Competition for Managers and Corporate Governance

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Abstract

Why do half of S&P 500 firms have *duality*, i.e., a CEO who is also the Chair of the Board? We show theoretically that duality can play an important role in the competition for CEOs. Empirically, we document that duality changes are concentrated at times when new CEOs are hired and firms are more likely to offer duality to CEOs with greater ability. This finding is robust to different measures of CEO ability and types of succession plans. We also show that the correlation between duality and CEO ability is stronger in industries that feature a greater competition for CEOs.

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1 Introduction

"In past CEO searches [...], many CEO candidates have told [me] they would not take the job unless they were also made chairman." Scally and Crowe, NYSE: Corporate Governance Guide (2014).

The separation between CEO and Chair has been at the centre of the governance debate at least since 1992, when the Cadbury Report recommended it in the UK. Over the years and around the world, an increasing number of institutional investors have come to view CEO-Chair separation and Chair independence as fundamental principles of corporate governance. Yet, even today about half of the companies in the S&P 500 index have duality, i.e. a combined CEO-Chair (as indicated by the Spencer Stuart Board Index 2019). Why does a majority of U.S. firms choose to lower their governance standards by combining the CEO-Chair roles in a single person?

We argue in this paper that duality arises because of competition in the market for managerial talent: firms offer duality to attract better CEOs. The key insight is that corporate governance affects the matching between managers and firms. Better governance may improve managerial oversight but it also reduces firms' ability to attract better managers. This offsetting effect may explain the limited impact of duality on firm performance uncovered by the academic literature in the US (see, for example Baliga et al., 1996; Dey et al., 2011): a positive direct effect on firm performance of having a separate Chair may combine with a negative indirect effect due to its impact on the firm's capability to attract high quality CEOs.

To illustrate our conceptual framework, we show in a simple model that, when the manager has limited outside options, firms are free to choose strict governance standards to monitor the CEO more effectively and save on executive compensation. However, when CEOs have a valuable outside option because managerial talent is scarce and firms have to compete to attract the few top quality managers, firms have to offer generous compensation packages to their CEOs independently of the governance standards they adopt. This follows from an outside option effect: individual firms are unable to affect the rents of the top quality CEOs as these managers can always find another firm to employ them. In other words, the individual rationality constraint is binding for the best managers and thus top

quality CEOs can effectively dictate their preferred level of managerial compensation. As a result, a firm wanting to employ a top quality manager opts for duality and does not hire an independent Chair. In an equilibrium with observable heterogeneity across managers, some firms target better CEOs by choosing laxer governance standards (i.e., CEO duality); others target weaker CEOs and choose a stricter governance regime (i.e., an independent Chair). The top quality CEOs earn a rent that makes shareholders indifferent between these two hiring strategies.

Our model delivers two main empirical predictions. The first one is that duality is part of the recruitment package offered to newly appointed CEOs: adopting (or preserving) duality is more likely when hiring higher-ability CEOs. The second prediction is that the correlation between duality and ability should strengthen when there is more competition for CEOs.

Our empirical analysis starts by documenting that changes in duality are more frequent in years when there is a CEO turnover than in years with no CEO turnover. The frequency of changes in duality increases by 50.5% around turnover. This result is economically large, since, on average, firms change duality about 13.4% of the years. It also shows that changes in duality are mainly driven by the competition for managerial talent and not by alternative explanations such as managerial entrenchment. An argument based on managerial entrenchment would predict that duality should become more likely as the CEO tenure increases, rather than being assigned at the appointment of a new CEO. Importantly, we find that increases in duality are concentrated at times when CEO ability increases as a result of CEO turnover. This result indicates that duality is used to attract high-ability managers, as predicted by our model. In terms of economic significance, hiring a higher-ability CEO (than the incumbent one) is associated with a 13.6% increase in the probability of duality compared with hiring a lower-ability CEO (than the incumbent one).

To test the second prediction of our model, we take advantage of cross-industry differences in the competition for managerial talent. Specifically, we measure the degree of competition for managers as the percentage of CEOs in an industry who were previously employed within the same industry, using data from Cremers and Grinstein (2014). CEOs employed in industries characterized by high within-industry mobility have industry-specific knowledge that reduce their outside options, limiting the effective competition for their talent. We add to our basic specification the interaction of the changes in CEO ability and the percentage

of within-industry moves. We find that this interaction term has a negative and statistically significant coefficient: sectors with less competition for managerial talent are associated with a lower correlation between CEO ability and duality. Moreover, the sum of the coefficients on CEO ability and the interaction term is not significantly different from zero, indicating that sectors with low competition for talent are associated with no correlation between CEO ability and duality.

We then focus on several robustness checks. A common view is that changes in duality are just the result of relay successions, as described by Vancil (1987).[1] This type of successions mechanically generates changes in duality without effects on corporate governance as all parties involved understand the transitory nature of these duality changes. To address this alternative explanation, we identify relay successions in the data and split our sample of CEO successions depending on whether they are relay successions or not. Our prediction is that there should be a stronger correlation between CEO quality and duality in competitive CEO appointments rather than in pre-defined relay successions. Consistent with this prediction, we find insignificant results for relay succession and stronger results for the competitive open-market CEO hiring.

Furthermore, we show that results are robust to the use of propensity score matching in which each firm experiencing a CEO turnover is paired with its closest comparable (that did not experience a CEO turnover). When we do so, we obtain results that are similar to the base case both in terms of statistical and economic significance: hiring a higher-ability CEO is associated with a 7.2% change in the probability of duality compared with hiring a lower-ability CEO and this number increases to 16,2% in non-relay successions.

We also show that our results are robust to an alternative measure of managerial ability: abnormal executive compensation. If we assume that executive compensation is correlated with managerial ability, we can measure managerial ability as abnormal executive compensation for a given individual in his/her previous job. Moreover, we examine the dynamics of duality in the years just before and just after the CEO turnover: we find no lead or lag

[1]Vancil (1987) describes a common succession pattern as "passing-the-baton" or "relay succession" as follows. When a CEO-to-be is being groomed, (s)he hold the President or Chief Operating Officer (COO) position. Then, the incumbent CEO, who is also holding the Chair position, hands the CEO position to the new manager. When the training of the new CEO is complete, the Chair steps down and the CEO also holds the position of Chair of the Board. In the next step, a new manager is groomed as CEO-to-be and gets appointed as President or COO; and the process re-starts.

relations between CEO turnover and duality but only a contemporaneous effect, which is consistent with the view that duality is chosen as a negotiating tool to attract new CEOs.

