

All good things come to an end: CEO tenure and firm value*

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Abstract

We investigate the relation between CEO tenure and firm value hypothesizing that longer tenure has both benefits (e.g., experience, learning) and costs (e.g., CEO-firm mismatch, reluctance to change). In fact, we find an inverted U-shaped relation between CEO tenure and firm value with optimal tenure for the average firm of about 12 years where costs outweigh benefits. This relation is robust to various alternative explanations including CEO age and power and the use of CEO-firm fixed effects. We investigate M&A announcement returns and profitability as potential channels and find a similar U-shaped pattern suggesting that better fitting CEOs do better acquisitions and improve firm profitability. Moreover, we find optimal tenure to vary significantly depending on a firm's economic environment that determines this cost-benefit relation. Hence, our results do not support a one-size-fits-all policy of CEO term limits. Finally, results from sudden deaths confirm that high-tenure CEOs reduce shareholder value.

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1 Introduction

In recent years, there has been a debate in both the business press¹ and among legal scholars (see, e.g., Whitehead, 2011) about the usefulness of term limits for chief executive officers (CEOs). At the heart of this debate is the question whether an optimal CEO tenure exists. To answer this question requires an understanding of the costs and benefits that arise over a CEO's time in office as well as the determinants of this cost-benefit relation. In this study, we empirically investigate the relation between CEO tenure and firm value to address these issues. Results improve our understanding of why and to which extent CEOs matter.

Although of primary interest to shareholders and corporate directors, only recently has the finance literature started to analyze what exactly happens over a CEO's tenure. Pan, Wang, and Weisbach (forthcoming) show that a firm's stock return volatility declines over the CEO's first years in office as the market learns about the CEO. In another recent study, Pan, Wang, and Weisbach (2015) find that corporate disinvestment decreases over a CEO's tenure, consistent with CEOs reshaping their firms. They also find that while investment quantity increases with tenure, investment quality deteriorates. The authors provide evidence that the latter result can be explained by CEOs' growing control over the board.²

Our study extends this recent literature about the link that learning, investment quality, and CEO power have with tenure. In particular, we posit that an inverted U-shaped relation between a CEO's time in office and firm value exists. We argue that this non-linear relation is the outcome of benefits and costs that arise over the CEO's tenure. Among the benefits are on-the-job learning, gaining experience and confidence, and establishing

¹ See, e.g., "How long is too long to be CEO?" in *The Washington Post* (April 16, 2014), "Long CEO tenure can hurt performance" in *Harvard Business Review* (March 2013), the two articles both entitled "CEO term limits" in *The Washington Post* (May 26, 2009) and *Forbes Magazine* (November 14, 2006) as well as "Been a CEO for ten years? Your time's about up?" in *Business Insider* (April 16, 2007).

² Consistent with Pan, Wang, and Weisbach (2015), Coles, Daniel, and Naveen (2014a) find that monitoring decreases with the number of directors appointed after the CEO assumed office.

valuable relations with people inside and outside the firm. These benefits likely increase over tenure with a declining marginal positive impact on firm value. Among the costs are the increasing likelihood of a mismatch between the incumbent CEO and the firm, together with a CEO's decreasing ability and increasing reluctance to change, to admit mistakes, and to consider the advice of others, as well as an increasing level of managerial entrenchment. These costs likely increase over tenure with an increasing marginal negative impact on firm value. Such a cost-benefit relation of tenure is consistent with the existing management literature (e.g., Hambrick and Fukutomi, 1991; Henderson, Miller, and Hambrick; 2006; Miller, 1991).

We find empirical evidence for the existence of an inverted U-shaped relation between CEO tenure and Tobin's Q, with an optimal tenure (the "sweet spot") for the average S&P 1500 firm of about 12 years. Our results control for the age and power of the CEOs, whether they are founders, and take past performance as well as governance characteristics like managerial entrenchment into account. Supporting our main result, we also find evidence for an inverted U-shaped relation between a CEO's time in office and abnormal stock returns to M&A announcements as well as firm profitability.

The non-linear relation between CEO tenure and firm value is robust to various changes and extensions to our empirical setting. First, our results hold when industry fixed effects, firm fixed effects, or CEO-firm fixed effects are accounted for. Second, it is robust to several alternative explanations including non-linear relations between CEO age, power, or director tenure and firm value (potentially captured by the CEO's tenure) and additional controls for firms' (dis)investment activities. Third, our results are robust to different ways of accounting for outliers such as the exclusion of CEOs with very long tenures or those CEOs who leave the firm during the first years after assuming office. Finally, our results

remain qualitatively similar when we restrict the sample to firms or CEO-firm pairs with high sample frequency.

Using several measures of firm and industry dynamism (some based on industry shocks), we provide evidence that the non-linear relation between CEO tenure and firm value depends on the dynamics of the firms' environment. These analyses constitute tests of the posited cost-benefit relation of CEO tenure described above. Specifically, we would expect that the benefits of tenure, particularly the CEO's accumulation of experience and knowledge, have a shorter half-life in more dynamic settings, while the costs of tenure, particularly the potential CEO-firm mismatch together with the CEO's decreasing ability and willingness to adapt and change, are likely to increase faster. Consistently, we find that optimal CEO tenure shifts to smaller (larger) values in more (less) dynamic settings relative to the optimal CEO tenure found for the average firm.

Finally, we use abnormal stock returns to announcements of sudden CEO deaths to provide an answer to the question whether CEOs may stay too long at the detriment of shareholders. This approach helps to further mitigate endogeneity concerns as sudden deaths occur randomly and are likely to be exogenous to firm and market conditions. We find abnormal stock returns to increase in CEO tenure controlling for founders, CEO age, and power. This suggests that CEOs may indeed stay at the helm for too long.

Our study has important policy implications. While our evidence indicates that regular CEO turnover, on average, might be valuable for shareholders (in line with Pan, Wang, and Weisbach, 2015), it does not support a one-size-fits-all policy of CEO term limits. As the optimal CEO tenure is likely to vary with a firm's economic environment, which may be subject to shocks, corporate boards should proactively monitor and assess the CEO's fit with the company and its economic environment on a frequent basis.

In this regard, our results complement Guay, Taylor, and Xiao (2014) who find that CEOs may have problems to adapt to industry shocks and that these shocks increase the likelihood of CEO turnover. This is in line with our evidence that, on average, optimal CEO tenure is significantly lower in firms and industries subject to high dynamism and shocks where CEO adaptability is most important. Consistent with the increasing power of CEOs over their tenure (also found in our study), the authors further find that CEOs who have spent a longer time in office are less likely to leave the firm, even after industry shocks. Taken together, the evidence seems to suggest that CEO power and entrenchment enable CEOs to stay too long allowing the costs of tenure to outweigh the benefits.

Apart from Guay, Taylor, and Xiao (2014) and Pan, Wang, and Weisbach (2015), the study closest to our work is Huang (2013). The author provides evidence for an inverted U-shaped relation between firm value and outside director tenure, consistent with benefits (e.g., on-the-job learning) and costs (e.g., entrenchment) arising over directors' time on the board. He finds this non-linear relation also for the quality and value of several corporate decisions such as M&As, measures of financial reporting quality and CEO replacement. Overall, our results are consistent with these three studies.

In general, our study extends the literature on CEOs' influence on firm policies and value (see, e.g., Adams, Almeida, and Ferreira, 2005; Bennedsen, Pérez-González, and Wolfenzon, 2010, 2012; Bertrand and Schoar, 2003; Fee, Hadlock, and Pierce, 2013). Supporting extant work, the evidence we provide suggests that CEOs matter for firm value. Specifically, they indicate that the same CEO can have a different impact on firm value over her time in office. This impact seems to depend on the economic environment a firm operates in. We conclude that not only heterogeneity among different CEOs matters for firm

policies and value, but also heterogeneity with respect to the same CEO and with respect to the environment the CEO works in.

The remainder of this paper is organized as follows. Section 2 describes our dataset and the employed variables. Section 3 presents the empirical results for the inverted U-shaped relation between CEO tenure and firm value, including a variety of robustness tests, as well as additional evidence for mergers and acquisitions. In section 4, we examine how the optimal CEO tenure varies depending on the economic environment firms operate in. Additional evidence from sudden CEO deaths is presented in Section 5. Conclusions follow.

2. Data and Variables

2.1 Data

Our initial sample consists of all listed S&P 1500 companies over the period 1998 to 2011 as covered by the RiskMetrics database.³ For these firms, we collect corporate governance data from the Governance segment of RiskMetrics and director-level data from the Director segment. We complement this dataset with data from several other databases. First, we match our sample with the Execucomp database to obtain information on several CEO characteristics including tenure, age, gender, and an annual description of titles (i.e., chairman and president). We collect information about whether the CEO is the company's founder from Board Analyst's The Corporate Library database for the years 2001 to 2011. Information for the years 1998 to 2000 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

³ RiskMetrics provides data from 1996 on. However, due to documented data availability and consistency problems for the years 1996 and 1997 (see, e.g., Knyazeva, Knyazeva, and Masulis, 2013), we chose 1998 as a starting point of our sample.

in accounting and regulation, our final sample consists of 12,427 firm-year observations (with all available data) covering 1,782 firms and 3,064 unique CEO-firm clusters.

2.2 Variables

Our variable of main interest is *CEO tenure* calculated as the fiscal year minus the year the CEO became the company's CEO (i.e., Execucomp variable "BECAMECEO"). CEOs are identified using Execucomp variable 'CEOANN'. Following Masulis and Mobbs (2014), we replace missing observations by the number of years the CEO has been serving on the company's board of directors (provided by RiskMetrics).⁴ To investigate a potential nonlinear relation between CEO tenure and a series of output variables, we also include *CEO tenure squared*, calculated as the square of *CEO tenure*, in most of our regressions.

Our 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, all divided by the book value of total assets. Other output variables include return on assets (*ROA*), announcement returns to acquisition announcements, and announcement returns to unexpected CEO deaths. *ROA* is calculated as earnings before interest, 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 below, in Sections 3.2 and 5 of the paper.

⁴ We identify the company's CEO in RiskMetrics 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 RiskMetrics 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 RiskMetrics 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 (RiskMetrics variable "DIRSINCE").

In our 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, 2014a), (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 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*. In robustness tests, we use the individual index components instead of the aggregated *CEO power index*.

