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Abstract

Motivated by the internal governance theory, we investigate the links between subordinate executives' horizon and firm policies. Using the number of years to retirement to capture subordinate executives' horizon inside the firm, we find that subordinates' horizon is positively associated with firm's risk-taking, long-term investments growth, and research and development productivity, but negatively related to the dividend decision and the payout ratio. We also find a positive relationship between subordinates' horizon and firm value. Our results are robust to controlling for alternative explanations including the pay gap between CEO and subordinate executives, executives' overconfidence, CEO's decision horizon, and other governance mechanisms. The results are also robust to alternative measures of subordinates' horizon, and after addressing potential endogeneity concerns.

Keywords: Subordinate executives' horizon, internal governance, risk-taking, long-term investment, payout ratio, firm performance.

JEL Classifications: G30, G31, G32, G35

1. Introduction

The managerial horizon literature provides mixed theoretical arguments about the impact of a manager's horizon on corporate policies. Career concern models suggest that younger managers are generally risk averse due to the fear of market reaction to bad investment decisions and the impacts of such decisions on their future career opportunities (Hirshleifer and Thakor 1992; Holmstrom 1999). However, the managerial signaling model of Prendergast and Stole (1996) posits that younger managers take more risks and make bolder investment decisions to show their managerial ability. Hambrick and Mason (1984) also present reasons why older managers tend to be more conservative, including their desire to maintain financial and career security and the impact of age on their managerial abilities.

Although managing an organization is a shared effort (Franelstien 1992), previous empirical research has mostly focused solely on the impact of the CEO's horizon on corporate decisions (Edmans, Fang, and Lewellen 2017; Serfling 2014; Yim 2013). This emphasis overlooks the role of other important stakeholders inside the firm and implicitly assumes that the CEO is the sole decision maker (Cheng, Lee, and Shevlin 2016). In contrast, recent studies have shown that subordinate executives, specifically, play a significant role in directing a firm's decisions to reflect a long-term commitment to value creation and to reduce the focus on short-term performance (e.g., Acharya, Myers, and Rajan 2011; Kini and Williams 2012).

In this paper, we focus on the key subordinate executives, the group of employees who have the ability and incentive to influence the CEO's decision-making process and provide balanced governance inside the top management team. Acharya, Myers, and Rajan (2011) not only posits that the top management team comprises diverse agents with different horizons, interests, and opportunities for misappropriation and growth but also emphasizes the subordinate executives'

role in monitoring the CEO to force him or her to act in a more public-spirited way. Motivated by their theoretical model, we investigate the impact of subordinate executives' horizon on risk taking, long-term investments, dividend payout policies and firm value. In this study, we argue that subordinate executives can act as a force to shift corporate policies to focus on long-term value creation and improve corporate risk taking.

There are several reasons to believe that subordinate executives' horizon matters for a firm's policies. First, subordinate executives have a high chance of becoming the next CEO. Prior literature shows that newly appointed CEOs are mostly insiders (Acharya, Myers, and Rajan 2011; Cremer and Grinstein 2014; Kini and Williams 2012). As aspiring CEOs, subordinate executives are interested in taking more risks because their future compensation depends on the firm's future cash flow. Hence, it is unlikely for a younger subordinate executive to forgo long-term opportunities to meet short-term market pressures. Second, as argued by Cheng et al. (2016), subordinate executives have more to lose if the firm fails to compete or takes more risks. Subordinate executives outside employment opportunities and wages depend on the success of their firm and the performance of other members of the top management team, including the CEO (Fama 1980).[1] Third, subordinate executives possess firm-specific knowledge and experience and contribute to the firm's day-to-day operations and decision making. This provides them with a rare opportunity to help direct the firm's resources toward high-quality projects and investments. In

[1] Previous research has documented that executives with failed or scandal-tainted companies on their résumés pay a penalty on the job market, even if they had nothing to do with the trouble (Groysberg, Lin, and Serafeim, 2020). For example, Groysberg et al. (2020) shows that senior executives who were associated with scandal-tainted companies face difficulty in changing jobs and are paid nearly 6.5% less than their peers. Further, we believe that subordinate executives are more exposed to labor market risk than the CEO for two main reasons. First, subordinate executives, in general, are younger than the CEO and hence have a longer career horizon compared to the CEO. Second, the CEO assumes the top executive position at the firm's organizational hierarchy and accordingly has more control over the firms' decisions compared to subordinates. As a result, subordinates may pay the price of the CEO's myopic behavior for a longer period of their career horizon, even if they have limited control over the CEO's decision.

addition, they not only have the incentives to focus on the firm's long-term goals, but also have the means to push the CEO to execute them, as the CEO's compensation is a function of subordinates' efforts inside the firm (Acharya, Myers, and Rajan 2011). If they observe that the incumbent CEO is leaving limited or no future opportunities for them, subordinate executives may have little motivation to act.

We may also assume, however, that subordinate executives may lack the incentives to focus on firm's risk taking and long-term investments. Many studies argue that stock price concerns (Stein 1988, 1989), the pressure to beat earnings targets (He and Tian 2013; Porter 1992), and concerns of being fired due to poor performance (Kaplan and Minton 2006) induce managerial short-termism. If both the CEO and other executives focus on short-term performance, then there are no incentives for the top management team to take more risks or invest in the firm's future. Another argument may suggest that subordinate executives do not exercise their power to influence the CEO's decision making either because they are afraid of repercussions if they disobey the CEO or because the CEO may play a role in choosing his or her successor (Cheng et al. 2016). Overall, these arguments demonstrate that subordinate executives may downplay their monitoring role inside the firm to maintain their career and financial security.

These competing arguments make the relationship between subordinate executives' horizon and firm's risk taking and other firm policies an empirical question. To answer this research question, we follow Cheng et al. (2016) and use the number of expected years to retirement as our primary measure to capture subordinate executives' horizon inside the firm. We use the firm's stock return volatility and idiosyncratic volatility as our measures of the firm's risk-

taking orientation.[2] Using a rich panel dataset of S&P 1500 US firms from 1994 to 2019, we find a robust positive association between the number of years subordinate executives have to retirements and risk taking. This finding is robust after controlling for CEO characteristics, including age and tenure, along with the pay performance sensitivity of the CEO and subordinate executives. The positive association between subordinate executives' horizon and risk taking is also robust after controlling for firm characteristics, year, and industry or firm unobserved heterogeneity. The results also hold if we use alternative measures of executives' horizon. Our additional results show that the positive impact of subordinate executives' horizon on risk taking is pronounced when the subordinate executives are part of the board directors and when the firm has low institutional ownership. However, powerful and older CEOs attenuate the impact of subordinates' horizon on risk taking.

To further understand the impacts of subordinate executives' horizon on corporate policies, we next examine the effect on the change in long-term investments, which is a proxy for the growth in the firm's capital stock. Acharya, Myers, and Rajan (2011) argue that CEOs need to commit part of the firm's current cash flow to invest in the capital stock of the firm to create a future for younger executives and to motivate them to exert more learning effort. Consistent with this argument, we find that firms with extended subordinate executives' horizon show higher levels of change in capital expenditure, net property, plants and equipment, and research and development investments. Moreover, we show that firms with subordinate executives who have more years remaining to retirement tend to reduce firm's payouts. This finding is consistent with the argument of Acharya, Myers, and Rajan (2011) that CEOs would prefer to keep investing in the future of

[2] The previous literature has used total return volatility as well as idiosyncratic volatility to measure a firm's risk-taking behavior (Cassell et al. 2012; Guay 1999; Kini and Williams 2012; Serfling 2014).

the firm when their subordinate executives have extended horizon in the firm rather than paying dividends to keep shareholders at bay.

Long-term investments reflect managerial commitment to improving the value of the firm in the long run; however, we cannot observe the quality of such investments just by studying the change in investments over years. Previous research suggests that entrenched CEOs may invest to signal investment opportunities to the market (Bebchuk and Stole 1993), but the quality of such investments decreases over time (Pan et al. 2016). To investigate the quality of a firm's long-term investments, we show that firms with extended executives' horizon observe a higher percentage increase in revenues because of an increase in R&D expenditure. Using the research quotient measure proposed by Knott (2008) as a measure for R&D productivity, we find that the elasticity of a firm's earnings to R&D investments is higher for firms with extended subordinate executives' horizon.

To conclude our study, we investigate the relationship between subordinate executives and firm value. Following Bebchuk, Cremers, and Peyer (2011) we use industry-adjusted Tobin's q as a measure of firm value. Our results show a positive and statistically significant relationship between subordinate executives' horizon and industry-adjusted Tobin's q. The results are robust to controlling for various firm and executives' characteristics, year, industry, or firm unobserved heterogeneity. These results highlight the role of subordinate executives' horizon as a key determinant of the firm's long-term valuation and performance. The results are also related to earlier literature that examines the relationship between different governance mechanisms and firm value measured by Tobin's q (e.g., Bebchuk et al., 2011; Cremers and Nair, 2005; Gompers et al., 2003). Our findings posit that due to their extended horizon, subordinate executives can serve as a bottom-up governance mechanism to increase the value of the firm.

Our findings are less likely to be explained by tournament incentives, subordinate executives' overconfidence, CEO's decision horizon, or anti-takeover provisions. Prior research suggests that subordinate executives are competing for the CEO position, and their effort inside the firm is a function of the magnitude of the promotion prize–pay gap between the CEO and other subordinates (Bognanno 2001; Kale, Reis, and Venkateswaran 2009; Kini and Williams 2012; Prendergast 1999). To rule out the possibility that subordinate executives' horizon is primarily driven by tournament incentives, we control for the pay gap in the top management team. Controlling for the pay gap, our results still show a robust relationship between subordinate executives' horizons and different corporate policies. We also examine the possibility that our findings are derived by the potential relationship between overconfidence and age. The prior psychology literature argues that younger people are more overconfident, which may explain the increase in a firm's long-term investment and risk taking (Kovalchik et al. 2005; Taylor 1975; Yim 2013). To refute this alternative explanation, we control for subordinate executives' overconfidence and confirm that our findings are not sensitive to subordinate executives' potential overconfidence.

Another concern with our results is that our measure of subordinate executives' horizon may, instead, capture the horizon of the CEO or other forms of corporate governance. To forestall this possibility, we use various alternative definitions of subordinate executives' horizon and confirm that our results are not sensitive to a specific definition of subordinates' horizon. Further, we control for Antia et al., (2010) measure of CEO's horizon, Gompers et al.'s, (2003) governance index (G-index) that measures the level of shareholders rights, institutional ownership, and analyst coverage to rule out this possibility. The results confirm that our findings are robust to controlling for additional controls and alternative explanations.

Although our results suggest a strong association between subordinate executives' horizon and corporate policies, we try to address biases caused by omitted variables and potential endogeneity concerns. One may argue that omitted variables could cause the match between younger executives (with a longer expected horizon) and firms with greater risk taking, higher long-term investments, and lower dividend payouts. Thus, the observed positive association between our corporate policy measures and subordinate executives' horizon could be related to omitted variables that affect both the managers' and firm's selection process. To address this concern, we use a firm-fixed effects model to control for other firm-specific heterogeneity that would not be captured by our model specifications. Our results show that the previous findings are less likely to be attributed to such omitted variables biases.

To further address other sources of endogeneity, we use the instrumental variable approach. Following Cline and Yore, (2016) and Serfling (2014), we use the natural logarithm of the average consumer price index (CPI) that corresponds to the birth years of subordinate executives as an instrument for subordinate executives' horizon. Given that the CPI and age are increasing with time, it is likely for the CPI to meet both the relevance and exclusion restrictions to be considered as a valid instrument. The regression results confirm our previous findings, reporting a positive and statistically significant association between subordinate executives' horizon and both risk taking and changes in long-term investments. We also find that subordinate executives' horizon is negatively related to the firm's dividend payout.

Our work contributes to the research stream that highlights the role of subordinate executives inside the top management team. The findings are consistent with earlier theoretical (Acharya, Myers, and Rajan 2011; Landier, Sraer, and Thesmar 2009) and empirical work (Cheng et al. 2016; Jain, Jiang, and Mekhaimer 2016; Landier et al., 2013) that stress the channels through

which subordinate managers can influence corporate decisions.[3] This paper is also closely related to the growing literature that considers managerial characteristics and their impact on a firm's long-term outlook (e.g., Custódio, Ferreira, and Matos 2017; Custódio and Metzger 2014; Hirshleifer, Low, and Teoh 2012; Pan, Wang, and Weisbach 2016; Yim 2013). However, our work shows that the conventional view of the CEO as the sole productive asset in the firm may portray an incomplete picture of the contribution of top management team members and does not always reflect the perspective of other team players, including subordinate executives. We show that the horizon of subordinate executives is highly significant in shaping a firm's future due to their influence on the corporate decision-making process. The in-depth knowledge of subordinate executives, along with their career and personal motivations enable them to increase the firm's risk-taking orientation, growth in long-term investments and return on long-term investments.