This paper is related to the literature on the competition for managerial talent. Building on Rosen (1981), Gabaix and Landier (2008) and Terviö (2008) show that better managers match to larger firms in a setup where managerial talent has a multiplicative effect on firm performance and managers are compensated according to their marginal contribution to their firms' productivity. Fabbri and Marin (2016) use data on Germany firms to show that domestic (and global) competition for managers has greatly contributed to the rise in executive pay. Cremers and Grinstein (2014) study CEOs movements for the period between 1993 and 2005 and find that the characteristics of the market for CEOs differs across industries. Specifically, the proportion of CEOs coming from firms in other sectors significantly varies across industries, indicating that there is not a unique pool of managers that all firms compete for, but instead many pools specific to individual industries. Our paper contributes to this literature by adding corporate governance as an important matching mechanism between firms and managers. We show that lax choices of governance emerge as equilibrium outcomes because of the competition for managerial talent.

This paper is also related to the long standing literature on CEO-Chair duality and firm performance. Jensen (1993), in his Presidential Address at the American Finance Association, argues in favor of separating the CEO and Chair position so that the board of directors can effectively oversee the management. Similarly, Goyal and Park (2002) document that duality leads to a lower probability of being fired, consistent with the notion that duality represent poorer corporate governance. On the contrary, Brickley et al. (1997) show that the potential costs of separation may not outweigh its benefits, and Baliga et al. (1996) and Dey et al. (2011) document no clear pattern in the stock market reaction around combination (or separation) of the CEO-Chair position. Boyd (1995) and Babajide-Wintoki et al. (2012) find no impact of the separation of the CEO-Chair roles on the performance of the firm. Krause et al. (2013) provide a recent review of the disparate empirical findings on CEO Duality, including its impact on firm performance. Larcker and Tayan (2016) offer an interesting discussion of duality in the context of succession planning. We add to this debate documenting the importance of the competition for managerial talent in explaining the choice of separation between the CEO and Chair of the board positions. We present two offsetting mechanisms that affect the correlation between CEO-Chair duality and firm

performance. This novel result may have clouded the previous empirical research and could be an explanation for the difficulty in finding conclusive evidence regarding the impact of CEO-Chair separation on firm performance.

The remainder of the paper is organized as follows. Section 2 presents a stylized model to help develop testable hypotheses. Section 3 explains the empirical strategy. Section 4 presents the empirical evidence. Section 5 discusses robustness issues. Section 6 concludes.

2 Model

To motivate our empirical analysis, we develop a simple model in which firms compete for CEOs by choosing duality as part of the optimal incentive contract. This model builds on two main insights. First, tight corporate governance (i.e. separation between CEO and Chair) limits CEO discretion, relaxes the incentive compatibility condition, and thus reduces the pay required to incentivize the CEO. Second, competition for scarce managerial talent drives up the outside option of talented CEOs so as to make the incentive compatibility condition for talented CEOs redundant. Hence, firms hiring talented CEOs find it useless to (costly) monitor their CEO by hiring an independent Chair. In equilibrium, some firms choose duality and attract the better CEOs while others choose separation and attract the worse CEOs.

2.1 Setup of the Model

Consider an economy with n firms and m potential CEOs (managers). There are two types of CEOs, m_H are high-ability, well-established managers with a strong track-record (H-type), and m_L are low-ability, or less-experienced, managers (L-type), where $m_H + m_L = m$. Types are observable. We assume that the number of L-type CEOs is greater than the number of firms, $m_L > n$, while the H-type CEOs are not numerous enough to be hired by all firms, $m_H < n$. There is also a large supply of experienced Chairs, whose quality does not affect firm value. CEOs and Chairs have an exogenously given reservation utility $\overline{u}_R > 0$. Firms can hire at most one CEO and one Chair. Managers (i.e., CEOs and Chairs) and shareholders are risk neutral. All firms are ex-ante identical.

The assumptions that CEO types are observable and that good CEOs are in short supply

are the critical ingredient of our model. Without these assumptions, there is no effective competition in the managerial market and no interesting interaction between the choice of corporate governance and the competition for CEOs across firms.

The timeline is as follows: At $t = 1$, each firm hires a CEO from a pool of candidates of observable ability $q \in \{L, H\}$. Given that abilities are observable, each firm sets a compensation contract which is a function of the manager's ability q. CEOs apply for one of the jobs. If a manager is not employed at the end of this stage, he/she receives a reservation utility equal to $\overline{u}_R$. A firm that does not employ any CEOs receives an output normalized to 0. Compensation contracts are represented by a performance-related bonus $w_q \geq 0$, which is contingent on the verifiable output X produced at $t = 3$ and CEO quality q. Moreover, as part of the incentive package, the firm also chooses whether to appoint an independent Chair of the Board (i.e., setting a high level of corporate governance, $g = 1$) or to allow duality (i.e., choosing a low level of governance $g = 0$). An independent Chair may monitor the CEO but needs to be incentivized. For that purpose the Chair (if different from the CEO) is paid a performance related bonus $w_C \geq 0$, which is contingent on the verifiable output X produced at $t = 3$.

At $t = 2$, each CEO chooses an action $Z \in \{M, S\}$, where action S generates at $t = 3$ output $X = Y_q$ with probability p and $X = 0$ otherwise, and no private benefit for the manager ($b = 0$); while action M generates a private benefit $b = B$ for the manager and no output ($X = 0$) for the firm.[2] We assume that $Y_H - Y_L \equiv \Delta > 0$ (i.e., productivity is increasing in quality. an independent Chair of the Board (if available) can monitor the CEO, by choosing monitoring intensity $m \in [0, 1]$ at a cost cm. Monitoring reduces the private benefits for the CEO from choosing action M from B to $(1 - m\mu)B$, with $\mu < 1$. The choice of action Z and monitoring intensity m are not observable to shareholders.

At $t = 3$, output X is realized and distributed, the performance-related bonuses (w_q, w_C) are paid, and the manager receives the private benefit b.

We make the following technical assumptions, which simplify our analysis but are not

[2]With this binomial structure, the compensation contracts can be restricted to the choice of the salary w_q to be paid when output is $X = Y_q$. Any payment when $X = 0$ would be inefficient: it would simply increase the amount of compensation needed to incentivize the manager.

critical for our results:[3]

(A1) $\mu B \in (\overline{u}_R + c, p\Delta + \overline{u}_R + c]$: this assumption ensures that the choice of duality is not trivial. If $\mu B < \overline{u}_R + c$ (i.e., the benefit of monitoring is very small), the optimal choice is always duality for all types of managers. If instead $\mu B > \overline{u}_R + c + p\Delta$ (i.e., monitoring is very beneficial), the optimal choice is never duality for all types of managers.