We control for a series of additional board and corporate governance variables. The board characteristics are *Board size*, i.e., the number of directors on the board (e.g., Yermack, 1996), *Busy board* defined as an indicator variable which is equal to one if a majority of the independent directors hold two or more additional outside directorships, and zero otherwise (Fich and Shivdasani, 2006), and the fraction of independent directors on the board, *Independence ratio*. To measure the alignment of independent directors' interests

with shareholders', we also control for the average fraction of shares outstanding held by each independent director (e.g., Masulis and Mobbs, 2014), *Independent director ownership*. Finally, we control for the entrenchment index, *E-index*, proposed by Bebchuk, Cohen, and Ferrell (2009). In some extensions and robustness tests, we further control for the average tenure of independent directors, *Independent director tenure*, and its squared term and a dummy variable whether the CEO assumes office in a given year, *New CEO*.

We control for a similar set of firm characteristics as used in the aforementioned literature: *Book leverage*, is calculated as the book value of long-term debt plus the book value of current liabilities, all divided by the book value of total assets. *Business segments* is the natural logarithm of the number of business segments as reported in Compustat's Segment database. *CapEx* is defined as capital expenditures divided by total assets and *R&D* as research and development expenses as a fraction total assets. *Firm age* is equal to the number of years the company is covered in CRSP at the time. *Firm risk* is the annualized standard deviation of the logarithm of daily stock returns over the fiscal year. *Operating CF* is the annual cash flow from operations divided by total assets. *Sales growth* is defined as growth in total revenue compared to the previous year and *Total assets* as the natural logarithm of the book value of total assets. Most of these firm characteristics enter the regressions with one lag (*Book leverage*, *CapEx*, *Firm risk*, *Operating CF*, *R&D*, and *Total assets*). Furthermore, firm performance regressions additionally include Tobin's Q with one lag as explanatory variable. Appendix A provides an overview of all variables used in the paper including detailed variable definitions.

2.3 Summary statistics

Table 1 presents summary statistics (at the firm-year level) for the previously defined variables. In terms of CEO tenure, we find that CEOs have been at the helm of the firm for about 7.6 years on average. 24% have an average tenure of more than 10 years, i.e.,

about a quarter of all S&P 1500 CEOs stay with their firm for more than a decade, with 13% of all CEOs even staying for more than 15 years. Figure 1 shows the distribution of CEO tenure.

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 fraction of newly hired CEOs (*New CEO*) is 7%. 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 2, 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.

Mean board size is 9 directors, with about 20% of boards being busy. On average, the E-index is 2.47, board independence is 71%, tenure of independent directors is 7.6 years, and stock ownership of the average independent director is 0.2%.

Finally, regarding firm characteristics, we find mean book leverage to be around 40% and the average number of business segments to be 3. CapEx amounts to 5%, R&D to 3%, and operating cash flow to 13% of total assets.⁵ Average firm age is 25 years. One-year sales growth is 10%, on average, and mean total assets amount to US\$ 6,212 million. Tobin's Q is 1.99.

⁵ Data on R&D expenditures are missing for 3,847 (31%) of the 12,427 firm-year observations in our sample. We replace these missing observations by zero.

Overall, these descriptive statistics compare well to those in recent corporate governance studies (see, e.g., Adams, Ferreira, and Almeida, 2005; Bebchuk, Cohen, and Ferrell, 2009; Custódio and Metzger, 2014; Fahlenbrach, 2009; Huang, 2013; Li, Lu, Phillips, 2014; Masulis and Mobbs, 2014).

3. CEO Tenure and Firm Value

In this section, we investigate the relation between CEO tenure and firm value. We may expect longer tenure to be associated with more knowledge and experience both at the firm and industry level. However, eventually the CEO-firm match is expected to decrease as both firms and industries evolve over time and the CEO's ability and willingness to adapt and change is likely to decrease in tenure (and age). Moreover, CEOs may become more entrenched when serving for longer periods of time as a CEO of a company. Such an entrenchment effect may reinforce the negative relation between tenure and firm value at high tenure levels. Hence, we expect an inverted U-shape relation between CEO tenure and firm value. One obvious channel through which CEOs can create and destroy corporate value are acquisitions. Following the previous argumentation, we would expect the accumulation of experience and knowledge to result in better acquisitions throughout the first years of a CEO's tenure. As eventually the CEO-firm match deteriorates in longer tenure, and the CEO in addition may become increasingly entrenched, we would expect acquisition to become worse. Hence, in the second part of the section, we analyze the market's reaction to acquisition announcements and whether they follow a similar inverted U-shape pattern as firm value which would support our hypothesis of acquisitions being one important channel through which learning and an optimal CEO-firm match create value.

3.1 Firm Value Analysis

We analyze the relation between CEO tenure and firm value by estimating regressions of *Tobin's Q* on *CEO tenure*, *CEO tenure squared*, and a number of control variables. As a starting point, the set of control variables only includes firm and year fixed effects to account for unobserved variables which are either constant over time or constant across firms. The results are reported in Column 1 of Table 2. The coefficient on *CEO tenure* is positive and significant and the coefficient on *CEO tenure squared* negative and significant suggesting an inverted U-shaped relation between CEO tenure and firm value. In Column 2, we additionally control for a number of CEO, corporate governance, and firm characteristics.⁶ The coefficients on *CEO tenure* and *CEO tenure squared* remain similar, are significant at the 5% level or better, and confirm an inverted U-shape. The inflection point in Column 2 is 13 years. In addition and consistent with Fahlenbrach (2009), we find founder CEOs to be associated with a higher firm value. Consistent with previous studies, we find both board size (e.g., Yermack, 1996) and busy boards (e.g., Fich and Shivdasani, 2006) to be negatively related to firm value. All other CEO characteristics and governance measures are estimated to be insignificant. In Column 3, we replace the CEO power index by its six constituents and in Column 4 we include (three-digit SIC code) industry×year fixed effects in order to control for time-varying factors particular to an industry and find the results to remain virtually unchanged, while the inflection point decreases further to 12 and 11 years, respectively. Finally, in Column 5, we omit the squared term of *CEO tenure* and find no significant linear relation between CEO tenure and firm value, consistent with CEO tenure capturing both benefits and costs. In sum, the results indicate that, on average,

⁶ The coefficients on the firm characteristics and all fixed effects are not reported for space reasons. Results for firm characteristics are consistent with prior studies: we find that the coefficients of the variables *Business segments* and *Total assets* are significantly negative, while the coefficients of the variables *Operating CF*, *R&D*, *Sales growth* and the lag of *Tobin's Q* are significantly positive. Furthermore, when we exclude the lag of *Tobin's Q* from the regressions or use two lags of this variable, results remain qualitatively similar. The same holds true when we substitute the lag of *Tobin's Q* for stock market performance of the previous year.

the benefits of increasing CEO tenure (e.g., CEOs accumulating valuable knowledge and experience) outweigh the costs (e.g., a deteriorating CEO-firm match and entrenchment) during the first roughly 10 to 15 years of tenure.

We perform a battery of robustness tests on these results. First, we replicate our regressions in Table 2 with firm fixed effects replaced by industry fixed effects based on three-digit SIC industries. The results, reported in Appendix B, are very similar to those reported in Table 2 and confirm the inverted U-shape relation between CEO tenure and Tobin's Q. Next, we analyze whether our results are influenced by outliers in the CEO tenure variable. First, we reestimate the regression reported in Column 2 of Table 2 excluding all observations with a CEO tenure value below the 1st (one year) and above the 99th percentiles (38 years). Second, we exclude 349 observations (3% of the sample) with a CEO tenure value above 30 years. Third, we exclude all CEOs who leave the company in the "honeymoon period" defined as the first three years of office. Fourth, we exclude founder CEOs who may differ substantially in power, and hence the level of entrenchment, incentives, and the learning effect from non-founder CEOs. The results from these four specifications are reported in Appendix C. Again the results confirm those in Table 2 suggesting an inverted U-shape relation between CEO tenure and firm value with inflection points between 11 and 15 years.

In the next set of robustness tests, reported in Table 3, we attempt to rule out a number of alternative explanations. First, CEO tenure and CEO tenure squared may simply pick up the effect of CEO age and CEO age squared. Hence, in Column 1, we add CEO age squared as an additional control variable to our standard specification as reported in Column 2 of Table 2. Second, CEO tenure and CEO tenure squared may simply capture an inverse U-shape relation between CEO power (i.e., *CEO power index*) and firm value as power will likely grow with longer tenure and as it may have both costs and benefits (see, e.g., Adams,

Almeida, and Ferreira, 2005; Sah and Stiglitz, 1986, 1991). Hence, in Column 2, we add a squared term of *CEO power index* to our standard regression. Third, CEO tenure and its squared term may capture a firm age effect if firms and their CEOs get older together. To account for this alternative explanation, in Column 3, we extend our standard specification to include the squared term of *Firm age*. Fourth, Huang (2013) reports an inverse U-shape relation between director tenure and firm value. As director tenure may correlate with CEO tenure, in Column 4, we extend our standard specification to include *Independent director tenure* and its squared term. Fifth, we investigate whether the upward sloping part of the U-shape relation is the outcome of new CEOs which are hired in response to poor previous performance (i.e., after the old CEO was fired). To this end, we supplement our standard specification by a dummy variable (*New CEO*) whether the CEO took office in the current year (Column 5). In Column 6, we include all these additional explanatory variables simultaneously. Finally, in Column 7, we replace the firm fixed effects by CEO-firm fixed effects to control for all unobserved time-invariant CEO-specific heterogeneity as well as for the endogenous CEO-firm matching (see, e.g., Custódio and Metzger, 2014). We find the U-shape relation between CEO tenure and firm value to hold across all seven regression specifications with all coefficients on *CEO tenure* and *CEO tenure squared* being significant at the 10% level or better.

We address further alternative explanations in Appendix D. As shown in Pan, Wang, and Weisbach (2015), firms' investments increase significantly over CEO tenure (with decreasing investment quality), while disinvestments decrease. Given that disinvestments efficiently reshape the firm, the U-shaped relation between CEO tenure and firm value might simply reflect this investment pattern. Thus, in addition to firms' capital expenditures already controlled for in all of our regressions, in Column 1 we control for firms' acquisition and divestiture activities. We use the dummy variables *Acquisition activity* and *Divestiture*

activity set to one if a firm undertakes an M&A transaction or a divestiture in a given year. In Column 2, we control for CEOs' general managerial abilities, which correlate with their tenure, using the *General ability index* proposed and provided (online) by Custódio, Ferreira, and Matos (2013). This data is only available until 2007 restricting our sample period to 1998-2007. In Column 3, we include all these additional controls simultaneously. Again, we find the U-shape relation between CEO tenure and firm value to hold across all regression specifications with all coefficients on *CEO tenure* and *CEO tenure squared* being statistically significant.