Our research also contributes to the literature on managerial incentives. We highlight the importance of studying the incentives of senior executives by showing that the horizon of senior executives in the top management team also matters for corporate policies. This study offers the board of directors an additional dimension—subordinate executives' horizon—to consider in constructing top management teams. To maintain an effective internal governance structure, top

[3] A growing thread of the literature has studied the role of subordinate executives as an internal corporate governance mechanism and a counterforce to the CEO power. Our paper differs from the previous literature in two key aspects. First, this study provides comprehensive empirical evidence that establishes the relation between subordinate executives' horizon and firm policies. Our work complements the previous theoretical work in this thread of literature (e.g Acharya, Myers, and Rajan, 2011; Landier, Sraer, and Thesmar, 2009). Second, our paper focuses on the subordinates' remaining horizon in the firm, in contrast to the focus on their compensation, relative subordinates' compensation to the CEO (e.g., Kini and Williams, 2012, Kale et al., 2009; Shen and Zhang, 2018) or their independence from the CEO (Landier et al., 2013). Although Cheng et al., (2016), and Jain, et al., (2016) use subordinate executives' horizon as one of their subordinates' horizon measures, they study the impact of subordinates' horizon on a firm's real earnings management and liquidity, which is different than our contribution in this study.

management teams should be a good mixture of talents with diversified career horizons and incentives to maximize their learning efforts.

2. Literature review and hypotheses development

To understand the potential effects of subordinate executives' horizon on corporate risk taking and long-term investments, we rely and build on two streams of the literature: the managerial horizon literature and the internal governance literature. Prior managerial horizon theoretical research proposes two competing arguments for how an executive's expected horizon may impact corporate investment decision making and risk-taking behavior. On the one hand, the career concern models argue that, given their limited experience and lack of reputation as high-quality managers, younger executives invest less aggressively (Hirshleifer and Thakor 1992; Holmstrom 1999; Scharfstein and Stein 1990). Younger managers who do not have a previous record of accomplishments may face greater labor market scrutiny for bad investment decisions, and their subsequent future career opportunities may be significantly reduced. This may make younger managers reluctant to pursue an aggressive investment strategy and forego risky long-term projects in favor of safe projects.

On the other hand, the managerial signaling model developed by Prendergast and Stole (1996) predicts that younger managers make more and bolder investments compared to their older counterparts to signal their superior ability to the market. Hambrick and Mason (1984) argues that older managers are more conservative for various reasons First, they argue that older managers value more financial and career security as they age. In addition, older managers' social circles, spending traits, and expectations about retirement income are already established, and hence, they may lack the incentives to take more risks. They further argue that older managers may have less ability to grasp and integrate new ideas, lack physical and mental stamina, and have a greater

commitment to the organizational status quo (Child 1974; Hambrick and Mason 1984; Taylor 1975). Overall, this thread of the literature suggests that younger managers would pursue riskier investments to build their careers and signal their talents.

Although the theoretical literature provides a generic framework for the role of managerial horizon on shaping corporate policies, most of the empirical research focuses solely on the CEO's horizon (Edmans, Fang, and Lewellen 2017; Pan, Wang, and Weisbach 2016; Serfling 2014; Yim 2013) and overlooks the role of other subordinate executives in the top management team. The tendency to focus on the CEO reflects the explicit or implicit assumption that the CEO is the sole decision maker. However, focusing on the CEO may yield an incomplete portrayal of the fact that managing organizations is a shared effort among all top executives (Cheng, Lee, and Shevlin 2016; Franelstien 1992). The top management team is composed of different agents with different appropriation horizons, opportunities, and preferences (Acharya, Myers, and Rajan 2011; Landier, Sraer, and Thesmar 2009). This gap in the empirical literature poses an important yet unanswered question about how other executives' horizon influences corporate decision making.

Acharya, Myers, and Rajan (2011) use a theoretical model to argue that the immediate subordinates of the CEO can act as an internal governance mechanism to provide checks and balances in the firm.[4] They assume a partnership between an older CEO who is about to retire and a younger subordinate manager who will be the next CEO. In their model, the CEO's compensation depends on the firm's current cash flow, which is a function of the firm's capital stock, the younger manager's effort, and the ability of the CEO to manage the firm. To motivate the subordinate manager to learn and exert more effort, the incumbent CEO needs to commit to investing a fraction

[4] Acharya et al. (2011) argue that the board of directors tends to treat the CEO generously; moreover, it is hard to see the market for corporate control as an effective governance mechanism in controlling operations decisions.

of the current cash flow to build and enhance the firm's capital stock sufficiently to generate a future for the young manager. Such commitment to invest in the future of the firm, at least partially, will allow the firm to build substantial value despite the CEO's potentially myopic behavior and even in the presence of dispersed and powerless shareholders. Otherwise, if subordinate managers see that the CEO will leave nothing behind, they will have no incentive to make an effort and the firm's cash flow will decrease significantly.

The extant literature provides several reasons to assume that subordinate executives' expected horizon could alter the firm's risk-taking behavior and long-term investment strategy. First, subordinate executives have a greater chance of being the next CEO, as prior research shows that newly appointed CEOs are mostly insiders (Cremer and Grinstein 2014; Kini and Williams 2012; Cheng et al. 2016). Second, given the number of remaining years of expected employment, subordinate executives have more to lose compared to the CEO. Cheng et al. (2016) argue that subordinate executives face a greater labor market risk. The potential loss of income when searching for a comparable job in the future is higher for subordinate executives, and their outside employment depends on the current firm's performance (Fama 1980). This motivates subordinate executives to focus more on the long-term performance and to monitor the CEO's behavior. Finally, subordinate executives not only have the desire, but also the means to influence the CEO's decisions, as the CEO's welfare depends on their contribution to the firm (Acharya, Myers, and Rajan 2011). Recent empirical research supports the impact of subordinate executives' bottom-up governance, showing that it improves firm's profitability (Landier et al. 2013) and liquidity (Jain et al. 2016) and decreases real earnings management (Cheng et al. 2016).

The previous discussion suggests that subordinate executives who have a long-term expected horizon inside the firm should increase the firm's risk-taking orientation and long-term

investments. However, a counter- argument suggests that subordinate executives may share the same incentives as the CEO and consequently focus on increasing their short-term benefits instead of investing in the firm's future. In addition, subordinate executives might be worried about challenging the CEO, either because they are afraid of retaliation from the CEO or because the incumbent CEO may play a role in choosing his or her successor. Hence, the impact of the subordinate executives' horizon on firm's risk taking and long-term investment is an empirical question. To answer this question, we test the following hypotheses.

H_1: *Subordinate executives' horizon is positively associated with firms' risk taking.*

H_2: *Subordinate executives' horizon is positively associated with firms' long-term investments growth.*

Acharya, Myers, and Rajan (2011) argue that internal governance, motivated by the non-CEO executive's horizon, may have implications for the firm's dividend policy. They suggest that shareholders do not care whether they are paid in dividends or by increases in the firm's capital gains; however, the CEO may use the dividend policy to motivate subordinate managers to exert more effort. The model suggests that the CEO initially would prefer to invest more because investment motivates greater managerial effort and increases the cash flows in the next period when a subordinate manager will be the next CEO. The current CEO will switch to paying dividends only when the return on investment diminishes beyond a certain point—not because shareholders prefer dividends to capital gains per se, but because the additional investment would reduce the subordinate manager's rents to below the participation constraint. Overall, this suggests that longer employment horizons for subordinate executives in the firm may encourage the CEO to reduce the dividend payout ratio and invest more heavily in the future of the firm to create a future for the young managers. Hence, we test the following hypothesis:

H3: *Subordinate executives' horizon is negatively associated with the firm's decision to pay dividend and with dividend payout ratio.*

3. Research design

3.1. Sample

We obtain our initial sample for S&P 1500 firms from Compustat Execucomp covering the period 1994–2019. For a given firm to be included in our sample, we require Execucomp to include information about the top executives' compensation package and age, including the CEO. We also require information about the dates of the CEO's appointment, the date of leaving the firm (if applicable), and the annual CEO indicator [CEOANN]. We drop all firms in the financial ([SIC] between 4000 and 4999) and utility ([SIC] between 6000 and 6999) industries, due to the special financial characteristics of these two industries. We obtain data on the percentage holdings of all institutional investors from the Thomson 13f-filing database. We also collect data on analyst coverage from the Institutional Brokers' Estimate System (I/B/E/S) data set. Finally, we merged the collected data sets with the Compustat and CRSP databases to obtain the firm-level fundamentals and the variables on the stock return required for our analysis. Table A.1 in the appendix summarizes the variable definitions and their sources.

3.2. Measures of subordinate executives' horizon

Our empirical investigation of the impact of subordinate managers' horizon on firm policies is initiated from the premise that subordinate executives tend to estimate their horizon by comparing their age to their expected retirement age, the CEO's age, or the age of other subordinate executives in the same industry (Antia et al. 2010; Cheng et al. 2016). To capture the horizon of non-CEO executives, we employ four alternative measures of their horizon.

We start with our primary measure of the subordinate executive's horizon, *Sub. Rem. Horizon.* Following Cheng et al. (2016), we define *Sub. Rem. Horizon* as the difference between the average age of the subordinate executives in firm *i* and their expected retirement age (assumed to be 65).[5]

$$Sub.\ Rem.\ Horizon_{i,t} = 65 - Sub.\ age_{i,t} \quad (1)$$

We assume that the longer the expected number of years remaining in the firm, the longer the horizon of the subordinate executives. A key advantage of using Sub. Rem. Horizon as our primary measure is the forward-looking nature of the variable, which captures the subordinate executives' incentive to focus on the long-term goals of the firm, including risk-taking orientation, and long-term investment.

Next, we use the difference between the ages of the CEO and subordinate executives as an alternative measure of subordinate executives' horizon. As subordinate executives' incentive to monitor the firm's long-term policies may be founded on their desire to become the next CEO (Acharya, Myers, and Rajan 2011; Cheng et al. 2016; Jain et al. 2016), we hypothesize that if subordinate executives have an extended horizon beyond that of the incumbent CEO, they are likely to be more interested in focusing on the firm's long-term objectives. In contrast, if subordinate executives' age exceeds or is even similar to that of the CEO, it may suggest that both have similar expected horizons inside the firm, so the motivation for subordinate executives to monitor long-term investment is limited. We compute our second measure of internal governance as follows:

$$Diff.\ in\ Horizons_{i,t} = CEO's\ age_{i,t} - Sub.\ age_{\ i,t} \quad (2)$$

[5] We confirm that our results are not sensitive to specific assumed retirement age. We also find similar results using 67 (social security benefits age) as an alternative retirement age.

where *CEO's age*$_{i,t}$, and *Sub. age*$_{i,t}$ denote the age of the CEO and the average age of the top subordinate non-CEO executives for firm *i* at year *t*, respectively.

Prior research suggests that the nature of the industry is a key determinant of the age structure of the executive team. For example, Datta and Rajagopalan (1998) report a negative relationship between the industry growth rate and the age of the CEO's successor. They also suggest that CEOs who have similar characteristics as the industry norms are more likely to have better post succession performance. Further Antia et al., (2010) suggests that a proper horizon measure should control for the relative horizon of the executive to his/her industry peers. To account for changes in age structure across different industries, we create two alternative measures of subordinate executives' horizon. First, we use the industry-adjusted subordinate executives' remaining horizon, *Sub. Ind. Adj. Horizon*, defined as the difference between the average age of subordinate executives in the firm's industry and the firm's average age of subordinate executives. This measure, shown below, accounts for the variation in executive team composition across industries.

$$Sub.Ind.adj\ Horizon_{i,t} = Sub.age_{ind,t} - Sub.age_{i,t} \quad (3)$$

Finally, we develop our final measure, which is the industry-adjusted age difference between the CEO and the subordinate executives as follows:

$$Ind.adj.Diff\ Horizons_{i,t} = \left[Sub.age_{ind,t} - Sub.age_{i,t}\right] - \left[CEO's\ age_{ind,t} - CEO's\ age_{i,t}\right] \quad (4)$$

The $Ind.adj.Diff\ Horizons_{i,t}$ compares the remaining horizon of subordinate executives, relative to their industry peers, with the remaining horizon of the CEO. A positive

value means that subordinates' industry-adjusted remaining horizon exceeds the industry adjusted horizon of the CEO.

3.3. Descriptive results

Panel A of Table 1 reports the summary statistics for subordinate executives' remaining horizon, *Sub. Rem. Horizon*, by year. The average (median) number of expected remaining years for the overall sample is 12.621 (12.750) years. There appears to be no significant variation in the mean value of *Sub. Rem. Horizon* across years except for the period 2007–2010, where the number of remaining years of subordinate executives increased to around 14 years. Starting from 2011, *Sub. Rem. Horizon* has decreased to reach its lowest level in 2019. However, the standard deviation shows that the within-year variation in *Sub. Rem. Horizon* decreased significantly after 2006. Panel B reports the summary statistics of *Sub. Rem. Horizon* by industry, according to Fama and French's (1997) forty-eight industry classifications. We observe that subordinate executives' remaining horizon varies across industries. On average, the fabricated products industry has the highest number of years for the expected subordinate executives' horizons, followed by business services, while the Automobiles & Trucks has the lowest, followed by Business Supplies.

Insert Table 1 Here

We report the summary statistics for the main variables used in our analyses in Table 2. The mean (median) *CEO age* is 55.946 (56.00). In contrast, the mean (median) age of subordinate executives (*Sub. age*) is 52.419 (52.250). These results indicate that, on average, subordinate executives have longer expected career horizon in the firm than the incumbent CEO. Our summary statistics of the average age for both the CEO and the subordinate executives are consistent with

those of Acharya, Myers, and Rajan (2011). According to Table 2, we find that the average expected remaining career horizon for subordinate executives (*Sub. Rem. Horizon*), based on the retirement age of sixty-five years, is approximately thirteen years. We also find that the mean (median) age difference between the CEO and the subordinate executives (*Diff. in Horizons*) is 3.565 (3.333) years.

Our sample also shows that the average change in capital expenditure (Δ CAPX) is 0.60%, while change in net capital expenditure (*Δ Net Invest*) is 1.20%. The average *R&D productivity*, defined as percentage increase in revenue from a 1% increase in R&D, is 0.104, and the average *total* (*idiosyncratic*) *risk* is 0.354 (0.278). Also, we find that about half of the firms in our sample pay dividends, and the average payout ratio is 0.157.

