. CEO and chairman characteristics are manually collected from the proxy filings. Company financial data for fiscal year 2009 are based upon Capital IQ information. *CEO age* is the age of the company's CEO in years. *CEO tenure* is the number of years the CEO has been serving as the company's CEO. *Founder CEO* is an indicator variable that takes the value of one if the CEO is the founder of the company, zero otherwise. *Independent chair* is an indicator variable set to one if the chairman of the board is classified as an independent director, zero otherwise. *Founder chair* is an indicator variable set to one if the chairman of the board is the founder of the company, zero otherwise. *Chair former company CEO* is an indicator variable that takes the value of one if the chairman has previously served as the CEO of the company, zero otherwise. *CAR [0,1]* is the two-day cumulative abnormal return calculated from the Fama-French three-factor model using a 220 days estimation window from -21 days to -241 days before the filing date. *Market capitalization* is calculated as the number of common shares outstanding times the stock price at the end of the previous fiscal year. *Tobin's Q* is defined as total assets minus book value of equity plus market capitalization all divided by total assets. *Firm age* is the number of years since the first inclusion date in CRSP. *Prior year BHR* is calculated as the buy-and-hold return over the previous 250 trading days before the filing date of the firm's proxy statement. *Tech firm* is an indicator variable set to one if the firm operates in a high-tech industry according to the Loughran and Ritter (2004) high-tech definition (SIC codes: 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3671, 3672, 3674, 3675, 3677, 3678, 3679, 3812, 3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899, 7371, 7372, 7373, 7374, 7375, 7378, or 7379). *Board size* is the number of directors serving on the firm's board of directors. *Independence ratio* is the number of independent directors divided by the total number of directors. *Staggered board* is an indicator variable set to one if the firm has a classified board, zero otherwise. *Number BLS reasons* is the absolute number of distinct leadership rationales disclosed in the firm's section on board leadership structure. *Positive (negative) tone* is calculated as the number of positive (negative) words divided by the number of total words used. Word lists for positive (negative) words are obtained from Bill McDonald's word lists page (http://www3.nd.edu/~mcdonald/Word_Lists.html). A positive word is only considered as positive if there is no simple negation (no, not, none, neither, never, nobody) within the three words preceding a positive word. *Text similarity* is the similarity of a firm's 2010 section on board leadership structure with the subsequent section disclosed in 2011. The sample consists of 276 of the 282 sample firms with a combined leadership structure, and 162 firms with a separate leadership structure for which the 2011 proxy statement is available. *Text similarity* is calculated using the Ratcliff and Obershelp (1988) algorithm for pattern matching. The algorithm returns similarity scores of two strings between zero and one where larger values indicate higher textual similarity. *Words* is the total number of words of the proxy statement section on board leadership structure. All dollar values are in millions. The last column presents two-sided difference-in-means test allowing for unequal variances between the two subsamples. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

**Table 4.1: Descriptive statistics and univariate comparisons of firms with combined or separate board leadership structure (cont'd)**

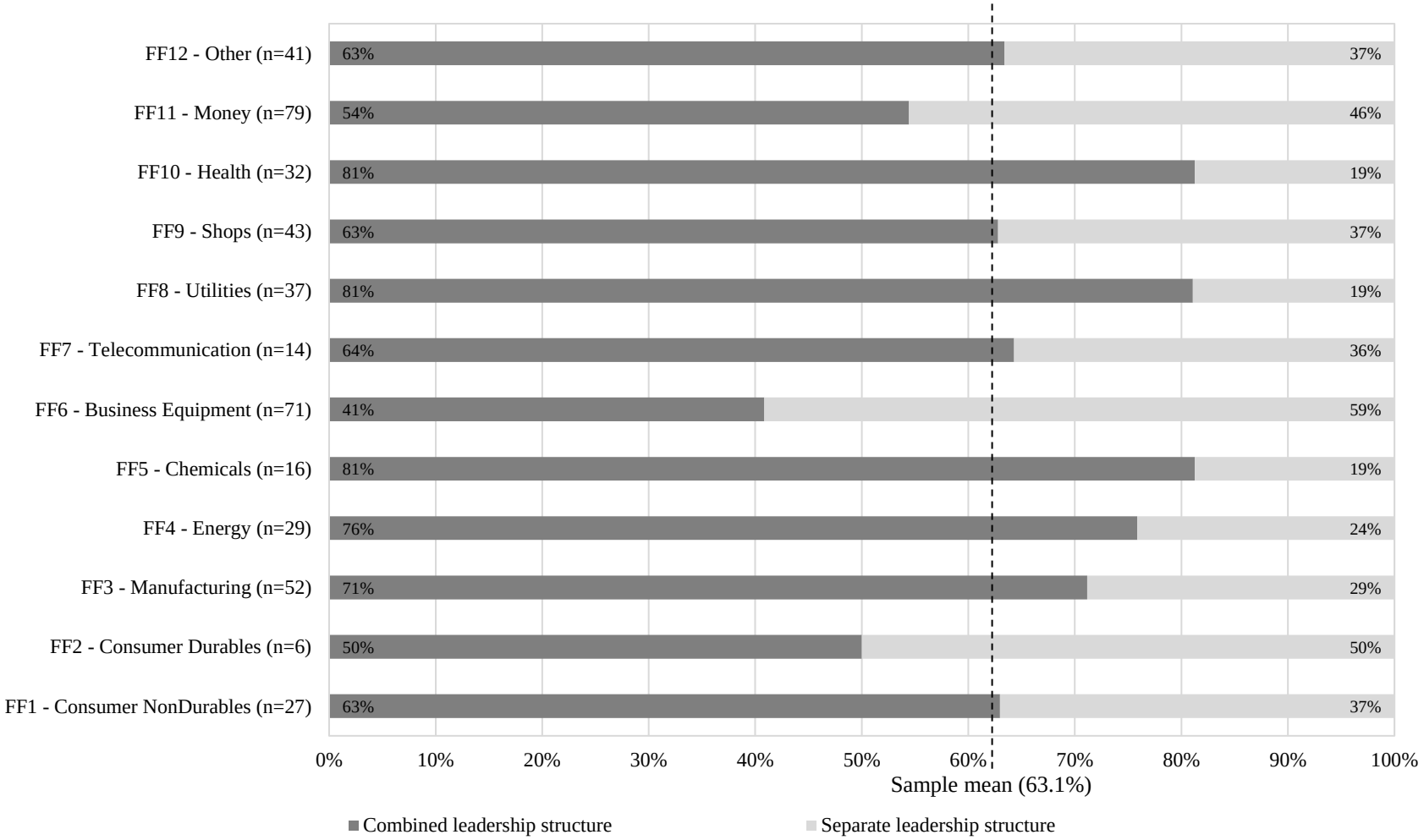
| | Combined leadership structure (N=282) | | | | Separate leadership structure (N=165) | | | | Difference-in-means |
|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | SD | Median | N | Mean | SD | Median | Difference (t-stat) |
| **CEO characteristics** | | | | | | | | | |
| CEO age | 282 | 56.88 | 6.21 | 56.50 | 165 | 53.27 | 6.44 | 53.00 | 3.61*** (5.79) |
| CEO tenure | 282 | 7.12 | 6.30 | 6.00 | 165 | 3.32 | 4.08 | 2.00 | 3.80*** (7.74) |
| Founder CEO | 282 | 0.08 | 0.27 | | 165 | 0.02 | 0.15 | | 0.06*** (2.83) |
| **Chair characteristics** | | | | | | | | | |
| Independent chair | | | | | 165 | 0.50 | 0.50 | | |
| Founder chair | | | | | 165 | 0.19 | 0.39 | | |
| Chair former company CEO | | | | | 165 | 0.47 | 0.50 | | |
| **Firm characteristics** | | | | | | | | | |
| CAR [0,1] [%] | 282 | 0.07 | 2.27 | 0.09 | 165 | -0.12 | 2.24 | -0.13 | 0.19 (0.86) |
| Firm age | 282 | 37.29 | 24.86 | 37.00 | 165 | 28.78 | 19.19 | 24.00 | 8.51*** (4.04) |
| Market capitalization | 282 | 23,967.71 | 38,985.55 | 9,858.25 | 165 | 15,530.62 | 26,604.69 | 7,775.91 | 8,437.08*** (2.71) |
| Prior year BHR | 282 | 0.25 | 0.80 | 0.07 | 165 | 0.31 | 0.79 | 0.07 | -0.06 (-0.74) |
| Tech firm | 282 | 0.11 | 0.32 | | 165 | 0.22 | 0.41 | | -0.10*** (-2.80) |
| Tobin's Q | 282 | 1.71 | 0.82 | 1.47 | 165 | 1.81 | 0.95 | 1.48 | -0.10 (-1.12) |
| Total assets | 282 | 52,160.66 | 165,957.90 | 1,3611.62 | 165 | 41,858.70 | 170,866.40 | 9,155.52 | 10,301.96 (0.62) |
| **Governance characteristics** | | | | | | | | | |
| Board size | 282 | 10.83 | 2.15 | 11.00 | 165 | 10.77 | 2.75 | 11.00 | 0.06 (0.26) |
| Independence ratio | 282 | 0.86 | 0.07 | 0.89 | 165 | 0.81 | 0.10 | 0.82 | 0.05*** (5.88) |
| Staggered board | 282 | 0.66 | 0.48 | | 165 | 0.59 | 0.49 | | 0.06 (1.30) |
| **Text characteristics** | | | | | | | | | |
| Negative tone [%] | 282 | 0.68 | 0.66 | 0.54 | 165 | 0.55 | 0.63 | 0.37 | 0.13** (2.12) |
| Number BLS reasons | 282 | 2.09 | 1.19 | 2.00 | 165 | 1.70 | 1.17 | 2.00 | 0.39*** (3.43) |
| Positive tone [%] | 282 | 2.62 | 1.30 | 2.34 | 165 | 1.91 | 1.20 | 1.86 | 0.71*** (5.82) |
| Text similarity [%] | 276 | 75.49 | 29.77 | 8.72 | 162 | 74.43 | 29.71 | 88.19 | 1.64 (0.36) |
| Words | 282 | 263.26 | 134.62 | 238.50 | 165 | 223.30 | 108.95 | 210.00 | 39.97*** (3.42) |

Table 4.1 presents descriptive statistics about the sample firms' CEOs, the chairpersons, fundamental and governance characteristics as well as textual characteristics of the disclosed section on board leadership structure, separately for each type of leadership structure. We identify 282 firms with a combined leadership structure, i.e., where the CEO simultaneously holds the position of the chairman and a total of 165 sample firms that use a separate leadership structure. Overall, this represents about 63% CEO duality for the entire sample. Focusing on the distribution of board leadership structure across individual industries, we find that board leadership structure decisions vary significantly with the firms' business environment. Figure 4.2 depicts the distribution of board leadership structures across industries using the Fama-French 12 industry classification. Relative to the cross-sectional average of 63%, a combination of the CEO and chairman position seems to be more frequently used by firms operating in the manufacturing (FF3), energy (FF4), chemical (FF5), utility (FF8), and health industry (FF10). Separating the roles, however, seems to be more commonly used in industries related to consumer durables (FF2), business equipment (FF6) or money (FF11).[43]

[43] The high fraction of separate board leadership structures, particularly for the "FF11 – Money" and "FF2 - Consumer Durables" industry categories is at least partly related to the high number of contemporary CEO transitions. Specifically, 13.9% (FF11) and 16.7% (FF2) of the CEOs assumed office within less than one year in these industries. The average across all industry clusters amounts to 10.2%. Additionally, about 19% of all firms in the "FF11- Money" industry cluster state in their section on board leadership structure that the current separate leadership structure is has been chosen due to leadership transition and leadership continuity reasons.

**Figure 4.2: Board leadership structure choices by industries**

This graph presents differences in the choices of board leadership structure for the 447 sample firms across industries. Industries are defined based on the Fama-French 12 industry classification. Firms with a combined leadership structure unify both positions of the CEO and the chairman of the board. Firms with a separate leadership structure have two different persons serving as the chairman of the board and as the CEO of the company.



Turning to the descriptive statistics shown in Table 4.1 and the characteristics of the CEO and chairman, we find consistent with previous studies that CEOs who serve also as the chairman of the board differ significantly from CEOs with a separate chairman. On average, a dual leadership CEO is about 56.9 years old, has been serving as the company's CEO for about 7.1 years and is in 8.0% of the cases the founder of the company. Comparing CEOs of both leadership types, CEOs of firms with a combined leadership structure are on average 3.6 years older, have been serving about 3.8 years longer as the company's CEO and are significantly more frequent also the company's founder. Regarding the characteristics of the chairman, half of the separate leadership structure firms in our sample have an independent chairman and for about 19% of the firms the chairman is also the founder of the company. Consistent with Brickely, Coles, and Linck (1999), a significant fraction of chairmen are a former CEO of their company (47%).

With respect to the fundamentals, firms of both types of leadership structure do not seem to differ in firm characteristics such as book value of total assets (*Total assets*), firm valuation (*Tobin's Q*), or prior year stock performance (*Prior year BHR*). We find that firms with a combined leadership structure, however, tend to be larger in terms of market capitalization ($23,968mn vs. $15,530mn), older (37.3 years vs. 28.8 years), and less likely high-tech companies (11% vs. 22%).

Regarding the governance characteristics, both leadership types are similar in terms of board size (10.8 directors) and the use of classified boards. On average, about two thirds of the combined leadership structure firms have established staggered boards while about 60% of the separate leadership structure firms have established a classified board. Consistent with the need for independent monitoring on the board when vesting the CEO and chairman titles in a single individual, firms with a combined leadership structure show significantly higher board

independence than firms with a separate chairman (86% vs. 81%).

We follow recent research methodologies on textual analysis (see e.g., Loughran and McDonald, 2011; García, 2013) to further investigate whether sections on board leadership structure differ in terms of text structure and sentiment across board leadership types. The sections on board leadership structure of dual leadership firms and those of firms with a non-independent chairman usually contain a description of the tasks and duties of the lead or presiding director. Since these descriptions most likely do not reveal any relevant information on the firm's actual leadership structure choice, we delete these paragraphs manually from the text sections before proceeding with the calculation of textual characteristics.[44] We calculate measures of positive and negative tone as the number of positive (negative) words relative to the total number of words. We apply Bill McDonald's word lists to derive the number of positive (negative) words, thereby controlling for simple negations ("no", "not", "none", "neither", "never", "nobody") within the three words preceding a positive word as done in Loughran and McDonald (2011).[45]

Overall, we find that the disclosed sections on board leadership structure of both leadership structures differ significantly with respect to several textual characteristics. Consistent with the increasing pressure towards the separation of the leadership roles and a likely greater need to justify a combined leadership structure, we find that the sections of dual leadership firms contain on average more board leadership reasons and also more words than sections of firms with a separate chairman. Specifically, sections on board leadership structure of dual leadership firms are typically about 263 words long and contain about two different reasons to explain

[44] Since firms with a combined leadership structure and those with a non-independent chairman are more likely to have established the position of a lead or presiding director, these firms are also more likely to include a description of the tasks and duties that accompany these positions. Hence, this would introduce a bias with respect to the number of words used in the section to describe and explain their choice of board leadership structure for such firms.

[45] Word lists for positive and negative words are available on Bill McDonald's website: http://www3.nd.edu/~mcdonald/Word_Lists.html

why the firm combines the CEO and chairman positions. Firms with a separate leadership structure, however, use significantly fewer words (223 words) and state significantly fewer leadership reasons (1.70).

Calculating and comparing the measures of textual sentiment indicates that text paragraphs on board leadership also differ with respect to the tone of the disclosed texts. Although firms of both leadership types seem to phrase their sections more positively than negatively, text sections of dual leadership firms contain on average a higher fraction of positive as well as negative words. Specifically, firms with a combined leadership structure use about 2.62% positive and only 0.68% negative words. Sections of firms with a separate leadership structure usually contain only 1.91% positive and only 0.55% negative words.

Finally, we extract the firms' subsequent year section on board leadership structure from their 2011 proxy statement to analyze potential changes in the firms' wording or disclosed reasoning. We are able to extract the sections for 276 out of the initially 282 combined leadership firms and for 162 out of the 165 firms with a separate board leadership structure.[46] We calculate the similarity of the 2010 and 2011 disclosed sections on board leadership for every sample firm using the Ratcliff and Obershelp (1988) algorithm for pattern recognition and textual similarity.[47] The algorithm generates similarity scores (*Text similarity*)[48] between zero and one, where larger values indicate higher textual similarity. The results presented in

[46] The six missing firms are the following: Allergheny Energy Inc. (merger with FirstEnergy Corp.); King Pharmaceuticals Inc. (acquired by Pfizer Inc.); Massey Energy Co. (acquired by Alpha Natural Resources); National Semiconductor Corp. (acquired by Texas Instruments Inc.); Pactiv Corp. (acquired by Rank Group Ltd); Qwest Communications International Inc. (merged with CenturyLink Inc.). The three missing firms are Expedia Inc. (2011 proxy statement not available via the SEC's EDGAR database); Marshall & Ilsley Corp. (merged with Bank of Montreal); McAfee Inc. (acquired by Intel Corp.)

[47] In order to be able to compare texts for the years 2010 and 2011, we apply the same text modifications to the 2011 section on board leadership structure as for 2010. In particular, we check each text manually and delete the paragraph on the description of the lead or presiding director's tasks and duties.

[48] Similarity of the two strings is calculated as the number of matching characters divided by the total number of characters in the two strings. Matching characters are those in the longest common subsequence plus, recursively, matching characters in the unmatched region on either side of the longest common subsequence. The algorithm is available as a function in the Python Standard Library "difflib".