To mitigate concerns that our results are influenced by firms with only very few observations in our sample or CEOs switching firms quickly, in the next set of robustness tests, we restrict our sample to firms with at least six firm-year observations or to CEO-firm pairs with at least six CEO-firm pair observations. The results from estimating our standard regression specification for these two restricted datasets are reported in Appendix E. The regression in Column 1 includes firm fixed effects and the regression in Column 2 CEO-firm fixed effects. The results in both columns confirm previous findings of an inverted U-shape relation between CEO tenure and firm value. Both tenure coefficients are significant at least at the 5% level. The inflection points are 14 (in Column 1) and 15 (Column 2) years, only slightly higher than those in Table 2.

As a final robustness test on our standard Q-regressions, we replace Tobin's Q by the return on assets (ROA) as a measure of firm performance or profitability. The results are reported in Appendix F. We estimate similar specifications as in Table 2 including CEO, corporate governance, and firm characteristics as well as industry and year fixed effects (Column 1), firm and year fixed effects (Column 2), and CEO-firm and year fixed effects (Column 3). The results in all three specifications confirm the previously documented

inverted U-shape relation between CEO tenure and firm performance. Inflection points show more variation than in the regressions on Tobin's Q, ranging from 8 to 20 years.

3.2 Acquisitions as a Channel of Value Creation

In this section, we investigate a potential channel through which CEO tenure may affect firm value, acquisitions. If the inverted U-shape relation between CEO tenure and firm value reflects a trade-off between benefits (such as learning and experience) and costs (such as CEO-firm mismatch and entrenchment), the same trade-off should also be reflected in corporate decisions, particularly acquisitions. In this regard, acquisitions are an ideal setting to study the quality of a CEO's corporate decisions as they are among the largest and most easily observable investments which are usually directly influenced by the CEO (e.g., Custódio and Metzger, 2013). Moreover, an analysis of the announcement returns allows a straightforward market-based assessment of the quality of the acquisition decision.

We compile a dataset of acquisitions announced by our sample firms during the period 1998-2011. Data on the acquisitions stem from Standard & Poor's Capital IQ database. We only include acquisitions 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 are acquired. In addition, we require the deal's total transaction value to represent at least 5% (10%) of the acquirer's market capitalization 20 days prior to the announcement of the deal. These filters result in 1,823 (1,097) acquisitions made by 980 (732) distinct firms. We measure acquirer announcement returns over a three-day event window from one day before to one day after the event date defined as the day of the acquisition announcement (or the first trading day if the announcement was made on a non-trading day) in Capital IQ ($CAR [-1,1]$). Cumulative announcement returns are calculated using the market model with a value-weighted market index (S&P 500). We control for acquirer characteristics and various deal characteristics. Acquirer characteristics are similar to the firm characteristics included in previous tables

including the set of corporate governance controls. Deal characteristics are based on previous research (e.g., Moeller, Schlingemann, and Stulz, 2004) and include payment method, target ownership status, relative deal size, industry relatedness, geographic relatedness, whether the acquisition is hostile, and the number of an acquirer's previous deals in the last 5 years. These variables are defined in the caption of Table 4.

The results from regressions of the three-day cumulative abnormal return on *CEO tenure*, *CEO tenure squared*, the acquirer and deal characteristics, and industry and year fixed effects are reported in the first two columns of Table 4. Column 1 (2) reports the results for the sample of acquisitions in which the deal's total transaction value represents at least 5% (10%) of the acquirer's market capitalization. In Columns 3 and 4, we estimate the same regression specifications but replace the industry by firm fixed effects. The results across all four specifications suggest an inverted U-shape relation between CEO tenure and M&A announcement returns. Consistent with the results on the relation between CEO tenure and firm value, we find the inflection point to be located in the area of 12 to 19 years. In additional unreported regressions we use two alternative dependent variables, *CAR [-1,1]* winsorized at the 1st and 99th percentiles level as well as the cumulative abnormal return for the seven-day event window from three days before to three days after the event date. Results are qualitatively similar.

Hence, these results suggest that firms with CEOs with either very short or very long tenure make suboptimal acquisition decisions. For short-tenured CEOs, a lack of knowledge about both the firm and the industry may result in the selection of relatively worse acquisition targets. Also, short-tenured CEOs may be less experienced with M&As and less confident, and thus ultimately be associated with weaker negotiation outcomes important in corporate takeovers (see Custódio and Metzger, 2013). As CEO tenure advances, learning allows the CEO to make better acquisition decisions. At some point, however, the CEO may

have lost too much of her fit with the company and select suboptimal takeover targets (e.g., without enough synergies or future growth potential). Further, the CEO may become too entrenched and acquisition decisions may be mostly motivated by empire building strategies or attempts to diversify the poorly diversified personal portfolios (e.g., Amihud and Lev, 1981). In summary, the relatively lower announcement returns to acquisition announcements associated with very short or very long CEO tenure suggest that there is an optimal CEO tenure and that not all firms have an optimal CEO tenure.

4. Economic Environment and Optimal CEO Tenure

In this section, we provide evidence on whether the relation between CEO tenure and firm value depends on the dynamics of the firms' environment. Specifically, we would expect that the benefits, particularly knowledge and experience accumulated by the CEO, have a shorter half-life in a more dynamic setting (working against a longer-term learning effect). In addition, a CEO-firm mismatch is more likely to occur and the CEO's ability (and willingness) to adapt and change is likely to decrease faster in a highly dynamic setting. As a consequence, relative to the inflection point of 12 years found for the average firm in Section 3, we expect the inflection point to shift to smaller (larger) tenure values in more (less) dynamic settings.⁷ The results of the following analyses therefore present empirical tests of the cost-benefit relation of CEO tenure we posit in this paper.

As a first measure for the dynamism in a firm's environment, we use a 6-factor industry shock score based on Guay, Taylor, Xiao (2014). This score is calculated as the sum of the following six indicator variables: (i) a dummy whether the absolute value of the percentage change in the total value of industry assets from fiscal year t-1 to fiscal year t is above the 50th percentile, and zero otherwise (ii) a dummy whether the absolute value of the

⁷ With regard to CEO power, which we control for in all regressions shown in this section, Li, Lu, and Phillips (2014) find that powerful CEOs are beneficial to firm value in rapidly changing, competitive product markets. The authors conclude that product markets affect the costs and benefits of CEO power in important ways.

percentage change in the total value of industry capital expenditures from fiscal year t-1 to fiscal year t is above the 50th percentile, and zero otherwise, (iii) a dummy whether the absolute value of the percentage change in the Herfindahl index of the industry sales concentration from fiscal year t-1 to fiscal year t is above the 50th percentile, and zero otherwise, (iv) a dummy whether the absolute value of the percentage change in the industry R&D expenditures from fiscal year t-1 to fiscal year t is above the 75th percentile, and zero otherwise, (v) a dummy whether the absolute value of the percentage change in the total value of industry sales from fiscal year t-1 to fiscal year t is above the 50th percentile, and zero otherwise, and (vi) a dummy whether the absolute value of the percentage change in industry advertising expenses from fiscal year t-1 to fiscal year t is above the 50th percentile, and zero otherwise. Industries are defined based on three-digit SIC clusters that contain at least ten firms both in year t-1 and in year t. The index takes on discrete values between 0 and 6 (with a median value of 2) with higher values indicating industries hit by more shocks (i.e., high-dynamism industries). The major advantage of using this measure is that such industry shocks are plausibly exogenous to the firms.

Results from reestimating our standard regression specification as reported in Column 2 of Table 2 for sub-samples of firm-year observations in more and less shock-affected industries are reported in Panel A of Table 5. The first column reports the results for firms in less affected, or less dynamic industry with an industry shock score below the median and the second column reports the results for firm-years with an industry shock score above the median. Both regression specifications confirm the inverted U-shape relation between CEO tenure and firm value. Most importantly, consistent with our

expectations, we find the inflection point to be much lower (8.5 vs. 15 years) in firms which are to a larger (lower) extent subject to industry shocks.⁸

The second measure we use for the dynamism of the setting a firm operates in is the industry dynamism index proposed by Coles, Daniel, and Naveen (2014b). 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 50th percentile, (ii) a dummy whether the average R&D expenses to total assets at the industry level are above the 75th percentile, (iii) a dummy whether the average of the fluidity scores of Hoberg, Philips, and Prabhala (2014) is above the 50th 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 50th percentile. Industries are defined based on three-digit SIC clusters. 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 our standard regressions for sub-samples based on whether the industry dynamism index is above or below the median value are reported in Panel B of Table 5. Consistent with the results in Panel A, we find the inflection point to be substantially lower for firms in a more dynamic industry setting suggesting that benefits of CEO tenure, particularly learning and experience, have indeed a shorter half-life and costs of CEO tenure, particularly the CEO-firm mismatch and lacking adaptability, occur earlier in a more dynamic setting (9.5 vs. 15 years).⁹ In unreported regressions, we find that CEO tenure (without its squared term) is

⁸ Appendix G replicates the results reported in Panel A of Table 5 for the sub-samples based on the six individual components of the industry shock score based on Guay, Taylor, and Xiao (2014). Consistent with the results in Table 5, the inverted U-shape relation between CEO tenure and firm value is confirmed across the vast majority of the 12 specifications. Moreover, the inflection point is earlier for firm-years which are subject to above median industry shocks.

⁹ Appendix H replicates the results reported in Panel B of Table 5 for sub-samples based on the four individual components of the industry dynamism measure proposed by Coles, Daniel, and Naveen (2014b). Consistent with the results in Table 5, the inverted U-shape relation between CEO tenure and firm value is confirmed across all eight specifications (with both tenure coefficients being insignificant in one specification). More importantly, the inflection point is earlier for firm-years in a more dynamic setting.

insignificant in all specifications shown in Panel A and Panel B. This further supports the non-linear CEO tenure-firm value relation.

Similar as in a dynamic industry, we would expect optimal CEO tenure to decrease in (high-)tech firms as accumulated knowledge may quickly become outdated and, hence, the negative value effect of a mismatch between the CEO and the firm and managerial entrenchment outweighs the positive learning effect at an earlier time. We use three alternative definitions of tech firms. First, we define all firms listed at NASDAQ as tech firms. Second, we follow Murphy (2003) and define firms in certain 4-digit SIC industries as tech firms.¹⁰ Third, we define tech firms based on the definition suggested by Loughran and Ritter (2004), again based on the firms' 4-digit SIC industries.¹¹ We reestimate our standard regression specification as reported in Column 2 of Table 2 for sub-samples of tech and non-tech firm-years. The results are reported in Table 6 with one separate panel devoted to each of the three alternative measures of tech vs. non-tech firms. The results across all three panels confirm the inverted U-shape relation between CEO tenure and firm value documented in previous tables. Moreover, and consistent with our expectations, we find the inflection point to be substantially earlier for tech vs. non-tech firms suggesting that the benefits of CEO tenure, particularly learning and experience, in fact dissipate faster in tech than in non-tech firms.