Insert Table 2 Here

In Table 3, we report the correlations among our subordinates' horizon measures (*Sub. Rem. Horizon, Diff. in Horizons, Sub. Ind. Adj. Horizon, Ind. Adj. Diff in Horizons, Sub DH*), firm risk-taking variables, investment policy variables, payout ratio, and firm value. Focusing on *Sub. Rem. Horizon*, we find that it is positively and significantly correlated with all risk-taking, long-term investment, and firm value. For example, the correlation between *Sub. Rem. Horizon* and *Total Risk* is 0.205 and significant at the 1% level. This indicates that firms increase risk taking and investments when subordinate executives have longer career horizon. Lastly, we find that these firms are less likely to pay dividends, and for those that do pay dividends, the payout ratios are lower. The correlation coefficients are consistent with our hypotheses and provide preliminary support to the relationship between subordinate executives' horizon and risk taking, long-term investments, and payout policy.

Insert Table 3 Here

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4. Empirical results

In this section, we present our multivariate regression analyses of the relationship between subordinate executives' horizon and corporate policies. We first establish the relationship between executives' horizons, and corporate risk taking, change in long-term investments, research and development productivity, and dividend payout. Next, we rule out alternative explanations of our findings and deal with potential endogeneity concerns.

4.1. Does subordinate executives' horizon affect corporate risk-taking?

We examine whether internal governance increases firm's level of risk exposure. Our hypothesis is that subordinate executives' power to withdraw their contribution to the firm compels the CEO to adopt risky investment projects to increase future firm performance. Thus, firms, where subordinate executives have longer career horizons, may assume a higher level of risk, all things being equal. We examine two different measures of risk: *Total Risk,* which is calculated as the annualized standard deviation of daily stock returns over the fiscal year, and *Idiosyncratic Risk,* which is calculated as the annualized standard deviation of the residuals from the regression of daily stock returns on the three Fama and French factors estimated over the fiscal year. We estimate panel regressions using industry and year fixed effects, as well as standard errors that allow for heteroscedasticity and clustering at the firm level. Thus, we estimate the model in the following form:

$$Firm\ risk_{i,t} = \alpha + \beta^{(1)} Sub.Executive\ Horizon_{i,t} + \theta X_{it} + \lambda_j + \phi_t + \varepsilon_{i.t} \quad (5)$$

where *Firm Risk* represents either *Total Risk* or *Idiosyncratic Risk*; *X* represents a set of CEO, subordinates and firm-control variables; and λ_j and ϕ_t are industry and year dummies, respectively. We follow the previous literature to control for firm characteristics that are known to affect firm's risk-taking behavior (Kini and Williams 2012; Serfling 2014; Yim 2013). We control for the firm's age, cash, book value of total assets, market-to-book, leverage, return on assets, buy and hold stock return and change in sales. Previous research shows that CEO age (Serfling 2014; Yim 2013), tenure (Simsek 2007) and the managerial compensation incentives of the top management team (Cole, Daniel, and Naveen 2006), measured by the delta, and vega of the CEO and other subordinate executives affect risk-taking incentives. As a result, we control for these variables in all our models. Further, we control for institutional ownership and analyst coverage to account for external governance mechanisms that may affect firm's risk-taking orientation.

We present the regression results in Table 4 using the previously discussed measures of executives' horizon. The estimated coefficients on all four measures of executives' horizon show a positive and highly significant association between senior executives' horizon and risk taking measured by *Total Risk.* These results also hold for firm-specific risk, *Idiosyncratic Risk.* The estimated coefficients on variables related to subordinate executives' horizon are positive and significant at the 1% level. We find that a one standard deviation increase in subordinates' remaining horizon is associated with a 2.26% increase in total risk relative to the mean, suggesting that our results are not only statistically significant but also have significant economic importance.[6] Using the standardized coefficients reported in Table 4, we can conclude that the reported effect

[6] To find the economic significance, we use an unstandardized coefficient of *Sub Rem. Horizon* in Table 4 (0.00146), the standard deviation of *Sub Rem. Horizon* (5.479), and mean of *Total Risk* (dependent variable), (0.354). An increase in one standard deviation increases the total risk taking by 2.26% relative to the mean {[0.00146 × 5.479] / 0.354}.

of subordinates' remaining horizon on total risk almost offsets the negative impact of CEO age on risk taking. The findings are close to the reported statistics in Serfling (2014), who observe a negative impact for CEO age on risk taking. The results not only show that focusing solely on the CEO's horizon may provide an incomplete picture of the impact of the top management team's horizons on risk taking, but also explain why firms can survive even with potentially myopic behavior from the CEO.

Insert Table 4 Here

4.2. Does subordinate executives' horizon affect growth in long-term investments?

Next, we test the relationship between subordinate executives' horizon and growth in long-term investments. As previously discussed, we hypothesize that for subordinate executives to be motivated to exert more learning effort in the firm they need the incumbent CEO to commit to invest part of the current cash flow to their future in the firm. Our prediction is that investment growth should be associated with the subordinate executives' horizon in the firm, which would suggest that the CEO is investing in the future of his or her young executives. To assess this relation, we use the following regression model:

$$\Delta\, Investment_{i,t} = \alpha + \beta^{(1)} Sub.Executive\ Horizon_{i,t} + \theta X_{it} + \lambda_j + \phi_t + \varepsilon_{i.t} \quad (6)$$

where *X* denotes a vector of CEO and firm control variables that are determinants of growth in long-term investments. We follow Edmans, Fang, and Lewellen (2017) and use the change in capital expenditure and net property plant and equipment (PPE) to proxy growth in long-term investments. We also use two additional measures that add the change in R&D to the change in capital expenditure or net PPE to proxy long-term investments growth. The Δ CAPX and

Δ Net Invest are defined as the change in the capital expenditure or net PPE from year t-1 to t, respectively, scaled by the total assets at the end of year t-1. Following Edmans, Fang, and Lewellen (2017), we also control for the lagged values of firm age, market value of the firm, cash, retained earnings, return on assets, idiosyncratic stock return, and leverage. We factor out confounding effects on growth in investment by controlling for CEO age, tenure, delta, and vega, along with subordinate executives' delta and vega, institutional ownership, and analyst coverage.

Panel A of Table 5 presents the results from the multivariate regression analyses that regress the change in long-term investments on our executive horizon variables and a vector of control variables. The regression results support our second hypothesis, showing that the executive horizon measures are positive and significant at the 1% level. Our results show that extending the horizon of subordinate executives pushes the CEO to invest in the future of the firm to create a future for those subordinates. These results are consistent with the internal governance theory developed by Acharya, Myers, and Rajan (2011) and suggest that subordinate executives can act as a bottom-up governance mechanism to force the CEO to focus on corporate long-term goals. Our results indicate that a one standard deviation increase in subordinates' remaining horizon is associated with a 13.59% (10.98%) increase in Δ CAPX (Δ Net Invest) relative to the mean. The results show that our findings are economically meaningful.

Insert Table 5 Here

Panel B shows the results for alternative investment measures that account for R&D spending: Δ CAPX + RD, which is defined as the sum of the change in the R&D expenditure and capital expenditure from year t-1 to t, scaled by the total assets at the end of year t-1 (missing R&D and capital expenditure are set to zero); and Δ Net Invest + RD, which is defined as the sum of the

change in R&D expenditure and net capital expenditure from quarter t-1 to t, scaled by the total assets at the end of year t-1 (missing R&D and net capital expenditure are set to zero). The regression results show that the estimated coefficients on our internal governance variables are positive and significant at the 1% level for the two alternative measures of investment growth. Taken together, these results indicate that firms with longer subordinate executives' horizon are inclined to invest more in the future to align the firm's investment horizon with those of the subordinate executives.

4.3. Does subordinate executives' horizon affect R&D productivity?

Previous literature shows that CEOs may invest to signal potential investment opportunities (Bebchuk and Stole 1993), but the quality of such investments may decrease over time. For example, Pan et al. (2016) document that a firm's investments follow the CEO's investment cycle in which disinvestment (investment) decreases (increases) over the course of a CEO's tenure. Despite the increase in investments, they report a decline in the quality of investments as the CEO gains more control over the board.

To investigate to what extent longer subordinate executives' horizon may affect the quality of long-term investment, we use firm's research quotient (*RQ*) developed by Knott (2008), as a measure of R&D productivity. We test this relationship using the following form:

$$\mathrm{RQ}_{i,t} = \alpha + \beta^{(1)} Sub.Executive\ Horizon_{i,t} + \theta X_{it} + \lambda_j + \phi_t + \varepsilon_{i.t} \quad (7)$$

RQ denotes the percentage increase in total revenues attributed to a 1% increase in R&D investment, all things being equal. According to our prediction, we should observe a positive association between the quality of long-term investments, measured by *RQ*, and subordinate executives' horizon, as subordinates should help direct investment toward high-quality projects to

improve the firm's future cash flows. The results are reported in Table 6. Consistent with our previous findings and our prediction, we find a positive and significant relationship between different measures of subordinates' horizon and firm *RQ*. Economically, the results show that one standard deviation increase in subordinates' remaining horizon is associated with a 2.57% increase in *RQ* relative to the mean.

Insert Table 6 Here

4.4. Does subordinate executives' horizon affect dividend payout?

According to the theory proposed by Acharya, Myers, and Rajan (2011), firms pay dividends to shareholders when an additional increase in investment would impose a considerable future burden on project implementers (i.e., subordinate executives). However, in the previous sections, we find that when subordinate executives have longer career horizon, firms increase investment in long-term projects. These findings imply that subordinate executives' longer horizon will make it unlikely for firms to pay dividends, and if they pay dividends, the payout ratio will be a decreasing function of the subordinate executives' horizon, all things being equal. We test these predictions using models in the following form:

$$\text{Div}_{i,t} = \alpha + \beta^{(1)} Sub.Executive\ Horizon_{i,t} + \theta X_{it} + \lambda_j + \phi_t + \varepsilon_{i.t} \quad (8)$$

where *Div* refers to either the *Dividend Paid* or *Payout Ratio*. We define *Dividend Paid* as a dummy equal to 1 if the firm paid dividend and zero otherwise. We define *Payout ratio* as the ratio of the total dividend paid to net income. Vector *X* represents a set of CEO and firm control variables, λ_j and ϕ_t are industry and year dummies, respectively. Following Custódio and Metzger

(2014), we control for the book value of total assets, cash, assets growth, leverage, return on assets, the lagged value of retained earnings, and market to book ratio.

We report the OLS and logit regressions results in Table 7. As predicted, firms with extended horizon of subordinate executives are less likely toward pay dividends. The estimated coefficients on subordinate executives' horizon are negative and highly significant across different measures of executives' horizon. The results are consistent with Acharya, Myers, and Rajan (2011) and echo our previous findings that subordinate executives with extended horizon in the firm would focus on long-term investments rather than directing the firm's resources to paying dividends. The findings also show that the payout ratio is negatively associated with subordinate executives' horizon in the firm. We find that one standard deviation in subordinate executives' horizon is associated with a 9.97% decrease in the payout ratio relative to the mean.

Insert Table 7 Here

4.5. Alternative explanations – Additional controls

In this section, we explore whether our results can be explained by alternative explanations. First, we examine the impact of controlling for managerial tournament incentives on our results. Using the pay gap between the CEO and the second-layer executives as a measure of tournament incentives, Kini and Williams (2012) show that a greater CEO promotion prize—pay gap—leads to greater risk taking and higher R&D intensity, but lower capital expenditure intensity. Although these results differ, at least partially, from our findings presented earlier—especially with respect to the capital expenditure—we acknowledge the possible connection between subordinate executives' horizon and managerial tournament incentives. To corroborate our previous finding,

we control for the pay gap between subordinate executives and the CEO. Panel A of Table 8 shows the regression results. Our findings suggest that the reported results are less likely to be driven by tournament incentives in the top management team. Our results are robust after including the top management pay gap as a control variable. As expected from the literature, our findings show a positive and significant association between tournament incentives and risk taking, as well as the change in net investments, and R&D productivity. However, we find a negative and statistically significant association between tournament incentives and the dividend payout. Also, we find no association between tournament incentives and the change in firm's capital expenditure. The results posit that subordinates' horizon effect on firm policies is incremental to the impact of tournament incentives.

Another alternative explanation of our results arises from the psychology literature, which argues that younger managers tend to be overconfident (Forbes 2005; Kovalchik et al. 2005; Taylor 1975). If younger managers tend to overestimate their abilities, they might be inclined to take greater risks and make more long-term investments, especially if such investments could lead to an increase in their compensation (Yim 2013). To refute this explanation, we control for the CEO and subordinate executives' confidence levels. Following the literature (see, e.g., Hirshleifer, Low, and Teoh 2012; Humphery-Jenner et al. 2016; Malmendier, Tate, and Yan 2011) we use subordinate executives' (CEO) options grant information as a measure of subordinates' (CEO) confidence. To construct a continuous confidence measure, we collect options grant information from Execucomp. Next, for every executive, we divide the value of all unexercised exercisable options by the number of options vested, we then scale the results by the price at the end of the fiscal year, as reported in Compustat. To reach a measure of subordinate executives' confidence at the firm level, we use average confidence measure for all subordinate executives.

The results are reported in Table 8 Panel B. We find that our results are not affected by subordinate executives' or CEO confidence levels. The results confirm our previous findings and rule out the possibility that our findings are driven by executives' overconfidence. The reported results show that subordinates' confidence is positive and significantly associated with the firm's change in long-term investments, while the CEO's confidence is negatively associated with the firm's payout policy.