Table 4.1 suggest that both types of firms show comparable values of textual similarity. Firms with a combined leadership structure show average similarity scores of about 75.5% (median: 88.7%) while textual similarity for separate leadership structure firms is on average 74.4% (median: 88.1%). In untabulated analyses where we restrict the sample to firms having the same individual serving as the company's CEO for the year 2010 and 2011, we find significant higher values of textual similarity for both leadership types. In particular, the increase in mean and median values of *Text similarity* is much stronger for firms that combine the CEO and chairman position than for firms with a separate leadership structure. Average and median values of *Text similarity* increase to 79.7% and 94.2% for dual leadership firms, and to 75.1% and 89.3% for separate leadership firms, respectively. Generally, the above findings suggest that sections on board leadership structure are quite persistent over time. High similarity scores for both leadership structures indicate that sections of both types of leadership structure are subject to only minor changes with respect to wording, text structure and the disclosed board leadership structure rationales.[49]

## 4.3. Empirical Analysis of Board Leadership Structure Reasons

### 4.3.1. Board leadership structure and disclosed board leadership structure reasons

We begin the analysis with a systematic documentation of the disclosed rationales for the sample firms' boar leadership structure decision, separately for the 282 firms with a combined leadership structure and for the 165 firms that separate the CEO and chairman position. We manually identify the reasons within the sample firms' text sections on board leadership structure in their 2010 proxy statement following the procedure described at the end of Section 4.2.2. Figure 4.3 and Figure 4.4 present overviews of the 15 most frequently

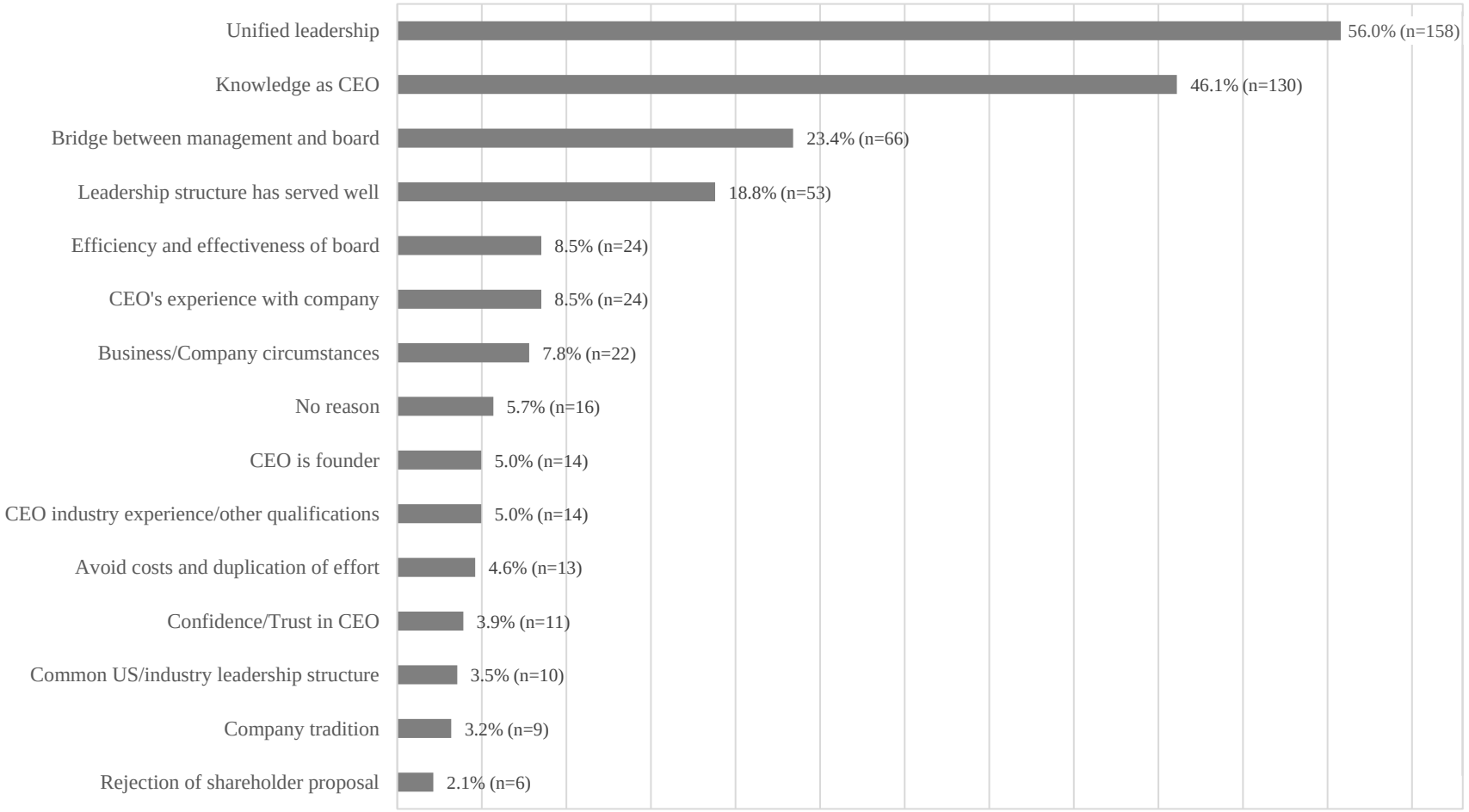
[49] Comparing the disclosed leadership reasons for the years 2010 and 2011, we find that only very few firms change their stated reasoning for their board leadership structure decision.

disclosed reasons for each type of board leadership structure. The complete lists with all individually identified reasons are provided in Appendix 4.A and 4.B. Overall, we identify 24 distinct reasons for the sample of combined leadership firms and a total of 22 rationales for firms that separate the CEO and chair position. Appendix 4.C and Appendix 4.D provide detailed descriptions as well as textual examples for the five most frequently stated reasons of both leadership types.

Figure 4.3 provides relative and absolute frequencies for the fifteen most frequently used rationales of the 282 combined leadership firms. The figure suggests that the use of reasons for combining the CEO and chairman position is highly concentrated among few but frequently used rationales which are often related to arguments consistent with organization theory and the potential benefits of a unitary leadership structure. Specifically, more than half of the 282 firms state that the roles of CEO and chairman are currently combined due to the importance and need for a single leader with unity of command who is able to provide clear operational and strategic guidance ("*Unified leadership*"). About 46% of the firms justify the unification of the two positions with the superior knowledge and informational advantage of the CEO from managing the day-to-day operations of the company which best qualifies her to act effectively as the chairman of the board ("*Knowledge as CEO*"). About 23.4% of the dual leadership firms point out that having the CEO acting in the dual role is essential to enable the CEO to act as an effective bridge between the management and the board to foster the information flow between the two entities ("*Bridge between management and board*"). Another 8.5% of the firms argue that the unified leadership structure generally contributes to the effective and efficient functioning of their board ("*Efficiency and effectiveness of board*").

**Figure 4.3: Combined board leadership structure and disclosed reasons**

This graph depicts the 15 most frequently used leadership reasons for a combined leadership structure. The reasons were stated by the 282 sample firms that combine the CEO and chairman position. Reasons are listed in descending order by their frequency of use.



Interestingly and most remarkable is the fact that a significant number of firms justify the preservation of the status quo and their current choice of a combined board leadership structure with the past experience over recent years. In particular, 53 of the sample firms specifically state that the current dual leadership structure has been chosen because the leadership structure has proven to be effective and has served the company and its shareholders well over the past ("*Leadership structure has served well*"). In addition, 3.2% of the firms point out that the current leadership structure is chosen because it is a company tradition, while another 3.5% of the firms have decided to combine the two leadership roles because it is the commonly applied leadership practice among U.S. companies or industry peers. Current or future business and company circumstances (7.8%), the avoidance of additional costs (4.6%), the characteristics and attributes of the individual serving as the company CEO, such as the CEO's experience with the company (8.5%), the CEO's founder status (5.0%) or her industry expertise and other qualifications (5.0%) are less frequently used as a rationale and seem to be of minor importance for the decisions to combine the CEO and chairman position. Also remarkably, about 6% of the firms with a combined leadership structure do not provide any reason at all.

**Figure 4.4: Separate board leadership structure and disclosed reasons**

This graph depicts the 15 most frequently used leadership reasons for the choice of a separate leadership structure. The reasons are stated by the 165 sample firms that separate the CEO and chairman position. Reasons are listed in descending order by their frequency of use.

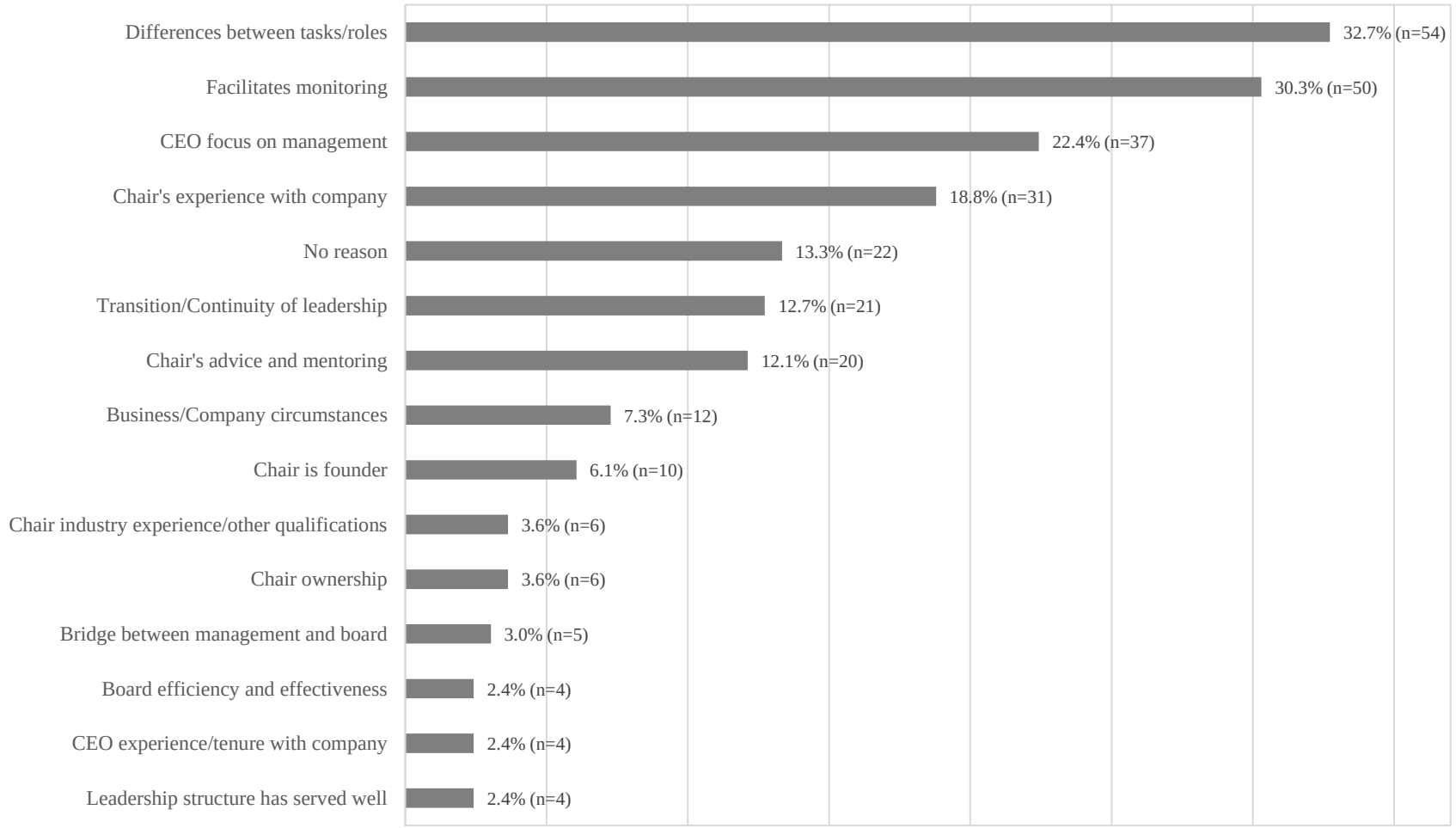


Figure 4.4 depicts relative and absolute frequencies for the fifteen most frequently disclosed rationales of firms with a separate board leadership structure. The figure suggests that the use of reasons for a separate leadership structure appears to be less concentrated compared to the use of rationales by firms with a combined leadership structure. Firms splitting the CEO and chairman position usually refer to reasons consistent with agency theory or the importance and experience of the chairman. In particular, almost one third of the 165 firms with a separate leadership structure point out that the leadership structure is chosen in recognition of the different tasks and duties associated with both positions ("*Differences between tasks/roles*"). About 30.3% of the firms argue that separating the roles facilitates and improves the monitoring of the CEO and the management by the board ("*Facilitates monitoring*"). According to 22.4% of the firms, having a separate individual serving as the chairman is the appropriate because the leadership structure allows the CEO to focus on managing the day-to-day operations of the company ("*CEO can focus on management*").

Overall, the skills and attributes of the chairperson seem to be more important for the decision to split the leadership roles than the characteristics, skills or attributes of the CEO are for combining the two positions. Specifically, 18.8% of the firms state that the decision to separate the roles has been made to leverage the in-depth experience and knowledge of the chair with the company ("*Chair's experience with company*"), the chair's valuable advice and mentoring ability (12.1%) or in recognition of the chair's industry experience and other qualifications (3.6%). Remarkably, although 19% of the chairmen are the founder of the company, only few firms actually relate the board leadership structure decision to the chair's founder status (6.1%) or to the significant stock ownership (3.6%). Finally, 21 firms (12.7%) currently separate the leadership positions due to contemporary CEO transitions and the need for continuity in leadership (12.7%), while a significant part of the firms (13.3%) do not provide any reason for the separation of the two leadership roles ("*No reason*").

### 4.3.2. Determinants of the number of stated board leadership structure reasons

The new SEC disclosure regulation requires firms to disclose the reasons why combining or separating the roles of CEO and chairman is the most appropriate leadership structure for the company at the time. Because firms are free to disclose as many relevant board leadership rationales as they want to, the total number of disclosed reasons might further reveal valuable information on the endogenous choice of the firms' board leadership structure.

Firms may choose to disclose more reasons in order to signal investors and corporate shareholders the board's superior quality and appropriate determination of the board leadership structure for the company. However, the disclosure of more reasons could also be interpreted negatively if firms might feel compelled to convince shareholders about their leadership structure decision. For example, firms deviating from generally accepted good governance practices might be urged to disclose more leadership rationales to explain the firm's choice of board leadership structure to shareholders with particular emphasis than firms in compliance with good governance practices would be.[50] Faleye (2007) argues that differences in firm and CEO characteristics help explain whether a certain leadership structure is beneficial or detrimental for the firm. He finds that organizational complexity, CEO reputation and managerial ownership are positively related with the probability of a combined leadership structure.

We run Poisson regressions of the number of disclosed board leadership reasons (*Number BLS reasons*) on a set of CEO, chair, governance and firm characteristics to analyze whether the number of disclosed leadership rationales is determined by the specific characteristics or circumstances of the firm. We perform regressions for the entire sample as well as for each leadership structure subsample separately. To capture differences in the number of reasons

[50] We implicitly assume that firms only disclose the true rationales behind their leadership structure decision.

between firms with a combined and a separate leadership structure, the regression specification for the entire sample contains the variable *Combined leadership structure*, an indicator variable that takes the value of one if the firm combines the CEO and chairman position, and zero otherwise. The regression results are shown in Table 4.2.

In line with the univariate results of Table 4.1, the multivariate regression results in column (1) of Table 4.2 indicate that a combined leadership structure is positively related with the number of disclosed leadership rationales. Further, the full sample results in column (1) as well as the results for each subsample presented in columns (2) and (3) provide consistent evidence that firms led by founder CEOs are also positively related with the number of disclosed leadership rationales. Regarding the subsample of firms with a separate chairman, we find that the number of disclosed reasons is also related to the characteristics of the chairperson. In particular, consistent with the hypothesis of Hambrick and Quigley (2012) that retaining the former CEO as the chairman often represents an obstacle to strategic change and therefore might have negative performance effects, firms having a former company CEO or the founder of the company serving as the chairman of the board are associated with the disclosure of more leadership rationales. Finally, there is no evidence that other governance or firm characteristics seem to systematically affect the number of disclosed board leadership structure rationales.

**Table 4.2: Determinants of the number of disclosed board leadership reasons**

The table presents Poisson regression results of absolute number of individual disclosed board leadership structure reasons (*Number BLS reasons*) on CEO, chair, governance and firm characteristics. Column (1) presents estimates for the entire sample of 447 firms. *Combined leadership structure* is an indicator variable that is set to one if the firm combines the CEO and chairman position in a single individual, zero otherwise. Column (2) and (3) present regression results for each type of board leadership separately. All other variables are as defined in Table 4.1. An intercept is included in all regressions, but not reported. Robust t-statistics are reported in parentheses below the regression coefficient. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | Number BLS reasons | | |
|---|---|---|---|
| | | **Combined board leadership structure** | **Separate board leadership structure** |
| | (1) | (2) | (3) |
| **Combined leadership structure** | **0.7143**** | | |
| | **(2.12)** | | |
| *CEO characteristics* | | | |
| CEO age | -0.0028 | 0.0001 | -0.0081 |
| | (-0.55) | (0.01) | (-0.89) |
| CEO gender | -0.0995 | -0.0429 | -0.2929 |
| | (-1.01) | (-0.40) | (-1.41) |
| CEO tenure | 0.0082 | 0.0052 | 0.0145 |
| | (1.30) | (0.79) | (1.21) |
| Founder CEO | 0.3325*** | 0.2724** | 0.5826*** |
| | (3.22) | (2.49) | (2.77) |
| *Chair characteristics* | | | |
| Chair former company CEO | 0.5722 | | 0.6232* |
| | (1.61) | | (1.82) |
| Founder chair | 0.2228 | | 0.2379* |
| | (1.59) | | (1.67) |
| Independent chair | 0.4771 | | 0.4960 |
| | (1.39) | | (1.49) |
| *Governance characteristics* | | | |
| Independence ratio | 0.2561 | 0.0080 | 0.7450 |
| | (0.73) | (0.02) | (1.36) |
| ln(Board size) | 0.1259 | 0.0960 | 0.2254 |
| | (0.82) | (0.52) | (0.84) |
| Staggered board | 0.0064 | -0.0170 | 0.0200 |
| | (0.11) | (-0.24) | (0.18) |
| *Firm characteristics* | | | |
| ln(Total assets) | -0.0229 | -0.0020 | -0.0782 |
| | (-0.78) | (-0.06) | (-1.25) |
| Firm age | 0.0012 | -0.00004 | 0.0051* |
| | (0.93) | (-0.03) | (1.96) |
| MTB | -0.0009 | -0.0033 | 0.0027 |
| | (-0.48) | (-1.52) | (1.07) |
| Prior year BHR | -0.0014 | -0.0099 | 0.0043 |
| | (-0.05) | (-0.30) | (0.09) |
| Tech firm | 0.0360 | 0.0287 | 0.0451 |
| | (0.49) | (0.33) | (0.33) |
| Regulated industry | 0.0838 | 0.0697 | 0.1259 |
| | (1.23) | (0.90) | (0.87) |
| Observations | 447 | 282 | 165 |
| Log Pseudolikelihood | -695.41 | -445.66 | -246.13 |

### 4.3.3. Regression analysis of abnormal returns

We continue the analysis by examining cumulative abnormal returns to equity holders following the disclosure of board leadership structure reasons by the 282 combined leadership structure firms and the 165 sample firms with a separate leadership structure. We use two-day abnormal returns around the filing date of the firms' proxy statements which includes the filing day and the following trading day because some proxy filings are published after financial markets are closed. Two-day abnormal stock returns are calculated using the three-factor model developed by Fama and French (1993) and the [-241, -21] parameter estimation period prior to the event date. We obtain data on daily Fama/French three factors from Kenneth French website.[51] The event study results remain qualitatively similar when we use a simple market model using the S&P500 index as the market return or the four-factor model as alternative models to calculate abnormal returns.[52]

The main variables of interest in the following analysis are the five most frequently stated reasons for each leadership type. We focus on the five most frequently stated board leadership reasons to circumvent estimation issues related to low sample frequency or potential outlier effects. For each leadership reason we create an indicator variable that equals one if the firm states this reason in their section on board leadership structure as to why it has chosen to combine or separate the positions of CEO and chairman, zero otherwise. To account for the disclosure of other reasons beyond the five most frequent rationales, we also include an indicator variable "*Other reason stated*" to the regression specification that take the value of one if the firm disclosed any other reason beyond one of the five most frequently disclosed

[51] The data is available for download on Kenneth R. French's professional website: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/f-f_factors.html. According to the data description, the market index includes all NYSE, AMEX and NASDAQ firms.

[52] The analysis is robust to the use of two-day cumulative abnormal returns that are winsorized at the 1st and 99th or at the 5th and 95th percentile, respectively. On average, the regression results tend to improve in statistical significance when winsorized CARs are used as the dependent variable.

rationales. Since the section on board leadership structure is only one part of the firms' comprehensive proxy statements and firms sometimes disclose other matters that are likely of importance to corporate shareholders simultaneously, we also include a broad set of proxy statement control variables in the regression specification. We examine each of the 447 proxy statements of our sample firms manually and identify matters for which investor reactions have previously been analyzed and been document to be important for corporate shareholders, such as CEO compensation, changes in the board composition, and other diverse topics of shareholder proposals.

We generally follow the approach proposed by Wei and Yermack (2011) and create a set of nine control indicator variables for the regression specification. First, we include an indicator that equal to one for thirty-nine of the sample firms that nominate new independent directors to be elected to the corporate board (Rosenstein and Wyatt, 1990). Second, an indicator variable that equals one for three firms that nominate new non-independent outside directors who are likely to have a material interest in the company (Shivdasani and Yermack, 1999). Third, we include three indicator variables for firms whose management proposes shareholder-friendly management proposals. Specifically, we add an indicator for nineteen firms where the management proposes to repeal the super-majority voting requirements, to introduce majority voting in director elections (sixteen firms) or to declassify a staggered board which is the case for fourteen firms (Faleye, 2007). Fourth, we control for several shareholder resolutions. We include indicators for shareholder proposals related to executive compensation (twenty-four firms), other corporate governance issues (thirty-seven), social or environmental issues (sixty-eight firms) (Karpoff, Malatesta, and Walkling, 1996), and any shareholder proposal other than one of the aforementioned (twenty-three firms). Finally, we include an indicator variable *Regulated Industry* that is set to one if the firm operates primarily in the regulated utility or financial industry (SIC code 40-49 or 60-69) as well as an indicator variable *Tech firm* if the

company is considered a high-tech company according to the four-digit SIC industry classification suggested by Loughran and Ritter (2004).[53] We test statistical significance of the regression estimates using robust standard errors.