Finally, we analyze sub-samples based on firm age and industry age. In young firms and industries the business environment may also be more dynamic and the value of learning may become more short-lived. Hence, we reestimate our standard regression specification for sub-samples based on whether firm age is equal to (or below) or above the

¹⁰ These industries comprise the following SIC codes: 3570, 3571, 3572, 3576, 3577, 3661, 3674, 4812, 4813, 5045, 5961, 7370, 7371, 7372, and 7373.

¹¹ These industries comprise the following 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, and 7379.

sample median (Table 7, Panel A) and whether industry age, measured as average firm age of all companies operating in a firm's industry, is equal to (or below) or above the sample median. Again, results confirm the inverted U-shape relation between CEO tenure and firm value and show that the inflection point is substantially earlier both in younger firms and industries.

5. Evidence from Sudden CEO Deaths

In this section, we aim to mitigate endogeneity concerns by employing an identification strategy based on unexpected deaths of incumbent CEOs (e.g., Bennedsen, Pérez-González, and Wolfenzon, 2010; Johnson, Magee, Nagarajan, and Newman, 1985; Nguyen and Nielsen, 2014). Unexpected CEO deaths offer plausibly exogenous identification of how markets assess a CEO's value because deaths occur randomly and are likely to be exogenous to current firm and market conditions. Results allow us to provide an answer, based on evidence that is very likely to be causal, to the question whether CEOs may stay in office for too long.

We hand-collected a sample of CEO deaths between 1991 and 2012 from various sources including Factiva, LexisNexis, and Google using keyword searches of expressions "CEO", "Chief Executive Officer" and "death", "passed away", "deceased", etc. We consider all CEOs of firms with available data in CRSP. To ensure that the CEO's death conveys new information, we restrict our 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 indicated to be a heart attack, stroke, or accident and when the specific cause is unreported, but the death is described as unexpected or unanticipated or sudden. This procedure leaves us with a sample of 80 sudden deaths of CEOs. For these 80 events, we compute cumulative abnormal stock returns (CARs) over the 3-day period from the day before the announcement

until the day after the announcement date (denoted $CAR [-1,1]$). We use the market model with the CRSP value-weighted index as a proxy for the market return.

In Panel A of Table 8, we report results from two-tailed univariate difference-in-means tests, which account for unequal variances between both subsamples, for whether $CAR [-1,1]$ differs depending on the CEO's tenure. Specifically, we compare mean CARs across two sub-samples based on whether CEO tenure is above or below the sample median of 9.5 years, i.e., only slightly below the lowest average inflection point of 10.6 years found in specification (4) of Table 2, or above or below 15 years. The latter is chosen for two reasons. First, it corresponds to the optimal tenure estimated in our extended regression model (see Table 3, specification 6). Second, Institutional Shareholder Services (ISS) recommends a maximum director tenure of 15 years (see ISS's 2015 Summary Proxy Voting Guidelines). The results show that announcement returns of CEOs with shorter tenure dying unexpectedly are significantly lower than announcement returns of CEOs with longer tenure.

Panel B reports results from regressions of $CAR [-1,1]$ on *CEO tenure* and different sets of controls. The specification in Column 1 is univariate and only includes CEO tenure as explanatory variable. The specification in Column 2 additionally includes CEO age and a number of firm characteristics as controls and the specification in Column 3 adds additional CEO characteristics. Adding more control variables reduces the number of observations in Columns 2 and 3 due to data availability. The results across all three specifications confirm the univariate findings and suggest a positive relation between announcement returns to CEOs' unexpected deaths and CEO tenure. Specifically, announcement returns are significantly less negative when CEOs have longer tenure suggesting that long tenure periods are negatively perceived by the market. This result, as suggested by the regression specification in column 3, is robust to controls for the most important CEO power measures

(*Duality* and *Founder CEO*). Thus, the negative effect of high-tenured CEOs on shareholder value, at least to a certain part, seems to stem from costs arising with tenure, particularly CEO-firm mismatch, other than the CEO's power/entrenchment. In sum, the evidence found in this section suggests that CEOs may indeed stay in office for too long.

6. Conclusion

In this study, we posit that an inverted U-shaped relation between a CEO's time in office and firm value exists. This relation is the outcome of benefits, such as learning and increasing experience, and costs, such as an increasing likelihood of a CEO-firm mismatch and increasing reluctance to change, that arise over the CEO's tenure. Controlling for CEO age and power, we find strong empirical support for a non-linear relation between CEO tenure and firm value. Our results stand a large set of robustness tests and are also found for M&A announcement returns and firm profitability. They suggest that the optimal CEO tenure (the "sweet spot") is about 12 years for the average S&P 1500 firm.

We further find that the optimal CEO tenure varies significantly depending on a firm's economic environment that determines the cost-benefit relation. Specifically, the optimum is reached much earlier (compared to the average firm) for firms operating in dynamic, fast changing environments, while it is reached much later in more mature and stable environments. Although additional results from sudden deaths suggest that CEOs may stay too long and reduce shareholder value, overall the evidence presented in this paper does not support a one-size-fits-all policy of CEO term limits.

The insights from this study add to both the ongoing debate about the usefulness of term limits for CEOs and the recent literature that measures the extent to which CEOs matter.

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Table 1 – Summary statistics

This table provides descriptive statistics for the sample of non-regulated S&P 1500 companies (excluding SIC codes 4000-4999 and 6000-6999) that consists of 12,427 firm-year observations on 1,782 unique firms and 3,064 unique CEO-firm pairs over the period 1998-2011. All variables are defined in Appendix A.

	Obs.	Mean	Median	1. Quartile	3. Quartile	SD
<i>CEO tenure</i>						
CEO tenure	12,427	7.67	5.00	2.00	10.00	8.02
CEO tenure squared	12,427	123.04	25.00	4.00	100.00	277.47
CEO tenure > 10 yrs	12,427	0.239				0.43
CEO tenure > 15 yrs	12,427	0.134				0.34
<i>CEO characteristics</i>						
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
New CEO (dummy)	12,427	0.07				0.25
<i>CEO power measures</i>						
CEO power index	12,427	2.90	3.00	2.00	4.00	1.21
CEO ownership	12,427	0.031	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
<i>Governance characteristics</i>						
Board size	12,427	9.01	9.00	7.00	10.00	2.23
Busy board (dummy)	12,427	0.20				0.40
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
Independent director tenure	12,427	7.57	7.11	5.20	9.30	3.47
Independent director ownership	12,427	0.002	0.0005	0.0002	0.001	0.005
<i>Firm characteristics</i>						
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

Table 2 – CEO tenure and firm value (Regression results with firm fixed effects)

This table reports results from firm fixed effects regressions of *Tobin's Q* on *CEO tenure* and its squared term along with CEO characteristics, CEO power measures, firm, and corporate governance characteristics. The sample includes S&P1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). The regression in Column 4 additionally contains interacted year and industry (based on three-digit SIC codes) fixed effects. All regressions use *Tobin's Q* as the measure for firm value, defined as the book value of assets minus the book value of common equity plus the market value of equity, all divided by the book value of assets. Regressions in Columns 2, 4, and 5 use *CEO power index* as control variable for CEO power, while the regression in Column 3 includes the individual components of *CEO power index*. All variables are defined in Appendix A. 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)	(4)	(5)
CEO tenure	0.0166*** (2.892)	0.0150** (2.558)	0.0146* (1.670)	0.0128* (1.737)	-0.0019 (-0.499)
CEO tenure squared	-0.0005*** (-2.820)	-0.0006*** (-3.680)	-0.0006*** (-2.880)	-0.0006*** (-3.008)	
<i>CEO characteristics</i>					
CEO age		0.0020 (0.679)	0.0015 (0.500)	0.0054 (1.532)	0.0025 (0.852)
CEO gender		0.0272 (0.319)	0.0370 (0.428)	-0.0162 (-0.173)	0.0208 (0.241)
CEO power index		-0.0235 (-1.197)		-0.0309 (-1.223)	-0.0088 (-0.462)
Founder CEO		0.4204*** (2.898)	0.4440*** (2.924)	0.4524*** (2.782)	0.3753*** (2.641)
<i>CEO power measures</i>					
CEO ownership			-0.7439** (-2.384)		
Co-Option			-0.0398 (-0.383)		
Duality			0.0257 (0.686)		
Involved CEO			-0.0228 (-0.549)		
Only insider			-0.0592 (-1.553)		
President			0.0020 (0.062)		
<i>Governance characteristics</i>					
Board size		-0.2572*** (-2.683)	-0.2777*** (-2.888)	-0.2067* (-1.811)	-0.2590*** (-2.689)
Busy board		-0.0518* (-1.671)	-0.0506 (-1.639)	-0.0351 (-1.050)	-0.0539* (-1.734)
E-Index		0.0163 (1.025)	0.0153 (0.982)	0.0190 (1.037)	0.0174 (1.088)
Independence ratio		-0.0454 (-0.336)	-0.0239 (-0.157)	-0.0464 (-0.261)	-0.0348 (-0.257)
Independent director ownership		-3.3973 (-1.561)	-3.3480 (-1.530)	-1.6211 (-0.655)	-3.2313 (-1.472)
Firm characteristics	No	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry*year fixed effects	No	No	No	Yes	No
Observations	12,427	12,427	12,427	12,427	12,427
R-squared (within)	0.104	0.299	0.300	0.441	0.297
Inflection point (yrs)	16.6	12.5	12.2	10.6	