Next, we examine whether our results are robust to controlling for the CEO's decision horizon. Antia et al., (2010) study the relationship between CEO's decision horizon and firm performance. They argue that CEO age and tenure relative to their industry peers affect the CEO's choice of the firm policies, showing that shorter CEO's decision horizon is associated with higher agency costs, lower firm valuation, and higher level of information risk. Although in our baseline regressions we control for CEO's age and tenure, in this test, we control for the Antia et al. (2010) measure of decision horizon to confirm that our results are not sensitive to controlling the CEO's horizon relative to his/her industry peers. Table 8 Panel C shows the regression results. We find that the relationships between subordinate executives' horizon and firm policies hold after controlling for the CEO's decision horizon. The results also show that CEOs with longer horizons relative to their industry peers have a positive impact on the growth in the firm's long-term investment.

Finally, we control for the impact of shareholders' rights measured by Gompers et al., (2003) governance index, on the relationship between subordinate executives' horizon and firm policies. Building on the quiet life hypothesis, Bertrand and Mullainathan (2003) shows that when managers are insulated from takeovers, the overall productivity, and profitability of the firm

decline. Also, Gompers, Ishii, and Metrick (2003) show that firms with stronger shareholder rights tend to have firm value, profits, and sales growth, but lower levels of capital expenditures, corporate acquisitions. To confirm our previous findings, we control for the G-index in Table 8 Panel D. Our results show that the impact of subordinate executives is not affected by including the G-index as a control variable. The coefficients of subordinates' executive are statistically significant for all dependent variables. The results for the G-index are consistent with earlier literature. We find that the G-index is negatively related to risk taking and capital expenditure growth but positively related to the dividend payout.

Insert Table 8 Here

4.6. Endogeneity issues

Although our results suggest a robust association between subordinate executives' horizon and firm policies, we still need to address potential endogeneity concerns. For example, it is possible that the association between the executives' horizon and firm policies is driven by a shift in the firm's fundamental policy which presumably will increase the risk level, long-term investments, and cut dividend payments. Such policies may push the board to appoint younger executives to carry out these tasks. In this case, the correlation between younger executives (with a longer horizon) and firm policies may be driven by reverse causality through the firm's need of bold policy changes not due to the extended horizon of subordinate executives. Furthermore, it is also possible for the subordinate executives' horizon measure to be correlated with unobservable variables that also influence firm's investment, dividend policies, and risk-taking. Hence omitted variables bias may spuriously cause the relationship between subordinate executives and firm policies.

To address these concerns, we use two approaches. First, we control for the firm fixed effects to test whether unobserved firm-specific factors are driving the reported effects of subordinate executives' horizon. The regression results for firm fixed effect regressions appear in Table 9. The results indicate that the effects of subordinate executives' horizon on investment, risk taking, and payout ratio are not driven by firm-specific unobservable factors. There is still a significant relationship between subordinate executives' horizon and all our measures of corporate policies, except for *Δ Net Invest* and *Δ Net Invest + RD*.[7] These results uphold our previous findings and suggest a robust association between subordinate executives' horizon and corporate policies.

Insert Table 9 Here

Next, we use the instrumental variable approach to address other sources of endogeneity. Given the difficulty of finding an instrument that satisfies both conditions; relevance and exclusion, for a valid instrument, we heed previous studies direction by using the CPI at the executive's birth year as an instrument for executives' age (Cline and Yore, 2016; Serfling, 2014). The CPI is on average increasing over time which satisfies the relevance condition as there is a negative (positive) correlation between CPI at the birth year and subordinate executives' age (subordinate executives remaining horizon). However, we acknowledge that such consistent increase in CPI may cause CPI to be almost a monotonic transformation of years.[8]

The first stage regression has confirmed this conjecture showing that the relationship between average subordinate executives' horizon and the log of the average CPI at the executives'

[7] It is important to note that growth in investment has relatively little within-firm variation over time, as we should not expect the change in capital expenditure, net investment, and R&D to change significantly from one year to another. To be consistent across different firm policies we use the industry fixed effects in our baseline regressions.
[8] We acknowledge an anonymous reviewer who pointed out this possibility.

birth years is positive and statistically significant. It is also unlikely for the CPI that corresponds to the executives' birth years to be correlated with the firm's current risk taking, growth in investment, or dividend payout policies, except through the role of subordinate executives in shaping the firm's policies. The F-statistics from the first stage regression has confirmed that the instrument is not weak as it exceeds 10, rejecting the null hypothesis of a weak instrument. Table 10 shows the second-stage regression results. The coefficients of subordinate executives' horizon, as expected, show a positive and statistically significant relationship with risk taking and investment policy, but a negative and statistically significant relationship with dividend payout. Overall, the (2SLS) regression results support our previous findings and suggest that it is unlikely for our findings to be driven by other endogeneity concerns.

Insert Table 10 Here

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5. Additional analyses

5.1. Alternative definitions of subordinates' horizon

Our primary measure of subordinate executives' horizon depends on two main assumptions. First, it implicitly assumes that subordinate executives' age solely reflects subordinates' horizon. Second, it also assumes that the retirement age of subordinate executives is the same across different industries. Although we have used multiple versions of subordinate executives' horizon measures to support our baseline findings, it is important to test whether our results would change if we relax any of these assumptions.

Previous literature has focused on two dimensions, age, and tenure, to measure an executive's horizon (e.g., Antia, Pantzalis, and Park, 2010; Cassell, Huang, Sanchez, and Stuart, 2012; Lee, Park, and Folta, 2018). Antia et al. (2010) posits that incorporating executive's age and

tenure relative to their industry peers should provide a more precise reflection of his/her career horizon, as each dimension may not adequately capture the executive's decision horizon. Following prior literature, we have used Antia et al.'s (2010) measure of decision horizon as an alternative measure of subordinates' horizon. Following Antia et al. (2010) we define the decision horizon as follows.

$$\mathrm{DH}_{i,t} = [Tenure_{ind,t} - Tenure_{i,t}] + [Age_{ind,t} - Age_{i,t}] \quad (9)$$

Where $\mathrm{DH}_{i,t}$ is the decision horizon of executive's *i* in year *t*. $Tenure_{ind,t}$ and $Age_{ind,t}$ are mean values of the tenure and age, respectively, of all executives operating in the same industry as executive *i*. To reach a measure of subordinate decision horizon at the firm level, we calculate the average value of the *DH* of all subordinate executives in the firm. The measure is designed as an increasing function of the executives' horizon.[9] The regression results, presented in Table 11 Panel A, show that our findings are robust to using Antia et al. (2010) as an alternative measure of subordinates' decision horizon.

Insert Table 11 Here

We further investigate whether assuming varying retirement age by industry, instead of 65, may affect our findings. To construct an alternative measure based on varying retirement age, we identify executives' retirement cases from Execucomp, inferred from the "REASON" variable. The variable determines the executive's reason for leaving the company. We only use cases where the reason for leaving the company is "RETIRED". We identified 304 retirement cases in all industries. We then calculated the industry retirement age based on SIC 2-digit industry

[9] In this test we lose half of the sample observations as subordinate executives' dates for joining and leaving the company in Execucomp are mostly incomplete and relatively rare compared to the CEOs' information.

classification and find the subordinate executives' horizons using the median retirement age for each industry. The results based on varying retirement ages are reported in Table 11 Panel B. The results again confirm that our findings are not sensitive to assuming 65 as the executive's retirement age.[10]

5.2. CFO vs. Highest paid-subordinate executive

Our previous results suggest that the compound effect of all subordinate executives' horizon affects corporate policies. However, it does not specify if a single subordinate executive can make a difference in shaping a firm's policies. To answer this question, we separately investigate the impact of the horizons of the CFO vs. the highest paid subordinate executive on the firm's policies. Table 11 Panel A shows the regression results for the impact of the CFO's horizon on corporate policies. Our results show that the coefficients of the CFO horizon are mostly insignificant except for the idiosyncratic volatility, *Δ CAPX,* and *Δ CAPX+RD*. The results, generally, suggest that it is unlikely for the CFO horizon to be the determining factor of the firm's risk taking, investment and dividend payout policies. On the other hand, we find the horizon of the highest paid subordinate executive plays a role in shaping firm's policies. We find that coefficients for the highest paid subordinate executive are statistically significant for all our measures of firm's policies except for *Δ CAPX +RD* and *Δ NETINV +RD*. The results, generally, are consistent with earlier literature that suggested that the CFO has a small chance of assuming the CEO position in

[10] In a parallel untabulated analysis, we have used all departure events in the Execucomp database regardless of the reason for leaving the firm. We find that our results are also robust to our alternative measure based on varying retirement (departure) executives' age. These results show that it is unlikely for our results to be driven by fixing the retirement age to 65 or a specific departure reason.

the future, which may explain the insignificant results for the CFO horizon (Kale, Reis, and Venkateswaran, 2009; Kini and Williams 2012; Mian, 2001).

Insert Table 12 Here

5.3. Risk taking: Additional analyses

In this section, we investigate the different factors that may affect the relationship between subordinate executives' horizon and risk taking. First, we examine the impact of low institutional ownership on the relationship between subordinates' horizon and risk taking. Acharya, Myers, and Rajan (2011) posit that subordinate executives' bottom-up governance would be more effective if external governance is weak. To test this argument, we use institutional ownership as a proxy for corporate governance, exercised by institutional investors (Cremers and Nair 2005). We create an indicator variable, *Low IO,* that takes the value of one if institutional ownership in the firm is below the sample median and zero otherwise. Table 13 reports the regression results. We find that the interaction terms between our primary measure of subordinate executives' horizon, *Sub. Rem. Horizon* and *Low IO,* are positive and statistically significant. The results suggest that the effects of subordinates' horizon are more effective when firms have a low level of institutional ownership.

We also find that the impact of subordinate executives' horizon on risk taking is higher when they have a greater presence on the board. We find the interaction terms between subordinate executives remaining horizon and the number of non-CEO executives, *Sub. Directors*, on the board, are positive and statistically significant. The results posit that subordinates with extended horizon in the firm who have access to the boardroom have greater influence on a firm's risk-taking behavior. The results show the impact of the added power that subordinate executives may possess through their access to the board on risk taking. These results are consistent with prior

theoretical studies (Adams and Ferreira 2007; Harris and Raviv 2008; Raheja 2005) and empirical work (Duchin et al. 2010; Masulis and Mobbs 2011) that highlight the role of non-CEO inside directors in providing important information to the board to improve its monitoring role.

Finally, we find that the relationship between subordinate executives' horizon and risk taking is negatively impacted by the presence of older or powerful CEOs. To test the impact of an older CEO, we create an indicator variable that takes the value of one if the CEO's age is above the sample median and zero otherwise. The interaction term between the indicator variable, *Older CEO,* and executives' horizon is negative and statistically significant for both *Total Risk* and *Idiosyncratic Risk.* These results are consistent with previous empirical work, which has shown that older CEOs are more conservative and tend to pursue less risky projects (Serfling 2014; Yim 2013). Similar results are also reported for the impact of the *CEO Power*. To proxy the CEO's power, we use Bebchuk, Cramers, and Peyer's (2011) pay slice measure to assess the CEO's power relative to other subordinate executives in the firm. Bebchuk et al. (2011) argue that the CEO's pay slice is a strong prediction of the CEO's dominance and his relative contribution/importance inside the top management team. We create a dummy variable that takes the value of one if the CEO's pay slice is greater than the sample median and zero otherwise. We find that the interaction term between CEO power and subordinates' remaining horizons is negative and statistically significant for both *Total Risk* and *Idiosyncratic Risk*. Our results are consistent with Acharya, Myers, and Rajan (2011), who argue that internal governance executed by subordinate executives is less effective if the CEO has more power in the firm.

Insert Table 13 Here

5.4. Firm value

To conclude our empirical analysis, we explore the relationship between subordinate executives' horizon and the value of the firm. Our results suggest that subordinate executives' horizon has a positive impact on firm's risk taking and investment, but to what extent such increase in risk taking and investment is reflected in the firm's value is still unclear.[11] Previous literature shows that CEOs with longer career horizon tend to have a positive impact on firm value (Antia et al., 2010; Cline and Yore, 2016). However, the impact of subordinate executives' horizon on firm value is still unknown. To answer this question, we follow Bebchuk et al. (2011) and use the firm industry-adjusted Tobin's q as a measure of the firm value. We control for variables that are known to affect firm value including executives' pay performance sensitivity, CEO's age, the book value of total assets, ROA, capital expenditure, R&D expenditure, leverage, firm age, and the lagged value of the firm's Tobin's q. In addition to the year fixed effects, we also include industry or firm fixed effects to control for unobservables at the firm or industry levels.

The results are reported in Table 14. We find that the coefficients of subordinates' horizon are positive and statistically significant for 6 out of 8 different regressions, suggesting that firm value is a function of subordinate executives' horizon. These results corroborate our previous findings by showing that the increase in risk taking and long term investments is expected to have a positive impact on the firm value measured by the industry-adjusted Tobin's q. The results also enrich our understanding of the role that is played by non-CEO senior executives in increasing the firm value. In terms of the economic significance, we find that a one standard deviation increase in subordinates' remaining horizon is associated with a 5.46% increase in the firm's industry-adjusted Tobin's q relative to the mean.

[11] We thank the anonymous referees for suggesting this test.