#### 4.3.3.1. Combined leadership structure reasons and abnormal returns to equity holders

We first turn the analysis of the two-day abnormal returns to the disclosure of board leadership reasons to the 282 firms with a combined leadership structure. Table 4.3 presents the regression results. The first three columns of Table 4.3 present cross-sectional ordinary least squares regression estimates of two-day cumulative abnormal returns to equity holders (*CAR [0,1*]) on the five most frequently stated reasons and control variables. The last two columns show results from cross-sectional logit regressions where the dependent variable is an indicator variable *CAR [0,1] negative* that takes the value of one if the two-day cumulative abnormal return is below zero, zero otherwise. Results presented in column (1) and (4) of Table 4.3 are based on the entire sample of 282 combined leadership firms while the results in columns (2), (3) and (5) are obtained from restricting the sample to early disclosure events, i.e., firms that filed their proxy statement either during the first month (March 2010) or within the first two months (March and April 2010) after the new disclosure regulation became effective.[54]

[53] The Loughran and Ritter (2004) high-industry definition contains the following four-digit SIC code industries: 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3671, 3672, 3674, 3675, 3677, 3678, 3679, 3812, 3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899, 7371, 7372, 7373, 7374, 7375, 7378, or 7379.

[54] The distribution of disclosure events presented in Figure 4.1 shows that the majority of observations are located in the first and first two months, respectively.

**Table 4.3: Combined leadership structure - Announcement returns and disclosed reasons**

This table contains regression results of two-day cumulative abnormal stock returns on the five most frequently used leadership reasons disclosed by the 282 sample firms with a combined leadership structure. Columns (1), (2), and (3) provide ordinary least squares regression results. The dependent variable is the two-day cumulative abnormal return to equity holder (*CAR [0,1]*). Columns (4) and (5) show logit regression results where the dependent variable is the indicator variable *CAR [0,1] negative*, which takes the value of one if the two-day cumulative abnormal return (*CAR [0,1]*) is below zero, zero otherwise. Regression results in columns (1) and (4) are obtained from the entire sample of 282 firms with a combined leadership structure. Regression results in column (2) are based on a restricted sample of firms that filed their proxy statement within the first month after the new SEC disclosure regulation became on February 28th, 2010. In column (3) and column (5), the sample is restricted to all observations within the first two months following the change in the disclosure regulation. "*Other reason stated*" is an indicator variable that is set to one if the company stated at least one reasoning for the board leadership structure decision beyond one of the five most frequent leadership rationales. *Regulated industry* is an indicator variable set to one if the company operates in the utility or financial industry (SIC codes: 4000 – 4999, 6000 – 6999), zero otherwise. The nine proxy statement control variables are dummy variables that take the value of one if certain corporate governance events, described more fully in Section 4.2.3, are reported in the proxy statement. All other variables are as defined in Table 4.1. An intercept is included in all regressions, but not reported. Robust t-statistics are reported in parentheses below the regression coefficient. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | **CAR [0,1]** | | | **CAR [0,1] negative** | |
|---|---|---|---|---|---|
| | (1) | (2) March 2010 | (3) March and April 2010 | (4) | (5) March and April 2010 |
| **Unified leadership** | **0.0039** | **0.0004** | **0.0023** | **-0.0992** | **-0.0875** |
| | **(1.48)** | **(0.17)** | **(0.86)** | **(-0.37)** | **(-0.29)** |
| **Knowledge as CEO** | **-0.0012** | **0.0015** | **0.0012** | **-0.0941** | **-0.2585** |
| | **(-0.45)** | **(0.61)** | **(0.43)** | **(-0.35)** | **(-0.85)** |
| **Bridge between management and board** | **-0.0027** | **-0.0031** | **-0.0056*** | **-0.1071** | **0.1321** |
| | **(-1.00)** | **(-1.07)** | **(-1.80)** | **(-0.33)** | **(0.36)** |
| **Leadership structure has served well** | **-0.0051*** | **-0.0061**** | **-0.0083***** | **0.6931**** | **0.9257**** |
| | **(-1.87)** | **(-2.32)** | **(-2.77)** | **(2.05)** | **(2.32)** |
| **Efficiency and effectiveness of board** | **-0.0005** | **-0.0059*** | **0.0079** | **0.0259** | **0.0446** |
| | **(-0.014)** | **(-1.69)** | **(0.20)** | **(0.05)** | **(0.08)** |
| Other reason stated | -0.0015 | 0.00004 | -0.0023 | -0.1728 | 0.1468 |
| | (-0.50) | (0.02) | (-0.86) | (-0.61) | (0.46) |
| ln(Market cap) | -0.0013 | -0.0005 | -0.0019 | 0.2114 | 0.1566 |
| | (-0.94) | (-0.49) | (-1.52) | (1.62) | (1.05) |
| ln(Words) | -0.0005 | -0.0003 | -0.0012 | 0.2633 | 0.2253 |
| | (-0.22) | (-0.12) | (-0.52) | (0.96) | (0.74) |
| Regulated industry | -0.0037 | -0.0001 | -0.0042 | 0.2059 | 0.2231 |
| | (-1.49) | (-0.06) | (-1.61) | (0.74) | (0.75) |
| Tech firm | -0.0035 | 0.0013 | 0.0112 | 0.1514 | -0.5763 |
| | (-0.44) | (0.30) | (1.25) | (0.37) | (-0.98) |
| Proxy statement controls (9) | Yes | Yes | Yes | Yes | Yes |
| Observations | 282 | 164 | 230 | 281 | 229 |
| R-squared/ Pseudo R-squared | 0.047 | 0.132 | 0.115 | 0.059 | 0.071 |

Overall, the regression results for the entire sample of 282 firms with a combined leadership structure of Table 4.3 show insignificant estimates for the majority of the five most frequently disclosed reasons upon two-day abnormal returns (*CAR [0,1])* and the probability of a negative two-day cumulative abnormal return (*CAR [0,1] negative*). However, the results show that the disclosure of the leadership reason "*Leadership structure has served well*" is negatively related to two-day abnormal stock returns (column (1)) and consistently also positively related to the probability of a negative two-day cumulative abnormal return (column (4)). Specifically, the disclosure of the rationale "*Leadership structure has served well"* reduces abnormal returns by about 0.5 percentage points while it increases the probability of a negative stock price reaction by about 17.1 percentage points. Hence, we conclude that investors consider the rationale "*Leadership structure has served well*" as an inappropriate reasoning for combining the CEO and chairman positions which might further constitute a negative signal regarding the overall governance of the company. With respect to the control variables of the specifications, none of the controls is significant and the vast majority of the proxy statement controls are insignificant as well. Hence, there is little evidence that simultaneous disclosure of other confounding information may affect the findings of the analysis.

Insignificant estimates for the majority of the board leadership reasons might suggest that market participants may already possess precise pre-disclosure expectations about the firms' leadership structure rationales. In this case, the new disclosure requirement would not provide valuable new information for investors. As a consequence, abnormal stock market reactions can be expected to converge to zero and the estimates of the leadership reasons will most likely be insignificant. Although investors' expectations might be relatively precise for some leadership rationales or some firms, the expectations are likely less precise for other rationales and firms. In addition, since we focus entirely on firms that have not disclosed previously any information on the motives behind their board leadership structure decision (see Section 4.2.2)

and we do find significant stock market reaction for at least some rationales, we consider the explanation of systematic ex-ante shareholder expectation to be less likely to be the case.

A second explanation consistent with insignificant estimates is related to potential learning effects of both firms and market participants. Firms disclosing their proxy statements relatively late during the sample period have the opportunity to learn from previous disclosures of other companies and might therefore be able to strategically select the set of disclosed leadership reasons. Hence, those firms might be able to avoid certain reasons that are assessed negatively by the market or have the possibility to substitute such rationales with reasons likely viewed more favorably by corporate shareholders. We attempt to address this issue by analyzing relative frequencies of the five most frequently stated reasons for early and late disclosing firms. The subsample means for early and late disclosures together with the difference-in-means tests are shown in Appendix 4.E. The results indicate that there is no evidence that reason disclosures of firms with a combined leadership structure differ significantly over time. Specifically, early and late disclosing firms use individual rationales equally frequent which suggests that firms do not seem to select reasons strategically.

Alternatively, investors might use the information provided by early disclosing firms to update their expectations about subsequent disclosures of reasons of similar companies. This might result in pre-disclosure price adjustments and hence diminishing and insignificant stock market reactions over the sample period. Estimates for early disclosure events can therefore be expected to be economically and statistically pronounced compared to late disclosure events and to the entire sample estimates. Hence, we repeat the full sample regression analyses of column (1) and column (4) of Table 4.3 using a restricted subsample of firms that filed their proxy statements during the first month (March 2010) or within the first two months (March and April 2010) after the new disclosure regulation became effective. The regression results

are presented in columns (2), (3), and (5) of Table 4.3.

Although the majority of estimates of the board leadership structure reasons are still statistically insignificant which is in line with the investor learning hypothesis, we find that estimates generally improve in economic magnitude as well as statistical significance. The regression results for the subsamples of early disclosing firms further supports the full sample finding of a negative stock market reaction to the disclosure of the rationale "*Leadership structure has served well*". On average, the disclosure of the reason during the early sample period is associated with lower abnormal returns of about 0.83 percentage points and an increase in the likelihood of a negative abnormal announcement return of about 22.7 percentage points. The results are generally consistent with the notion that market participants learn from early disclosures and update their beliefs about reason disclosures of other comparable companies.

Lastly, insignificant estimates for the majority of the board leadership structure reasons might also indicate heterogeneity in the assessment of disclosed rationales by market participants. Depending on the characteristics of the company, some firms may have good reasons to select a given board leadership structure while others may have poor or even no reasoning. As indicated by Hermalin and Weisbach (1998), boards should ideally select the appropriate board leadership structure by trading off potential benefits and costs that are likely specific to the characteristics and business environment of the firm. Recent empirical literature provides various empirical evidence for heterogeneous effects across a variety of governance structures, such as CEO power (see e.g., Adams, Almeida, and Ferreira, 2005; Li, Lu, and Phillips, 2017), board size (see e.g., Coles, Daniel, Naveen, 2008), board independence (see e.g., Faleye, Hoitash, and Hoitash, 2011) or staggered boards (see e.g., Cremers, Litov, and Sepe, forth).

Previous empirical research also suggests heterogeneity with respect to the choice of board leadership structure. Yang and Zhao (2014) as well as Li, Lu, and Phillips (2017) show that

CEO duality is particularly valuable for firms operating in high uncertain and more dynamic business environments that are characterized by high communication and information sharing costs where managerial discretion and fast decision making are expected to be most beneficial (see e.g., Boyd, 1995). Since more growth-oriented firms typically rely on very specific information which is more difficult to share and less transparent to company outsiders (e.g., Subrahmanyam and Titman, 2001; Graham and Harvey, 2001; Linck, Netter, Yang, 2008), the benefits of a combined leadership structure likely outweigh the potential costs for firms with higher growth opportunities. Hence, we hypothesize that leadership rationales emphasizing the benefits of a unified leadership structure should be positively related with two-day abnormal returns for firms operating in more dynamic or more growth-oriented business environments.

The literature further argues that larger and more mature firms likely operating in more stable and less dynamic business environments and are hence better predictable. Jensen and Meckling (1976) hypothesize that agency costs are an increasing function of firm size and monitoring activities become more difficult and more expensive the larger the firm gets over time, making more powerful CEOs more dysfunctional. Analyzing announcements of changes in board leadership structure of public U.S. companies, Palmon and Wald (2002) as well as Dey, Engel, and Liu (2011) provide evidence consistent with the hypothesis that benefits and costs of board leadership structure vary with the size of the firm. The authors document that changing board leadership structure from a combined structure to a separate structure is on average associated with negative announcement returns for small firms while large firms usually experience positive abnormal returns. We therefore expect that leadership rationales for a combined leadership structure disclosed by larger and more mature firms are viewed less favorably by investors and hence leadership rationales that particularly emphasize the benefits of a unified leadership structure are expected to be negatively related to abnormal returns.

We test the hypotheses regarding the heterogeneity in abnormal stock returns to the disclosure of combined leadership reasons by adding interaction terms of the respective leadership rationale and measures for environmental dynamics, firm size, or firm maturity to the regression specification of two-day abnormal returns (*CAR [0,1])* for the sample of 282 combined leadership structure firms shown in column (1) of Table 4.3. In particular, we focus on the three most frequently stated rationales based on organization theory, i.e., "*Unified leadership*", "*Knowledge as CEO*", and "*Bridge between management and board*".

We apply the following measures for environmental dynamics and growth-orientation, firm size and firm maturity: First, we use the indicator variable *Tech firm* according to the high-tech industry definition proposed by Loughran and Ritter (2004) since high-tech industries are typically characterized by rapidly changing and highly dynamic environments. Second, as an alternative and more restrictive definition, we apply the high-tech industry definition according to Murphy (2003) (*New economy)*. Third, we use the firm's market-to-book ratio (*MTB*) because higher MTB ratios likely indicate higher uncertainty regarding future growth potential and future profitability. Firm size is captured by the natural logarithm of the firm's book value of total assets (*ln(Total assets)*) or the natural logarithm of the firm's market capitalization (*ln(Market cap)*). Finally, the maturity of the firm is measured as the number of years since the firm first appeared in CRSP (*Firm age).*

The results for the three major combined leadership reasons "*Unified leadership*", "*Knowledge as CEO*", and "*Bridge between management and board*" are presented in Tables 4.4, 4.5 and 4.6. Each table consists of two panels. Panel A shows the regression results for the interactions with *Tech firm*, *New economy*, and *MTB* while Panel B presents the estimates of the interactions with the proxies for firm size and firm maturity.

**Table 4.4: Combined leadership structure - Heterogeneous stock market reactions to "Unified leadership"**

This table presents ordinary least squares regression results on heterogeneity of two-day abnormal returns (*CAR [0,1]*) following the disclosure of the board leadership reason "*Unified leadership*" for the sample of 282 firms with a combined board leadership structure. Panel A contains results from interactions with proxies for dynamic business environments, while Panel B shows interaction results with measures of firm size and firm maturity. *New economy* is an indicator variable that takes the value of one if the firm operates in a high-tech industry following the definition in Murphy (2003), zero otherwise. A firm is considered a high-tech firm if it operates in one of the following 4-digit SIC codes: 3570, 3571, 3572, 3576, 3577, 3661, 3674, 4812, 4813, 5045, 5961, 7370, 7371, 7372, and 7373. *MTB* is the ratio of market value of equity to the book value of equity. Control variables are identical to those shown in Table 4.3, except for column (1) of Panel B where *ln(Market cap)* is replaced by *ln(Total assets)* in the set of other controls. All other variables are as defined in Table 4.1. The nine proxy statement control variables are dummy variables that equal one if certain corporate governance events, described more fully in Section 4.2.3, are reported in the proxy statement. An intercept is included in all regressions, but not reported. Robust t-statistics are reported in parentheses below the regression coefficient. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| **Panel A** | **CAR [0,1]** | | |
|---|---|---|---|
| *Interaction measure:* | *Tech firm* | *New economy* | *MTB* |
| | (1) | (2) | (3) |
| Unified leadership | 0.0002 | 0.0003 | 0.0033 |
| | (0.09) | (0.15) | (1.18) |
| **Unified leadership* Interaction measure** | **0.0318*** | **0.0405**** | **0.0002***** |
| | **(1.89)** | **(1.98)** | **(3.64)** |
| Interaction measure | -0.0203 | -0.0221 | 0.00001 |
| | (-1.48) | (-1.35) | (-0.39) |
| Other reasons | Yes | Yes | Yes |
| Other controls | Yes | Yes | Yes |
| Proxy statement controls (9) | Yes | Yes | Yes |
| Observations | 282 | 282 | 282 |
| R-squared | 0.094 | 0.106 | 0.051 |

| **Panel B** | **CAR [0,1]** | | |
|---|---|---|---|
| *Interaction measure:* | *ln(Total assets)* | *ln(Market cap)* | *Firm age* |
| | (1) | (2) | (3) |
| Unified leadership | 0.0550* | 0.0574** | 0.0114* |
| | (1.80) | (2.00) | (1.90) |
| **Unified leadership* Interaction measure** | **-0.0053*** | **-0.0057*** | **-0.0002*** |
| | **(-1.74)** | **(-1.96)** | **(-1.81)** |
| Interaction measure | 0.0028 | 0.0020 | 0.0001 |
| | (0.93) | (0.76) | (1.25) |
| Other reason categories | Yes | Yes | Yes |
| Other controls | Yes | Yes | Yes |
| Proxy statement controls (9) | Yes | Yes | Yes |
| Observations | 282 | 282 | 282 |
| R-squared | 0.067 | 0.064 | 0.058 |

We turn first to the heterogeneity analysis for the leadership rationale "*Unified leadership*" shown in Table 4.4. In support of the hypothesis that potential benefits of a combined leadership structure likely exceed the potential costs for firms operating in highly dynamic and likely more uncertain business environments, the estimates of each interaction term in column (1) to column (3) of Panel A show positive and statistically significant relations with the two-day abnormal returns. The results indicate that investors welcome the disclosure of "*Unified leadership*" as a rationale for combining the CEO and chairman position if the firm operates in dynamic high-tech industries or is characterized by high growth opportunities.

The results in Panel B of Table 4.4 are generally in support of the hypothesis of heterogeneity in stock market reactions across firm size which suggests that investors likely assess the leadership rationale "*Unified leadership*" contingent on the size of the company. Consistent with increasing agency costs associated with combining the CEO and chairman position in larger and more mature companies, the results show negative estimates for the interaction terms with the two proxies for firm size and for firm maturity. Taking heterogeneity across firm size into account, the main estimate of the rationale "*Unified leadership*" becomes significant and is overall positively related with the two-day cumulative abnormal returns throughout all three specifications of Panel B. The results generally show that smaller firms are associated with positive abnormal returns while larger firms typically experience negative abnormal returns following the disclosure of "*Unified leadership*".