Table 3 – Addressing alternative explanations for CEO tenure and firm value

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&P1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). Results reported in Columns 1 to 6 are based on firm fixed effects regressions and results in Column 7 on a CEO-firm fixed effects regression. All variables are defined in Appendix A. 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						
	Firm-FE						CEO-firm-FE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CEO tenure	0.0131** (2.087)	0.0151*** (2.616)	0.0147** (2.537)	0.0150*** (2.628)	0.0168*** (2.584)	0.0147** (2.230)	0.0252** (2.239)
CEO tenure squared	-0.0005*** (-2.940)	-0.0006*** (-3.692)	-0.0006*** (-3.663)	-0.0006*** (-3.637)	-0.0006*** (-3.760)	-0.0005*** (-2.976)	-0.0006* (-1.887)
<i>Alternative explanations</i>							
CEO age squared	-0.0003 (-1.262)					-0.0003 (-1.243)	0.0001 (0.231)
CEO power index squared		0.0046 (0.464)				0.0039 (0.391)	0.0148 (1.268)
Firm age squared			-0.0810 (-1.523)			-0.0779 (-1.502)	-0.1087* (-1.856)
Independent director tenure				0.0065 (0.429)		0.0031 (0.212)	-0.0046 (-0.275)
Independent director tenure sq.				-0.0007 (-0.923)		-0.0006 (-0.738)	-0.0002 (-0.193)
New CEO					0.0375 (1.200)	0.0365 (1.145)	0.0916** (2.107)
<i>CEO characteristics</i>							
CEO age	0.0392 (1.262)	0.0020 (0.683)	0.0020 (0.689)	0.0022 (0.749)	0.0020 (0.664)	0.0387 (1.249)	-0.0084 (-0.148)
CEO gender	0.0206 (0.244)	0.0273 (0.319)	0.0253 (0.294)	0.0265 (0.309)	0.0272 (0.319)	0.0179 (0.208)	-
CEO power index	-0.0235 (-1.199)	-0.0495 (-1.028)	-0.0230 (-1.183)	-0.0252 (-1.312)	-0.0232 (-1.187)	-0.0467 (-0.960)	-0.1056* (-1.722)
Founder CEO	0.4197*** (2.908)	0.4222*** (2.884)	0.4209*** (2.902)	0.4165*** (2.866)	0.4153*** (2.849)	0.4130*** (2.816)	-
<i>Governance characteristics</i>							
Board size	-0.2551*** (-2.670)	-0.2572*** (-2.683)	-0.2597*** (-2.716)	-0.2731*** (-2.832)	-0.2583*** (-2.697)	-0.2754*** (-2.878)	-0.1957** (-1.964)
Busy board	-0.0506 (-1.641)	-0.0519* (-1.675)	-0.0489 (-1.573)	-0.0521* (-1.685)	-0.0519* (-1.674)	-0.0484 (-1.569)	-0.0106 (-0.332)
E-index	0.0164 (1.025)	0.0163 (1.023)	0.0165 (1.034)	0.0162 (1.021)	0.0166 (1.040)	0.0165 (1.042)	0.0091 (0.529)
Independence ratio	-0.0565 (-0.410)	-0.0421 (-0.318)	-0.0389 (-0.285)	-0.0663 (-0.489)	-0.0424 (-0.311)	-0.0651 (-0.475)	0.0029 (0.022)
Independent director ownership	-3.3405 (-1.525)	-3.4409 (-1.582)	-3.4641 (-1.587)	-2.8544 (-1.335)	-3.4223 (-1.569)	-2.9204 (-1.356)	-2.3585 (-1.102)
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	No
CEO-Firm fixed effects	No	No	No	No	No	No	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,427	12,427	12,427	12,427	12,427	12,427	12,427
R-squared (within)	0.299	0.299	0.299	0.299	0.299	0.300	0.226

Table 4 – Evidence from acquisitions

This table presents results from regressions of three-day cumulative abnormal returns ($CAR [-1,1]$) 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 SDC as hostile deals, zero otherwise. *MTB* 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. *No. deals before* 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 regression specifications include year and industry fixed effects (based on Fama-French 48 industries). All other variables are defined in the Appendix A. 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]			
	OLS		Firm-FE	
	≥ 5%	≥ 10%	≥ 5%	≥ 10%
Relative size	(1)	(2)	(3)	(4)
CEO tenure	0.00187*** (3.462)	0.0029*** (3.402)	0.0023* (1.658)	0.0048** (2.199)
CEO tenure squared	-0.00005*** (-3.242)	-0.0001*** (-2.829)	-0.0001* (-1.723)	-0.0002** (-2.109)
<i>CEO characteristics</i>				
CEO age	-0.0040* (-1.850)	-0.0022 (-0.598)	0.0009 (0.171)	0.0002 (0.019)
CEO age squared	0.00004** (2.017)	0.00002 (0.772)	-0.000005 (-0.099)	0.000008 (0.084)
CEO gender	0.0156 (1.535)	-0.0044** (-2.069)	0.0360* (1.759)	0.0152 (0.458)
CEO power index	-0.0027* (-1.724)	0.0010 (0.111)	0.0013 (0.472)	0.0022 (0.547)
Founder CEO	0.0005 (0.098)	0.0224* (1.696)	0.0411* (1.666)	0.0943*** (2.615)
<i>Acquirer characteristics</i>				
Book leverage _{t-1}	0.0145 (1.214)	-0.0070*** (-2.736)	-0.0217 (-0.902)	0.0489 (1.296)
Business segments	-0.0003 (-0.124)	0.0016 (0.405)	-0.0019 (-0.279)	-0.0001 (-0.011)
Firm age	0.0001 (0.944)	0.0001 (0.973)	0.0011 (0.393)	0.0034 (0.819)
Firm risk _{t-1}	-0.0072 (-0.494)	0.0162 (1.006)	0.0175 (0.811)	0.0225 (0.728)
MTB _{t-1}	0.0006 (1.578)	-0.0239 (-1.357)	0.0001 (0.126)	-0.0056*** (-2.788)
Operating CF _{t-1}	0.0056 (0.284)	0.0009* (1.775)	-0.0298 (-0.944)	-0.0239 (-0.541)
Total assets _{t-1}	-0.0037** (-2.121)	-0.0041 (-0.145)	0.0046 (0.662)	-0.0037 (-0.351)
Board size	-0.0040 (-0.439)	-0.0106 (-0.841)	-0.0375* (-1.731)	-0.0639* (-1.707)
Busy board	-0.0002 (-0.035)	0.0009 (0.044)	0.0217*** (3.206)	0.0220 (1.581)
E-index	0.0011 (0.801)	-0.0004 (-0.230)	0.0006 (0.160)	0.0013 (0.178)
Independence ratio	-0.0084 (-0.602)	-0.0023 (-0.381)	0.0069 (0.287)	-0.0118 (-0.332)
Independent director ownership	-0.2340 (-0.572)	-0.1274 (-0.259)	-1.3230* (-1.908)	-1.6630 (-1.296)
<i>Deal characteristics</i>				
Cross-border	0.0044 (1.156)	-0.0087 (-1.175)	0.0028 (0.508)	0.0013 (0.140)
Hostile	-0.0387 (-1.132)	-0.0079 (-1.366)	-0.0139 (-0.441)	-0.0443** (-2.049)
No. deals before	-0.0002 (-0.423)	-0.0033 (-0.580)	-0.0006 (-0.717)	0.0012 (0.838)
Payment includes stock	-0.0056 (-1.267)	-0.0321 (-0.935)	-0.0025 (-0.411)	0.0013 (0.131)
Public target	-0.0082** (-2.019)	0.0003 (0.505)	-0.0070 (-1.249)	-0.0072 (-0.841)
Relative size	-0.0071 (-1.028)	0.0013 (0.218)	0.0045 (0.444)	0.0076 (0.634)
Same industry	-0.0027 (-0.723)	-0.0054 (-1.067)	-0.0083 (-1.588)	-0.0114 (-1.297)
Industry fixed effects	Yes	Yes	No	No
Firm fixed effects	No	No	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	1,823	1,097	1,823	1,097

Table 5 – Industry shocks, industry dynamism, and optimal 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 industry sub-samples. The sample includes S&P1500 firms over the period 1998-2011 excluding regulated financial and utility firms (SIC codes 4000-4999 and 6000-6999). Panel A reports sub-sample results using the *6-factor industry shock score* proposed by Guay, Taylor, and Xiao (2014). An industry is defined as a three-digit SIC cluster that contains at least ten firms in year $t-1$ and year t . An industry shock is measured based on the absolute value of the percentage change in the mean of the industry characteristic from fiscal year $t-1$ to fiscal year t , regardless of the direction of the change. The 6-factor industry shock score is the sum of the following six indicator variables: (i) Industry assets shock is set to one if the absolute value of the percentage change in the total value of industry assets (Δ Industry Assets) is above the 50th percentile, zero otherwise (ii) Industry investment shock is set to one if the absolute value of the percentage change in the total value of industry capital expenditures (Δ Industry Investment) is above the 50th percentile, zero otherwise, (iii) Industry HHI shock is set to one if the absolute value of the percentage change in the Herfindahl index of the industry sales concentration (Δ Industry HHI) is above the 50th percentile, zero otherwise, (iv) Industry R&D shock is set to one if the absolute value of the percentage change in the industry R&D expenditures (Δ Industry R&D) is above the 75th percentile, zero otherwise, (v) Industry sales shock is set to one if the absolute value of the percentage change in the total value of industry sales (Δ Industry sales) is above the 50th percentile, zero otherwise, (vi) Industry advertisement shock is set to one if the absolute value of the percentage change in the industry advertising expense (Δ Industry Advertising) is above the 50th percentile, zero otherwise. Panel B reports sub-sample results for more versus less dynamic industries using the industry dynamism index proposed by Coles, Daniel, and Naveen (2014). Industries are defined based on three-digit SIC clusters. *Dynamism index* is defined as the sum of the following four indicator variables. (i) *Growth industry* that equals one if the average annual sales growth of all firms in the industry is above the 50th percentile, zero otherwise, (ii) *R&D industry* that equals one if the average R&D expenses to total assets at the industry level is above the 75th percentile, zero otherwise, (iii) *High fluidity industry* which is set to one if the average of the fluidity scores of Hoberg, Philips, and Prabhala (2014) is above the 50th percentile, zero otherwise, and (iv) *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 50th percentile, zero otherwise. Therefore, the index takes discrete values between 0 and 4, where higher values indicate higher industry dynamism. Control variables are identical to those used in Table 2. All variables are defined in Appendix A. 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 – 6-factor industry shock score (based on Guay et al., 2014)		
	≤ Median	> Median
CEO tenure	0.0179** (2.321)	0.0085 (1.077)
CEO tenure squared	-0.0006*** (-2.720)	-0.0005*** (-2.674)
CEO characteristics	Yes	Yes
Governance characteristics	Yes	Yes
Firm characteristics	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	6,726	5,701
R-squared (within)	0.3246	0.2963
Inflection point (yrs)	14.9	8.5

Panel B – Dynamism index (based on Coles, Daniel, and Naveen, 2014)		
	≤ Median	> Median
CEO tenure	0.0059* (1.792)	0.0397* (1.685)
CEO tenure squared	-0.0002** (-2.074)	-0.0021*** (-2.676)
CEO characteristics	Yes	Yes
Governance characteristics	Yes	Yes
Firm characteristics	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	8,951	3,476
R-squared (within)	0.3831	0.3718
Inflection point (yrs)	14.8	9.5

Table 6 – Tech industries and optimal 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 various sub-samples. The sample includes S&P1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). Panel A reports sub-sample results based on whether firms are listed at the NASDAQ stock exchange or not. Panel B reports sub-sample results for tech firms versus non-tech firms following the definition in Murphy (2003). Firms in the following 4-digit SIC codes are considered to be tech firms: 3570, 3571, 3572, 3576, 3577, 3661, 3674, 4812, 4813, 5045, 5961, 7370, 7371, 7372, and 7373. Panel C reports sub-sample results using the tech firm definition suggested by Loughran and Ritter (2004). According to their definition, a firm is considered a tech firm if the company is operating in one of the following four-digit 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. All variables are defined in Appendix A. Control variables are identical to those used in Table 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.