Insert Table 14 Here

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6. Conclusion

The agency theory suggests that managers' main objective is to maximize shareholders' wealth. Managers should invest in the future of the firm, take on risky projects with high returns, and increase the capital stock of the firm. In contrast, many studies have argued that external pressure and managerial career concerns induce managerial short-termism (He and Tian 2013; Kaplan and Minton 2006; Stein 1988, 1989). Although previous research has focused extensively on the effects of the CEO's characteristics on corporate policies (Edmans, Fang, and Lewellen 2017; Serfling 2014; Yim 2013), it overlooks the important roles of other stakeholders inside the firm, including subordinate executives. Underpinning the role of bottom-up governance exercised by subordinate managers, Acharya, Myers, and Rajan (2011) posit that a firm's management team consists of diverse agents with different career horizons, incentives, and growth opportunities. They theorize that, given their incentives and ability to influence the CEO's decision-making, subordinate managers can push the CEO to invest more in the future of the firm.

In this study, we empirically test whether there is a link between the subordinate executives' horizon and the firm's risk taking, growth in long-term investments, payout ratio, and firm value. We hypothesize that subordinate executives' horizon is positively associated with a firm's risk taking and growth in long-term investment and firm value, but negatively related to the firm's payout ratio. Using the number of years to retirement as our main proxy for subordinate executives' horizon, we find strong evidence that supports our hypotheses. First, we find that firms take more risks and invest more in long-term assets when subordinate executives have longer horizon in the firm. In addition, as capital projects demand significant cash commitments, we

document that these firms reduce their payouts to free up cash for projects. We also find evidence that a firm's earnings elasticity to R&D investments increases with subordinate executives' horizon. Finally, we find that there is a positive association between firm value and subordinates' horizon. These results are robust to alternative measures of subordinates' horizon. We also show that our results are less likely to be explained by the difference in pay between the CEO and his or her subordinates, the CEO's horizon, or by executives' potential overconfidence. We address the expected omitted variables bias and the potential endogeneity concerns by using firm fixed effects models and by employing 2 stages least squares regressions.

Our results highlight the significance of considering subordinate executives' horizon and its impact on shaping corporate policies. The results offer the board an additional dimension to consider when constructing top management teams. To maintain effective internal governance, top management team members should be a combination of agents with different employment horizons. This type of structure would provide an incentive for managers with extended horizon to force the CEO to focus on the firm's future by investing more in long-term projects, increasing risk taking and improving firm value.

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Table 1: Subordinate executives' horizon

Panel A reports the 25th percentile (P25), mean, median (P50), 75th percentile (P75), and standard deviation of subordinate executives' remaining horizon (*Sub. Rem. Horizon)* by year. Panel B reports the same statistics based on the Fama–French 48 industry classifications (FF). Variable definitions are provided in the Appendix.

Panel A: Subordinate executives' remaining horizon by year

Year	P25	Mean	P50	P75	SD
1994	8.000	12.487	13.000	17.000	6.781
1995	8.000	12.389	13.000	17.000	6.994
1996	8.000	12.435	12.333	17.250	6.808
1997	7.667	12.129	12.500	17.125	7.090
1998	7.583	12.346	12.750	17.583	7.205
1999	8.000	12.803	13.250	18.000	7.152
2000	8.367	12.899	13.000	18.000	7.056
2001	7.500	12.497	13.000	18.000	7.175
2002	8.750	12.581	13.000	17.750	6.866
2003	9.000	12.522	13.500	17.333	6.659
2004	8.500	12.476	13.250	17.250	6.737
2005	8.750	12.453	13.000	17.000	6.647
2006	8.000	12.136	13.000	16.667	6.572
2007	11.500	14.269	14.250	17.250	4.343
2008	11.286	14.064	14.000	17.000	4.331
2009	11.000	13.818	14.000	16.667	4.285
2010	10.600	13.368	13.500	16.000	4.295
2011	10.250	13.003	13.155	15.833	4.362
2012	10.000	12.747	12.750	15.500	4.378
2013	9.750	12.477	12.388	15.250	4.330
2014	9.500	12.333	12.200	15.000	4.417
2015	9.500	12.024	12.000	14.667	4.302
2016	9.200	11.774	11.600	14.500	4.237
2017	8.800	11.529	11.500	14.250	4.240
2018	8.750	11.344	11.400	14.000	4.252
2019	8.667	11.241	11.500	14.000	4.403
Full Sample	9.500	12.621	12.750	16.000	5.479

Panel B: Subordinate executives' remaining horizon by industry													
Industry Name	FF	P25	Mean	P50	P75	SD	Industry Name	FF	P25	Mean	P50	P75	SD
Agriculture	01	9.000	12.001	12.000	16.000	6.627	*Machinery*	22	9.750	12.379	12.400	15.400	4.837
Food Products	02	8.000	10.958	11.000	13.750	5.245	*Electrical Equipment*	23	9.500	12.212	12.000	15.000	4.797
Candy & Soda	03	6.250	10.008	10.292	13.333	5.630	*Automobiles & Trucks*	24	6.750	8.988	9.600	12.000	4.754
Beer & Liquor	04	7.250	10.089	9.900	12.600	5.059	*Aircraft*	25	8.000	11.356	10.750	13.600	4.401
Tobacco Products	05	8.250	10.377	10.500	12.400	3.925	*Ships & Railroad Equipment*	26	5.800	9.872	10.750	14.000	6.364
Recreation	06	8.000	11.605	12.292	15.750	6.739	*Defense*	27	8.000	11.131	12.143	15.400	6.869
Entertainment	07	11.367	14.305	15.000	18.000	5.488	*Precious Metals*	28	8.600	11.205	11.250	14.400	4.511
Printing & Publishing	08	8.000	11.442	11.000	15.000	5.984	*Non-Metallic Metal Mining*	29	11.250	13.438	13.500	15.600	3.150
Consumer Goods	09	8.675	11.374	11.500	15.000	5.799	*Coal*	30	9.000	12.043	12.000	15.200	5.080
Apparel	10	9.750	12.667	13.000	16.000	5.247	*Petroleum and Natural Gas*	32	9.000	12.455	12.429	16.000	5.698
Healthcare	11	10.143	13.584	13.250	17.600	5.740	*Communication*	33	9.000	12.287	12.750	15.833	5.462
Medical Equipment	12	10.500	13.523	14.000	17.000	5.261	*Personal Services*	34	11.500	14.828	15.000	18.500	5.462
Pharmaceutical Products	13	10.000	12.882	12.750	16.000	4.679	*Business Services*	35	10.500	13.652	13.800	17.000	5.239
Chemicals	14	9.000	11.395	11.400	14.000	4.154	*Computers*	36	9.250	12.244	12.500	15.750	5.201
Rubber &Plastic Products	15	9.000	11.460	12.250	15.800	6.144	*Electronic Equipment*	37	9.250	11.930	12.250	15.000	4.887
Textiles	16	7.250	11.278	11.250	15.600	5.895	*Measuring &Control Equipment*	38	8.500	10.852	11.500	14.000	5.138
Construction Materials	17	7.143	10.698	11.200	14.600	5.645	*Business Supplies*	39	6.750	9.179	9.250	11.429	4.260
Construction	18	8.367	11.530	11.600	15.000	5.706	*Shipping Containers*	40	10.000	13.369	13.250	17.000	5.416
Steel Works	19	7.500	10.702	11.000	14.000	5.541	*Transportation*	41	9.600	12.947	12.800	16.500	5.554
Fabricated Products	20	13.000	14.982	15.833	18.250	5.572	*Wholesale*	42	9.750	12.804	13.250	16.400	5.574
Machinery	21	9.000	11.665	12.000	15.000	5.014	*Retail*	43	11.200	14.131	14.000	17.667	5.296
Full Sample		9.500	12.621	12.750	16.000	5.479	*Restaurants, Hotels, Motels*	48	9.000	11.775	13.000	16.500	6.778

Table 2: Descriptive statistics

This table reports the 25th percentile (P25), mean, median (P50), 75th percentile (P75), and standard deviation of the main variables, including different measures of subordinate executives' horizon, executives' characteristics, our main measures of different firm policies, and other control variables. Variable definitions are provided in the Appendix.

	N	P25	Mean	P50	P75	SD
Subordinate Horizon Measures						
Sub. Rem. Horizon	31383	9.500	12.621	12.750	16.000	5.479
Diff. in Horizons	30627	-1.500	3.565	3.333	8.667	8.270
Sub. Ind. Adj. Horizon	31383	-3.106	-0.296	-0.022	2.933	5.129
Ind. Adj. Diff in Horizons	30627	-5.111	-0.121	-0.240	4.890	8.103
Sub DH	15225	-6.333	-1.134	1.120	6.618	11.307
Risk Taking						
Total Risk	30101	0.251	0.354	0.325	0.426	0.142
Idiosyncratic Risk	30091	0.172	0.278	0.243	0.350	0.146
Investment Policy						
Δ CAPX	31141	-0.006	0.006	0.001	0.012	0.038
Δ Net Invest	30912	-0.014	0.012	0.001	0.022	0.096
Δ (CAPX +RD)	31141	-0.006	0.010	0.003	0.018	0.050
Δ (Net Invest + RD)	30912	-0.015	0.015	0.003	0.028	0.104
R&D Productivity	12526	0.079	0.104	0.097	0.121	0.038
Dividend Payout						
Payout Ratio	31102	0.000	0.157	0.000	0.263	0.481
Dividend Paid	31114	0.000	0.505	1.000	1.000	0.500
Valuation						
Industry-adjusted Tobin's q	28587	-0.263	0.276	0.000	0.390	1.826
Executive Characteristics						
CEO Age	30627	51.000	55.946	56.000	61.000	7.523
CEO DH	28749	-6.125	-0.358	1.509	7.923	12.122
CEO Tenure	29446	1.099	1.764	1.792	2.398	0.902
CEO Delta	28787	4.245	5.242	5.267	6.329	1.666
CEO Vega	28710	1.990	3.303	3.625	4.789	1.992
CEO. Overconfidence	24393	0.054	0.311	0.278	0.514	0.264
Sub. Age	31383	49.000	52.419	52.250	55.500	5.787
Sub. Delta	29473	2.833	3.755	3.718	4.658	1.397
Sub. Vega	29451	1.309	2.381	2.443	3.434	1.482
Sub. Overconfidence	27163	0.068	0.293	0.256	0.470	0.245
Ln (Pay Gap)	29010	6.629	7.464	7.601	8.417	1.309
Control Variables						
Instit. Ownership	31383	0.000	0.483	0.594	0.838	0.391
Analyst Coverage	31383	0.000	1.585	1.792	2.565	1.173
Stk. Return	30239	0.838	1.141	1.076	1.345	0.516
Cash	31197	0.030	0.156	0.091	0.222	0.171
Total Assets	31199	6.142	7.315	7.204	8.387	1.644
MTB	30545	1.220	2.064	1.632	2.377	1.359
Leverage	31076	0.056	0.235	0.214	0.352	0.201
ROA	31118	0.050	0.102	0.097	0.157	0.118
Δ Sales	31048	-0.007	0.115	0.069	0.179	0.283
Firm Age	31226	11.001	25.132	20.999	36.419	17.057
Market Value	28881	6.254	7.384	7.268	8.438	1.687
CAPX	31199	-0.654	-0.008	-0.330	0.245	1.020
R&D/Sales	31141	-0.392	-0.006	-0.389	-0.073	0.998
Retained Earnings	30861	3.422	1113.659	196.268	878.000	2955.826

Idiosyncratic Ret	28356	-0.153	0.149	0.090	0.358	0.506
Assets Growth	31131	0.984	1.205	1.064	1.181	3.486

Table 3: Correlation matrix

The table presents the correlation matrix between the main variables used in the analysis. Variable definitions are provided in the Appendix.

	Sub. Rem. Horizon	*Diff. in Horizons*	*Sub. Ind. Adj. Horizon*	*Ind. Adj. Diff in Horizons*	*Sub DH*	*Total Risk*	*Idiosyncratic Risk*	*Δ CAPX*	*Δ Net Invest*	*Δ CAPX +RD*	*Δ Net Invest + RD*	*R&D Productivity*	*Payout Ratio*	*Dividend Paid*	*Tobin's q*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1)	1														
(2)	0.439***	1													
(3)	0.933***	0.452***	1												
(4)	0.419***	0.984***	0.461***	1											
(5)	0.644***	0.254***	0.681***	0.256***	1										
(6)	0.205***	0.010	0.117***	0.009	0.152***	1									
(7)	0.160***	0.023*	0.103***	0.023*	0.123***	0.729***	1								
(8)	0.065***	0.005	0.064***	0.003	0.029**	-0.014	0.002	1							
(9)	0.025*	0.006	0.034**	0.009	0.027**	-0.044***	-0.041***	0.518***	1						
(10)	0.082***	0.004	0.065***	0.002	0.040***	0.008	0.028**	0.808***	0.446***	1					
(11)	0.047***	0.007	0.044***	0.008	0.039***	-0.026*	-0.013	0.525***	0.886***	0.700***	1				
(12)	0.146***	-0.011	0.139***	-0.013	0.142***	-0.003	-0.005	0.054***	0.034**	0.103***	0.074***	1			
(13)	-0.082***	-0.001	-0.042***	0.002	-0.060***	-0.210***	-0.155***	-0.013	0.022	-0.031**	0.005	-0.029**	1		
(14)	-0.243***	-0.012	-0.154***	-0.011	-0.199***	-0.380***	-0.281***	-0.035**	-0.003	-0.081***	-0.041***	-0.081***	0.345***	1	
(15)	0.042***	-0.018	0.021	-0.021	-0.012	0.001	-0.003	0.143***	0.054***	0.174***	0.099***	0.085***	0.012	-0.009	1

Table 4: Risk taking

This table reports the regression analyses for different measures of subordinate executives' horizon and firm's risk taking. Total risk is defined as the annualized standard deviation of total returns in a given year, while idiosyncratic risk is defined as the annualized standard deviation of the residuals from the regression of daily stock returns on the Fama–French three factors estimated over the fiscal year. All regressions control for two-digit SIC code industry and year fixed effects (FE). Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Variables are defined in the Appendix.