(A2) $(1-\mu)B \geq \overline{u}_R$: this assumption implies that, if there is no competition for CEOs, the IR constraint is redundant. Removing this assumption would not change the nature of the results but would require to take into consideration the participation constraint of the type-L manager explicitly.

(A3) $pY_L > B$: this inequality ensures that incentivizing the L-type CEO to choose action S is efficient (and thus *a fortiori* incentivizing the H-type is also efficient). This assumption implies that shareholders always prefer that the incentive compatibility condition for the CEO is met.

2.2 Incentive Contracts

Let's start with the incentive compatibility (IC) constraints. There are two ways to incentivize CEOs: (i) by paying them a relatively high performance-related wage and allowing duality; and (ii) by paying them a relatively low performance-related wage and providing Chairs with enough incentives to monitor the CEO.

More precisely, we can prove the following result:

Lemma 1 (IC Constraints): *There are three cases to consider: (i) If $pw_q \geq B$, the CEO chooses action S and the Chair (if present) exerts no monitoring; (ii) if $pw_q \in [B(1-m\mu), B)$, the CEO chooses action S if $g = 1$ and the Chair monitors at level m if $pw_q \leq B(1-m\mu)$; and (iii) in all other cases, the CEO chooses action M and the Chair does not monitor.*

[3]We also make the following tie-breaking assumptions to simplify notations: When indifferent, firms prefer to hire a H-type CEO rather than a L-type one, CEOs prefer to choose action S to action M, and Chairs prefer to monitor rather than not doing so.

Proof: See Appendix A.

The pay for the CEO and the Chair needs also to satisfy their individual rationality (IR) constraints, which depend on the degree of competition for CEOs.

2.3 Equilibrium without competition

Consider first the case in which there is no competition for CEOs. Specifically, CEOs are matched with firms, they are given a take-it-or-leave offer, and, if they reject it, they cannot find another employer to hire them.

The shareholders' problem is:

$$\begin{aligned} \max_{(w_q, w_C, m, g)} \quad & p\left(Y_q - w_q - w_C\right) \\ \text{s.t. (IC) - CEO} \quad & pw_q \geq B(1 - gm\mu) \\ \text{(IR) - CEO} \quad & pw_q \geq \overline{u}_R \\ \text{(IC) - Chair} \quad & g(pw_q - B(1 - m\mu)) \leq 0 \\ \text{(IR) - Chair} \quad & g(pw_C - \overline{u}_R - mc) \geq 0 \end{aligned} \tag{1}$$

where $g \in \{0, 1\}$ indicates whether there is separation between CEO and Chair ($g = 1$) or duality ($g = 0$), $m \in [0, 1]$ is the monitoring intensity. Notice that, without competition for managers, the IR constraint for any CEO, $pw_q \geq \overline{u}_R$, is redundant once the IC constraint is satisfied from assumption (A2). The IC constraint of the CEO depends on g and m: if $g = 0$, the IC condition of the CEO is $pw_q \geq B$; if $g = 1$, the IC condition of the CEO is $pw_q \geq B(1 - m\mu)$. The IR constraint of the Chair also depends on g and m: there is no Chair, and thus no IR constraint to satisfy, if $g = 0$; the IR constraint of the Chair is $pw_C - mc \geq \overline{u}_R$ if $g = 1$. Finally, when $g = 1$ problem (1) must also satisfy the IC constraint of the Chair. As shown in Lemma 1, this requires that the CEO chooses $Z = M$ if monitoring intensity is just below the level m or $pw_q \leq B(1 - m\mu)$.

We can show that firms choose to separate the roles of CEO and Chair:

Proposition 1 (Governance without competition for CEOs): *A firm matched with a CEO of type $q \in \{H, L\}$ chooses separation between the CEO and the Chair, offers incentive*

contracts for CEO and Chair:

$$(w_q, w_C) = ((1-\mu)B/p, (\overline{u}_R + c)/p),$$

and generates expected profits $pY_q - (1-\mu)B - c - \overline{u}_R$.

Proof: See Appendix A.

Both the CEO and the Chair should be paid an incentive contract conditional on performance so that the IC constraint of the CEO and the IR constraint of the Chair are binding. Interestingly, without competition the CEO's pay is independent of its type.

2.4 Equilibrium with competition

Consider now the case in which firms can compete for CEOs. Specifically, we assume that each firm advertises one contract for each type. Firms commit to what is written in the contract but reserve the right to choose whom to employ if more than one prospective CEO applies for the job. CEOs choose among the available contracts until the market clears. i.e. until all firms have a CEO.

With competition, the CEO's reservation utility depends on his type as type H is likely to be in greater demand than type L. Let $\overline{u}_q$ with $q \in \{H, L\}$ be the reservation utility for a manager of type q to be endogenously determined later as we solve for the equilibrium in the market for CEOs. The IR constraint for the CEO depends on his ability: a CEO of ability $q \in \{H, L\}$ accepts an offer only if $w_q \geq \overline{u}_q/p$. The IR constraint for an independent Chair of the Board is as in the case without competition: she must be paid $w_C \geq (\overline{u}_R + cm)/p$ (if she is expected to exert monitoring at intensity m).

We can now turn to study how shareholders choose between duality and separation and whether managerial ability affects this decision.

2.4.1 Incentive Contract with Duality

Consider first the case in which there is duality. In such case, the IC and IR constraints for the Chair of the Board are irrelevant. The shareholders' problem is then:

$$\begin{aligned} \max_{w_q} \quad & p\left(Y_q - w_q\right) \\ \text{s.t. (IC) - CEO} \quad & pw_q \geq B \\ \text{and (IR) - CEO} \quad & pw_q \geq \overline{u}_q \end{aligned} \tag{2}$$

Analyzing the optimal incentive contracts conditional on the manager's type, we derive the following result:

Lemma 2 (Optimal contract with duality): *The optimal contract for a CEO of type q who is also the Chair of the board is* $w_q = \max\{B, \overline{u}_q\}/p$ *and shareholders' expected profits are* $pY_q - \max\{B, \overline{u}_q\} \equiv \Pi_q^D$.