Panel A – Tech vs. Non-Tech (NASDAQ)		
	NASDAQ = 0	NASDAQ = 1
CEO tenure	0.0116*** (2.586)	0.0127 (0.812)
CEO tenure squared	-0.0003** (-2.431)	-0.0009** (-2.213)
CEO characteristics	Yes	Yes
Governance characteristics	Yes	Yes
Firm characteristics	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	8,191	4,236
R-squared (within)	0.397	0.334
Inflection point (yrs)	19.3	7.1

Panel B – Tech vs. Non-Tech (Murphy, 2003)		
	New Economy = 0	New Economy = 1
CEO tenure	0.0087** (2.295)	0.0482 (1.468)
CEO tenure squared	-0.0003** (-2.441)	-0.0025** (-2.172)
CEO characteristics	Yes	Yes
Governance characteristics	Yes	Yes
Firm characteristics	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	10,539	1,888
R-squared (within)	0.369	0.405
Inflection point (yrs)	14.5	9.6

Panel C – Tech vs. Non-Tech (Loughran and Ritter, 2004)		
	Tech LR = 0	Tech LR = 1
CEO tenure	0.0082* (1.861)	0.0444* (1.725)
CEO tenure squared	-0.0003* (-1.898)	-0.0021*** (-2.741)
CEO characteristics	Yes	Yes
Governance characteristics	Yes	Yes
Firm characteristics	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	9,808	2,619
R-squared (within)	0.308	0.369
Inflection point (yrs)	13.7	10.6

Table 7 – Firm age and optimal 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 various sub-samples. The sample includes S&P1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). Panel A reports sub-sample results for old vs. young firms. Firms are considered young if *Firm age* is equal to or below the sample median while firms are considered old if *Firm age* is above the sample median. Panel B reports sub-sample regression results for old and young industries. Industries are defined based on three-digit SIC clusters. The age of an industry is defined as the average firm age (i.e., based on the CRSP inclusion year) of all companies operating in the respective three-digit SIC industry. *Old industry* is an indicator variable that equals one if the average firm age of all companies operating in a firm's industry is above the sample median. Accordingly, *Young industry* is a dummy variable that equals one if the average firm age of all companies operating in a firm's industry is equal to or below the sample median. Control variables are identical to those used in Table 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.

Panel A – Firm age		
	Old firms	Young firms
CEO tenure	0.0103** (2.359)	0.0110 (0.844)
CEO tenure squared	-0.0003** (-2.342)	-0.0006* (-1.904)
CEO characteristics	Yes	Yes
Governance characteristics	Yes	Yes
Firm characteristics	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	5,937	6,490
R-squared (within)	0.432	0.268
Inflection point (yrs)	16.7	9.2

Panel B – Industry age		
	Old Industries	Young Industries
CEO tenure	0.0085* (1.745)	0.0201* (1.773)
CEO tenure squared	-0.0003* (-1.894)	-0.0009*** (-3.283)
CEO characteristics	Yes	Yes
Governance characteristics	Yes	Yes
Firm characteristics	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	6,211	6,216
R-squared (within)	0.405	0.314
Inflection point (yrs)	14.2	11.2

Table 8 – Evidence from CEO sudden deaths

Table 8 reports three-day announcement return on a sample of CEOs who died suddenly between 1991 and 2012. Similar to Nguyen and Nielsen (2014), death is considered as sudden if it is unanticipated. $CAR [-1,1]$ 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 the trading day when the death of a CEO is first reported in the news (or the next trading day in case death was announced on a non-trading day). Panel A shows two-tailed univariate difference-in-means tests (accounting for unequal variances between both subsamples) for $CAR [-1,1]$. Panel B reports multivariate event study regression of $CAR [-1,1]$ on CEO tenure and additional controls. Decade dummy variables for each decade (1990s, 2000s, and 2010s) are included in all regressions. The number of observations reported in specifications (2) and (3) is reduced due to data availability. Firm characteristics are winsorized at the 1 and 99 percentile. All other variables are defined in Appendix A. Robust t-statistics are reported in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Difference-in-means tests			
	CEO tenure \leq median (9.5 yrs)	CEO tenure $>$ median (9.5 yrs)	Difference
CAR [-1,1]	-0.0230 (N=43)	0.0141 (N=37)	-0.0371* (-1.716)
	CEO tenure \leq 15 yrs	CEO tenure $>$ 15 yrs	Difference
CAR [-1,1]	-0.0240 (N=52)	0.0280 (N=28)	-0.0519** (-2.217)

Panel B: Multivariate regression results			
	CAR [-1,1]		
	(1)	(2)	(3)
CEO tenure	0.0026*** (2.762)	0.0027*** (3.154)	0.0024** (2.306)
<i>CEO characteristics</i>			
CEO age		0.0008 (0.734)	0.0009 (0.789)
Duality			0.0224 (1.203)
Founder CEO			-0.0063 (-0.276)
President			0.0020 (0.123)
<i>Firm characteristics</i>			
Total assets		0.0149*** (3.755)	0.0134*** (3.243)
Market-to-book		-0.0006 (-0.438)	-0.0013 (-0.711)
ROA		-0.0558 (-1.610)	-0.0585 (-1.567)
Constant	-0.1019*** (-3.040)	-0.1668** (-2.230)	-0.1730** (-2.284)
Decade controls	Yes	Yes	Yes
Observations	80	68	68
R-squared	0.098	0.327	0.344
F-statistic	3.00	6.35	4.60
p-value	0.0358	0.0000	0.0001

Figure 1 – CEO tenure distribution

The figure displays a histogram of CEO tenure for a sample of non-regulated S&P 1500 companies (excluding SIC codes 4000-4999 and 6000-6999) for the sample period 1998-2011.

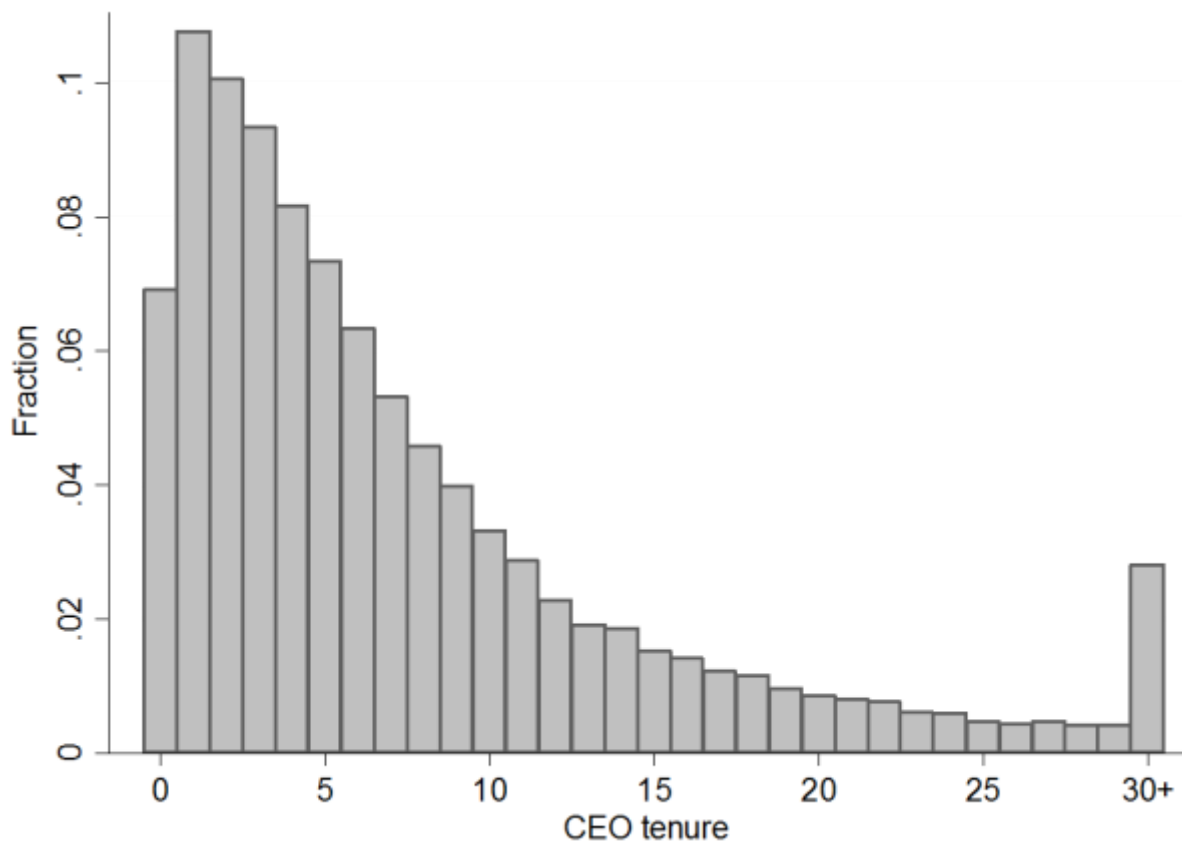
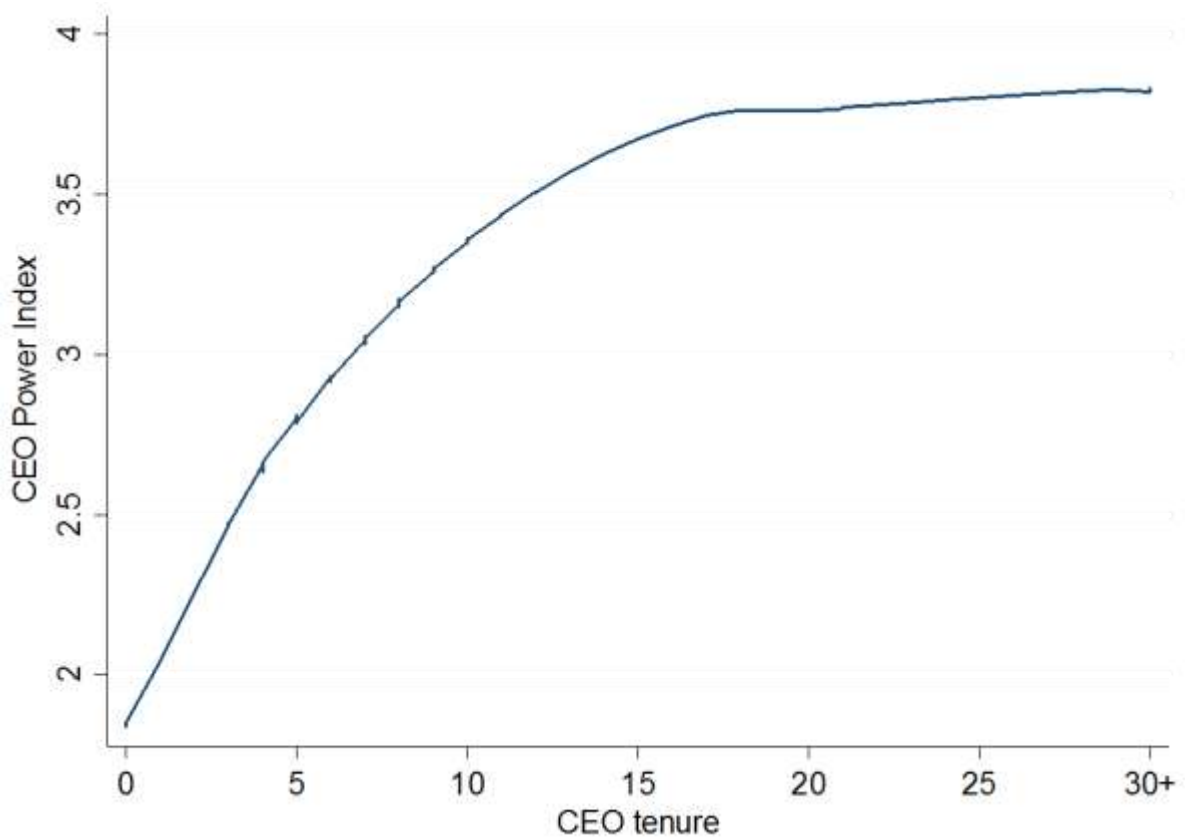