**Table 4.5: Combined leadership structure - Heterogeneous stock market reactions to "Knowledge as CEO"**

This table presents ordinary least squares regression results on heterogeneity of two-day abnormal returns (*CAR [0,1]*) following the disclosure of the board leadership reason "*Knowledge as CEO*" for the sample of 282 firms with a combined board leadership structure. Panel A contains results from interactions with proxies for dynamic business environments, while Panel B shows interaction results with measures of firm size and firm maturity. *New economy* is an indicator variable that takes the value of one if the firm operates in a high-tech industry following the definition in Murphy (2003), zero otherwise. A firm is considered a high-tech firm if it operates in one of the following 4-digit SIC codes: 3570, 3571, 3572, 3576, 3577, 3661, 3674, 4812, 4813, 5045, 5961, 7370, 7371, 7372, and 7373. *MTB* is the ratio of market value of equity to the book value of equity. Control variables are identical to those shown in Table 4.3, except for column (1) of Panel B where *ln(Market cap)* is replaced by *ln(Total assets)* in the set of other controls. All other variables are as defined in Table 4.1. The nine proxy statement control variables are dummy variables that equal one if certain corporate governance events, described more fully in Section 4.2.3, are reported in the proxy statement. An intercept is included in all regressions, but not reported. Robust t-statistics are reported in parentheses below the regression coefficient. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| **Panel A** | **CAR [0,1]** | | |
|---|---|---|---|
| *Interaction measure:* | *Tech firm* | *New economy* | *MTB* |
| | (1) | (2) | (3) |
| Knowledge as CEO | -0.0002 | -0.0001 | -0.0017 |
| | (-0.10) | (-0.05) | (-0.60) |
| **Knowledge as CEO* Interaction measure** | **-0.0102** | **0.0166** | **0.0001** |
| | **(-0.72)** | **(-0.93)** | **(1.32)** |
| Interaction measure | 0.0027 | 0.0080 | 0.0000 |
| | (0.70) | (1.38) | (-0.20) |
| Other reasons | Yes | Yes | Yes |
| Other controls | Yes | Yes | Yes |
| Proxy statement controls (9) | Yes | Yes | Yes |
| Observations | 282 | 282 | 282 |
| R-squared | 0.051 | 0.055 | 0.049 |

| **Panel B** | **CAR [0,1]** | | |
|---|---|---|---|
| *Interaction measure:* | *ln(Total assets)* | *ln(Market cap)* | *Firm age* |
| | (1) | (2) | (3) |
| Knowledge as CEO | -0.0013 | -0.0112 | 0.0013 |
| | (-0.05) | (-0.41) | (0.21) |
| **Knowledge as CEO* Interaction measure** | **0.0000** | **0.0011** | **-0.0001** |
| | **(0.00)** | **(0.039)** | **(-0.61)** |
| Interaction measure | -0.0002 | -0.0018 | 0.0000 |
| | (-0.15) | (-1.37) | (0.53) |
| Other reason categories | Yes | Yes | Yes |
| Other controls | Yes | Yes | Yes |
| Proxy statement controls (9) | Yes | Yes | Yes |
| Observations | 282 | 282 | 282 |
| R-squared | 0.044 | 0.048 | 0.048 |

The results from a similar analysis for the leadership reason "*Knowledge as CEO*" are presented in Table 4.5. Consistent with the previous hypotheses, we again expect investors to react more favorably to the rationale if the firm operates in a more dynamic and growth-oriented business environment while market participants are expected to react more negatively if the rationale is stated by larger and more mature firms. Overall, we do not find consistent evidence for heterogeneous stock market reactions regarding the rationale "*Knowledge as CEO"*. Neither the interactions with proxies for environmental dynamics shown in Panel A nor the interactions with firm size or firm maturity in Panel B are statistically significant. The insignificant estimates might suggest that the leadership rationale provides only very limited insights into the decision about the firm's board leadership structure.

Turning to the analysis for the third most frequently stated reason for a combined leadership structure "*Bridge between management and board*". The rationale particularly emphasizes the potential benefits of enhanced information flow between the management and the board if the CEO also acts as the chairman of the board. We again expected the rationale to be most valuable for firms in more dynamic and growth-oriented business environment while the relation is expected to less beneficial for larger and more mature firms. The results presented in Table 4.6 provide some empirical support for the hypotheses. Although the majority of the interaction terms show insignificant regression estimates, both coefficients of the interactions with the high-tech industry indicators are positive (see Panel A) while the coefficients of the interactions with both measures for firm size show negative signs (see Panel B). Consistent with the firm size hypothesis, the interaction of the leadership reason "*Bridge between management and board*" with firm age is significant and negatively related with two-day abnormal returns indicating that investors consider the rationale for combining the roles to allow the CEO to act as an information bridge to be less appropriate for more mature firms.

**Table 4.6: Combined leadership structure - Heterogeneous effects to "Bridge between management and board"**

This table presents ordinary least squares regression results on heterogeneity of two-day abnormal returns (*CAR [0,1]*) following the disclosure of the board leadership reason "*Bridge between management and board*" for the sample of 282 firms with a combined board leadership structure. Panel A contains results from interactions with proxies for dynamic business environments, while Panel B shows interaction results with measures of firm size and firm maturity. *New economy* is an indicator variable set to one if the firm operates in a high-tech industry following the definition in Murphy (2003), zero otherwise. A firm is considered a high-tech firm if it operates in one of the following 4-digit SIC codes: 3570, 3571, 3572, 3576, 3577, 3661, 3674, 4812, 4813, 5045, 5961, 7370, 7371, 7372, and 7373. *MTB* is the ratio of market value of equity to the book value of equity. Control variables are identical to those shown in Table 4.3, except for column (1) of Panel B where *ln(Market cap)* is replaced by *ln(Total assets)* in the set of other controls. All other variables are as defined in Table 4.1. The nine proxy statement control variables are dummy variables that equal one if certain corporate governance events, described more fully in Section 4.2.3, are reported in the proxy statement. An intercept is included in all regressions, but not reported. Robust t-statistics are reported in parentheses below the regression coefficient. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| **Panel A** | **CAR [0,1]** | | |
|---|---|---|---|
| *Interaction measure:* | *Tech firm* | *New economy* | *MTB* |
| | (1) | (2) | (3) |
| Bridge between management and board | -0.0040 | -0.0039 | -0.0026 |
| | (-1.45) | (-1.42) | (-0.91) |
| **Bridge between management and board* Interaction measure** | **0.0104** | **0.0116** | **-0.0000** |
| | **(0.85)** | **(0.72)** | **(-0.70)** |
| Interaction measure | -0.0061 | -0.0058 | 0.0000 |
| | (-0.057) | (-0.39) | (0.68) |
| Other reasons | Yes | Yes | Yes |
| Other controls | Yes | Yes | Yes |
| Proxy statement controls (9) | Yes | Yes | Yes |
| Observations | 282 | 282 | 282 |
| R-squared | 0.051 | 0.050 | 0.047 |

| **Panel B** | **CAR [0,1]** | | |
|---|---|---|---|
| *Interaction measure:* | *ln(Total assets)* | *ln(Market cap)* | *Firm age* |
| | (1) | (2) | (3) |
| Bridge between management and board | 0.0074 | 0.0114 | 0.0054 |
| | (0.34) | (0.47) | (1.03) |
| **Bridge between management and board* Interaction measure** | **-0.0011** | **-0.0015** | **-0.0002**** |
| | **(-0.48)** | **(-0.61)** | **(-1.95)** |
| Interaction measure | 0.0017 | -0.0010 | 0.0000 |
| | (0.68) | (-0.59) | (0.95) |
| Other reason categories | Yes | Yes | Yes |
| Other controls | Yes | Yes | Yes |
| Proxy statement controls (9) | Yes | Yes | Yes |
| Observations | 282 | 282 | 282 |
| R-squared | 0.050 | 0.048 | 0.057 |

Finally, we investigate whether the previously documented negative relation of the rationale "*Leadership structure has served well*" depends on the actual performance of the company. In Table 4.7, we interact the leadership reason with two measures of recent corporate performance that are likely relevant to shareholders, i.e., the company's prior year buy-and-hold return (*Prior year BHR*) and the total return to shareholders over the past three years (*TRS 3 years*). Both estimates for the interaction terms are insignificant (see columns (1) and (2) of Table 4.7). We find that better stock market performance does not seem to mitigate the overall negative effect. Moreover, the main effect of the rationale "*Leadership structure has served well*" remains negative and statistically significant throughout both regressions.[55]

The finance literature argues that founder CEOs differ considerably from professional CEOs in several aspects. Founder-CEOs have shaped their companies from their inception and likely possess more influence and decision-making power. Founder-CEOs are furthermore characterized by their intrinsic motivation to ensure the company's survival and prosperity, large equity stakes that mitigate agency problems and likely pursue more long-term oriented strategies rather than short-term actions to maximize firm value. Several empirical studies document superior stock market performance of founder CEOs (see e.g., Fahlenbrach, 2009; Lilienfeld-Toal and Ruenzi, 2014). Given the unique characteristics of founder CEOs, we expect non-negative or even positive stock market reactions to the disclosure of the leadership rationale "*Leadership structure has served well*" for founder CEOs. Column (3) of Table 4.7 shows the regression results for the aforementioned hypothesis for founder CEOs.

[55] In unreported regressions, we alternatively interact the leadership rationale "*Leadership structure has served well*" with measures of current or past accounting performance of the sample firms. Using the firm's return on assets calculated as EBITDA over lagged total assets, the ratio of net income over total sales, or simple sales growth as proxies for corporate performance, we find insignificant estimates for all interaction terms.

**Table 4.7: Combined leadership structure - Heterogeneous effects to "Leadership structure has served well"**

This table presents ordinary least squares regression results on heterogeneity of two-day abnormal returns (*CAR [0,1]*) following the disclosure of the board leadership reason "*Leadership structure has served well*" for the sample of 282 firms with a combined board leadership structure. Column (1) and column (2) show results from interactions with past stock market performance, while column (3) contains regression results for the interaction of the rationale "*Leadership structure has served well*" with the indicator variable *Founder CEO*. *Prior year BHR* is the realized buy-and-hold return calculated over a 250 days window before the event date. *TRS 3 years* is the total return to shareholders calculated over the previous three years with reinvested dividends. *Founder CEO* is an indicator variable if the CEO is the founder of the company, zero otherwise. Control variables are identical to those shown in Table 4.3. The nine proxy statement control variables are dummy variables that equal one if certain corporate governance events, described more fully in the text, are reported in the proxy statement. An intercept is included in all regressions, but not reported. Robust t-statistics are reported in parentheses below the regression coefficient. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | **CAR [0,1]** | | |
|---|---|---|---|
| Board leadership structure reason: | Leadership structure has served well | | |
| *Interaction measure:* | *Prior year BHR* | *TRS 3 years* | *Founder CEO* |
| | (1) | (2) | (3) |
| Leadership structure has served well | -0.0059** | -0.0069** | -0.0064** |
| | (-2.02) | (-2.59) | (-2.49) |
| **Leadership structure has served well * Interaction measure** | **0.0030** | **-0.0003** | **0.0213**** |
| | **(0.50)** | **(-0.97)** | **(2.08)** |
| Interaction measure | -0.0010 | -0.0002 | 0.0048 |
| | (-0.48) | (-1.00) | (0.50) |
| Other reasons | Yes | Yes | Yes |
| Other controls | Yes | Yes | Yes |
| Proxy statement controls (9) | Yes | Yes | Yes |
| Observations | 282 | 275 | 282 |
| R-squared | 0.048 | 0.065 | 0.062 |

Consistent with the hypothesis, we find a positive relation of abnormal returns with the disclosure of "*Leadership structure has served well*" for founder-CEO firms, as the positive effect outweighs the general negative stock market reaction. Overall, the results of Table 4.7 do not indicate heterogeneity in stock market reactions for the rationale "*Leadership structure has served well*" due to differences in the firms' past performance. However, the results rather suggest heterogeneity with respect to differences between founder-CEO firms and firms managed by non-founder-CEOs.

#### 4.3.3.2. Separate leadership structure reasons and abnormal returns to equity holders

We now turn the analysis to the leadership reasons stated by the 165 sample firms that have chosen to separate the CEO and chairman position. Table 4.8 presents the regression results. Again, the first three columns (columns (1), (2) and (3)) show cross-sectional ordinary least squares regression results of two-day cumulative abnormal returns to equity holders (*CAR [0,1]*) on the five most frequently stated reasons by firms with a separate leadership structure. The last two columns contain estimates from logit regressions where the dependent variable is an indicator variable, *CAR [0,1] negative,* that takes the value of one if the two-day cumulative abnormal return is below zero, and zero otherwise. The estimates in column (1) and column (4) of Table 4.8 are based on the entire sample of firms with a separate leadership structure while the results shown in columns (2), (3) and (5) are obtained from restricting the sample to early disclosure events, i.e., firms that filed their proxy statements during the first month (March 2010) or within the first two months (March and April 2010) after the new disclosure regulation became effective.

**Table 4.8: Separate leadership structure - Announcement returns and disclosed reasons**

This table contains regression results of two-day cumulative abnormal stock returns on the five most frequently used leadership reasons disclosed by the 165 sample firms with a separate leadership structure. Columns (1), (2), and (3) provide ordinary least squares regression results. The dependent variable is the two-day cumulative abnormal return to equity holder (*CAR [0,1]*). Columns (4) and (5) show logit regression results where the dependent variable is the indicator variable *CAR [0,1] negative*, which takes the value of one if the two-day cumulative abnormal return (*CAR [0,1]*) is below zero, zero otherwise. Regression results in columns (1) and (4) are obtained from the entire sample of 165 firms with a separate leadership structure. Regression results in column (2) are based on a restricted sample of firms that filed their proxy statement within the first month after the new SEC disclosure regulation became on February 28th, 2010. In column (3) and column (5), the sample is restricted to all observations within the first two months following the change in the disclosure regulation. "*Other reason stated*" is an indicator variable that is set to one if the company stated at least one reasoning for the board leadership structure decision beyond one of the five most frequent leadership rationales. *Regulated industry* is an indicator variable set to one if the company operates in the utility or financial industry (SIC codes: 4000 – 4999, 6000 – 6999), zero otherwise. The nine proxy statement control variables are dummy variables that take the value of one if certain corporate governance events, described more fully in Section 4.2.3, are reported in the proxy statement. All other variables are as defined in Table 4.1. An intercept is included in all regressions, but not reported. Robust t-statistics are reported in parentheses below the regression coefficient. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | **CAR [0,1]** | | | **CAR [0,1] negative** | |
|---|---|---|---|---|---|
| | (1) | (2) March 2010 | (3) March and April 2010 | (4) | (5) March and April 2010 |
| **Differences between tasks/roles** | **0.0047** | **0.0189*** ** | **0.0082** | **-0.7562*** | **-1.2820** ** |
| | **(1.12)** | **(2.68)** | **(1.66)** | **(-1.89)** | **(-2.33)** |
| **Facilitates monitoring** | **0.017** | **0.0004** | **0.0027** | **-0.1649** | **-0.3571** |
| | **(0.42)** | **(0.05)** | **(0.57)** | **(-0.39)** | **(-0.62)** |
| **CEO can focus on management** | **-0.0004** | **-0.0037** | **0.0043** | **-0.2374** | **-0.9618** |
| | **(-0.07)** | **(-0.37)** | **(0.71)** | **(-0.52)** | **(-1.45)** |
| **Chair's experience** | **0.0101*** | **0.0108** | **0.0112** | **-0.8091*** | **-0.9684** |
| **with company** | **(1.83)** | **(0.98)** | **(1.57)** | **(-1.67)** | **(-1.43)** |
| **No reason stated** | **0.0119*** | **0.0314** ** | **0.0178*** | **-1.3231** ** | **-2.4253*** ** |
| | **(1.67)** | **(2.53)** | **(1.93)** | **(-2.00)** | **(-2.73)** |
| Other reason stated | 0.0002 | 0.0047 | 0.0028 | 0.0127 | -0.3292 |
| | (-0.05) | (0.67) | (0.56) | (0.03) | (-0.61) |
| ln(Market cap) | 0.0046 | 0.0012 | 0.0018 | 0.3002 | 0.1621 |
| | (0.20) | (0.27) | (0.64) | (1.37) | (0.60) |
| ln(Words) | -0.0035 | -0.0029 | -0.0049 | -0.0334 | 0.1866 |
| | (-1.07) | (-0.39) | (-1.16) | (-0.10) | (0.46) |
| Regulated industry | -0.0056 | 0.0041 | 0.0030 | -0.4469 | -0.5370 |
| | (-1.15) | (0.62) | (0.67) | (-1.08) | (-1.02) |
| Tech firm | 0.0047 | 0.0140 | 0.0110** | -1.1118** | -2.2489*** |
| | (0.94) | (1.16) | (2.13) | (-2.41) | (-3.33) |
| Proxy statement controls (9) | Yes | Yes | Yes | Yes | Yes |
| Observations | 165 | 72 | 122 | 163 | 117 |
| R-squared/ Pseudo R-squared | 0.080 | 0.259 | 0.145 | 0.095 | 0.152 |

The regression results in column (1) and column (5) of Table 4.8 for the full sample of 165 separate leadership firms again yield insignificant cross-sectional estimates for the majority of leadership rationales upon two-day abnormal returns (*CAR [0,1])* and the probability of a negative two-day cumulative abnormal return (*CAR [0,1] negative*). However, we find positive stock returns for the rationale "*Chair's experience with company*" suggesting that investors on average seem to welcome the disclosure of the rationale. The rationale is positively related with two-day abnormal returns and consistently also negatively related with the probability of a negative abnormal return. Surprisingly, we also find positive stock market reactions for firms whose sections on board leadership structure do not contain any rationale ("*No reason stated*"). Lastly, the full sample results further indicate that separating the two roles due to the differences between the CEO and chairman position ("*Differences between tasks/roles*") tends to be viewed rather favorably by investors. We find that the disclosure of the reason is associated with a reduction of the likelihood of a negative two-day abnormal return. Again, the estimates for the large majority of the control variables as well as for the proxy statement controls are insignificant indicating that simultaneous disclosure of other confounding information does not seem to affect the findings of the analysis.

Similar to the analysis of the two-day abnormal returns for firms with a combined leadership structure, we investigate whether learning effects of firms or investors, or heterogeneity in investors' stock market reactions help explain the insignificant estimates for the majority of leadership rationales. First, to test for learning effects of investors over time, we rerun the regression analysis of column (1) of Table 4.8 with a restricted sample of firms that filed their proxy statements during the first month (March 2010) or the first two months (March and April 2010) of the sample period, respectively. The results shown in column (2), (3) and (5) of Table 4.8 again indicate that restricting the sample to early disclosure events generally improves the economic magnitude and the statistical significance of the estimates. Consistent with agency

theory, we find that emphasizing the differences in the roles between the CEO and chairman is welcomed by investors as the relation of the leadership rationale with the two-day abnormal returns is found to be positive. Overall, the findings again support the notion that investors seem to learn about reason disclosures of firms over time and use the information provided by early disclosures to update their expectations about the reason disclosure of other comparable firms.

Second, in Appendix 4.F we compare relative frequencies of leadership reasons over the sample period to test for potential learning effects of firms over time. Analyzing difference-in-means tests for the five most frequently stated rationales reveals that the use of the two leadership reasons "*Differences between tasks/roles*" and "*CEO can focus on management*" for the separation of the CEO and chairman position significantly increases over time. Particularly, late disclosing firms, i.e., firms that file their proxy statement after the first two months of the sample period use both leadership reasons almost twice as often as early disclosing firms. Contrary to firms with a combined leadership structure, the significant differences in the frequencies of the aforementioned two rationales provide some indication for potential learning and adjustment effects of firms with a separate leadership structure over time.

Finally, we perform an analysis regarding heterogeneity in stock market reactions to the disclosure of leadership rationales for the sample of separate leadership firms similar to the analysis for the sample of firms with a combined leadership structure. Specifically, we investigate whether two-day abnormal returns following the disclosure of the three most frequently stated leadership rationales for separating the CEO and chairman position, i.e., "*Differences between tasks/roles*", "*Facilitates monitoring*", and "*CEO can focus on management*" that are based on agency theory are also contingent on the characteristics and specific circumstances of the firm. Consistent with the concept of potential benefits and costs

for board leadership structure decisions, the rationales for separating the two roles are expected to be viewed less favorably by corporate shareholders if the firm operates in more dynamic and growth-oriented business environments. On the contrary, rationales for the separation of the CEO and chairman position are expected to be rather welcomed by investors if stated by larger and more mature firms as those firms are typically more difficult to manage and separation of the tasks is likely most valuable for managing the company and in mitigating agency costs. Again, we use the high-tech classifications *Tech firm* and *New economy* as well as the firm's market-to-book ratio (*MTB*) to proxy for dynamic business environments and growth opportunities. The measures for firm size and firm maturity are the natural logarithm of the firm's total assets (*ln(Total Assets)* or the firm's market capitalization (*ln(MarketCap)*), and the firm's age (*Firm age*). In addition to the analysis for firms with a combined leadership structure, we investigate for the sample of firms with a separate leadership structure to what extent stock market reactions to the rationales for separating the CEO and chairman positions depend on the characteristics of the chairman (*Founder chair*, *Chair former CEO*, *Independent chair*), the characteristics of the CEO (*CEO tenure*, *New CEO*), as well as governance characteristics like board independence.[56] We add interaction terms of the three main leadership rationales and the above listed variables to the full sample regression specification shown in column (1) of Table 4.8. The analysis and the respective regression results for the three leadership reasons are presented in Table 4.9, Table 4.10, and Table 4.11, respectively. Panel A of each table contains the interactions with environmental dynamics, firm size and firm maturity while Panel B contains the interactions with CEO, chairman and governance characteristics.