Proof: See Appendix A.

Intuitively, the optimal incentive contract for a type-q CEO depends on his reservation utility. If the CEO's reservation utility is large ($\overline{u}_q > B$), the incentive compatibility constraint is redundant and the incentive pay is set to meet the individual rationality constraint ($w_q = \overline{u}_q/p$). If instead the CEO's reservation utility is low ($\overline{u}_q < B$), the individual rationality constraint is redundant and the incentive pay is set to meet the incentive compatibility constraint ($w_q = B/p$).

2.4.2 Incentive Contract with Separation

Consider next the case in which there is separation. In such case, shareholders have to decide the monitoring intensity they want the Chair to exert.

The shareholders' problem is to maximize:

$$\begin{aligned} \max_{(w_q, w_C, m)} \quad & p\left(Y_q - w_q - w_C\right) \\ \text{s.t. (IR) - CEO} \quad & pw_q \geq \overline{u}_q \\ \text{(IC) - CEO} \quad & pw_q \geq B(1-\mu m) \\ \text{(IR) - Chair} \quad & pw_C \geq \overline{u}_R + cm \\ \text{(IC) - Chair} \quad & pw_q \leq B(1-\mu m) \end{aligned} \tag{3}$$

where the level of monitoring $m \in [0,1]$ affects the constraints faced by shareholders. Problem (3) must satisfy four constraints: the IC condition of the CEO ($pw_q \geq B(1-m\mu)$), the IR constraint of the CEO ($pw_q \geq \overline{u}_q$), the IR constraint of the Chair ($pw_C \geq \overline{u}_R + mc$), and the the IC constraint of the Chair, which, as shown in Lemma 1, requires that the CEO chooses $Z = M$ if the Chair monitors less than m, i.e., $pw_q \leq B(1-\mu m)$. As discussed in Lemma 1, the combination of the two IC constraints imply that $pw_q = B(1-\mu m)$. Otherwise, one of the two is violated.

The optimal incentive contracts for the CEO and the Chair are as follows:

Lemma 3 (Optimal contract with separation): *The optimal contract for a CEO of type q and the optimal contract for the Chair are:*

$$(w_q, w_C) = \begin{cases} (B(1-\mu)/p, (\overline{u}_R + c)/p) & \text{if } \overline{u}_q < (1-\mu)B \\ (\overline{u}_q/p, [\overline{u}_R + (c/\mu)(1-\overline{u}_q/B)]/p) & \text{if } \overline{u}_q \in [(1-\mu)B, B) \\ (\overline{u}_q/p, \overline{u}_R/p) & \text{if } \overline{u}_q \geq B \end{cases}$$

Shareholders' expected profits are:

$$\Pi_q^S = \begin{cases} pY_q - B(1-\mu) - (\overline{u}_R + c) & \text{if } \overline{u}_q < (1-\mu)B \\ pY_q - \overline{u}_q - [\overline{u}_R + (c/\mu)(1-\overline{u}_q/B)] & \text{if } \overline{u}_q \in [(1-\mu)B, B) \\ pY_q - \overline{u}_q - \overline{u}_R & \text{if } \overline{u}_q \geq B \end{cases}$$

Proof: See Appendix A.

Figure 1 offers a graphical comparison between Lemmas 2 and 3, by plotting the expected profits with separation (Π_q^S) and with duality (Π_q^D) as a function of the reservation utility

$\overline{u}_q$. As can be seen, separation dominates duality for low values of $\overline{u}_q$ (specifically, as long as $\overline{u}_q < B - (\overline{u}_q + c)$); while duality dominates separation for higher values of $\overline{u}_q$.

The intuition for these results comes from the fact that monitoring is an effective way to relax the IC constraint of the CEO whenever it is binding. For relatively low values of $\overline{u}_q$, the IC constraint is binding while the IR constraint of the CEO is redundant and thus separation and monitoring are efficient. For higher values of $\overline{u}_q$, the IR constraint becomes binding while the IC constraint becomes slack. So monitoring becomes useless and duality becomes optimal.

2.4.3 Market for CEOs

To close the model we need to solve for $\overline{u}_q$, which clearly depends on CEO quality q (unlike in the case without competition) as there is greater competition for high-quality managers. The equilibrium in the market for managers is a follows:

Proposition 2 (Governance with competition for CEOs): *A mass m_H of firms hire a type-H CEO, choose duality and a pay $w_H = \Delta + [B(1-\mu) + \overline{u}_R + c]/p$. The remaining $n - m_H$ hire a type-L CEO, choose separation and pay CEO and Chair $(w_L, w_c) = (B(1-\mu)/p, (\overline{u}_R + c)/p)$, respectively. The expected profits for all firms are $pY_L - B(1-\mu) - (\overline{u}_R + c)$.*

Proof: See Appendix A.

This is the key result of the model. The scarcity of type-H CEOs leads firms to drive up the rent awarded to type-H CEOs ($\overline{u}_H$) so as to become indifferent between hiring type-H or Lmanagers. If hiring a type H leads to higher profits than hiring a type L, then a firm can marginally increase the compensation to H, attracting one of them for sure, increasing profit. If instead hiring a type L leads to a higher profit, all firms would hire a type L and thus type H would be willing to work for less.

Since firms take type-H CEOs' rents ($\overline{u}_H$) as given and separation of the roles of Chair of the board and CEO is used by firms to reduce managerial rents, firms hiring type-H CEOs find duality optimal. Conversely, firms hiring L-type managers face no competition

for them and can, therefore, keep managerial compensation down to the incentive compatibility constraint. Thus, these firms choose the efficient corporate governance regime, namely separation.

The result in Proposition 2 is illustrated graphically in Figure 2, where we plot the expected profits associated with hiring an L-type CEO and choosing separation (Π_L^S) and the expected profits associated with hiring a type H and choosing duality (Π_H^D) as a function of the reservation utility of the H type, $\overline{u}_H$. The expected profits associated with hiring a type L always lies within the expected profits associated with hiring a type H as H types dominate L type for the same level of CEO compensation. In equilibrium firms must be indifferent between hiring the two types and thus H types should earn a rent equal to $p\Delta + (1-\mu)B + c$ so as to equate Π_L^S and Π_H^D.