Figure 2 – CEO tenure and CEO power accumulation

The figure plots the results from a locally weighted regression of the *CEO power index* on *CEO tenure*. The sample includes S&P1500 firms over the period 1998-2011 excluding observations from regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). *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*. *CEO tenure* is the number of years the CEO has been serving as the firm's CEO.



APPENDICES

Appendix A – Variable definitions

Variable	Definition
Board size	Natural logarithm of the number of directors on the firm's board of directors. <i>Source: RiskMetrics</i>
Book leverage	(Long-term debt + current liabilities)/Total assets, all at the end of the previous fiscal year. <i>Source: Compustat</i>
Business segments	Natural logarithm of the number of business segments. <i>Source: Compustat Segments</i>
Busy board	Indicator variable that equals one if a majority of the independent directors hold two or more additional outside directorships, zero otherwise. <i>Source: RiskMetrics</i>
CapEx	Capital expenditures/Total assets, all at the end of the previous fiscal year. <i>Source: Compustat</i>
CEO age	Age of the firm's CEO measured in years. <i>Source: Execucomp</i>
CEO gender	Indicator variable that equals one if the CEO's gender is female, zero otherwise. <i>Source: Execucomp</i>
CEO ownership	Percentage of shares outstanding held by the CEO, winzorized at the 1% and 99% levels. <i>Source: Execucomp, RiskMetrics</i>
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 RiskMetrics. <i>Source: Execucomp, RiskMetrics</i>
Co-Option	Fraction of directors on the board who have been appointed to the firm's board after the current CEO assumed office. <i>Source: RiskMetrics</i>
Duality	Indicator variable that equals one if the CEO is also the chairman of the board, zero otherwise. <i>Source: Execucomp</i>
E-Index	Entrenchment index based on six anti-takeover protection devices as proposed by Bebchuk, Cohen, and Ferrell (2009). <i>Source: RiskMetrics Governance database</i>
Firm age	Natural logarithm of the number of years the firm is listed in CRSP. <i>Source: CRSP</i>
Firm risk	Standard deviation of daily stock returns during the year, all at the end of the previous fiscal year. <i>Source: CRSP</i>
Founder CEO	Indicator variable that equals one if the CEO is the founder of the company, zero otherwise. <i>Source: The Corporate Library, hand collected</i>
Independence ratio	Percentage of directors on the board classified as independent directors. <i>Source: RiskMetrics</i>
Independent director ownership	Average fraction of outstanding shares held by all independent directors on the board, winzorized at the 1% and 99% levels. <i>Source: RiskMetrics</i>

Independent director tenure	Average number of years the independent directors serves on the firm's board. <i>Source: RiskMetrics</i>
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. <i>Source: RiskMetrics</i>
New CEO	Indicator variable that equals one if the firm's CEO took office in the current year, zero otherwise. <i>Source: Execucomp</i>
Only insider	Indicator variable that equals one if the CEO is the only inside director on the board, zero otherwise. <i>Source: RiskMetrics</i>
Operating CF	Annual cash flow from operations/Total assets _{t-1} , all at the end of the previous fiscal year. <i>Source: Compustat</i>
President	Indicator variable that equals one if the CEO also holds the title of President of the firm, zero otherwise. <i>Source: Execucomp</i>
R&D	R&D expense/Total assets, all at the end of the previous fiscal year. <i>Source: Compustat</i>
ROA	EBITDA/Total assets _{t-1} <i>Source: Compustat</i>
Sales growth	Annual change in net sales divided by previous year's net sales: $(Sales_t/Sales_{t-1}) - 1$ <i>Source: Compustat</i>
Tobin's Q	$(Total\ assets - Book\ equity + Market\ value\ of\ equity)/Total\ assets$ <i>Source: Compustat</i>
Total assets	Natural logarithm of total assets at the end of the previous fiscal year. <i>Source: Compustat</i>

Appendix B – CEO tenure and firm value: Pooled OLS with industry fixed effects

This table reports results from pooled OLS regressions of *Tobin's Q* on *CEO tenure* and its squared term along with CEO power measures, additional CEO characteristics, firm, and corporate governance characteristics. The sample includes S&P1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). Regressions in Columns 2, 4, and 5 use *CEO power index* as control variable for CEO power, while the regression in Column 3 includes the individual components of *CEO power index*. The specification in Column 4 includes year fixed effects and year fixed effects interacted with industry fixed effects (based on three-digit SIC codes). Control variables are identical to those used in Table 2. All variables are defined in Appendix A. 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)	(2)	(3)	(4)	(5)
CEO tenure	0.0282*** (4.593)	0.0151*** (3.716)	0.0164*** (2.671)	0.0157*** (3.259)	0.0001 (0.039)
CEO tenure squared	-0.0008*** (-4.997)	-0.0005*** (-4.193)	-0.0004*** (-3.277)	-0.0005*** (-3.492)	
<i>CEO characteristics:</i>					
CEO age		0.0002 (0.134)	-0.00002 (-0.011)	0.0002 (0.134)	-0.0003 (-0.148)
CEO gender		-0.0878 (-1.286)	-0.0883 (-1.300)	-0.0514 (-0.699)	-0.0982 (-1.433)
CEO power index		-0.0496*** (-3.337)		-0.0524*** (-2.935)	-0.0334** (-2.517)
Founder CEO		0.1936*** (3.109)	0.1999*** (3.146)	0.2055*** (2.961)	0.1938*** (3.099)
<i>CEO power measures:</i>					
CEO ownership			-0.1378* (-1.834)		
Co-Option			-0.4359* (-1.855)		
Duality			-0.0147 (-0.581)		
Involved CEO			-0.0317 (-0.875)		
Only insider			-0.0281 (-1.106)		
President			-0.0291 (-1.334)		
<i>Governance characteristics:</i>					
Board size		-0.0716 (-1.151)	-0.0427 (-0.699)	-0.0556 (-0.798)	-0.0657 (-1.048)
Busy board		0.0183 (0.694)	0.0193 (0.734)	0.0307 (1.006)	0.0152 (0.577)
E-Index		-0.0224** (-2.023)	-0.0247** (-2.192)	-0.0224* (-1.806)	-0.0234** (-2.106)
Independence ratio		0.0857 (0.838)	0.0373 (0.332)	0.1198 (0.997)	0.0849 (0.827)
Independent director ownership		1.5140 (0.764)	1.4368 (0.730)	1.6172 (0.694)	1.5851 (0.806)
Firm characteristics	No	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	No	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry*Year fixed effects	No	No	No	Yes	No
Observations	12,429	12,427	12,427	12,427	12,427
Adjusted R-squared	0.210	0.568	0.567	0.554	0.567

Appendix C – Addressing outliers

This table reports results from pooled OLS regressions of *Tobin's Q* on *CEO tenure* and its squared term along with CEO, firm, and corporate governance characteristics. The sample includes S&P1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). Specification (1) excludes all observations with CEO tenure values below one and equal to or above 38 (the 1% and 99% percentiles). Specification (2) contains only firm-year observations with CEO tenure values below 30 years. Regression specification (3) excludes all CEO-firm observations in which the CEOs left the company during the honeymoon period, i.e., during the first three years in office. A CEO is classified as a CEO who leaves the firm during her honeymoon period if the maximum tenure observed within the sample for a respective CEO-firm pair does not exceed three years. Specification (4) restricts the sample to non-founder CEO observations. All variables are defined in Appendix A. Control variables are identical to those used in Table 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)	(4)
	0 < CEO tenure < 38	CEO tenure < 30	w/o CEOs leaving during honeymoon period	Founder CEO = 0
CEO tenure	0.0244**	0.0154**	0.0166**	0.0149**
	(2.173)	(2.064)	(2.415)	(2.545)
CEO tenure squared	-0.0011***	-0.0006*	-0.0007***	-0.0005***
	(-3.194)	(-1.949)	(-3.765)	(-2.653)
<i>CEO characteristics:</i>				
CEO age	0.0044	0.0022	0.0030	-0.0002
	(0.937)	(0.726)	(0.754)	(-0.071)
CEO gender	-0.0264	0.0067	-0.0531	-0.0070
	(-0.222)	(0.078)	(-0.485)	(-0.083)
CEO power index	-0.0205	-0.0242	-0.0283	-0.0385**
	(-0.759)	(-1.189)	(-1.297)	(-2.440)
Founder CEO	0.7406***	0.4529***	0.5812***	-
	(2.941)	(2.806)	(3.171)	
<i>Governance characteristics:</i>				
Board size	-0.3088***	-0.2481**	-0.2587**	-0.1590**
	(-2.702)	(-2.521)	(-2.431)	(-2.010)
Busy board	-0.0454	-0.0465	-0.0505	-0.0314
	(-1.217)	(-1.444)	(-1.482)	(-1.064)
E-index	0.0267	0.0184	0.0254	0.0026
	(1.272)	(1.134)	(1.484)	(0.171)
Independence ratio	-0.0353	-0.0532	-0.0329	-0.0596
	(-0.214)	(-0.381)	(-0.220)	(-0.543)
Independent director ownership	-5.6174**	-2.6165	-3.3988	-2.1610
	(-1.979)	(-1.204)	(-1.369)	(-1.188)
Firm characteristics	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	10,097	12,078	11,407	10,978
R-squared (within)	0.299	0.295	0.298	0.309