[56] We alternatively apply other CEO and governance characteristics, such as *CEO age*, *Founder CEO*, or *Staggered board*. We do not find evidence for heterogeneity in investors' stock market reactions with respect to the aforementioned characteristics.

**Table 4.9: Separate leadership structure - Heterogeneous stock market reactions to "Differences between tasks/roles"**

This table presents ordinary least squares regression results on heterogeneity in two-day abnormal returns (*CAR [0,1]*) following the disclosure of the board leadership reason "*Differences between tasks/roles*" for the sample of 165 firms with a separate board leadership structure. Panel A contains results from interactions of the leadership rationale with proxies for more dynamic business environments (column (1) to column (3)) and with measures of firm size and firm maturity (column (4) to column (6)). Panel B presents results from interactions with characteristics of the CEO (column (1) and (2)), characteristics of the chairman (column (3), (4), and (5)) or board independence (column (6)). *New CEO* is an indicator variable that equals one if the current CEO has been appointed the company's CEO within less than one year, zero otherwise. *Firm age* is the number of years since the first inclusion date in CRSP. *Founder chair* is an indicator variable that takes the value of one if the chairman is the founder of the company, zero otherwise. *Chair former CEO* is an indicator variable that equals one if the chairman of the board has previously been worked as the company's CEO, zero otherwise. *Independent chair* is an indicator variable that equals one if the chairman of the board is an independent director, zero otherwise. *Independence ratio* is the number of independent directors divided by the total number of directors. Control variables are identical to those shown in Table 4.8. The nine proxy statement control variables are dummy variables that equal one if certain corporate governance events, described more fully in the text, are reported in the proxy statement. An intercept is included in all regressions, but not reported. Robust t-statistics are reported in parentheses below the regression coefficient. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

**Table 4.9: Separate leadership structure - Heterogeneous stock market reactions to "Differences between tasks/roles" (cont'd)**

| **Panel A** | **CAR [0,1]** | | | | | |
|---|---|---|---|---|---|---|
| *Interaction measure:* | *Tech firm* | *New economy* | *MTB* | *ln(Total assets)* | *ln(Market cap)* | *Firm age* |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Differences between tasks/roles | 0.0060 | 0.0061 | 0.0046 | -0.0075 | 0.0167 | 0.0013 |
| | (1.34) | (1.31) | (1.03) | (-0.23) | (0.44) | (0.19) |
| **Differences between tasks/roles*** | **-0.0055** | **-0.0053** | **0.0000** | **0.0014** | **-0.0013** | **0.0002** |
| **Interaction measure** | **(-0.56)** | **(-0.49)** | **(0.09)** | **(0.39)** | **(-0.32)** | **(0.76)** |
| Interaction measure | 0.0070 | -0.0035 | 0.00002 | 0.0037 | 0.0008 | 0.0001* |
| | (1.25) | (-0.59) | (0.48) | (1.64) | (0.30) | (1.66) |
| Other reasons | Yes | Yes | Yes | Yes | Yes | Yes |
| Other controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Proxy statement controls (9) | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 165 | 165 | 165 | 165 | 165 | 165 |
| R-squared | 0.082 | 0.084 | 0.081 | 0.114 | 0.081 | 0.102 |

| **Panel B** | **CAR [0,1]** | | | | | |
|---|---|---|---|---|---|---|
| *Interaction measure:* | *New CEO* | *CEO tenure* | *Founder chair* | *Chair former CEO* | *Independent chair* | *Independence ratio* |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Differences between tasks/roles | 0.0032 | 0.0050 | 0.0024 | 0.0020 | 0.0059 | 0.0047 |
| | (0.71) | (0.87) | (0.46) | (0.27) | (1.20) | (0.13) |
| **Differences between tasks/roles*** | **0.0166*** | **-0.0002** | **0.0070** | **0.0058** | **-0.0027** | **-0.00036** |
| **Interaction measure** | **(1.75)** | **(-0.28)** | **(0.81)** | **(0.64)** | **(-0.29)** | **(-0.01)** |
| Interaction measure | 0.0028 | 0.0004 | 0.0033 | -0.0042 | 0.0047 | -0.0059 |
| | (0.48) | (0.74) | (0.62) | (-0.83) | (0.09) | (-0.22) |
| Other reasons | Yes | Yes | Yes | Yes | Yes | Yes |
| Other controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Proxy statement controls (9) | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 165 | 165 | 165 | 165 | 165 | 165 |
| R-squared | 0.109 | 0.083 | 0.093 | 0.085 | 0.081 | 0.081 |

**Table 4.10: Separate leadership structure - Heterogeneous stock market reactions to "Facilitates monitoring"**

This table presents ordinary least squares regression results on heterogeneity in two-day abnormal returns (*CAR [0,1]*) following the disclosure of the board leadership reason "*Facilitates monitoring*" for the sample of 165 firms with a separate board leadership structure. Panel A contains results from interactions of the leadership rationale with proxies for more dynamic business environments (column (1) to column (3)) and with measures of firm size and firm maturity (column (4) to column (6)). Panel B presents results from interactions with characteristics of the CEO (column (1) and (2)), characteristics of the chairman (column (3), (4), and (5)) or board independence (column (6)). *New CEO* is an indicator variable that equals one if the current CEO has been appointed the company's CEO within less than one year, zero otherwise. *Firm age* is the number of years since the first inclusion date in CRSP. *Founder chair* is an indicator variable that takes the value of one if the chairman is the founder of the company, zero otherwise. *Chair former CEO* is an indicator variable that equals one if the chairman of the board has previously been worked as the company's CEO, zero otherwise. *Independent chair* is an indicator variable that equals one if the chairman of the board is an independent director, zero otherwise. *Independence ratio* is the number of independent directors divided by the total number of directors. Control variables are identical to those shown in Table 4.8. The nine proxy statement control variables are dummy variables that equal one if certain corporate governance events, described more fully in the text, are reported in the proxy statement. An intercept is included in all regressions, but not reported. Robust t-statistics are reported in parentheses below the regression coefficient. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

**Table 4.10: Separate leadership structure - Heterogeneous stock market reactions to "Facilitates monitoring" (cont'd)**

| **Panel A** | **CAR [0,1]** | | | | | |
|---|---|---|---|---|---|---|
| *Interaction measure:* | *Tech firm* | *New economy* | *MTB* | *ln(Total assets)* | *ln(Market cap)* | *Firm age* |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Facilitates monitoring | -0.0005 | 0.0009 | 0.0020 | 0.249 | 0.0200 | 0.0031 |
| | (-0.11) | (0.19) | (0.47) | (0.74) | (-0.53) | (0.52) |
| **Facilitates monitoring*** | **0.0098** | **0.0062** | **-0.0001** | **-0.0023** | **0.0024** | **-0.00005** |
| **Interaction measure** | **(1.06)** | **(0.64)** | **(-0.30)** | **(-0.64)** | **(0.57)** | **(-0.35)** |
| Interaction measure | 0.0012 | -0.0077 | 0.00003 | 0.0044** | -0.0002 | 0.0002* |
| | (0.16) | (-1.15) | (0.75) | (2.13) | (-0.15) | (1.93) |
| Other reasons | Yes | Yes | Yes | Yes | Yes | Yes |
| Other controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Proxy statement controls (9) | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 165 | 165 | 165 | 165 | 165 | 165 |
| R-squared | 0.087 | 0.085 | 0.081 | 0.115 | 0.082 | 0.100 |

| **Panel B** | **CAR [0,1]** | | | | | |
|---|---|---|---|---|---|---|
| *Interaction measure:* | *New CEO* | *CEO tenure* | *Founder chair* | *Chair former CEO* | *Independent chair* | *Independence ratio* |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Facilitates monitoring | 0.0056 | -0.0047 | 0.0033 | 0.0024 | 0.0003 | -0.0381 |
| | (1.27) | (-0.90) | (0.73) | (0.41) | (0.06) | (-1.29) |
| **Facilitates monitoring*** | **-0.0199**** | **0.0014*** | **-0.0092** | **-0.0037** | **0.0023** | **0.0482** |
| **Interaction measure** | **(-2.05)** | **(1.81)** | **(-1.17)** | **(-0.48)** | **(0.29)** | **(1.34)** |
| Interaction measure | 0.011** | -0.0004 | 0.0086 | -0.0014 | -0.0010 | -0.0171 |
| | (2.06) | (-0.70) | (1.48) | (-0.25) | (-0.17) | (-0.61) |
| Other reasons | Yes | Yes | Yes | Yes | Yes | Yes |
| Other controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Proxy statement controls (9) | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 165 | 165 | 165 | 165 | 165 | 165 |
| R-squared | 0.111 | 0.097 | 0.094 | 0.083 | 0.081 | 0.088 |

Turning to the analyses for the leadership reasons "*Differences between the tasks/roles*" and "*Facilitates monitoring*". The results in Panel A and Panel B of Table 4.9 and Table 4.10 do not suggest that there is heterogeneity in abnormal returns to the disclosure of the two leadership rationales. Neither the interactions with the tech-industry indicator variables, the firm's MTB ratio, firm size, nor the interactions with the characteristics of the chairman show statistically significant estimates. Results in column (1) of Panel B in Table 4.9 indicate, however, that investors seem to react positively to the rationale "*Differences between the task/roles*" if the current CEO has recently been appointed.

Turning to Panel B of Table 4.10, we find that the interaction of the rationale "*Facilitates monitoring*" with the indicator variable for a newly hired CEOs (*New CEO*) is negatively related to two-day abnormal returns (see column (1)) while the interaction with *CEO tenure* is associated with positive stock market reactions by investors (see column (2)). The negative coefficient for recently appointed CEOs is consistent with the notion that shareholders consider the rationale of more effective monitoring less convincing and rather implausible for the CEO has been recently hired as is likely less entrenched. The benefits of intense monitoring are rather small for recently appointed CEOs and likely less powerful CEOs compared to their long-tenured counterparts (see e.g., Taylor, 2010). Consistently, shareholders seem to welcome the rationale "*Facilitates monitoring*" for splitting the roles as it indicates that the board recognizes the need for enhanced monitoring ability which is particularly valuable for long-tenured and likely more powerful CEOs.

**Table 4.11: Separate leadership structure - Heterogeneous stock market reactions to "CEO can focus on management"**

This table presents ordinary least squares regression results on heterogeneity in two-day abnormal returns (*CAR [0,1]*) following the disclosure of the board leadership reason "*CEO can focus on management*" for the sample of 165 firms with a separate board leadership structure. Panel A contains results from interactions of the leadership rationale with proxies for more dynamic business environments (column (1) to column (3)) and with measures of firm size and firm maturity (column (4) to column (6)). Panel B presents results from interactions with characteristics of the CEO (column (1) and (2)), characteristics of the chairman (column (3), (4), and (5)) or board independence (column (6)). *New CEO* is an indicator variable that equals one if the current CEO has been appointed the company's CEO within less than one year, zero otherwise. *Firm age* is the number of years since the first inclusion date in CRSP. *Founder chair* is an indicator variable that takes the value of one if the chairman is the founder of the company, zero otherwise. *Chair former CEO* is an indicator variable that equals one if the chairman of the board has previously been worked as the company's CEO, zero otherwise. *Independent chair* is an indicator variable that equals one if the chairman of the board is an independent director, zero otherwise. *Independence ratio* is the number of independent directors divided by the total number of directors. Control variables are identical to those shown in Table 4.8. The nine proxy statement control variables are dummy variables that equal one if certain corporate governance events, described more fully in the text, are reported in the proxy statement. An intercept is included in all regressions, but not reported. Robust t-statistics are reported in parentheses below the regression coefficient. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

**Table 4.11: Separate leadership structure - Heterogeneous stock market reactions to "CEO can focus on management" (cont'd)**

| **Panel A** | **CAR [0,1]** | | | | | |
|---|---|---|---|---|---|---|
| *Interaction measure:* | *Tech firm* | *New economy* | *MTB* | *ln(Total assets)* | *ln(Market cap)* | *Firm age* |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| CEO can focus on management | 0.0008 | 0.0015 | 0.0069 | -0.0577* | -0.0731 | -0.0167** |
| | (0.15) | (0.25) | (0.94) | (-1.85) | (-1.41) | (-2.16) |
| **CEO can focus on management*** | **-0.0044** | **-0.0043** | **-0.0024** | **0.0061*** | **0.0079** | **0.0006***** |
| **Interaction measure** | **(-0.29)** | **(-0.34)** | **(-1.38)** | **(1.89)** | **(1.40)** | **(3.74)** |
| Interaction measure | 0.0058 | -0.0042 | 0.00003 | 0.0024 | -0.0013 | 0.0001 |
| | (1.40) | (-0.86) | (0.97) | (1.22) | (-0.62) | (0.61) |
| Other reasons | Yes | Yes | Yes | Yes | Yes | Yes |
| Other controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Proxy statement controls (9) | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 165 | 165 | 165 | 165 | 165 | 165 |
| R-squared | 0.081 | 0.083 | 0.094 | 0.134 | 0.095 | 0.145 |

| **Panel B** | **CAR [0,1]** | | | | | |
|---|---|---|---|---|---|---|
| *Interaction measure:* | *New CEO* | *CEO tenure* | *Founder chair* | *Chair former CEO* | *Independent chair* | *Independence ratio* |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| CEO can focus on management | -0.0043 | 0.0037 | -0.0064 | -0.0086 | 0.0108 | 0.0901** |
| | (-0.71) | (0.53) | (-0.99) | (-1.06) | (1.62) | (2.33) |
| **CEO can focus on management*** | **0.0192*** | **-0.0011** | **0.0300***** | **0.0209*** | **-0.0185*** | **-0.1108**** |
| **Interaction measure** | **(1.69)** | **(-1.32)** | **(2.97)** | **(1.96)** | **(-1.73)** | **(-2.21)** |
| Interaction measure | 0.0028 | 0.0007* | -0.0009 | -0.0062 | 0.0031 | 0.0195 |
| | (0.54) | (1.72) | (-0.22) | (-1.31) | (0.63) | (0.85) |
| Other reasons | Yes | Yes | Yes | Yes | Yes | Yes |
| Other controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Proxy statement controls (9) | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 165 | 165 | 165 | 165 | 165 | 165 |
| R-squared | 0.114 | 0.091 | 0.133 | 0.112 | 0.104 | 0.120 |

The third most important reason for a separate leadership structure is the possibility to allow the CEO to fully concentrate on managing the day-to-day operations of the company. Being able to focus on managing the company can be particularly beneficial if the CEO just entered the corner office or if the firm is larger and likely more difficult to manage. In contrast, the benefits might be less pronounced for firms operating in more dynamic and more rapidly changing business environments. Table 4.11 provides the results of the analysis of heterogeneity in investors' stock market reactions to the leadership rationale "*CEO can focus on management*".

In general support of the previous hypothesis, the first three columns of Panel A of Table 4.11 show negative but insignificant coefficients for the interaction terms with high-tech and growth-oriented companies. The results, however, suggest that investors' reaction to the disclosure of the leadership reason "*CEO can focus on management*" seems to depend less on the economic environment of the firm. However, and consistent with the hypothesis for firm size and firm complexity, we find that smaller firms are on average associated with negative abnormal returns while larger and more mature firms typically experience significant, positive stock market reactions (see column (4) to column (6) of Panel A). Overall, the findings complement the negative interaction effects for the interactions with firm size and firm age with the leadership rationale "*Unified leadership*" for a combined leadership structure shown in Section 4.3.3.1 very well.

Allowing the CEO to focus on management likely necessitates to have a chairman or other directors on the board who possess in-depth knowledge about and experience with the company. It might be particularly valuable to have individuals on the board who are able to provide advice and managerial support to the CEO rather than having more independent and likely more critical directors who are potentially more engaged in scrutinizing and impeding

managerial actions. Panel B of Table 4.11 shows that shareholders indeed react positively to the disclosure of "*CEO can focus on management*", particularly for recently appointed CEOs (see column (1)), and if the chairman is the founder or a former CEO of the company (see columns (3) and (4)). Consistently, stock market reactions are found to be negative if the firms has already higher governance standards in place, i.e., if the chairman is an independent director or board independence is high (see column (5) and (6)).

In a last step of the analysis of two-abnormal returns, we address the question whether investor reactions to the disclosure of the rationale "*Chair's experience with the company*" vary depending on the actual experience and knowledge of the chairman with the company. We use the chairperson's founder status, the classification as a former company CEO and the non-independence status as proxies for potential in-depth knowledge and experience with the company.[57] In column (1) to column (3) of Table 4.12, we rerun the baseline regression from column (1) of Table 4.8 separately for the subsamples of founder chairmen, former company CEOs and non-independent chairmen. Throughout all three subsample regressions for proxies of in-depth knowledge and experience with the company, we find that the leadership rationale "*Chair's experience with company*" is positively related with two-day abnormal returns. Finally, using the interaction term of the leadership rationale with the indicator variable *Independent chair* reveals substantial differences in stock market reactions between independent and non-independent chairs. Firms with a non-independent chairman experience positive abnormal returns while firms with an independent chairman face negative stock market reactions indicating that investors seem to assess the disclosure of the rationale "*Chair's experience with company*" based on the chair's actual experience with the company.

[57] Non-independent directors are usually inside directors who are employed by the company, or outside non-independent directors who have material relationship with company either directly or as a partner, shareholder or officer of the company that has a relationship with the company.

**Table 4.12: Separate leadership structure - Heterogeneous stock market reactions to "Chair's experience with the company"**

This table presents heterogeneous stock market effects of two-day cumulative abnormal stock returns (*CAR [0,1])* to equity holders following the disclosure of the leadership reason "*Chair's experience with the company*" for the sample of 165 firms with a separate leadership structure. Column (1), (2) and (3) present regression results for subsamples where the chairman is either the company's founder, a former CEO of the company, or classified as non-independent chairman. The regression results in column (4) are obtained by adding an interaction term of the indicator variable *Independent chair* and the leadership rationale "*Chair's experience with the company*" to the regression specification shown in column (1) of Table 8. *Independent chair* is an indicator variable that equals one if the chairman of the board is an independent director, zero otherwise. Control variables are identical to those shown in Table 4.8. The nine proxy statement control variables are dummy variables that equal one if certain corporate governance events, described more fully in the text, are reported in the proxy statement. An intercept is included in all regressions, but not reported. Robust t-statistics are reported in parentheses below the regression coefficient. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | **CAR [0,1]** | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Subsample:* | Founder chair | Chair former company CEO | Non-independent chair | |
| *Interaction measure:* | | | | Independent chair |
| **Chair's experience with company** | **0.0184*** | **0.0134*** | **0.0131*** | **0.0126**** |
| | **(1.83)** | **(1.99)** | **(1.96)** | **(2.09)** |
| **Chair's experience with company* Interaction measure** | | | | **-0.0250**** |
| | | | | **(-2.43)** |
| **Interaction measure** | | | | **0.0012** |
| | | | | **(0.24)** |
| Other reasons | Yes | Yes | Yes | Yes |
| Other controls | Yes | Yes | Yes | Yes |
| Proxy statement controls (9) | Yes | Yes | Yes | Yes |
| Observations | 31 | 78 | 82 | 165 |
| R-squared | 0.674 | 0.197 | 0.176 | 0.094 |

### 4.3.4. Analysis of textual similarity of sections on board leadership structure

Shareholder reactions to firms' leadership rationales as well as disclosures of leadership structure reasons of other companies might encourage firms to adjust their sections on board leadership structure over time. Firms might either change the wording of the disclosed section on board leadership or even substitute certain leadership rationales that are likely perceived less favorably by shareholders and financial markets. To address this question, we study the determinants of textual similarity of the sample firms' 2010 sections on board leadership and the following sections that are disclosed in the firms' 2011 proxy statements.