	Total Risk				*Idiosyncratic Risk*			
Sub. Rem. Horizon	0.055***				0.046***			
	(0.008)				(0.008)			
Diff. in Horizons		0.083***				0.069***		
		(0.012)				(0.012)		
Sub. Ind. Adj. Horizon			0.043***				0.036***	
			(0.007)				(0.007)	
Ind. Adj. Diff in Horizons				0.068***				0.060***
				(0.011)				(0.011)
CEO Age	-0.029***	-0.103***	-0.031***	-0.092***	-0.026***	-0.088***	-0.028***	-0.080***
	(0.008)	(0.012)	(0.008)	(0.012)	(0.008)	(0.013)	(0.008)	(0.013)
CEO Tenure	0.013	0.014	0.014*	0.014*	0.013	0.013	0.014	0.014
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
CEO Delta	-0.059***	-0.059***	-0.058***	-0.058***	-0.050***	-0.050***	-0.049***	-0.049***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
CEO Vega	-0.030***	-0.030***	-0.030***	-0.030***	-0.009	-0.009	-0.010	-0.010
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Sub. Delta	-0.075***	-0.074***	-0.079***	-0.078***	-0.058***	-0.058***	-0.061***	-0.060***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Sub. Vega	-0.024**	-0.024**	-0.022*	-0.022*	-0.036***	-0.036***	-0.034***	-0.035***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Instit. Ownership	-0.097***	-0.097***	-0.097***	-0.097***	-0.071***	-0.071***	-0.071***	-0.071***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Analyst Coverage	0.019	0.019	0.019	0.019	0.011	0.011	0.011	0.011
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Stk. Return	0.029***	0.029***	0.029***	0.029***	0.034***	0.034***	0.034***	0.034***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.008)	(0.008)	(0.008)	(0.008)
Cash	0.088***	0.088***	0.088***	0.088***	0.051***	0.051***	0.052***	0.051***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)
Total Assets	-0.195***	-0.195***	-0.195***	-0.194***	-0.183***	-0.183***	-0.184***	-0.183***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.012)	(0.012)	(0.012)	(0.012)
MTB	0.045***	0.045***	0.046***	0.046***	0.018*	0.018*	0.018*	0.019*
	(0.011)	(0.011)	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)
Leverage	0.104***	0.104***	0.104***	0.104***	0.073***	0.074***	0.074***	0.073***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)
ROA	-0.227***	-0.227***	-0.227***	-0.227***	-0.171***	-0.171***	-0.171***	-0.171***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)
Δ Sales	0.079***	0.079***	0.080***	0.080***	0.062***	0.062***	0.063***	0.063***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
Firm Age	-0.088***	-0.088***	-0.089***	-0.090***	-0.069***	-0.069***	-0.070***	-0.070***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	25,642	25,642	25,642	25,642	25,641	25,641	25,641	25,641
adj. R^2	0.595	0.595	0.594	0.594	0.392	0.392	0.392	0.392

Table 5: Investment growth.

This table reports the regression analyses for different measures of subordinate executives' horizon and firm's changes in long-term investments. *Δ CAPX* is the change in capital expenditure from year t−1 to t, scaled by total assets at the end of year t−1. *Δ NETINV* Change in net property plant and equipment (PPE), calculated as ($PPENT_t - PPENT_{t-1}$) − ($PPENT_{t-1} - PPENT_{t-2}$) / AT_{t-1}. *Δ (CAPX+RD)* and *Δ (NETINV+RD)* are constructed as the change in capital expenditure and PPE after adding the change in research and development expenditure. Panel A shows the regression results for *Δ CAPX* and *Δ NETINV*. Panel B shows the results for *Δ (CAPX+RD)* and *Δ (NETINV+RD)*. All regressions control for two-digit SIC code industry and year fixed effects (FE). Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Variables are defined in the Appendix.

Panel A: Δ CAPX & Δ NETINV

	Δ CAPX				*Δ NETINV*			
Sub. Rem. Horizon	0.021***				0.014***			
	(0.006)				(0.004)			
Diff. in Horizons		0.033***				0.021***		
		(0.010)				(0.005)		
Sub. Ind. Adj. Horizon			0.019***				0.014***	
			(0.006)				(0.004)	
Ind. Adj. Diff in Horizons				0.029***				0.019***
				(0.008)				(0.004)
CEO Age	-0.014*	-0.043***	-0.014*	-0.039***	0.008	-0.011	0.008	-0.009
	(0.007)	(0.012)	(0.008)	(0.012)	(0.006)	(0.007)	(0.006)	(0.007)
CEO Tenure	-0.004	-0.004	-0.004	-0.004	-0.043***	-0.043***	-0.043***	-0.043***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
CEO Delta	0.033**	0.033**	0.033**	0.033**	0.046***	0.046***	0.046***	0.046***
	(0.012)	(0.012)	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)	(0.012)
CEO Vega	-0.008	-0.008	-0.008	-0.008	-0.008	-0.008	-0.008	-0.008
	(0.008)	(0.008)	(0.009)	(0.009)	(0.011)	(0.011)	(0.011)	(0.011)
Sub. Delta	0.058***	0.058***	0.057***	0.057***	0.031***	0.031***	0.031***	0.031***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.010)	(0.010)	(0.010)	(0.010)
Sub. Vega	-0.022**	-0.023**	-0.022*	-0.022**	-0.012	-0.013	-0.012	-0.012
	(0.011)	(0.010)	(0.011)	(0.010)	(0.014)	(0.014)	(0.014)	(0.014)
Instit. Ownership	-0.013	-0.013	-0.013	-0.013	0.007	0.007	0.007	0.007
	(0.008)	(0.008)	(0.008)	(0.008)	(0.013)	(0.013)	(0.013)	(0.013)
Analyst Coverage	0.006	0.006	0.006	0.006	-0.006	-0.006	-0.006	-0.006
	(0.011)	(0.011)	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)
Market Value $_{t-1}$	-0.028	-0.029	-0.028	-0.028	-0.044***	-0.044***	-0.044***	-0.044***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.013)	(0.013)	(0.013)	(0.013)
Cash $_{t-1}$	0.046***	0.046***	0.046***	0.046***	0.063***	0.063***	0.063***	0.063***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.009)	(0.009)	(0.009)	(0.009)
Retained Earnings $_{t-1}$	-0.026***	-0.026***	-0.026***	-0.026***	-0.029***	-0.029***	-0.029***	-0.029***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.008)	(0.008)	(0.008)
ROA $_{t-1}$	0.057***	0.058***	0.058***	0.057***	-0.033***	-0.033***	-0.033***	-0.033***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.008)	(0.008)	(0.008)	(0.008)
Firm Age $_{t-1}$	-0.018***	-0.018***	-0.019***	-0.019***	0.018**	0.019**	0.019**	0.018**
	(0.007)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
Idiosyncratic Ret $_{t-1}$	0.211***	0.211***	0.211***	0.211***	0.107***	0.107***	0.107***	0.107***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.011)	(0.011)	(0.011)	(0.011)
Leverage $_{t-1}$	-0.030***	-0.030***	-0.030***	-0.030***	-0.009	-0.009	-0.009	-0.009
	(0.007)	(0.007)	(0.007)	(0.007)	(0.011)	(0.011)	(0.011)	(0.011)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	24,480	24,480	24,480	24,480	24,432	24,432	24,432	24,432
adj. R^2	0.113	0.113	0.113	0.113	0.047	0.047	0.047	0.047

Panel B: Δ (CAPX+RD) & Δ (NETINV+RD)

	Δ (CAPX+RD)				*Δ (NETINV+RD)*			
Sub. Rem. Horizon	0.023***				0.017***			
	(0.008)				(0.004)			
Diff. in Horizons		0.036***				0.026***		
		(0.012)				(0.005)		
Sub. Ind. Adj. Horizon			0.021***				0.017***	
			(0.007)				(0.004)	
Ind. Adj. Diff in Horizons				0.032***				0.024***
				(0.010)				(0.004)
CEO Age	-0.024***	-0.056***	-0.024***	-0.053***	0.001	-0.023***	0.001	-0.021***
	(0.006)	(0.014)	(0.006)	(0.013)	(0.006)	(0.008)	(0.006)	(0.007)
CEO Tenure	0.005	0.005	0.005	0.005	-0.037***	-0.037***	-0.037***	-0.037***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
CEO Delta	0.032**	0.032**	0.032**	0.032**	0.047***	0.047***	0.047***	0.047***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
CEO Vega	-0.002	-0.002	-0.003	-0.003	-0.007	-0.007	-0.007	-0.007
	(0.010)	(0.010)	(0.010)	(0.010)	(0.012)	(0.012)	(0.012)	(0.012)
Sub. Delta	0.068***	0.068***	0.067***	0.067***	0.038***	0.038***	0.038***	0.038***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.010)	(0.010)	(0.009)	(0.009)
Sub. Vega	-0.017	-0.017	-0.017	-0.017	-0.009	-0.009	-0.009	-0.009
	(0.011)	(0.011)	(0.011)	(0.011)	(0.014)	(0.014)	(0.014)	(0.014)
Instit. Ownership	-0.022***	-0.022***	-0.022***	-0.022***	0.001	0.001	0.001	0.001
	(0.008)	(0.008)	(0.008)	(0.008)	(0.012)	(0.012)	(0.012)	(0.012)
Analyst Coverage	0.026***	0.026***	0.025***	0.025***	0.003	0.003	0.003	0.003
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Market Value $_{t-1}$	-0.036**	-0.037**	-0.036**	-0.036**	-0.045***	-0.045***	-0.045***	-0.045***
	(0.017)	(0.017)	(0.017)	(0.017)	(0.014)	(0.014)	(0.014)	(0.014)
Cash $_{t-1}$	0.110***	0.110***	0.110***	0.110***	0.094***	0.093***	0.094***	0.094***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.010)	(0.010)	(0.010)	(0.010)
Retained Earnings $_{t-1}$	-0.033***	-0.033***	-0.033***	-0.033***	-0.034***	-0.034***	-0.034***	-0.034***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.007)	(0.007)	(0.007)	(0.007)
ROA $_{t-1}$	0.065***	0.065***	0.065***	0.065***	-0.018*	-0.018*	-0.018*	-0.018*
	(0.015)	(0.015)	(0.015)	(0.015)	(0.010)	(0.010)	(0.010)	(0.010)
Firm Age $_{t-1}$	-0.025***	-0.025***	-0.025***	-0.025***	0.013*	0.013*	0.013*	0.012*
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Idiosyncratic Ret $_{t-1}$	0.209***	0.209***	0.209***	0.209***	0.124***	0.124***	0.124***	0.124***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.013)	(0.013)	(0.013)	(0.013)
Leverage $_{t-1}$	-0.036***	-0.035***	-0.035***	-0.036***	-0.016	-0.016	-0.016	-0.016
	(0.006)	(0.006)	(0.006)	(0.006)	(0.010)	(0.010)	(0.010)	(0.010)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	24,480	24,480	24,480	24,480	24,432	24,432	24,432	24,432
adj. R^2	0.136	0.136	0.136	0.136	0.057	0.057	0.057	0.057

Table 6: R&D productivity

This table reports regression analyses for different measures of subordinate executives' horizon and R&D productivity measured by research quotient (*RQ*). *RQ* is defined as the percentage increase in revenue from a 1% increase in R&D. Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Variables are defined in the Appendix.

	RQ	*RQ*	*RQ*	*RQ*
Sub. Rem. Horizon	0.069***			
	(0.019)			
Diff. in Horizons		0.104***		
		(0.029)		
Sub. Ind. Adj. Horizon			0.066***	
			(0.018)	
Ind. Adj. Diff in Horizons				0.102***
				(0.028)
CEO Age	-0.045**	-0.137***	-0.045**	-0.136***
	(0.021)	(0.032)	(0.021)	(0.031)
CEO Tenure	-0.042*	-0.042*	-0.042*	-0.042*
	(0.023)	(0.023)	(0.023)	(0.023)
CEO Delta	0.020	0.019	0.020	0.020
	(0.034)	(0.034)	(0.034)	(0.034)
CEO Vega	0.022	0.022	0.022	0.022
	(0.031)	(0.031)	(0.031)	(0.031)
Sub. Delta	0.039	0.040	0.040	0.040
	(0.028)	(0.028)	(0.028)	(0.028)
Sub. Vega	-0.023	-0.023	-0.023	-0.023
	(0.028)	(0.028)	(0.028)	(0.028)
Instit. Ownership	-0.005	-0.005	-0.005	-0.006
	(0.025)	(0.025)	(0.025)	(0.025)
Analyst Coverage	0.015	0.015	0.015	0.015
	(0.027)	(0.027)	(0.027)	(0.027)
Market Value $_{t-1}$	-0.056	-0.056	-0.055	-0.055
	(0.037)	(0.037)	(0.037)	(0.037)
Cash $_{t-1}$	0.153***	0.153***	0.153***	0.153***
	(0.029)	(0.029)	(0.029)	(0.029)
Retained Earnings $_{t-1}$	0.041**	0.041**	0.040**	0.040**
	(0.019)	(0.019)	(0.019)	(0.019)
ROA $_{t-1}$	0.083***	0.083***	0.084***	0.083***
	(0.020)	(0.020)	(0.021)	(0.020)
Firm Age $_{t-1}$	-0.103***	-0.103***	-0.103***	-0.103***
	(0.023)	(0.023)	(0.023)	(0.023)
Idiosyncratic Ret $_{t-1}$	0.004	0.004	0.005	0.005
	(0.012)	(0.012)	(0.012)	(0.012)
Leverage $_{t-1}$	0.015	0.015	0.015	0.015
	(0.020)	(0.020)	(0.020)	(0.020)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	10,478	10,478	10,478	10,478
adj. R^2	0.238	0.238	0.238	0.238

Table 7: Dividend Payout

This table report regression analyses for different measures of subordinate executives' horizon and firm's dividend policy. Payout ratio is defined as the total amount of dividend paid scaled by the net income in a given year. Dividend paid is an indicator variable that takes the value of one if the firm pays dividends in a given year and zero otherwise. All regressions control for two-digit SIC code industry and year fixed effects (FE). Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Variables are defined in the Appendix.