Appendix D – Further alternative explanations

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&P1500 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 activity* is a dummy variable that equals one, if the firm is identified as an acquirer within our M&A sample (not restricted to M&As of a minimum relative deal size) and has announced an acquisition during the year, zero otherwise. *Divestiture* is a dummy variable that equals one if the company is indicated as the target by the SDC Platinum Mergers & Acquisitions Database of a deal which is labeled by the variable "ACQUISITION TECHNIQUE" as a "DIVESTITURE", zero otherwise. *General ability index* is defined as in Custódio, Ferreira, and Matos (2013) and is retrieved directly from the website of the Journal of Financial Economics. All other variables are defined in Appendix A. Control variables are identical to those used in Table 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)
CEO tenure	0.0149** (2.547)	0.0150* (1.773)	0.0149* (1.770)
CEO tenure squared	-0.0006*** (-3.663)	-0.0007*** (-2.863)	-0.0007*** (-2.855)
<i>Further alternative explanations</i>			
Acquisition activity	-0.0564*** (-2.996)		-0.0461* (-1.727)
Divestiture	0.0103 (0.468)		0.0379 (1.294)
General ability index		-0.0684** (-1.966)	-0.0686** (-1.977)
<i>CEO characteristics</i>			
CEO age	0.0020 (0.673)	0.0023 (0.520)	0.0023 (0.520)
CEO gender	0.0301 (0.354)	0.0924 (0.648)	0.0971 (0.685)
CEO power index	-0.0233 (-1.187)	-0.0191 (-0.726)	-0.0190 (-0.723)
Founder CEO	0.4192*** (2.892)	0.6394*** (2.987)	0.6394*** (2.996)
<i>Governance characteristics</i>			
Board size	-0.2576*** (-2.685)	-0.2044 (-1.528)	-0.2059 (-1.538)
Busy board	-0.0517* (-1.670)	-0.0379 (-0.849)	-0.0373 (-0.834)
E-index	0.0163 (1.024)	0.0104 (0.407)	0.0105 (0.412)
Independence ratio	-0.0501 (-0.371)	-0.0891 (-0.485)	-0.0905 (-0.493)
Independent director ownership	-3.4294 (-1.574)	-6.3001** (-2.344)	-6.2910** (-2.329)
Firm characteristics	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Sample period	1998-2011	1998-2007	1998-2007
Observations	12,427	8,092	8,092
R-squared (within)	0.300	0.243	0.243

Appendix E – Restricting the sample

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&P1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). In Column 1, the sample is restricted to firms with more than five firm-year observations and the regression includes firm fixed effects. In Column 2, the sample is restricted to CEO-firm pairs with more than five CEO-firm pair observations and the regression includes CEO-firm fixed effects. Control variables are identical to those used in specifications (6) and (7) of Table 3, respectively. All variables are defined in Appendix A. 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)
	Firm obs. > 5	CEO-Firm obs. > 5
CEO tenure	0.0142** (2.055)	0.0242** (2.075)
CEO tenure squared	-0.0005*** (-3.027)	-0.0008** (-2.082)
<i>Alternative explanations</i>		
CEO age squared	-0.0003 (-1.182)	0.0003 (0.593)
CEO power index squared	0.0026 (0.233)	0.0031 (0.347)
Firm age squared	-0.0891 (-1.420)	-0.2092** (-2.463)
Independent director tenure	0.0014 (0.096)	-0.0050 (-0.276)
Independent director tenure sq.	-0.0005 (-0.613)	-0.0001 (-0.109)
New CEO	0.0285 (0.835)	0.0710 (1.262)
<i>CEO characteristics</i>		
CEO age	0.0400 (1.207)	-0.0299 (-0.599)
CEO gender	0.0579 (0.684)	-
CEO power index	-0.0435 (-0.803)	-0.0507 (-0.994)
Founder CEO	0.4629*** (2.960)	-
<i>Governance characteristics</i>		
Board size	-0.2819*** (-2.785)	-0.1470 (-1.442)
Busy board	-0.0497 (-1.584)	-0.0082 (-0.224)
E-index	0.0182 (1.127)	0.0180 (0.970)
Independence ratio	-0.0616 (-0.429)	0.1952 (1.598)
Independent director ownership	-2.7790 (-1.241)	-1.4116 (-0.473)
Firm characteristics	Yes	Yes
Firm fixed effects	Yes	No
CEO-Firm fixed effects	No	Yes
Year fixed effects	Yes	Yes
Observations	10,204	6,614
R-squared (within)	0.247	0.350

Appendix F – Return on assets (ROA) as an alternative measure of firm performance

This table presents results from firm-fixed effects regressions of *ROA* on *CEO tenure* and its squared term along with CEO, firm, and corporate governance characteristics. The sample includes S&P1500 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, 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 in Column 1 are based on a pooled OLS regression with industry fixed effects. Results in Column 2 stem from a firm fixed effects regression. Results reported in Column 3 are based on a regression including CEO-firm fixed effects. Control variables are identical to those used in Table 2, but exclude *Operation CF_{t-1}*. All variables are defined in Appendix A. 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.

	Pooled (1)	Firm-FE (2)	CEO-Firm FE (3)
CEO tenure	0.0016*** (3.484)	0.0013*** (2.699)	0.0015** (2.354)
CEO tenure squared	-0.00004*** (-3.219)	-0.00003* (-1.778)	-0.0001** (-2.371)
<i>CEO characteristics</i>			
CEO age	0.0001 (0.661)	-0.0004* (-1.730)	0.0005 (1.339)
CEO gender	-0.0148** (-1.975)	-0.0038 (-0.455)	-
CEO power index	-0.0043*** (-3.322)	-0.0007 (-0.703)	0.0005 (1.339)
Founder CEO	-0.0088 (-1.422)	0.0096 (1.244)	-
<i>Governance characteristics</i>			
Board size	0.0071 (1.089)	0.0146** (2.046)	0.0128 (1.460)
Busy board	-0.0005 (-0.196)	-0.0025 (-1.052)	0.0001 (0.021)
E-index	-0.0028** (-2.289)	-0.0013 (-1.007)	-0.0019 (-1.269)
Independence ratio	0.0059 (0.591)	-0.0100 (-0.936)	-0.0049 (-0.400)
Independent director ownership	-0.4721* (-1.861)	-0.4337** (-2.016)	-0.4482** (-2.045)
Firm characteristics	Yes	Yes	Yes
Industry fixed effects	Yes	No	No
Firm fixed effects	No	Yes	No
CEO-Firm fixed effects	No	No	Yes
Year fixed effects	Yes	Yes	Yes
Observations	12,400	12,400	12,400
R-squared (within)		0.323	0.315

Appendix G – Industry shock measures, CEO tenure, and firm value

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 various sub-samples. The sample includes S&P1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). Industry shock measures are calculated as in Guay, Taylor, and Xiao (2014) and described in the caption to Table 7. Control variables are identical to those used in Table 2. All variables are defined in Appendix A. An intercept is included in all specifications, 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.

Industry shock measures (based on Guay, Taylor, Xiao, 2014)												
	Δ Industry Assets		Δ Industry Investments		Δ Industry HHI		Δ Industry R&D		Δ Industry Sales		Δ Industry Advertising	
	≤ Median	> Median	≤ Median	> Median	≤ Median	> Median	≤ 75 th percentile	>75 th percentile	≤ Median	> Median	≤ Median	> Median
CEO tenure	0.0151* (1.787)	0.0170* (1.773)	0.0325*** (2.759)	-0.0031 (-0.298)	0.0182** (2.051)	0.0154 (1.490)	0.0250*** (2.851)	0.0019 (0.107)	0.0122 (1.491)	0.0173 (1.398)	0.0253*** (2.789)	0.0083 (0.821)
CEO tenure squared	-0.0006** (-2.060)	-0.0007*** (-2.997)	-0.0011*** (-3.153)	-0.0001 (-0.861)	-0.0005* (-1.855)	-0.0007*** (-3.073)	-0.0008*** (-3.320)	-0.0004 (-1.473)	-0.0005* (-1.952)	-0.0008*** (-2.798)	-0.0006*** (-2.685)	-0.0006** (-2.042)
CEO characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Governance characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,304	5,306	5,270	5,340	5,391	5,219	7,259	2,422	5,241	5,369	5,226	5,226
R-squared (within)	0.335	0.2463	0.368	0.2680	0.340	0.284	0.322	0.427	0.314	0.368	0.415	0.254
Inflection point (yrs)	12.6	12.1	14.8	-	18.2	11.0	15.6	2.4	12.2	10.8	21.1	6.9

Appendix H – Industry dynamism measures, CEO tenure, and firm value

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 various sub-samples. The sample includes S&P1500 firms over the period 1998-2011 excluding regulated utility and financial firms (SIC codes 4000-4999 and 6000-6999). Dynamism measures are calculated as in Coles, Daniel, and Naveen (2014) and described in the caption to Table 7. Control variables are identical to those used in Table 2. All variables are defined in Appendix A. An intercept is included in all specifications, 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.

Dynamism measures (Coles, Daniel, and Naveen, 2014)								
	R&D industry =0	R&D industry =1	Growth Industry =0	Growth industry =1	Fluidity industry =0	Fluidity industry =1	Merger industry =0	Merger industry =1
CEO tenure	0.0059* (1.834)	0.0389* (1.915)	0.0193*** (2.829)	0.0128 (1.223)	0.0027 (0.802)	0.0295* (1.879)	0.0068 (1.418)	0.0188* (1.678)
CEO tenure squared	-0.0002** (-1.993)	-0.0015*** (-2.887)	-0.0005** (-2.562)	-0.0008*** (-2.891)	-0.0001 (-0.909)	-0.0014*** (-2.764)	-0.0002* (-1.705)	-0.0009*** (-2.693)
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	8,516	3,911	6,266	6,151	7,220	5,207	5,607	6,820
R-squared (within)	0.392	0.363	0.290	0.2978	0.390	0.330	0.393	0.304
Inflection point (yrs)	14.8	13.0	19.3	8.0	13.5	10.5	17.0	10.4