2.5 Discussion

Without competition, as shown in Proposition 1, it would be efficient to separate the roles of Chair and CEO for all CEOs independently of their type. However, higher reservation utility of H type CEOs forces firms to offer higher compensation and duality to type-H CEOs, as shown in Proposition 2. If they could coordinate, firms would prefer to separate the two roles so as to reduce as much as possible the rents that type H enjoys. They do not do so in the competitive equilibrium because each firm does not internalize the externality their choices of corporate governance impose on other firms. Specifically, in our model, when firms increase monitoring by the Chair, they reduce the reservation utility of managers working in other firms. Hence, they bear all the cost of higher governance but only enjoy part of the benefits. This intuition is similar to the work by Acharya and Volpin (2010) and Dicks (2012).

An assumption in the analysis above is that the CEO is risk neutral. Removing this assumption complicates the analysis but does not alter the logic of our argument: the idea that investing in governance is less valuable for a firm that chooses to hire a CEO with a better outside option transcends the risk preferences of the CEO.

To grasp the intuition for this result, notice that when the agent is risk averse, the firm will pay a fixed wage w_0 and a bonus w to meet the IC constraint: $pU(w_0+w)+(1-p)U(w_0) = U(w_0 + B(1-m\mu))$. If the CEO's outside option is sufficiently low ($\overline{u} \leq U(w_0^* + B(1-\mu))$,

where w_0^* is the chosen fixed wage when only the IC constraint is met, the IR constraint is redundant. In that case, exactly as in the case with risk neutrality, investing in governance is efficient as it reduces the compensation (the mix of fixed wage and bonus) needed to satisfy the IC constraint.

When instead the CEO's outside option is not redundant, in equilibrium both the IC and the IR constraints of the CEO will be binding. The IR constraint ($\overline{u} = U(w_0 + B(1 - m\mu))$) reduces the value of governance as any increase in m must be compensated by a proportional increase in the fixed wage w_0. This implies that in equilibrium firms will choose a lower level of governance when hiring a CEO with better outside options (as compared to a CEO with weaker outside options), as found in the case with risk neutrality.

3 Empirical Strategy

It is common view among investors and regulators that CEO-Chair duality is inconsistent with good corporate governance (examples include, NYSE (2014) or Olson (2013)). This view is supported by many academics. For instance, Jensen (1993) argues that the separation between the CEO and the Chair of the Board is a necessary condition for an adequate board monitoring of the CEO. However, there is a large amount of empirical studies, such as Baliga et al. (1996), Boyd (1995) and Babajide-Wintoki et al. (2012) that find no correlation between the separation of the CEO-Chair roles and firm performance.

In this paper, we reconcile these seemingly contradictory arguments. We show that CEO-Chair duality is indeed inconsistent with good corporate governance but, as a counterbalancing effect, firms use CEO-Chair duality as a mechanism to attract high talent managers. Hence, CEO-Chair duality has a direct direct negative effect on firm performance and an indirect positive effect, as it allows the firm to attract better managers.

3.1 Hypotheses

The model presented in Section 2 offers two testable predictions. First, provided that one can find an appropriate measure of managerial talent, the model predicts that:

Prediction 1 (Matching CEO ability and duality): *When firms hire higher ability*

CEOs, they choose duality. Instead, when firms employ lower ability CEOs, they prefer to separate the CEO and Chair roles.

As the comparison between Propositions 1 and 2 of the model highlights, the prediction above critically depends on the degree of competition for CEOs. Therefore, conditional on us finding a relevant measure of the effective competition for CEOs:

Prediction 2 (Competition for CEOs and duality): *The correlation between CEO ability and duality should be increasing in the degree of competition for managers.*

3.2 Empirical Specification

We now turn to the design of an empirical test of these two predictions.

To test the first prediction (that shareholders are more likely to adopt duality when they appoint a better CEO), we examine the correlation between changes in firms' duality from one year to the next one and changes in CEO ability. Specifically, we estimate the following specification:

$$DualityChg_{it} = \alpha + \beta AbilityChg_{it} + \delta'\omega_{it} + \chi_t + \gamma_i + \xi_{it} \tag{4}$$

where $DualityChg_{it}$ is a categorical variable that takes value 1 in year t for firm i if duality is higher at the end of year t than it is at the end of year $t-1$, 0 if it does not change, and -1 if it decreases; $AbilityChg_{it}$ is a categorical variable that takes value 1 if $Turnover_{it} = 1$ and the new CEO has higher *Ability* than the previous one, 0 if $Turnover_{it} = 0$, and -1 if $Turnover_{it} = 1$ and the new CEO has lower *Ability* than the previous one. *Ability* is the average CEO ability as measured by Demerjian et al. (2012) for a given CEO-firm match. We discuss this measure in detail in section 4.1. We control for time varying firm characteristics, year, and firm fixed effects ($\delta'\omega_{it}$, χ_t, and γ_i, respectively).

Prediction 1 implies that $\beta > 0$, that is, firms increase (decrease) CEO-Chair duality to attract better (worse) CEOs. We focus our analysis on time series regressions by controlling for firm fixed effects. We do so for several reasons. First, including firm fixed effects is the most conservative approach as they capture any (time invariant) firm characteristic that affects the correlation between changes in ability and changes in CEO-Chair duality. Second, in this test we are interested in how a given firm changes CEO-Chair duality to attract a better CEO so we are focusing on within-firm variations.

To test the second prediction on the role of the competition for CEOs, we take advantage of cross-industry differences in the competition for managerial talent. Specifically, we estimate the degree of competition for managers in an industry using the percentage of CEOs in an industry that were previously employed within the same industry (*Within Industry*), as measured by Cremers and Grinstein (2014). In sectors with more insider promotions, CEO skills are more industry specific and thus CEOs have more limited outside options. This means less competition for CEOs and thus we expect to find a weaker correlation between changes in CEO ability and duality in those sectors. Conversely, in sectors more open to outsiders, we expect CEO skills to be more transferable and thus CEOs have more outside options. This means more competition for talent, and thus stronger correlation between changes in CEO ability and duality. In other words, we predict $\beta > 0$ and $\beta = 0$ in specification (4) for competitive environments and non-competitive environments, respectively.