We extract the following year sections on board leadership structure from the sample firms' 2011 proxy statement and calculate scores of textual similarity for each pair of a firm's sections on board leadership structure using the Ratcliff and Obershelp (1988) algorithm for pattern recognition and textual similarity.[58] The algorithm generates similarity scores (*Text similarity*) between zero and one, where larger values indicate higher textual similarity between both sections of a firm.[59] We run Tobit regressions of *Text similarity* on the five most frequently stated leadership reasons, textual sentiment measures for positive and negative tone, and a set of additional potential other determinants related to firm, governance, CEO, or chairman characteristics. Table 4.13 and Table 4.14 present the regression results separately for each type of board leadership structure.

As CEO turnover likely affects the disclosed text of firms' sections on board leadership structure, the second column of each table contains estimates for the respective subsets of firms where the same individual is serving as the company's CEO in both years 2010 and 2011.

[58] Due to merger and acquisition activities of our sample firms during the fiscal year 2010, we are only able to access the proxy statements for 276 firms with a combined leadership structure and for 162 firms with a separate leadership structure.
[59] For detailed information on the algorithm see footnote 42 in Section 4.2.2.

First, results in Table 4.13 for the sample of combined leadership firms yield insignificant estimates for almost all of the five leadership structure rationales. We only find that firms stating that the combined leadership structure contributes to an efficient and effective board are associated with higher textual similarity and hence fewer textual adjustments in their sections on board leadership structure. The analysis further reveals that dual leadership firms with larger boards also tend to be more persistent in their wording of the sections on board leadership structure. Further, we find female CEOs as well as larger firms to be associated with lower textual similarity over time. Most interestingly, the results also indicate that sections with more negative sentiment as well as sections disclosed by firms which have been targeted by shareholder proposals calling for an independent chairman in 2010 show lower textual persistence and are more likely to be rephrased. In line with expectations, CEO replacements are found to affect textual similarity of sections on board leadership structure negatively.

**Table 4.13: Combined leadership structure - Text similarity of 2010 and 2011 sections on board leadership structure**

The table presents Tobit regression results of *Text similarity* on the five most frequently used leadership reasons and additional CEO, firm and governance controls for firms with a combined leadership structure. *Text similarity* is the similarity of each firm's texts on board leadership structure disclosed in the 2010 and the following 2011 proxy statement. The sample consists of 276 sample firms with a combined leadership structure and available 2011 proxy statement section on board leadership structure. *Text similarity* is calculated using the Ratcliff and Obershelp (1988) algorithm for pattern matching. The algorithm returns similarity scores of two strings between zero and one. Higher values indicate higher textual similarity. *New $CEO_{2011}$* is an indicator variable that equals one if the company's CEO changed compared to the previous year, zero otherwise. In column (2), the sample consists of all firms where the same individual serves as the company's CEO for the year 2010 and 2011, i.e., indicator variable *New $CEO_{2011}$* equals zero. "*Other reason stated*" is an indicator variable set to one if the company stated at least one reason beyond the five most frequent ones. An intercept is included in all regressions, but not reported. Robust t-statistics are reported in parentheses below the regression coefficient. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

**Table 4.13: Combined leadership structure - Text similarity of 2010 and 2011 sections on board leadership structure (cont'd)**

| | **Text similarity$_{2010_2011}$** | |
|---|---|---|
| | (1) | (2) |
| **Unified leadership** | **0.0010** | **0.0031** |
| | **(0.03)** | **(0.08)** |
| **Knowledge as CEO** | **0.0267** | **0.0283** |
| | **(0.71)** | **(0.72)** |
| **Bridge between management and board** | **0.0044** | **0.0062** |
| | **(0.10)** | **(0.13)** |
| **Leadership structure has served well** | **0.0241** | **0.0040** |
| | **(0.54)** | **(0.09)** |
| **Efficiency and effectiveness of board** | **0.1195**** | **0.1910***** |
| | **(2.33)** | **(3.77)** |
| **Other reason stated** | **-0.0590** | **-0.0349** |
| | **(-1.61)** | **(-0.88)** |
| Negative tone | -5.4887** | -4.2788 |
| | (-2.13) | (-1.65) |
| Positive tone | 0.9107 | 1.6502 |
| | (0.62) | (1.05) |
| CEO age | -0.0003 | -0.0017 |
| | (-0.07) | (-0.47) |
| CEO gender | -0.2503** | -0.2481** |
| | (-2.400) | (-2.24) |
| CEO tenure | -0.0045 | -0.0017 |
| | (-1.23) | (-0.39) |
| Founder CEO | -0.0616 | -0.0320 |
| | (-0.81) | (-0.39) |
| New CEO$_{2011}$ | -0.4302*** | |
| | (-8.59) | |
| Board size | 0.1688* | 0.2402** |
| | (1.65) | (2.26) |
| Independence ratio | -0.0789 | 0.0381 |
| | (-0.33) | (0.15) |
| Staggered board | -0.0208 | 0.0081 |
| | (-0.59) | (0.21) |
| ln(Total assets) | -0.0553*** | -0.0652*** |
| | (-3.36) | (-3.75) |
| Prior year BHR | -0.0290 | -0.0198 |
| | (-1.32) | (-0.82) |
| Independent chair proposal$_{2010}$ | -0.1177** | -0.1088* |
| | (-2.01) | (-1.78) |
| Regulated industry | 0.0508 | 0.0372 |
| | (1.25) | (0.84) |
| Tech firm | 0.0566 | 0.1238* |
| | (0.96) | (1.84) |
| Observations | 276 | 243 |
| Log likelihood | -72.75 | -66.89 |

Second, turning to the results of textual similarity for firms with a separate leadership structure presented in Table 4.14, we find that disclosing rationales for separating the roles consistent with agency theory, i.e., "*Difference between task/roles*" or "*Facilitates monitoring*" is typically associated with higher textual similarity and higher persistence in the disclosed sections. Further, stating any other reason beside one of the five most frequent rationales as well as texts with higher negative sentiment are associated lower textual similarity and more likely to be subject to change over time.

**Table 4.14: Separate leadership structure - Text similarity of 2010 and 2011 sections board leadership structure**

The table presents Tobit regression results of *Text similarity* on the five most frequently used leadership reasons and additional CEO, firm and governance controls for firms with a separate leadership structure. *Text similarity* is the similarity of each firm's texts on board leadership structure disclosed in the 2010 and the following 2011 proxy statement. The sample consists of 162 sample firms with a separate leadership structure and available 2011 proxy statement section on board leadership structure. *Text similarity* is calculated using the Ratcliff and Obershelp (1988) algorithm for pattern matching. The algorithm returns similarity scores of two strings between zero and one. Higher values indicate higher textual similarity. *New $CEO_{2011}$* is an indicator variable that equals one if the company's CEO changed compared to the previous year, zero otherwise. In column (2), the sample consists of all firms where the same individual serves as the company's CEO for the year 2010 and 2011, i.e., indicator variable *New $CEO_{2011}$* equals zero. "*Other reason stated*" is an indicator variable set to one if the company stated at least one reason beyond the five most frequent ones. An intercept is included in all regressions, but not reported. Robust t-statistics are reported in parentheses below the regression coefficient. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

**Table 4.14: Separate leadership structure - Text similarity of 2010 and 2011 sections board leadership structure (cont'd)**

| | Text similarity$_{2010_2011}$ | |
|---|---|---|
| | (1) | (2) |
| **Differences between tasks/roles** | **0.0940** | **0.1198**** |
| | **(1.65)** | **(2.13)** |
| **Facilitates monitoring** | **0.1223*** | **0.1320**** |
| | **(1.85)** | **(2.00)** |
| **CEO can focus on management** | **-0.0697** | **-0.0534** |
| | **(-1.09)** | **(-0.86)** |
| **Chair's experience with company** | **0.0266** | **0.0402** |
| | **(0.44)** | **(0.64)** |
| **No reason stated** | **-0.0615** | **-0.0515** |
| | **(-0.64)** | **(-0.53)** |
| **Other reason stated** | **-0.1394***** | **-0.1611***** |
| | **(-2.62)** | **(-3.02)** |
| Negative tone | -12.9350*** | -13.1468*** |
| | (-2.94) | (-2.94) |
| Positive tone | -0.4709 | -0.5259 |
| | (-0.23) | (-0.25) |
| CEO age | -0.0080* | -0.0076* |
| | (-1.85) | (-1.70) |
| CEO gender | 0.2045* | 0.0871 |
| | (1.93) | (1.14) |
| CEO tenure | 0.0124* | 0.0070 |
| | (1.67) | (0.98) |
| Founder CEO | -0.1872 | -0.2130* |
| | (-1.60) | (-1.70) |
| New CEO$_{2011}$ | -0.1293 | |
| | (-1.17) | |
| Board size | 0.0461 | 0.0755 |
| | (0.39) | (0.64) |
| Independence ratio | -0.2176 | -0.2665 |
| | (-0.99) | (-1.21) |
| Staggered board | 0.0574 | 0.0866* |
| | (1.12) | (1.69) |
| ln(Total assets) | -0.0038 | -0.0070 |
| | (-0.13) | (-0.23) |
| Prior year BHR | 0.0005 | -0.0064 |
| | (0.01) | (-0.18) |
| Independent chair proposal$_{2010}$ | -0.0642 | -0.0458 |
| | (-0.30) | (-0.21) |
| Regulated industry | -0.0243 | -0.0265 |
| | (-0.39) | (-0.42) |
| Tech firm | -0.0194 | -0.0406 |
| | (-0.31) | (-0.64) |
| Observations | 162 | 151 |
| Log likelihood | -46.26 | -40.60 |

Overall, we find that none of the estimates of the major board leadership structure rationales for both leadership types is negatively related to textual similarity. We take this as evidence that certain leadership rationales do not seem to encourage firms to revise their disclosed section on board leadership structure to strategically avoid or replace certain leadership rationales. In unreported regressions, we find no empirical evidence that neither two-day abnormal returns at the time of the first reason disclosure nor that cross-sectional heterogeneity with respect to the leadership structure rationales seems to affect textual similarity of firms' sections on board leadership structure. For the sample of firms with a separate leadership structure, we also find no indication that textual similarity is related to individual characteristics of the chairman. Finally, restricting the sample to early disclosing firms does not change the findings and results presented in Table 4.13 and Table 4.14.

## 4.4. Conclusion

This chapter of the dissertation proposes a novel approach to study optimal board leadership structure decisions of public corporations. Using the 2009 change in the SEC regulation which requires firms to disclose the rationales why firms have decided to combine or separate the positions of the chief executive officer and the chairman, the chapter provides valuable insights from endogenous, yet unobserved rationales for board leadership structure decisions of corporate boards of S&P500 companies.

We document that firms that combine the CEO and chairman position state more leadership rationales than firms with a separate leadership structure. The empirical results from the analysis of the two-day abnormal returns to equity holders suggest that the majority of disclosed reasons are informative for investors (as proposed by the SEC) and that market participants care about the so-far unobserved motives of board leadership structure choices. Most importantly, the empirical evidence on heterogeneity in stock market reactions to the

disclosure of individual leadership structure rationales indicates that investors seem to evaluate the rationales for the unification or separation of the CEO and chairman positions conditional on the specific circumstances and characteristics of the firm. Furthermore, the analysis reveals that stock market reactions of investors are largely consistent with the concept of potential benefits and costs associated with each type of board leadership structure, as suggested by agency and organization theories.

The analysis of textual similarity of firms' the current and following year sections on board leadership structure suggests that board leadership sections are largely persistent over time and do not seem to be actively change to avoid specific leadership rationales that are likely perceived less favorably by market participants. Hence, we do not find evidence for opportunistic or strategic disclosure of leadership rationales by firms.

Overall, the chapter provides a significant contribution regarding the endogenous choice of board leadership structure of public firms, particularly against the backdrop of a highly controversial discussion and the question as to why firms grant their CEOs structural power via a dual leadership role. Finally, the chapter provides evidence regarding the research question whether the rationales of corporate boards for their choice of leadership structure actually matter for corporate shareholders and whether the disclosed rationales constitute valuable information regarding the firm's governance structure.

# Chapter 5 – Conclusion and Outlook

A significant part of the literature in corporate governance and corporate leadership builds on the non-dynamic and rather dichotomous conception that certain governance mechanisms are either always beneficial or detrimental for corporate performance. So far, dynamic situations and interdependences as caused, for example, by sudden major shocks to the economic environment, dynamics in and interactions with the business environment or effects due to the evolution of managers over time have largely been neglected in the literature. In this context, this dissertation contributes to the recent strand of the literature on corporate governance and corporate leadership and helps to improve the understanding of how different forms of dynamics in a nonstationary world can interact with and alter the effects of governance and corporate leadership structures.

Chapter 2 of the dissertation provides new insights on the interaction and relation between the CEO and chairman. Substantial age dissimilarity between the two leads to more intense board monitoring and higher firm value, particular for firms with greater monitoring needs. However, the positive effect of substantial age dissimilarity significantly changes after the economic shock of the 2007 financial crisis. During the crisis, firms with substantial age dissimilarity between the CEO and the chairman experience a stronger decline and destruction in firm value which cancels out the positive effect during the non-crisis years. The findings of the chapter contribute to the limited literature about the effects of the chair's characteristics and to the emerging literature on the effects of (dis)similarities between the CEO and the board of directors. Further, the chapter provides evidence that this relationship matters for the board's monitoring intensity and firm value. It shows specifically that the relationship is significantly affected by the demographic characteristics, in particular age. Most importantly, the chapter

documents that firms should mind the age gap as substantial age dissimilarity can have severe adverse effects during economic recessions.

Chapter 3 studies how the impact of CEOs on the valuation of the firm they run changes over their time in office. The chapter investigates the external (environmental) determinants that dynamically render CEOs more or less valuable to the firm. The chapter documents that on average firm performance exhibits a hump-shaped relation over the CEO's tenure. Most importantly, the tenure-performance relation is found to vary substantially depending on the dynamics of the industry environment of the firm, the economic business cycle and the exogenous conditions of the market for corporate control. The chapter further shows that the CEOs' ability to adapt to mitigate the continuously declining CEO-firm match over time might help to overcome the negative effects on firm performance - particularly in the later years of the tenure. Overall, the findings suggest that a significant fraction of long-tenured CEOs constitute suboptimal matches for their firms and that boards have trouble replacing their CEOs particularly due to increasing entrenchment over time. The chapter's results help explain why even good performing CEOs can be associated with declining firm value after some point in time as the economic environment changes over time (see Appendix 3.A).

Finally, Chapter 4 of the dissertation presents a novel approach to study optimal board leadership structure decisions of public corporations using a 2009 regulatory disclosure reform by the SEC which required firms to reveal the yet unobserved rationales behind their decision to combine or separate the CEO and chairman position. The empirical results from the analysis of the two-day abnormal returns reveals that investors' stock market reactions are contingent on the context and circumstances of the firm, and largely consistent with agency and organizational theory arguments. Particularly, the empirical results suggest that the dynamics of the business environment affect investors' reaction to the rationales for the firms' board

leadership structure decisions. If firms operate in likely more (less) dynamic business environments, stock market reactions tend to be more positive (negative) for firms that combine the CEO and chairman position. By systematically identifying the firms' leadership rationales and the analysis of investors' stock reactions, a form of feedback from corporate shareholders, this chapter of the dissertation provides valuable insights on the qualitative determinants of board leadership structure decisions of corporate boards and how investors value the disclosed reasoning. The latter further allows for more sophisticated assessment of the firms' choice of board leadership structure.

The findings of the three chapters of this dissertation indicate that environmental dynamics and dynamic interactions are important factors in the determination and assessment of optimal governance and leadership structures. Specifically, dynamic changes can induce significant variation in how governance and leadership structures affect corporate performance over time. Even if the firm's business environment might change only little, macroeconomic shocks can lead to severe changes in the effect of governance and leadership mechanisms. Overall, the results are to some degree contrary to recent developments in the regulatory requirements of corporate governance codes that frequently call for mandatory age and term limits for executives and directors or for a mandatory separation of leadership positions. Hence, the results of the dissertation suggest that a static "one size fits all" cure regarding corporate governance might be inappropriate and suboptimal for some firms because static and inflexible regulatory actions can prevent firms from selecting optimal board composition or leadership structures over time. The dissertation particularly indicates that boards should have the flexibility to pro-actively select governance and leadership structures according to the firms' future needs and should put less emphasis on historic performance and economic conditions as governance structures are long-term oriented and might not be as quickly adaptable as the economic environment might change.

Building upon the research questions and the main findings of this dissertation, several related interesting aspects for future research might arise: First, given that substantial age dissimilarity between the CEO and the chairman is associated with enhanced monitoring and better governance (see Chapter 2), further research might investigate whether and how age dissimilarity affects corporate risk taking, managerial compensation, corporate investment behavior or the innovativeness of firms. Research might also address the question whether the relation of substantial age dissimilarity varies with the dynamics across business environments.

Second, based on the findings of Chapter 3, further research might investigate whether the tenure-performance relation varies across other CEO types? Do professional CEOs of family firms exhibit a similar tenure-performance relation given that CEO entrenchment is expected to be less pronounced and hardly possible in family businesses? Are there differences across the characteristics of general managerial ability of CEOs that are more or less important for their ability to adapt to changes in the economic environment?

Finally, related to the analysis of Chapter 4, future research might focus on whether and how the rationales for board leadership structure decisions change over time. Particularly, how does the company's reasoning change after the announcement of changes in one of the two leadership positions, i.e., after the appointment of a new CEO or a new chairman. Do the disclosed leadership rationales on the choice of board leadership structure depend on the type of turnover of the previous CEO? Are rationales more related to agency theory subsequent a forced CEO turnover or are firms even more likely to split the roles following forced turnover of a dual leadership CEO?

Answering the above questions would extend and improve the understanding of the research questions addressed in this dissertation.