	Payout				*Dividend Paid*			
Sub. Rem. Horizon	-0.032***				-0.187***			
	(0.009)				(0.036)			
Diff. in Horizons		-0.047***				-0.281***		
		(0.013)				(0.055)		
Sub. Ind. Adj. Horizon			-0.023**				-0.170***	
			(0.009)				(0.035)	
Ind. Adj. Diff in Horizons				-0.039***				-0.250***
				(0.013)				(0.053)
CEO Age	0.017*	0.058***	0.018*	0.052***	0.168***	0.417***	0.171***	0.392***
	(0.010)	(0.015)	(0.010)	(0.015)	(0.039)	(0.062)	(0.039)	(0.060)
CEO Tenure	0.005	0.005	0.005	0.005	-0.009	-0.009	-0.010	-0.011
	(0.008)	(0.008)	(0.008)	(0.008)	(0.037)	(0.037)	(0.037)	(0.037)
CEO Delta	-0.003	-0.003	-0.004	-0.004	-0.090*	-0.089*	-0.092*	-0.093*
	(0.014)	(0.014)	(0.014)	(0.014)	(0.053)	(0.053)	(0.053)	(0.053)
CEO Vega	0.006	0.006	0.007	0.007	-0.024	-0.023	-0.022	-0.020
	(0.012)	(0.012)	(0.012)	(0.012)	(0.052)	(0.052)	(0.052)	(0.052)
Sub. Delta	-0.045**	-0.045**	-0.042**	-0.043**	-0.197***	-0.197***	-0.190***	-0.188***
	(0.017)	(0.017)	(0.017)	(0.017)	(0.056)	(0.056)	(0.056)	(0.056)
Sub. Vega	-0.012	-0.012	-0.014	-0.014	-0.035	-0.036	-0.041	-0.043
	(0.016)	(0.016)	(0.016)	(0.016)	(0.065)	(0.065)	(0.065)	(0.064)
Instit. Ownership	0.027**	0.027**	0.027**	0.027**	0.151***	0.151***	0.151***	0.151***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.047)	(0.047)	(0.047)	(0.047)
Analyst Coverage	-0.027**	-0.027**	-0.027**	-0.027**	-0.109**	-0.109**	-0.109**	-0.109**
	(0.012)	(0.012)	(0.012)	(0.012)	(0.056)	(0.056)	(0.056)	(0.056)
Cash	-0.033***	-0.033***	-0.034***	-0.033***	-0.413***	-0.413***	-0.413***	-0.413***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.052)	(0.052)	(0.052)	(0.052)
Total Assets	0.076***	0.076***	0.077***	0.076***	0.634***	0.634***	0.634***	0.634***
	(0.021)	(0.021)	(0.021)	(0.021)	(0.067)	(0.067)	(0.067)	(0.067)
Assets Growth	-0.094**	-0.093**	-0.096**	-0.095**	-1.502***	-1.502***	-1.521***	-1.525***
	(0.040)	(0.040)	(0.040)	(0.040)	(0.249)	(0.249)	(0.249)	(0.249)
Leverage	-0.004	-0.004	-0.004	-0.004	-0.104**	-0.104**	-0.103**	-0.103**
	(0.014)	(0.014)	(0.014)	(0.014)	(0.044)	(0.044)	(0.044)	(0.044)
ROA	0.063***	0.063***	0.062***	0.063***	0.352***	0.351***	0.352***	0.353***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.054)	(0.054)	(0.054)	(0.054)
Retained Earnings $_{t-1}$	0.060***	0.060***	0.061***	0.061***	0.858***	0.858***	0.861***	0.861***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.120)	(0.120)	(0.120)	(0.120)
MTB	0.046***	0.046***	0.045***	0.045***	0.091	0.091	0.089	0.086
	(0.012)	(0.012)	(0.012)	(0.012)	(0.057)	(0.057)	(0.057)	(0.057)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	26,018	26,018	26,018	26,018	26018	26018	26018	26018
adj. R^2 */ Pseudo* R^2	0.048	0.048	0.048	0.048	0.242	0.241	0.241	0.241

Table 8: Additional Controls

This table presents the relationship between subordinate executives' horizon and firm policies. Panel A, B, C and D controls for, tournament incentive measured by *Ln (Pay Gap)*, executives' confidence, CEO's decision horizon, and Gompers et al. (2003) governance index, G-index, respectively. All regressions control for two-digit SIC code industry and year fixed effects (FE). Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Variables are defined in the Appendix.

	Total Risk	*Idiosyncratic Risk*	*Δ CAPX*	*Δ NETINV*	*Δ (CAPX+RD)*	*Δ (NETINV+RD)*	*RQ*	*Payout Ratio*	*Dividend Paid*
Panel A: Tournament Incentives									
Sub. Rem. Horizon	0.047***	0.038***	0.019***	0.012**	0.020***	0.014***	0.064***	-0.031***	-0.189***
	(0.008)	(0.008)	(0.005)	(0.004)	(0.007)	(0.004)	(0.019)	(0.009)	(0.037)
Ln Pay Gap	0.045***	0.019**	0.009	0.038***	0.017	0.044***	0.098***	-0.034***	-0.125***
	(0.008)	(0.009)	(0.013)	(0.008)	(0.013)	(0.008)	(0.022)	(0.011)	(0.041)
Executive control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	24,210	24,209	23,184	23,138	23,184	23,138	9,982	24,545	24,545
Adj-R^2 / Pseudo R^2	0.591	0.387	0.110	0.045	0.131	0.054	0.244	0.049	0.247
Panel B: Executives' confidence									
Sub. Rem. Horizon	0.052***	0.039***	0.014**	0.011**	0.014**	0.013**	0.070***	-0.026***	-0.187***
	(0.008)	(0.008)	(0.006)	(0.005)	(0.006)	(0.005)	(0.020)	(0.008)	(0.038)
Sub. Confidence	-0.021	-0.023*	0.093***	0.047***	0.084***	0.048***	-0.034	-0.015	-0.024
	(0.013)	(0.013)	(0.012)	(0.010)	(0.014)	(0.010)	(0.034)	(0.013)	(0.055)
CEO's Confidence	0.002	-0.009	0.012	-0.005	0.027	0.003	0.060*	-0.056***	-0.189***
	(0.012)	(0.012)	(0.012)	(0.013)	(0.017)	(0.015)	(0.031)	(0.012)	(0.050)
Executive control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	20,812	20,811	19,881	19,838	19,881	19,838	8,904	21,093	21,093
Adj-R^2 / Pseudo R^2	0.611	0.409	0.119	0.042	0.144	0.054	0.241	0.054	0.276

Panel C: CEO decision horizon									
Sub. Rem. Horizon	0.056***	0.047***	0.021***	0.013***	0.022***	0.016***	0.066***	-0.032***	-0.186***
	(0.008)	(0.008)	(0.006)	(0.004)	(0.007)	(0.004)	(0.019)	(0.009)	(0.0358)
CEO's Decision	-0.050***	-0.031	0.045**	0.037*	0.054**	0.048**	0.129**	0.008	-0.0581
Horizon	(0.019)	(0.019)	(0.022)	(0.019)	(0.020)	(0.018)	(0.051)	(0.024)	(0.100)
Executive control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	25,642	25,641	24,480	24,432	24,480	24,432	10,478	26,018	26,018
Adj-R^2 / Pseudo R^2	0.595	0.392	0.113	0.047	0.136	0.057	0.240	0.048	0.242
Panel D: G-Index									
Sub. Rem. Horizon	0.052***	0.044***	0.020***	0.013***	0.022***	0.016***	0.068***	-0.027***	-0.165***
	(0.008)	(0.008)	(0.006)	(0.004)	(0.007)	(0.004)	(0.019)	(0.009)	(0.0361)
G-Index	-0.018***	-0.010***	-0.007***	-0.002	-0.008***	-0.003	-0.003	0.017***	0.102***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.006)	(0.003)	(0.0109)
Executive control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	25,642	25,641	24,480	24,432	24,480	24,432	10,478	26,018	26,018
Adj-R^2 / Pseudo R^2	0.598	0.393	0.113	0.047	0.136	0.057	0.238	0.051	0.252

Table 9: Firm Fixed effects

This table presents the relationship between subordinate executives' horizon and firm policies. All regressions control for firm and year fixed effects (FE). Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Variables are defined in the Appendix.

Firm fixed effect

	Total Risk	*Idiosyncratic Risk*	*Δ CAPX*	*Δ NETINV*	*Δ (CAPX+RD)*	*Δ (NETINV+RD)*	*RQ*	*Payout Ratio*	*Dividend Paid*
Sub. Rem. Horizon	0.039***	0.031***	0.015**	0.002	0.019***	0.006	0.025*	-0.017*	-0.230***
	(0.008)	(0.009)	(0.006)	(0.007)	(0.007)	(0.007)	(0.012)	(0.010)	(0.080)
Executive control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	25,452	25,451	24,268	24,221	24,268	24,221	10,336	25,829	26,018
Adj-R^2 / Pseudo R^2	0.721	0.471	0.110	0.031	0.160	0.047	0.679	0.158	0.754

Table 10: 2 Stages Least Squares (2SLS)

This table presents second-stage results from 2-Stage Least Squares regressions for the relationship between subordinate executives' horizon and firm policies. First-stage results use the natural log of the average CPI at birth years of subordinate executives as an instrumental variable along with other control variables. All regressions control for two-digit SIC code industry and year fixed effects (FE). Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Variables are defined in the Appendix.

2SLS – Second stage

	Total Risk	*Idiosyncratic Risk*	*Δ CAPX*	*Δ NETINV*	*Δ (CAPX+RD)*	*Δ (NETINV+RD)*	*RQ*	*Payout Ratio*	*Dividend Paid*
Sub. Rem. Horizon (Instrument = Ln	0.065***	0.056***	0.028***	0.014***	0.033***	0.020***	0.062***	-0.039***	-0.121***
average CPI)	(0.009)	(0.009)	(0.006)	(0.005)	(0.008)	(0.005)	(0.019)	(0.009)	(0.012)
Executive control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	25,638	25,637	24,476	24,428	24,476	24,428	10,478	26,014	26,014
Adj-R^2	0.375	0.204	0.069	0.020	0.095	0.033	0.065	0.018	--

Table 11: Alternative horizon definitions

Using alternative measures, this table reports regression results for the relation between subordinate executives' horizon and firm policies. Panel A uses the average subordinates' decision horizon as defined by Antia et al. (2010), $DH_{i,t} = [TENURE_{ind,t} - TENURE_{i,t}] + [AGE_{ind,t} - AGE_{i,t}]$. Panel B uses subordinate executives' remaining horizon assuming a varying retirement age by industry. All regressions control for two-digit SIC code industry and year fixed effects (FE). Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. See Appendix A for variable definitions and data sources.

Panel A: Subordinates' decision horizon									
	Total Risk	*Idiosyncratic Risk*	*Δ CAPX*	*Δ NETINV*	*Δ (CAPX+RD)*	*Δ (NETINV+RD)*	*RQ*	*Payout Ratio*	*Dividend Paid*
Sub DH	0.062***	0.058***	0.018*	0.016***	0.025**	0.022***	0.123***	-0.018*	-0.199***
	(0.010)	(0.009)	(0.009)	(0.005)	(0.010)	(0.005)	(0.024)	(0.010)	(0.055)
Executive control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	12,689	12,688	12,025	11,993	12,025	11,993	5,211	12,834	12,834
Adj-R^2 / Pseudo R^2	0.617	0.437	0.123	0.037	0.149	0.055	0.271	0.053	0.238
Panel B: Varying retirement age by industry									
Sub. Rem. Horizon (Varying	0.064***	0.052***	0.026***	0.016***	0.027***	0.020***	0.077***	-0.035***	-0.215***
Retirement Age)	(0.009)	(0.009)	(0.007)	(0.004)	(0.009)	(0.004)	(0.021)	(0.010)	(0.0415)
Executive control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	24,929	24,928	23,795	23,749	23,795	23,749	10,398	25,295	25,295
Adj-R^2 / Pseudo R^2	0.596	0.392	0.114	0.046	0.137	0.056	0.238	0.048	0.242

Table 12: CFO vs. Highest paid subordinate executive.

This table presents the relationship between CFO and highest paid subordinate horizons and firm policies. Panel A uses the remaining horizon of the Chief Financial Officer (CFO) (inferred from CFOANN). Panel B uses subordinate executives remaining horizon based on highest paid subordinate executive on the Execucomp subordinate executives' rank based on the sum of salary and bonus (inferred from EXECRANKANN). All regressions control for two-digit SIC code industry and year fixed effects (FE). Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. See Appendix A for variable definitions and data sources.