To test this prediction, we estimate the following specification:

$$\begin{aligned} DualityChg_{it} = \alpha + \beta_1 AbilityChg_{it} \times Within\ Industry_i + \\ + \beta_2 AbilityChg_{it} + \delta' \omega_{it} + \chi_t + \gamma_{ind} + \xi_{it} \end{aligned} \tag{5}$$

where $DualityChg_{it}$, $AbilityChg_{it}$, $Within\ Industry_i$, $\delta'\omega_{it}$, and χ_t are as described above; γ_{ind} are the industry fixed effects, which replace firm fixed effects as the main source of variation for this test is at the industry level. Prediction 2 implies that $\beta_1 < 0$ and $\beta_1 + \beta_2 = 0$. An alternative way to test Prediction 2 is to estimate equation (4) separately for each Fama-French 49 industry and compute the correlation between the industry-specific coefficient β^{ind} and our measure of competition for talent, *Within Industry*. Our model would predict a negative correlation between these two variables.

3.3 Identification Strategy

In the data, there is no clear source of exogenous variation in the key explanatory variable, the change in firm-level CEO ability ("AbilityChg") from one CEO to the next, which can be used to establish causality. However, that is not the main goal of the empirical analysis.

Our primary goal is to find supporting evidence for the selection mechanism described in the model: the idea that better CEOs would be more likely to have duality and that this is specially prevalent in more competitive industries. In the model, there is no direction

of causality between CEO ability and duality: they are both are chosen (i.e., endogenous) variables. The model predicts a positive correlation between these endogenous variables, which can be tested in the data.

Our empirical tests rely on the changes in ability between the incumbent and the newly appointed CEO. According to the model, CEO ability is perfectly known at the time of hiring; in reality, the perceived CEO ability at the time of hiring is likely to be a noisy signal of the true CEO ability. In other words, it is possible that there is residual uncertainty about the CEO ability that is as good as randomly assigned conditional on firm and year fixed effects and a number of control variables. In that respect, the empirical results could be interpreted (with caution) as more than correlations.

3.4 Alternative Explanations

The model emphasizes how duality emerges as a solution of an optimal incentive contract in the presence of competition for CEOs. The combination of Predictions 1 and 2 is specific to the model presented in Section 2. However, there other possible explanations that are consistent with Prediction 1.

One alternative story focuses on the role of the Chair of the Board. In the model presented in Section 2, the only role of the Chair of the board is to monitor the CEO and thereby prevent the CEO from shirking. Furthermore, all potential chairs are equally able to monitor the CEO (and have the same monitoring cost). In practice, the Chair is likely to also have other roles and do other things that influence the firm's performance. In that case, the chair's talent may matter in the sense that, all else equal, a more talented Chair is more desirable than a less talented one. This would imply (as stated in Prediction 1) that more talented CEOs would have a higher likelihood of being appointed Chair of the board even in the absence of the mechanism highlighted by our model.

A similar story would be that "better" CEOs simply need less monitoring (e.g., because they know better what is the right action to take). In that case, it would also appear that "better" CEOs should be more likely to also be the Chair of the board (which would save the cost of paying someone else for the job).

Both these alternative explanations are consistent with Prediction 1 but do not imply

Prediction 2, as competition (for CEOs) does not play any role in them.

4 Empirical Results

In this section, we start by describing the data and then we present our main results.

4.1 Data description

We obtain CEO data from ExecuComp, ISS (former RiskMetrics) and Demerjian et al. (2012). Using ExecuComp, we define *Turnover* as an indicator that takes value 1 in year t if the CEO at the end of year t is different from the CEO at the end of year $t-1$.

In our main tests, we use the measure of managerial ability developed by Demerjian et al. (2012). The authors obtain a yearly measure of CEO talent as the residual firm productivity, after controlling for inputs and some observable characteristics beyond the CEO's control that may affect firm's productivity. First, they use data envelopment analysis (DEA) to calculate the efficient production frontier of a given industry as the amount of inputs needed to achieve a certain output level. Second, they assign each firm a score between 0 and 1 depending on the distance from the efficient frontier (lower score if further away from the frontier). Finally, they calculate CEO ability as the residual firm score unexplained by firm characteristics.[4] We define CEO *Ability* as the average of the CEO talent for each CEO-firm match. Hence, our measure of CEO ability is a time-invariant firm-CEO specific measure. We define *AbilityChg* as follows: $AbilityChg = 1$ if $Turnover = 1$ and the current CEO has higher *Ability* than the previous one; $AbilityChg = -1$ if $Turnover = 1$ and the current CEO has lower *Ability* than the previous one; and, $AbilityChg = 0$ if $Turnover = 0$.

An alternative (and complementary) approach is adopted by Milbourn (2003), Murphy and Zábojník (2007), Falato et al. (2015), and Engelberg et al. (2013). They develop an empirical proxy for CEO talent based on observable characteristics. These papers show

[4]In more details, Demerjian et al. (2012) calculate the firm efficiency using revenues, as their measure of output, and net property, plant, and equipment (PP&E), net operating leases, net R&D, purchased goodwill, other intangible assets, cost of inventory, and selling, general, and administrative expenses (SG&A), as their measures of inputs. Then, they calculate managerial ability as the residual in the regression of the previously calculated firm efficiency over observables such as total assets, market share, free cash flow indicator, firm age, business segment concentration, foreign currency indicator and, year fixed effects. They run the regression separately for each industry.

that, when setting CEO compensation, boards reward several reputational, career, and educational credentials of the CEOs (which can be viewed as measure of talent). Another, more indirect approach is to measure CEO talent as the CEO fixed effect. This approach has been used by Bertrand and Schoar (2003) to study managerial styles and by Graham et al. (2012) to study executive compensation. We do not follow this approach because we need to be able to sort CEO according to their ability to test the correlation between ability and corporate governance. In other words, we would need to estimate the CEO fixed effects from a regression with performance as the dependent variable and use them as regressors in a regression in which duality is the dependent variable. The methodology proposed by Demerjian at al. (2012) is an efficient way to achieve this result.

In the robustness results, we use abnormal compensation at the previous employment (*Pre-Appointment Comp*) as an alternative measure of CEO talent: first, for each CEO, we calculate abnormal compensation in their previous job as the residual on a regression of total compensation on firm size, dummies for different roles, industry and year fixed effects. Then, we take the average of all the residuals for a CEO while working at the previous employer. Hence, *Pre-Appointment Comp* is defined at the CEO-firm level. We define *AbilityChg Alt* as follows: $AbilityChg = 1$ if $Turnover = 1$ and the current CEO has higher *Pre-Appointment Comp* than the previous one; $AbilityChg\ Alt = -1$ if $Turnover = 1$ and the current CEO has lower *Pre-Appointment Comp* than the previous one; and, $AbilityChg\ Alt = 0$ if $Turnover = 0$.