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# Appendices

## Appendix 2.A: Definition of variables

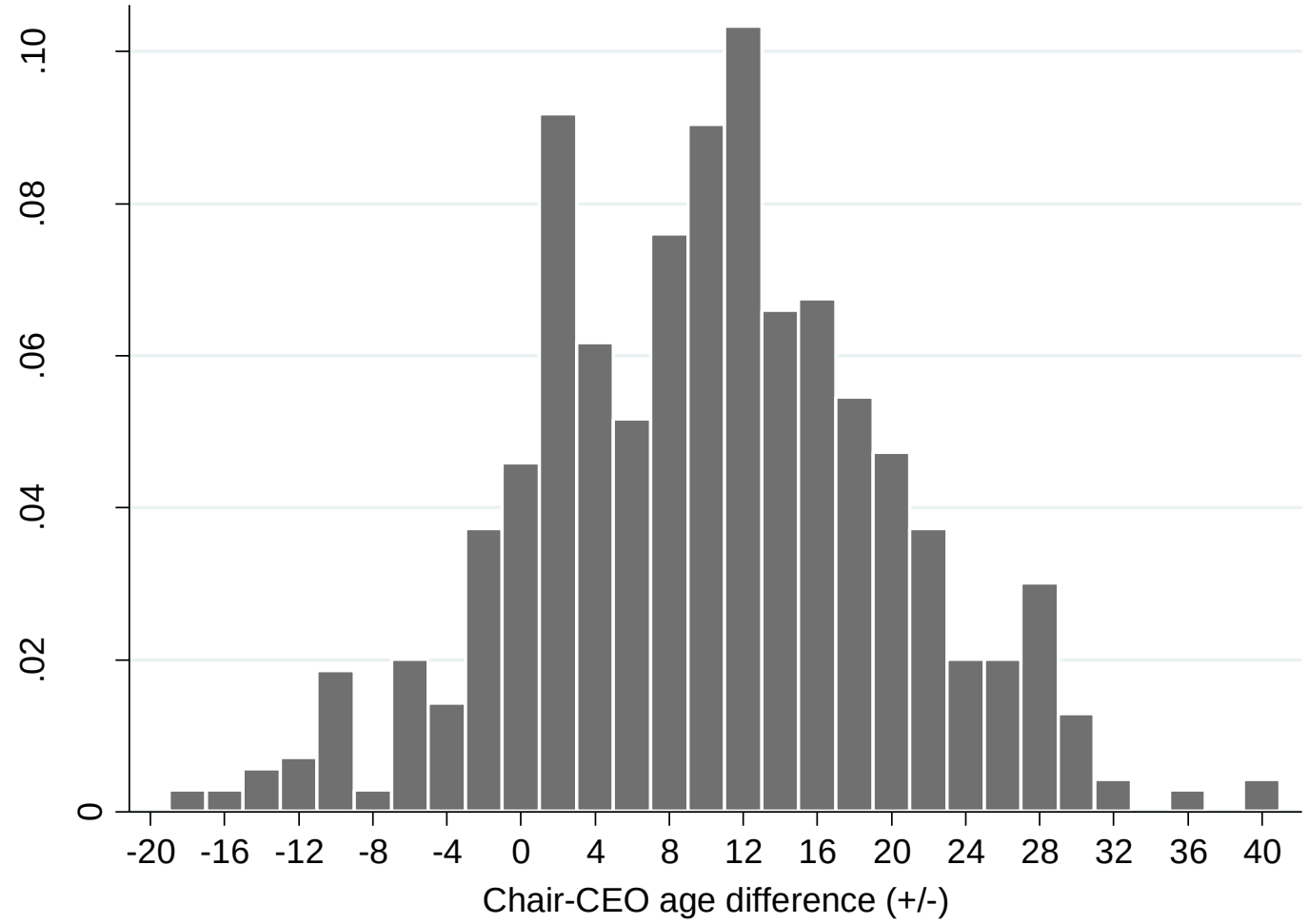
| Variable | Definition |
|---|---|
| ***Dependent variables*** | |
| Board meetings | The number of ordinary and extraordinary board meetings as well as the number of video and telephone conferences held by the supervisory board during the fiscal year. Meetings are reported in the firms' annual reports. |
| ROA | Earnings before interest, tax, depreciation and amortization (EBITDA) divided by the book value of total assets. |
| Tobin's Q | The firm's market value to its replacement costs approximated by the market capitalization plus the difference between the book value of total assets and the book value of equity, all divided by the book value of total assets. |
| ***Age characteristics*** | |
| CEO age | The natural logarithm of the age of the firm's chief executive officer (CEO). |
| Chair-CEO age difference (+/-) | The age difference (in years) between the chair of the supervisory board and the CEO calculated as chair age minus CEO age. |
| Chair-CEO age difference absolute | The absolute value of the age difference (in years) between the chair of the supervisory board and the CEO. |
| Chair age | The natural logarithm of the age of the supervisory board's chair. |
| Gap20 chair-CEO | Dummy variable that takes a value of one if the age difference between the chair of the supervisory board and the CEO and is at least 20 years, and zero otherwise. This dummy variable measures a generational gap, as reflected by an age difference of at least 20 years as suggested by Strauss and Howe (1997). |
| Squared chair-CEO age difference | The squared age difference between the CEO and the chair of the supervisory board. |
| ***Other chair-CEO dissimilarities*** | |
| Chair-CEO different education | Dummy variable that is set to one if the chair of the supervisory board and the CEO do not have the same education (law, economics, else), and zero otherwise. |
| Chair-CEO different gender | Dummy variable that is set to one if the chair of the supervisory board and the CEO have a different gender, and zero otherwise. |
| Chair-CEO different nationality | Dummy variable that is set to one if the chair of the supervisory board and the CEO have different nationalities, and zero otherwise. |
| Chair-CEO joint tenure | The number of years the chair of the supervisory board and the CEO have been working together in these positions. |
| Chair-CEO same family | Dummy variable that is set to one if the chair of the supervisory board and the CEO are from the same family. |
| ***CEO characteristics*** | |
| CEO change | Dummy variable set to one for years when there is a CEO change. |
| CEO tenure | The number of years the CEO has been serving as the CEO of the firm. |
| Founder CEO | Dummy variable set to one if the CEO is the founder of the firm, and zero otherwise. |
| ***Chair characteristics*** | |
| Busy chair | Dummy variable that takes a value of one if the chair of the supervisory board holds three or more directorships, and zero otherwise. |
| Chair change | Dummy variable set to one if either the firm's chair of the supervisory board takes office in a given year. |
| Chair tenure | The number of years the chair has been serving as the chair of the supervisory board. |
| Chair is former firm CEO | Dummy variable that takes the value of one if the chair of the supervisory board is the firm's former CEO, zero otherwise. |
| Chair is former firm executive | Dummy variable that takes the value of one if chair of the supervisory board is a former member of the firm's management board, and zero otherwise. |
| Founder chair | Dummy variable set to one if the chair of the supervisory board is the founder of the company, and zero otherwise. |

## Appendix 2.A: Definition of variables (cont'd)

| | |
|---|---|
| ***Supervisory board characteristics*** | |
| Board age | The average age of all the shareholder representatives on the supervisory board. |
| Board size | The total number of members on the supervisory board. |
| Busy board | Dummy variable that takes the value of one if at least 50% of the shareholder representatives hold three or more directorships, and zero otherwise. |
| CV board age | The coefficient of variation of the supervisory board age defined as the standard deviation of the age of shareholder representatives on the supervisory board divided by the average age of shareholder representatives. |
| Avg. tenure SB members | The average tenure (in years) of all supervisory board members. Board appointment is traced back to the year 1998. |
| No. of active committees | The number of committees involving members of the supervisory board and that meet at least once a year. |
| Union representatives | The number of union representatives on the supervisory board divided by the number of employee representatives. |
| ***Management board characteristics*** | |
| CV management board age | The coefficient of variation of the management board age defined as the standard deviation of the age of the members of the management board, excluding the CEO, divided by the average age of the members of the management board, excluding the CEO. |
| Management board age | The average age of the members of the management board, excluding the CEO. |
| Management board size | The natural logarithm of the total number of members of the management board. |
| Management board tenure | The average number of years the members of the management board have been serving on the firm's management board, excluding the CEO. |
| ***Firm characteristics*** | |
| Book leverage | The firm's book value of total debt divided by the book value of total assets, both measured at the end of the fiscal year t-1. |
| Blockholder 50% | Dummy variable that takes the value of one if a single shareholder holds at least 50% of the common shares outstanding, and zero otherwise. |
| Business segments | The number of business segments reported in S&P Capital IQ that generate at least 10% of the firm's annual total revenues. |
| CapEx/TA | The firm's capital expenditures (CapEx) standardized by total assets, both measured at the end of the fiscal year t-1. |
| Family firm | Dummy variable that is set to one if the firm is a family firm according to the definition used in Anderson and Reeb (2003), and zero otherwise. |
| FCF/Sales | Free cash flow (defined as EBITDA - CapEx) divided by total sales. |
| Firm age (foundation) | The natural logarithm of the number of years since the foundation of the firm. |
| Free float | The percentage of the company's voting shares to be free float. |
| Herf. control | The Herfindahl index of all blockholders that own at least 5% of the firm's ordinary shares. |
| Intangibles assets | The firm's book value of intangible assets divided by the book value of total assets. |
| R&D/sales | The annual R&D expenditures divided by total revenue, both measured at the end of the fiscal year t-1. Missing R&D values are set to zero. |
| ROA | Earnings before interest, tax, depreciation and amortization (EBITDA) divided by the book value of total assets. |
| ROE | The firm's net income divided by the book value of equity, both measured at the end of the fiscal year t-1. |
| Sales growth | The nominal growth rate of total revenues over the past two years. |
| Stock volatility | Stock volatility is measured as the stock volatility (standard deviation) over the past two years using daily stock returns. |
| Total assets | The natural logarithm of the book value of total assets at the end of the fiscal year t-1. |

**Appendix 2.B: Histogram for Chair-CEO age difference (+/-)**

This figure shows a histogram of the age difference between the the chair of the supervisory board and the CEO for the sample of German firms listed on the DAX, MDAX or SDAX in the sample period 2005 to 2010.



## Appendix 2.C: Chair-CEO age dissimilarity and firm profitability (return on assets)

This table reports panel regression results of return on assets (*ROA*) on measures of chair-CEO age dissimilarity and additional controls for German firms listed on the DAX, MDAX, or SDAX in 2005 and 2010. *ROA* is defined as EBITDA to book value of total assets. Regressions (1) to (4) use firm-fixed effects, regression (5) uses CEO-firm fixed effects, regression (6) uses chair-firm fixed effects, and regressions (7) and (8) are dynamic panel system GMM estimations (similar to those in Table 2.9). $ROE_{t-1}$ is excluded from the set of control variables named *Firm characteristics*. All other sets of controls are as in Table 2.2. All variables are defined in Appendix 2.A. Regressions (1) to (6) use robust t-statistics (in parentheses) are based on standard errors clustered by industry (4-digit SIC codes) and year, regressions (7) and (8) use robust standard errors clustered by firm. A constant is included in all regressions, but not reported. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

## Appendix 2.C: Chair-CEO age dissimilarity and firm profitability (return on assets) (cont'd)

| | ROA | ROA | ROA | ln(ROA) | ROA | ROA | ROA | ln(ROA) |
|---|---|---|---|---|---|---|---|---|
| | **Firm-fixed effects** | | | | **CEO-firm FE** | **Chair-firm FE** | **System GMM** | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| **Gap20 chair-CEO** | **0.0439*** ** | **0.0354*** ** | | | **0.0342* ** | **0.0226** ** | **0.0787* ** | |
| | **(4.466)** | **(3.036)** | | | **(1.649)** | **(2.059)** | **(1.781)** | |
| **Chair-CEO age difference (+/-)** | | | **0.0005** | | | | | |
| | | | **(0.946)** | | | | | |
| **Squared chair-CEO age difference** | | | **0.0001*** ** | | | | | |
| | | | **(2.594)** | | | | | |
| **Chair-CEO age difference absolute** | | | | **0.0013*** ** | | | | **0.0025** ** |
| | | | | **(2.794)** | | | | **(1.987)** |
| Chair younger | | | | -0.0038 | | | | 0.0130 |
| | | | | (-0.429) | | | | (0.455) |
| CEO age | | -0.0292 | | | | | | |
| | | (-0.862) | | | | | | |
| Chair age | | 0.0582* | | | | | | |
| | | (1.774) | | | | | | |
| *Other chair-CEO characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *CEO characteristics* | Yes | Yes | Yes | Yes | CEO tenure, CEO change | Busy chair, Chair change, Chair tenure | Yes | Yes |
| *Chair characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Supervisory board characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Firm characteristics* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Number of observations | 646 | 646 | 646 | 646 | 646 | 646 | 502 | 502 |
| Fixed effects | Firm, year | Firm, year | Firm, year | Firm, year | CEO-firm, year | Chair-firm, year | Firm, year | Firm, year |
| R-squared (within) | 0.208 | 0.212 | 0.211 | 0.184 | 0.248 | 0.248 | | |
| Arellano-Bond test for AR(1) (p-value) | | | | | | | 0.001 | 0.000 |
| Arellano-Bond test for AR(2) (p-value) | | | | | | | 0.593 | 0.363 |
| Hansen test for overidentification restrictions (p-value) | | | | | | | 0.452 | 0.207 |
| Diff-in-Hansen test GMM (p-value) | | | | | | | 0.371 | 0.207 |

## Appendix 3.A – Anecdotal evidence on CEO (mis)fit over time[60]

### Microsoft

"[…] **Steve Ballmer was a strong fit for Microsoft's challenges when he was promoted to CEO in 2000.** The company's twenty years of entrepreneurial success had positioned the company to reap greater financial rewards using a more disciplined operational focus. **Ballmer effectively led this shift and saw strong revenue growth from it.** However, by the middle of the decade, Google was growing, YouTube was forming, and "operational excellence" wasn't a differentiating strategy in technology. **Ballmer had done his job, but the strategic needs of the organization had shifted. As CEO fit decreased, Ballmer's performance followed** and he was pressured out of the job in late 2013."

### Home Depot

"[…] In the late 1990's, Home Depot's rapid growth had outpaced its corporate infrastructure and was hiding serious cost management challenges. Their board hired Robert Nardelli from GE to quickly install the organizational foundation necessary to continue the company's growth and better manage costs. Nardelli's background and personality were **a perfect fit for that challenge and he delivered some of the company's most profitable years. But with the infrastructure and discipline in place, the company needed a leader who could drive innovation-based growth. No one should have expected Nardelli to transition to fit with the new challenge and profile needed, but the board didn't pro-actively change CEOs** and Nardelli suffered through a needlessly messy exit."

[60] See "Assess Your CEO's Strategic Fit Over Time", *Harvard Business Review* Blog Network, March 2014.

## Appendix 3.B: Variable definitions

| Variable | Definition |
|---|---|
| Board age | The average age of the board of directors.<br>*Source: ISS (formerly RiskMetrics)* |
| Board meetings | The number of meetings held by the board of directors over the fiscal year.<br>*Source: ExecuComp (until 2006), The Corporate Library (2007-2011), missing values hand-collected (1998-2011)* |
| Board size | Natural logarithm of the number of directors on the firm's board of directors.<br>*Source: ISS* |
| Book leverage | (Long-term debt + current liabilities)/Total assets, all at the end of the previous fiscal year.<br>*Source: Compustat* |
| Business segments | Natural logarithm of the number of business segments.<br>*Source: Compustat Segments* |
| Busy board | Indicator variable that equals one if a majority of the independent directors hold two or more additional outside directorships, zero otherwise.<br>*Source: ISS* |
| CapEx | Capital expenditures/Total assets, all at the end of the previous fiscal year.<br>*Source: Compustat* |
| CEO age | Age of the firm's CEO measured in years.<br>*Source: ExecuComp* |
| CEO gender | Indicator variable that equals one if the CEO's gender is female, zero otherwise.<br>*Source: ExecuComp* |
| CEO ownership | Percentage of shares outstanding held by the CEO, winzorized at the 1st and 99th percentiles.<br>*Source: ExecuComp, ISS* |
| CEO power index | The index is the sum of the following indicator variables: CEO ownership above median, Co-Option above median, Duality, Involved CEO, President, Only insider. The index can take on values between zero and six. |
| CEO tenure | Number of years the CEO has been serving as the firm's CEO, calculated by using the ExecuComp "BECAMECEO" variable. Missing or incorrect data is replaced by the number of years the CEO has been serving on the board as reported in ISS. CEO tenure takes the value of zero for the CEO's first year in office.<br>*Source: ExecuComp, ISS* |
| Co-Option | Fraction of directors on the board who have been appointed to the firm's board after the current CEO assumed office.<br>*Source: ISS* |
| Director ownership | Average fraction of outstanding shares held by all independent directors on the board, winzorized at the 1st and 99th percentiles.<br>*Source: ISS* |
| Divestiture | Indicator variable that equals one if the company is listed as the target of a deal labeled by the variable "ACQUISITION TECHNIQUE" as a "DIVESTITURE", zero otherwise.<br>*Source: SDC Platinum* |
| Duality | Indicator variable that equals one if the CEO is also the chairman of the board, zero otherwise.<br>*Source: ExecuComp* |
| E-Index | Entrenchment index based on six anti-takeover protection devices as proposed by Bebchuk, Cohen, and Ferrell (2009).<br>*Source: ISS Governance database* |

## Appendix 3.B: Variable definitions (cont'd)

| | |
|---|---|
| Firm age | Natural logarithm of the number of years the firm is listed in CRSP.<br>*Source: CRSP* |
| Firm risk | Standard deviation of daily stock returns during the year, all at the end of the previous fiscal year.<br>*Source: CRSP* |
| Founder CEO | Indicator variable that equals one if the CEO is the founder of the company, zero otherwise.<br>*Source: The Corporate Library (2001-2011), hand-collected (1998-2000)* |
| Independence ratio | Percentage of directors on the board classified as independent directors.<br>*Source: ISS* |
| Involved CEO | Indicator variable that equals one if (i) the board has established a nominating committee and the CEO serves as a member or (ii) if such a committee does not exist, zero otherwise.<br>*Source: ISS* |
| MTB | Market-to-book ratio of equity, all at the end of the fiscal year.<br>*Source: Compustat* |
| New CEO | Indicator variable that equals one if the firm's CEO took office in the current year, zero otherwise.<br>*Source: ExecuComp* |
| Only insider | Indicator variable that equals one if the CEO is the only inside director on the board, zero otherwise.<br>*Source: ISS* |
| Operating CF | Annual cash flow from operations/Total assets$_{t-1}$, all at the end of the previous fiscal year.<br>*Source: Compustat* |
| Outside director tenure | Average number of years the outside directors have served on the firm's board.<br>*Source: ISS* |
| President | Indicator variable that equals one if the CEO also holds the title of President of the firm, zero otherwise.<br>*Source: ExecuComp* |
| R&D | R&D expense/Total assets, all at the end of the previous fiscal year.<br>*Source: Compustat* |
| ROA | EBITDA/Total assets$_{t-1}$<br>*Source: Compustat* |
| Sales growth | Annual change in net sales divided by previous year's net sales: (Sales$_t$/Sales$_{t-1}$) - 1<br>*Source: Compustat* |
| Tobin's Q | (Total assets - Book equity + Market value of equity)/Total assets<br>*Source: Compustat* |
| Total assets | Natural logarithm of total assets at the end of the previous fiscal year.<br>*Source: Compustat* |

## Appendix 3.C: Addressing alternative non-linear relations

This table reports results from firm fixed effects regressions of *Tobin's Q* on *CEO tenure* and its squared term along with CEO, firm and corporate governance characteristics. The sample includes S&P 1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). Regression specifications (1) to (5) each address one alternative non-linear relation with firm value. Regression specification (6) contains all control variables (to address all non-linear relations) at once. All variables are defined in Appendix 3.B. Control variables are identical to those used in regression (3) of Table 3.2. Year fixed effects and an intercept are included in all regressions, but not reported. Robust t-statistics adjusted for clustering by firm are reported in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | ***Tobin's Q*** | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| **CEO tenure** | **0.0127*** | **0.0142**** | **0.0147**** | **0.0143**** | **0.0148**** | **0.0119*** |
| | **(1.943)** | **(2.385)** | **(2.465)** | **(2.370)** | **(2.439)** | **(1.893)** |
| **CEO tenure squared** | **-0.0005***** | **-0.0006***** | **-0.0006***** | **-0.0006***** | **-0.0006***** | **-0.0005***** |
| | **(-2.925)** | **(-3.600)** | **(-3.624)** | **(-3.611)** | **(-3.621)** | **(-2.856)** |
| ***Alternative non-linear relations*** | | | | | | |
| CEO age squared | -0.0003 | | | | | -0.0004 |
| | (-1.276) | | | | | (-1.354) |
| Firm age squared | | -0.0843 | | | | -0.0755 |
| | | (-1.603) | | | | (-1.426) |
| CEO power index squared | | | 0.0042 | | | 0.0035 |
| | | | (0.429) | | | (0.355) |
| Board age | | | | -0.0099 | | -0.0474 |
| | | | | (-0.096) | | (-0.446) |
| Board age squared | | | | -0.0000 | | 0.0003 |
| | | | | (-0.031) | | (0.298) |
| Outside director tenure | | | | | 0.0162 | 0.0224* |
| | | | | | (1.362) | (1.752) |
| Outside director tenure squared | | | | | -0.0010* | -0.0009* |
| | | | | | (-1.875) | (-1.733) |
| CEO characteristics | Yes | Yes | Yes | Yes | Yes | Yes |
| Governance characteristics | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm characteristics | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 12,427 | 12,427 | 12,427 | 12,427 | 12,427 | 12,427 |
| R-squared (within) | 0.299 | 0.299 | 0.299 | 0.299 | 0.300 | 0.300 |