	Total Risk	*Idiosyncratic Risk*	*Δ CAPX*	*Δ NETINV*	*Δ (CAPX+RD)*	*Δ (NETINV+RD)*	*RQ*	*Payout Ratio*	*Dividend Paid*
Panel A: CFO									
CFO. Rem. Horizon	0.007	0.014*	0.016***	0.009	0.013*	0.008	0.037	-0.007	-0.029
	(0.008)	(0.008)	(0.005)	(0.006)	(0.007)	(0.007)	(0.022)	(0.010)	(0.039)
Executive control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16,551	16,550	16,178	16,165	16,178	16,165	7,264	16,821	16,821
Adj-R^2 / Pseudo R^2	0.632	0.367	0.103	0.056	0.124	0.062	0.216	0.052	0.238
Panel B: Highest paid executive									
Sub. Rem. Horizon (Highest ranked Sub. executive)	0.039***	0.025***	0.013*	0.013*	0.008	0.011	0.052**	-0.027***	-0.151***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)	(0.020)	(0.008)	(0.032)
Executive control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	21,780	21,779	20,995	20,965	20,995	20,965	9,128	22,069	22,069
Adj-R^2 / Pseudo R^2	0.585	0.379	0.107	0.047	0.131	0.057	0.236	0.050	0.243

Table 13: Risk taking – Additional analyses

This table presents additional analyses for the relationship between subordinate manager's horizon and risk-taking conditioned on low institutional ownership (*Low Instit)*, subordinate executives' directorships (*Sub. Director*), CEO's age (*Older CEO*), and *CEO's power* (measured by CEO's Pay Slice). All regressions control for two-digit SIC code industry and year fixed effects (FE). Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. See Appendix A for variable definitions and data sources.

	Total Risk				*Idiosyncratic Risk*			
Low IO	0.052*				0.070**			
	(0.030)				(0.029)			
Low IO × Sub. Rem. Horizon	0.067***				0.052***			
	(0.013)				(0.013)			
Sub. Director		0.021**				0.019**		
		(0.009)				(0.009)		
Sub. Director × Sub. Rem. Horizon		0.024***				0.019**		
		(0.008)				(0.008)		
Older CEO			0.032*				0.046**	
			(0.017)				(0.018)	
Older CEO × Sub. Rem. Horizon			-0.028**				-0.022*	
			(0.014)				(0.014)	
CEO Power				-0.028**				-0.035***
				(0.012)				(0.011)
CEO Power × Sub. Rem. Horizon				-0.031***				-0.045***
				(0.012)				(0.011)
Sub. Rem. Horizon	0.018*	0.032***	0.068***	0.061***	0.018*	0.028**	0.056***	0.076***
	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)	(0.011)	(0.010)	(0.010)
Executive control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	25,642	25,642	25,642	25,641	25,641	25,641	25,641	25,642
Adj-R^2	0.596	0.595	0.595	0.393	0.393	0.393	0.392	0.595

Table 14: Industry-adjusted Tobin's q

This table reports regression analyses for different measures of subordinate executives' horizon and firm value measured by the industry-adjusted Tobin's q. *Industry-adjusted Tobin's q* is defined as the difference between firm's Tobin's q and the four-digit SIC industry median Tobin's q. Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. See Appendix A for variable definitions and data sources.

	Industry-adjusted Tobin's q				*Industry-adjusted Tobin's q*			
Sub. Rem. Horizon	0.008**				0.011			
	(0.004)				(0.007)			
Diff. in Horizons		0.011*				0.018*		
		(0.007)				(0.010)		
Sub. Ind. Adj. Horizon			0.008**				0.012*	
			(0.004)				(0.006)	
Ind. Adj. Diff in Horizons				0.009				0.016*
				(0.006)				(0.009)
CEO Age	-0.001	-0.012*	-0.002	-0.010	-0.001	-0.016	-0.001	-0.014
	(0.004)	(0.007)	(0.004)	(0.007)	(0.006)	(0.010)	(0.006)	(0.009)
CEO Tenure	-0.033***	-0.033***	-0.033***	-0.033***	-0.021***	-0.021***	-0.021***	-0.021***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.006)	(0.006)	(0.006)	(0.006)
CEO Delta	0.066***	0.066***	0.066***	0.066***	0.091***	0.091***	0.091***	0.091***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.010)	(0.010)	(0.010)	(0.010)
CEO Vega	0.012	0.012	0.012	0.012	-0.010	-0.010	-0.010	-0.010
	(0.009)	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)
Sub. Delta	0.106***	0.105***	0.106***	0.105***	0.144***	0.144***	0.144***	0.144***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)	(0.009)	(0.009)
Sub. Vega	-0.055***	-0.055***	-0.055***	-0.055***	-0.067***	-0.067***	-0.067***	-0.067***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)
Instit. Ownership	-0.025***	-0.025***	-0.025***	-0.025***	-0.002	-0.002	-0.002	-0.002
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Analyst Coverage	0.052***	0.052***	0.051***	0.051***	0.041***	0.041***	0.041***	0.041***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)	(0.009)	(0.009)
Industry-adjusted Tobin's q $_{t-1}$	0.287***	0.287***	0.287***	0.287***	0.188***	0.188***	0.188***	0.188***
	(0.031)	(0.031)	(0.031)	(0.031)	(0.019)	(0.019)	(0.019)	(0.019)
Total Assets	-0.136***	-0.136***	-0.136***	-0.136***	-0.427***	-0.426***	-0.427***	-0.427***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.022)	(0.022)	(0.022)	(0.022)
ROA	0.118***	0.118***	0.118***	0.118***	0.117***	0.117***	0.117***	0.117***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.013)	(0.013)	(0.013)	(0.013)
CAPX	-0.005	-0.005	-0.005	-0.005	-0.003	-0.003	-0.003	-0.003
	(0.006)	(0.006)	(0.006)	(0.006)	(0.009)	(0.009)	(0.009)	(0.009)
R&D/Sales	0.068***	0.068***	0.068***	0.068***	0.039	0.038	0.038	0.039
	(0.012)	(0.012)	(0.012)	(0.012)	(0.025)	(0.025)	(0.025)	(0.025)
Leverage	0.029***	0.029***	0.029***	0.029***	0.028***	0.028***	0.028***	0.028***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.010)	(0.010)	(0.010)	(0.010)
Firm Age	0.027***	0.027***	0.027***	0.027***	0.972***	0.973***	0.968***	0.975***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.238)	(0.238)	(0.238)	(0.238)
Firm FE	No	No	No	No	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	No	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	22,811	22,811	22,811	22,811	22,590	22,590	22,590	22,590
Adj-R^2	0.520	0.520	0.520	0.520	0.641	0.641	0.641	0.641

Appendix

Table A.1: Variable definitions

Variable	Description	Source
Sub. Rem. Horizon	Expected remaining subordinate executives' horizon based on 65 as the age of retirement, defined as the difference between 65 and the average subordinate executives' age.	ExecuComp
Diff. in Horizons	Age difference between the CEO's age and the average age of top subordinate executives.	ExecuComp
Sub. Ind. Adj. Horizon	Difference between subordinate executives' industry average age and subordinate executives' average age at the firm level. Industry averages are calculated based on 2 digit SIC codes.	ExecuComp
Ind. Adj. Age Diff.	Industry adjusted age difference calculated as follows [{Industry subordinate average age − firm's subordinate average age} − {Industry average CEO's age − firm's CEO age}]	ExecuComp
Sub DH	The subordinates' average decision horizon. Following Antia et al. (2010), decision horizon (DH) is defined as follows $DH_{i,t} = [TENURE_{ind,t} - TENURE_{i,t}] + [AGE_{ind,t} - AGE_{i,t}]$. Industry averages are calculated based on 2 digit SIC codes.	ExecuComp
Sub. Rem. Horizon (Varying Retirement Age)	Expected remaining subordinate executives' horizon based on the industry average retirement age. Industry average retirement ages are calculated based on retirement cases in Execucomp (inferred from REASON = "*RETIRED*").	ExecuComp
Sub. Rem. Horizon (2nd executive)	Expected remaining horizon of the highest paid subordinate executive based on Execucomp's rank (inferred from EXECRANKANN).	ExecuComp
CEO Age	CEO's age for a firm in a given year.	ExecuComp
CEO Tenure	The difference between the CEO's appointment date and the date of leaving the firm (if applicable). If the CEO is still serving, tenure is defined as the difference between the current year and the appointment year.	ExecuComp
CEO DH	The CEO decision horizon. Following Antia et al. (2010), decision horizon (DH) is defined as follows $DH_{i,t} = [TENURE_{ind,t} - TENURE_{i,t}] + [AGE_{ind,t} - AGE_{i,t}]$. Industry averages are calculated based on 2 digit SIC codes.	
CEO Overconfidence	The CEO percentages of in the money (ITM) unexercised exercisable options. Following Banerjee et. al. (2015), we obtain the total value-per option of the ITM options by dividing the value of all unexercised exercisable options (Execucomp: opt_unex_exer_est_val) by the number of options (Execucomp: opt_unex_exer_num). Next, we scale this 'value-per-option' by the price at the end of the fiscal year as reported in (Compustat: prcc_f)	ExecuComp & Compustat
CEO Delta	Expected dollar change in the CEO's wealth for a 1% change in stock sensitivity price.	ExecuComp
CEO Vega	Expected dollar change in the CEO's wealth for a 0.01 change in stock return volatility.	ExecuComp
Sub. Age	Average age of the top non-CEO executives.	ExecuComp
Sub. Delta	Expected average dollar change in subordinates' wealth for a 1% change in stock sensitivity price.	ExecuComp
Sub. Vega	Expected average dollar change in subordinates' wealth for a 0.01 change in stock return volatility.	ExecuComp
Sub. Overconfidence	The average of subordinate executives' percentages of in the money (ITM) of unexercised exercisable options.	ExecuComp & Compustat
Ln (Pay Gap)	The natural logarthism of the difference between CEO's total compensation (TDC1) and average subordinate executives' total compensation.	ExecuComp
Total Risk	The natural logarithm of annualized standard deviation of daily stock returns over a fiscal year.	CRSP

Idiosyncratic Risk	The natural logarithm of annualized standard deviation of the residuals from the regression of daily stock returns on the Fama–French three factors estimated over the fiscal year.	CRSP
Δ CAPX	Change in capital expenditure (inferred from CAPX) from year t−1 to t, scaled by total assets at the end of year t−1. Missing capital expenditure is set to zero ($CAPX_t$−$lagCAPX_{t-1}$) / AT_{t-1};	Compustat
Δ Net Invest	Change in net property plants and equipment from year t−1 to t, calculated as ($PPENT_t$ − $PPENT_{t-1}$) − ($PPENT_{t-1}$ − $PPENT_{t-2}$) / AT_{t-1}	Compustat
Δ (CAPX +RD)	Change in the sum of R&D expenditure and capital expenditure from year q−1 to q, scaled by total assets at the end of year t−1. Missing values for R&D expenditure and capital expenditure are set to zero.	Compustat
Δ (NETINV+RD)	Change in the sum of R&D expenditure and net capital expenditure from year q−1 to q, scaled by total assets at the end of year t−1. Missing values for R&D expenditure are set to zero.	Compustat
R&D Productivity (RQ)	Research quotient (RQ), defined as the percentage increase in revenue from a 1% increase in R&D.	RQ – WRDS
Dividend Payout	The total amount of dividend paid scaled by the net income in a given year.	Compustat
Dividend Paid	Indicator variable that takes the value of one if the firm pays dividend and zero otherwise.	Compustat
Industry-adjusted Tobin's q	Tobin's q is defined as the market value of equity plus the book value of the difference between long-term debt the book value deferred taxes, all divided by the book value of assets. Industry-adjusted Tobin's q is the difference between firm's Tobin's q and the four-digit SIC industry median Tobin's q.	
G - Index	Gompers et al., (2003) G-Index defined as the sum of 24 anti-takeover provisions.	Institutional Shareholder Services
Instit. Ownership	Shares held by institutional investors as a fraction of shares outstanding.	TR13F Holdings
Analyst Coverage	The natural logarithm of the average of the twelve-monthly numbers of earnings forecasts for firm *i* extracted from the IBES summary file over a fiscal year.	IBES
Firm Age	The natural logarithm of the number of years since a firm's first appearance in the Compustat database.	Compustat
Total Assets	The natural logarithm of total book value of assets	
MTB	The market value of equity plus long-term liabilities divided by the book value of equity.	
Market Value	The logarithm of market value calculated as the numbers of shares outstanding multiplied by the price at the end of the fiscal year as reported in (Compustat: prcc_f)	Compustat
Cash	The book value of cash and short-term investments divided by the book value of assets.	Compustat
Idiosyncratic Ret	The annualized standard deviation of the residuals from the regression of daily stock returns on the Fama–French three factors estimated over the fiscal year.	CRSP
CAPX	The capital expenditure deflated by the book value of total assets	
R&D/Sales	The research and development expenses deflated by total sales.	
Retained Earnings	The retained earnings deflated by the book value of total assets.	Compustat
ROA	The earnings before interests and taxes deflated by the lag value of total assets.	Compustat
Stk Return	The buy and hold stock return.	Compustat
Leverage	The sum of book value of current and long-term debts scaled by the book value of total assets.	Compustat
Δ Sales	The percentage change in sales calculated as ($sale_t$ − $sale_{t-1}$)/$sale_{t-1}$;	Compustat
Assets Growth	The growth in the book value of total assets.	Compustat