We obtain *Duality* from ISS: it is an indicator that takes value 1 if the CEO holds the position of Chair of the Board in the same firm/year, and 0 otherwise. We define *DualityChg* as a categorical variable that takes value 1 if duality increases, 0 if it does not change, and -1 if it decreases.

We measure firm performance as return on assets (*ROA*). We use an accounting-based measure of firm performance to prevent the forward-looking components of market-based measures (such as Tobins' Q) clouding our results. In all specifications, we control for firm size, as measured by the firm market capitalization (*Market Cap*), and the CEO age (*CEO Age*). In some specifications, we also control for previous year return on assets (*L.ROA*), book leverage (*Book Lev*), a dummy that takes value 1 if the current CEO was externally appointed, 0 otherwise (*External Dummy*), the CEO tenure (*Tenure*), the logarithm of the

number of board members (*Board Size*), and the percentage of independent directors on the board (*Fract Indep*).

As proxy for the (lack of) competition for managerial talent, we use the percentage of CEOs that were hired from within a given industry: *Within Industry* is defined as the percentage of CEOs that were employed in the same Fama-French industry two fiscal years before they were promoted to CEO. As argued in the empirical predictions section, competition for managers affects duality choices through the managers' individual rationality constraints. To satisfy this individual rationality constraints a firm must pay the manager his/her reservation utility, which is the rent he/she would obtain if he/she would work for another firm. Empirically, the probability that a CEO finds an alternative position is directly affected by the number of firms that could potentially employ him/her. If firms in an industry tend to hire from within their own employees, this creates a relatively small "CEO talent pools", as documented by Cremers and Grinstein (2014). Hence, the percentage of CEOs either internally promoted or previously working at a firm within the industry is inversely correlated with the competition for managers. Cremers and Grinstein (2014) document that these differences across industries in terms of percentage of internally promoted managers arise from the importance of firm-specific skills.

Alternatively, the impact of specific skills on the competition for managers could also go the other way: if firms cannot hire a CEO from other industries, there may instead be high competition for the few CEOs that possess the required specific skills.

Which of the two effects dominates is ultimately and empirical question (and not the focus of this paper). Both Cremers and Grinstein (2014) and Custodio et al. (2013) document an increased importance of general managerial skills over firm-specific human capital in the market for CEOs; implying that generic skills increase the CEO bargaining power in the labor market, increasing their pay. Given their results, we consider that an increase is cross-industry appointments indeed increases competition for managerial talent.

The dominant view on changes of duality is the idea of "relay successions" or "passing-the-baton". As described by Vancil (1987), an internal heir apparent is selected some years before the current CEO is expected to step down and is trained until the current CEO step down. Then, the incumbent CEO usually stays as Chair of the Board for a training period after the new CEO is appointed. Following Naveen (2006), we define *HeirsApparent*

as a variable that takes value 1 for CEOs appointed after a succession consistent with relay successions, and 0 otherwise. Specifically, as in Naveen (2006), we consider a succession to be consistent with a relay succession if the new CEO was president or chief operating officer (COO) at the same firm the year before being appointed CEO. *HeirsApparent* is a time invariant variable defined for each CEO-firm match.

In our additional model predictions, we use executive compensation and other corporate governance measures. We measure executive compensation using (logarithm) of total compensation (*ln(Total Comp)*), incentive compensation (*ln(Incentive Comp)*), bonus (*ln(Bonus)*) and salary (*ln(Salary)*) from ExecuComp. We use the percentage of independent directors on the board (*Fract Indep*), the GIM-Index (*GIM-Index*) from Gompers et al. (2003), and the Entrenchment-Index (*E-Index*) from Bebchuck et al. (2009), as other measures of corporate governance.

The definitions of all the variables are in the Appendix B.

As commonly done, we exclude financial, utilities and governmental and quasi governmental firms (SIC codes from 6000 to 6999, from 4900 to 4999 and bigger than 9000; respectively). Their competition for managerial talent may follow different patterns. We winsorize all our non-categorical variables at the 1% level.

Summary statistics for all the variables are reported in Table 1. Panel A reports continuous and dummy variables. Panel B reports categorial variables. Our dataset spans the 1996-2013 period, covers 2,982 different CEOs and 1,783 different firms.[5]

4.2 Duality as a selection mechanism

In this section, we study whether duality is used as part of the selection mechanism for new CEOs. For this to be the case, we should expect a higher frequency of changes of duality when there is a CEO turnover than otherwise. A very different prediction would follow from the view that duality is the outcome of CEO entrenchment. If CEO entrenchment was the main mechanism driving duality, we would expect most of the increases in duality to take place some years after the CEO is appointed, once his/her power within the firm is stronger.

[5]The dataset starts in 1996 and finishes in 2013 because of governance and ability measure data availability, respectively.

In Table 2, we report the changes in CEO-Chair duality in years with CEO turnover compared to years without CEO turnover. In Panel A, we show that firms are far more likely to change duality (*DualityChg*= 1 or *DualityChg*= −1) when there is CEO turnover (*Turnover*= 1). Duality changes take place in 7.6% of the firm-year observations without CEO turnover while they take place in 58.1% of the firm-year observations with CEO turnover. Given the large economic magnitudes, the differences are also largely statistically significant. Moreover, results also document a clear asymmetric pattern: there are more duality decreases than increases around turnover.

In Panel B, we further explore the asymmetry between increases and decreases in CEO-Chair duality changes around CEO turnover. Consistent with Naveen (2006), we show that relay successions drive this specific result. That is, decreases in CEO Chair duality are specially common when there is a clear succession plan (*Heirs Apparent*=Yes). CEO-Chair decreases 60% of the turnover cases when there is a heirs apparent while it only decreases 37% of the times in other successions.

Overall, the finding that changes in duality are concentrated in periods around CEO turnover is supportive of our maintained hypothesis: CEO-Chair duality plays a role in the CEO selection mechanism. Conversely, the low frequency of changes in duality outside CEO turnover is difficult to reconcile with the view that duality is the result of CEO entrenchment.

4.3 Matching CEO ability and duality

In this section, we estimate specification (4) to test whether shareholders grant duality to high ability managers while they separate the Chair and CEO role for low ability managers.

Consistent with Prediction 1, in column (1) of Table 3, we find that the coefficient on *AbilityChg* is positive and significant. Increases in duality are associated with increases in CEO ability. This result indicates not only that duality is a selection mechanism but also that firms use it to attract the high ability managers. To appreciate the economic significance of this result notice that hiring a higher-ability CEO (than the incumbent one) is associated with a 17% change in the probability of increasing duality compared with hiring a lower-ability CEO (than the incumbent one). In other words, we document that firms are more likely to implement the separation between CEO and Chair when they hire a new CEO that has lower ability than the incumbent one.