## Appendix 3.D: Addressing further alternative explanations related to investments and incentives

This table presents results from firm fixed effects regressions of *Tobin's Q* on *CEO tenure* and its squared term along with CEO, firm and corporate governance characteristics. The sample includes S&P 1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). Additional control variables are included. *Acquisition* is a dummy variable that equals one, if the firm is identified as an acquirer within the M&A sample (not restricted to M&As of a minimum relative deal size) and has announced an acquisition during the year, zero otherwise. *Fraction of variable compensation* is calculated as total compensation (ExecuComp item "TDC1") minus salary, all divided by the total value of total compensation ("TDC1"). Values of total annual compensation before 2006 are adjusted following the methodology in Walker (2011). *Scaled wealth-performance sensitivity* is the dollar change in CEO wealth for a 100 percentage point change in firm value, divided by annual flow compensation (scaled by 1,000). The data is available on Alex Edmans's data website (http://alexedmans.com/data/). All other variables are defined in Appendix 3.B. Control variables are identical to those used in regression (3) of Table 3.2. Year fixed effects and an intercept are included in all regressions, but not reported. Robust t-statistics adjusted for clustering by firm are reported in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | ***Tobin's Q*** | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| **CEO tenure** | **0.0145**** | **0.0153**** | **0.0154**** | **0.0150**** | **0.0167**** |
| | **(2.399)** | **(2.555)** | **(2.572)** | **(2.164)** | **(2.449)** |
| **CEO tenure squared** | **-0.0006***** | **-0.0006***** | **-0.0006***** | **-0.0006***** | **-0.0006***** |
| | **(-3.604)** | **(-3.587)** | **(-3.704)** | **(-3.534)** | **(-3.586)** |
| ***Further explanations*** | | | | | |
| Acquisition | -0.0570*** | | | | -0.0581*** |
| | (-3.053) | | | | (-2.724) |
| Divestiture | 0.0106 | | | | 0.0099 |
| | (0.480) | | | | (0.408) |
| CEO ownership | | -0.5926 | | | -0.6012 |
| | | (-1.594) | | | (-1.263) |
| CEO ownership squared | | 0.1723 | | | 0.1729 |
| | | (0.779) | | | (0.642) |
| Fraction of variable compensation | | | -0.4481** | | -0.4176* |
| | | | (-2.021) | | (-1.897) |
| Fraction of variable compensation squared | | | 0.6515*** | | 0.6056*** |
| | | | (3.533) | | (3.251) |
| Scaled wealth-performance sensitivity | | | | 0.0000 | 0.0001 |
| | | | | (0.905) | (0.976) |
| Scaled wealth-performance sensitivity | | | | -0.0000 | -0.0000 |
| | | | | (-0.326) | (-0.480) |
| CEO characteristics | Yes | Yes | Yes | Yes | Yes |
| Governance characteristics | Yes | Yes | Yes | Yes | Yes |
| Firm characteristics | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Observations | 12,427 | 12,427 | 12,363 | 10,399 | 10,340 |
| R-squared (within) | 0.300 | 0.300 | 0.303 | 0.287 | 0.292 |

## Appendix 3.E: Firm value peak point

This table presents regression results of *Tobin's Q* on the dummy variable *CEO tenure plateau [11-13]* along with CEO, firm and corporate governance characteristics. The sample includes S&P 1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). The variable *CEO tenure plateau [11-13]* is an indicator variable that takes the value of one if CEO tenure is between 11 and 13 years, zero otherwise. Column (1) presents results from firm fixed effects estimations, while results shown in column (2) are based on CEO-firm fixed effects estimations. Control variables are identical to those used in specification (3) of Table 3.2. All variables are defined in Appendix 3.B. An intercept and year fixed effects are included in all regressions, but not reported. Robust t-statistics reported in parentheses in column (1) are adjusted for clustering by firm. Robust t-statistics reported in parentheses in column (2) are adjusted for clustering by CEO-firm pair. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | ***Tobin's Q*** | |
|---|---|---|
| | (1) | (2) |
| **CEO tenure plateau [11-13]** | **0.0804**** | **0.0709**** |
| | **(2.101)** | **(2.072)** |
| ***CEO characteristics*** | | |
| CEO age | 0.0011 | -0.3119 |
| | (0.519) | (-0.398) |
| CEO gender | 0.0303 | _ |
| | (0.347) | |
| CEO power index | -0.0131 | -0.0115 |
| | (-0.884) | (-0.803) |
| Founder CEO | 0.3620** | _ |
| | (2.349) | |
| ***Governance characteristics*** | | |
| Board size | -0.2642*** | -0.1335 |
| | (-2.740) | (-1.542) |
| Busy board | -0.0543* | -0.0253 |
| | (-1.749) | (-0.838) |
| Director ownership | -3.1440 | -2.1946 |
| | (-1.412) | (-0.961) |
| E-index | 0.0170 | 0.0056 |
| | (1.050) | (0.343) |
| Independence ratio | -0.0298 | 0.0739 |
| | (-0.226) | (0.660) |
| Firm characteristics | Yes | Yes |
| Firm fixed effects | Yes | No |
| CEO-firm fixed effects | No | Yes |
| Year fixed effects | Yes | Yes |
| Observations | 12,427 | 12,427 |
| R-squared (within) | 0.300 | 0.265 |

## Appendix 3.F: Return on assets (ROA) as an alternative measure of firm performance

This table presents results from fixed effects regressions of return on assets (*ROA)* on *CEO tenure* and its squared term along with CEO, firm, and corporate governance characteristics. The sample includes S&P 1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). *ROA* is calculated as earnings before interest expense, taxes, depreciation and amortization (EBITDA) divided by the book value of total assets at the end of the previous year and is winsorized at the 1st and 99th percentiles. Results shown in specification (1) stem from a firm fixed effects regression. Results shown in specification (2) are based on a regression including CEO-firm fixed effects and the use of the natural logarithm of *CEO age* instead of *CEO age*. Control variables are identical to those used in regression (3) of Table 3.2. All variables are defined in Appendix 3.B. An intercept, year fixed effects and interacted year and industry (based on Fama French 48 industries) fixed effects are included in all regressions, but not reported. Robust t-statistics reported in parentheses in specification (1) are adjusted for clustering by firm. Robust t-statistics reported in parentheses in specification (2) are adjusted for clustering by CEO-firm pair. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | ***ROA*** | |
|---|---|---|
| | (1) | (2) |
| **CEO tenure** | **0.0010**** | **0.0019**** |
| | **(2.547)** | **(2.438)** |
| **CEO tenure squared** | **-0.00003**** | **-0.00007***** |
| | **(-2.036)** | **(-3.218)** |
| ***CEO characteristics*** | | |
| CEO age | -0.0002 | 0.1246* |
| | (-0.808) | (1.849) |
| CEO gender | 0.0003 | – |
| | (0.035) | |
| CEO power index | -0.0014 | -0.0026*** |
| | (-1.559) | (-2.586) |
| Founder CEO | 0.0115* | – |
| | (1.801) | |
| ***Governance characteristics*** | | |
| Board size | 0.0156** | 0.0149** |
| | (2.433) | (1.968) |
| Busy board | -0.0013 | -0.0001 |
| | (-0.618) | (-0.063) |
| Director ownership | -0.4198** | -0.5484*** |
| | (-2.026) | (-2.618) |
| E-index | -0.0010 | -0.0021* |
| | (-0.947) | (-1.736) |
| Independence ratio | -0.0055 | -0.0089 |
| | (-0.594) | (-0.861) |
| Firm characteristics | Yes | Yes |
| Firm fixed effects | Yes | No |
| CEO-firm fixed effects | No | Yes |
| Industry*Year fixed effects | Yes | Yes |
| Year fixed effects | Yes | Yes |
| Observations | 12,400 | 12,400 |
| R-squared (within) | 0.457 | 0.451 |

## Appendix 3.G: Outside CEOs and the relation between firm value and CEO tenure

This table reports results from firm fixed effects regressions of *Tobin's Q* on *CEO tenure* and its squared term or the natural logarithm of *CEO tenure* (denoted *ln(CEO tenure)*) along with CEO, firm and corporate governance characteristics for outside CEOs. The sample includes S&P 1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). *Outside CEO* is an indicator variable that takes the value of one if the CEO is not classified as an inside CEO according to the definition of Bebchuk, Cremers, and Peyer (2011), zero otherwise. Accordingly, a CEO is considered an insider if the CEO joined the company more than a year before becoming CEO, or if the CEO is classified as the founder of the company (*Founder CEO*), or if the ExecuComp data item "JOINED_CO" is missing. Specification (1) shows regression results with interaction effects for Outside CEOs. Specifications (2) and (3) show regression results for the sample of *Outside CEOs*. Specification (2) uses *CEO tenure* and its squared term as the functional form for the relation between *CEO tenure* and *Tobin's Q*, while specification (3) uses *ln(CEO tenure).* All other variables are defined in Appendix 3.B. Control variables are identical to those used in specification (3) of Table 3.2. An intercept and year fixed effects are included in all regressions, but not reported. Robust t-statistics adjusted for clustering by firm are reported in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

| | ***Tobin's Q*** | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| | *All CEOs* | *Outside CEOs* | |
| **ln(CEO tenure)** | | | **0.1095*** |
| | | | **(1.867)** |
| **CEO tenure** | **0.0158*** | **0.0128** | |
| | **(1.900)** | **(0.570)** | |
| **CEO tenure squared** | **-0.0007***** | **0.0006** | |
| | **(-3.095)** | **(0.664)** | |
| **CEO tenure * Outside CEO** | **-0.0157** | | |
| | **(-1.114)** | | |
| **CEO tenure squared * Outside CEO** | **0.0011**** | | |
| | **(2.246)** | | |
| Outside CEO | 0.0160 | | |
| | (0.198) | | |
| Generalist CEO | -0.0218 | 0.0225 | 0.0058 |
| | (-0.658) | (0.258) | (0.067) |
| CEO characteristics | Yes | Yes | Yes |
| Governance characteristics | Yes | Yes | Yes |
| Firm characteristics | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes |
| Observations | 10,234 | 1,812 | 1,812 |
| R-squared (within) | 0.288 | 0.190 | 0.190 |
| ***Test of linear hypothesis*** | | | |
| (CEO tenure squared + | | | |
| CEO tenure squared * Outside CEO = 0) | | | |
| F-statistic | 0.82 | | |
| Prob. > F-statistic | 0.365 | | |

## Appendix 4.A: Combined leadership structure: List of individual leadership reasons

This table contains the complete list of 24 distinct leadership reasons disclosed by the 282 sample firms with a combined leadership structure. Reasons are listed in descending order by frequency of use.

| N = 282 firms | Percentage | Number of firms |
|---|---|---|
| Unified leadership | 56.0% | 158 |
| Knowledge as CEO best qualifies as chairman | 46.1% | 130 |
| Bridge between management and board | 23.4% | 66 |
| Leadership structure has served well | 18.8% | 53 |
| Board efficiency and effectiveness | 8.5% | 24 |
| CEO experience/tenure with company | 8.5% | 24 |
| Business/Company circumstances | 7.8% | 22 |
| No reason | 5.7% | 16 |
| CEO is founder | 5.0% | 14 |
| CEO industry experience/other qualifications | 5.0% | 14 |
| Avoid costs and duplication of effort | 4.6% | 13 |
| Confidence/Trust in CEO | 3.9% | 11 |
| Common US/industry leadership structure | 3.5% | 10 |
| Company tradition | 3.2% | 9 |
| Rejection of shareholder proposal | 2.1% | 6 |
| Effective corporate governance structures | 2.1% | 6 |
| Equality among directors | 1.8% | 5 |
| Family ownership/large shareholder | 1.1% | 3 |
| CEO ownership | 1.1% | 3 |
| CEO employment contract | 1.1% | 3 |
| Facilitates monitoring | 0.7% | 2 |
| Necessary to attract and retain CEO | 0.7% | 2 |
| CEO focus on management | 0.4% | 1 |
| Inconclusive academic evidence | 0.4% | 1 |

## Appendix 4.B: Separate leadership structure: List of individual leadership reasons

This table contains the complete list of 22 distinct leadership reasons disclosed by the 165 sample firms with a separate leadership structure. Reasons are listed in descending order by frequency of use.

| N = 165 firms | Percentage | Number of firms |
|---|---|---|
| Differences between tasks/roles | 32.7% | 54 |
| Facilitates monitoring | 30.3% | 50 |
| CEO focus on management | 22.4% | 37 |
| Chair experience/tenure with company | 18.8% | 31 |
| No reason | 13.3% | 22 |
| Transition/Continuity of leadership | 12.7% | 21 |
| Chair's advice and mentoring | 12.1% | 20 |
| Business/Company circumstances | 7.3% | 12 |
| Chair is founder | 6.1% | 10 |
| Chair industry experience/other qualifications | 3.6% | 6 |
| Chair ownership | 3.6% | 6 |
| Bridge between management and board | 3.0% | 5 |
| Leadership structure has served well | 2.4% | 4 |
| Board efficiency and effectiveness | 2.4% | 4 |
| CEO experience/tenure with company | 2.4% | 4 |
| CEO is founder | 1.8% | 3 |
| CEO industry experience/other qualifications | 1.2% | 2 |
| Company tradition | 1.2% | 2 |
| Family ownership/large shareholder | 1.2% | 2 |
| Unified leadership | 0.6% | 1 |
| CEO ownership | 0.6% | 1 |
| Demanding nature of positions | 0.6% | 1 |

## Appendix 4.C: Combined leadership structure: Descriptions of the five most frequently used leadership reasons

| **Combined Leadership Structure** |
|---|
| **Unified leadership**<br>The company stated the key word "Unified leadership" or described it similarly.<br><br>Examples:<br>The leadership structure…<br>- *"[…] effectively combines the responsibilities of strategic development and execution with management of day-to-day operations."*<br>- *"[…] promotes strong, clear, consistent leadership and directional clarity."*<br>- *"[…] fosters decisive leadership, clear accountability, and effective decision-making."*<br>- *"[…] ensures that the board acts with a common purpose and speaks with one voice."* |
| **Knowledge as CEO**<br>The company stated that the CEO is best positioned to serve as the chairman of the board because she has the "knowledge and understanding from being the CEO".<br><br>Examples:<br>- *"The CEO is responsible for the day-to-day operations, she possesses in-depth knowledge and understanding of the company, and is therefore best positioned to set the agenda and to chair board meetings."*<br>- *"[…] allowing the senior-most executive who possesses significant business and industry knowledge to set Board meeting agendas and to lead the related discussions."* |
| **Bridge between management and board**<br>The company disclosed that the CEO acts as a "bridge between management and board" or "Between the board and the other management".<br><br>Examples:<br>- *"[…] acting as both enables our CEO to be an efficient bridge between the Board and the Company management."*<br>- *"[…] promotes a more enhanced information flow between management and the Board."*<br>- *"Combining these roles facilitates efficient and effective board deliberation, since our CEO brings a leadership perspective that blends the outlook of both the board and management."* |
| **Leadership structure has served well**<br>The company either explicitly states that the leadership structure "has served well" over the past or emphasizes the company's performance under the current board leadership structure.<br><br>Examples:<br>- *"The structure has served the Company and its shareholders well in the past, as evidenced by the Company's success."*<br>- *"[…] a structure that has proven effective for the Company in the past."*<br>- *"[…] has been effective thus far in the Company's operating history."*<br>- *"[…] has proven extremely effective for the Company historically in the area of company performance."* |
| **Efficiency and effectiveness of board**<br>The company stated that combining the roles of CEO and chairman constitutes to an "efficient and effective board."<br><br>Examples:<br>- *"[…] combining the roles contributes to an efficient and effective Board."*<br>- *"[…] the Board has operated effectively since our CEO assumed the role of Chairman."* |

## Appendix 4.D: Separate leadership structure: Descriptions for the five most frequently used leadership reasons

| **Separate Leadership Structure** |
|---|
| **Differences between tasks/roles**<br>The company stated that it has chosen to separate the position of the CEO and the chairman of the board in recognition of the "differences between the roles".<br><br>Examples:<br>- *"We separate the roles of CEO and Chairman of the Board in recognition of the differences between the two roles."*<br>- *"[…] the structure creates a better balance in leadership and accountability, as the functions of the CEO and the Board Chairman are significantly different."*<br>- *"[…] because it separates the leadership of the Board from the duties of day-to-day leadership of the Company."* |
| **Facilitates monitoring**<br>The company stated that separating the positions of CEO and chairman of the board "facilitates monitoring".<br><br>Examples:<br>- *"Splitting the roles allows the chairman to ensure that the Board is focused on its oversight responsibilities, including independent oversight of management."*<br>- *"[…] the leadership structure was and continues to be appropriate and beneficial, as this delineation creates increased oversight."* |
| **CEO can focus on management**<br>The company stated that combining the roles of CEO and chairman constitutes to an "efficient and effective board."<br><br>Examples:<br>- *"[…] separating the roles allows our CEO to focus on our day-to-day business, while allowing the chairman of the board to lead the board in its fundamental role of providing advice to and independent oversight of management."*<br>- *"In particular, it permits our CEO to focus his full time and attention of the business…"* |
| **Chair's experience with company**<br>The company stated that combining the roles of CEO and chairman constitutes to an "efficient and effective board."<br><br>Examples:<br>- *"[…] the leadership structure allows to draw upon the skills and 37 years of Company experience of a Chairman who continues to provide strategic oversight and broad direction […] "*<br>- *"The Board determined that the Chairman's knowledge and past experience would serve our Company well, and his insights have been and continue to be invaluable to the Board."* |
| **No reason stated**<br>Companies either simply stated that they have a separate chairman or that they have separated the positions of the CEO and the chairman of the board. However, they neither explained why they have chosen to split the two positions nor why the present board leadership structure is currently the most effective leadership structure for the company. |

## Appendix 4.E: Comparing the frequency of use of board leadership structure reasons over time

This table present two-sided difference-in-means tests between early and late disclosure events regarding the five most frequently stated rationales. Early disclosures are all observations where the firm files the proxy statement within the first two months (March or April 2010) after the new SEC disclosure regulation became effective on February 28, 2010. The remaining sample period contains all firms with event dates between May 01, 2010 and February 28, 2011. Panel A shows difference-in-means tests for the sample of 282 firms with a combined leadership structure while Panel B contains the difference-in-means tests for the sample 165 firms that separate the CEO and chairman position. All tests for difference-in-means allow for unequal variances across both subsamples. T-statistics are reported in parentheses behind the difference in the subsample means. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

**Panel A: Combined leadership structure (N=282)**

| | **Early disclosures** | | **Remaining sample period** | | **Difference-in-means** |
|---|---|---|---|---|---|
| *Board leadership structure reason* | N | Mean | N | Mean | Difference (t-stat) |
| Unified leadership | 230 | 0.561 | 52 | 0.558 | 0.003 (0.04) |
| Knowledge as CEO | 230 | 0.439 | 52 | 0.558 | -0.119 (-1.54) |
| Bridge between management and board | 230 | 0.235 | 52 | 0.231 | 0.004 (0.06) |
| Leadership structure has served well | 230 | 0.174 | 52 | 0.250 | -0.076 (-1.16) |
| Efficiency and effectiveness of board | 230 | 0.065 | 52 | 0.077 | -0.012 (-0.29) |
| Other reason stated | 230 | 0.456 | 52 | 0.442 | 0.014 (0.18) |

**Panel B: Separate leadership structure (N=165)**

| | **Early disclosures** | | **Remaining sample period** | | **Difference-in-means** |
|---|---|---|---|---|---|
| *Board leadership structure reason* | N | Mean | N | Mean | Difference (t-stat) |
| Differences between tasks/roles | 122 | 0.279 | 43 | 0.465 | -0.186** (2.14) |
| Facilitates monitoring | 122 | 0.295 | 43 | 0.325 | -0.030 (-0.37) |
| CEO can focus on management | 122 | 0.172 | 43 | 0.372 | -0.200** (2.44) |
| Chair's experience with company | 122 | 0.197 | 43 | 0.163 | 0.034 (0.05) |
| No reason stated | 122 | 0.123 | 43 | 0.163 | -0.040 (-0.62) |
| Other reason stated | 122 | 0.475 | 43 | 0.442 | 0.033 (0.38) |