We include firm fixed effects to ensures that our results are purely time series; that is, our results arise from comparing changes in CEO-Chair duality for changes in ability around turnover. As discussed in section 3.2, we are interested in how a given firm changes CEO-Chair duality to attract a CEO with a given ability.

More importantly, our methodology takes into account that turnover years may be substantially different than non-turnover years. For example, turnover may happen around period of poor performance. Arguably, under-performing firms would be more inclined to change things, including CEO-Chair duality. If this is the case, some firms would increase CEO-Chair duality while others would decrease it. As long as this confounding effect is not correlated to changes in managerial ability, this confounding effect is biasing our coefficients towards not finding a significant result. The main argument of the paper is that these changes in duality are indeed correlated to changes in ability in a directional pattern: to employ a better manager, firms grant duality to the new CEO.[6] Moreover, in the robustness section, we repeat the analysis restricting our sample to CEO turnover periods only and find similar results.

The inclusion of firm fixed effects may also explain the fact that firm size (*Market Cap*) is insignificantly different from zero as most of the firm size variation is across firm rather than within a firm. We find that *CEO Age* is positively associated with duality which indicates that older (more experienced) CEOs tend to also be the Chair of the board.

In column (2), we show that our results are robust to controlling for additional time-varying firm characteristics that may affect changes in duality. As suggested in the previous section, *Tenure* is always positive and statistically different from 0: as CEOs gain power they are more likely to enjoy duality. More importantly, the economic significance of the coefficient is smaller than the recruitment mechanism discussed in this paper. For example, in column (3) of Table 3, our results indicate that, given the average CEO employment length of 6 years, the probability of CEO-Chair duality at the end of a given CEO appointment will increase only by 3.6% due to power.[7] This suggests that the effect of increasing duality

[6]Similarly, if changes in duality tend to decrease during turnover periods, independently of the new CEO ability, then we would see no effect of *AbilityChg* on *DualityChg*. The coefficient on *AbilityChg* relies on changes on duality taking a specific direction depending on changes in CEO ability.

[7]We do this calculations as follows. Given the coefficient on tenure in column (3) of Table 3, 0.006, this implies an increase in 0.036 in *DualityChg* when tenure increases from 1 to 7 years.

to attract highly talented CEOs is largely independent of power.

We also control for previous performance (*L.ROA*), book leverage (*Book Lev*) and find insignificant results. Hiring an external CEO (*External Dummy*) does not have an effect on the changes in duality implying that externally appointed managers are equally likely to implement than to remove duality. Finally, we document that CEO-Chair duality changes are also correlated with changes in other board characteristics such as board independence (*Fract Indep*) and board size (*Board Size*).

In columns (4) to (6) of Table 3, we explore the role of relay successions. In column (4), we show that changes in duality as a selection mechanism are more common in non-heirs turnover cases. Importantly, the results show an increased role of duality as a selection mechanism for non-heirs related turnover: hiring a higher-ability CEO in non-heirs related succession is associated with a 21.8% increase in the probability of duality compared with hiring a lower-ability CEO in a non-heirs related succession. Consistent with Vancil (1987), our results show that new CEO ability does not significantly influence the choice of duality in heirs-related turnover. In columns (5) and (6) we repeat the analysis splitting between heirs-related and non-heirs related successions and obtain very similar results: duality is a selection mechanism in non-relay successions. Interestingly, when we split our sample depending on whether the current CEO was appointed after a relay succession or not, we find that the effect of tenure on CEO Chair duality for relay successions is economically larger. This suggests power has a greater effect on these firms.

Given the discrete nature of our dependent variable, we repeat the analysis using an ordered logit model and obtain very similar (untabulated) results. Throughout the paper, we use linear probability models to simplify the interpretation of the results and to improve the comparison across settings.

4.4 Matching and competition for CEOs

We now study how the role of corporate governance as part of an optimal compensation contract depends on the competition for managers, and test Prediction 2: the relationship between high-ability CEOs and duality increases with the competition for talented managers.

First, in Table 4 we presents the results of the estimation of specification (5). We docu-

ment a negative coefficient on the interaction term between *AbilityChg* and *Within Industry*: sectors with more within-industry mobility are associated with a lower correlation between CEO ability and duality. Moreover, the sum of the coefficients on *AbilityChg* and the interaction term is not significantly different from 0. This result indicates that sectors with very high percentage of within-industry mobility are associated with no correlation between CEO ability and duality. In column (2), we show the results are robust to the introduction of an array of controls.

Second, in Figure 3, we plot the relationship between the coefficients β^{ind} when we estimate the equation (4) separately for each industry on the vertical axis, and the percentage of within industry hires (*Within Industry*) on the horizontal axis. Each point in the plot corresponds to a different industry, indicated by the number reported next to each point, coded following the 49 Fama French industries. To ensure robust results, we only include industries that have at least 100 observations. We also plot the linear fit of all the different data points, showing that higher competition for managers implies a stronger role of duality as a mechanism to attract CEO ability. In numbers, the correlation between the different β^{ind} and the percentage of internal promotions is -0.41, which is statistically different from zero at the 1% level.

In summary, these results provide evidence that the competition for managers plays a crucial role in the choices of duality of firms that want to attract highly talented managers, our key insight. Indeed, firms seem to use corporate governance as part of an optimal compensation contract more aggressively in those industries where the competition for talent is more severe.

5 Further Analysis

In this section, we provide additional results to complement our analysis. First, we show that our findings do not change when we use propensity score matching. Second, we show that our results are not driven by a specific measure of ability: we find similar results when we use abnormal compensation paid to the executive before being appointed as CEO as a measure of his/her ability. Third, our results do not change when we restrict our sample exclusively to turnover observations. Forth, we show that our results are robust to controlling for lead and lag effects of CEO turnover on CEO Chair duality. Last but not the least, we document

empirical support for some additional testable hypotheses from our model.

5.1 Propensity score matching

In this section, we use propensity score matching as a robustness test for our results. This approach addresses the concern that CEO turnovers are special times in the life of firms and thus our findings on changes of duality around turnovers may be driven by other characteristics associated with CEO turnovers. Propensity score matching can alleviate some of these concerns by restricting the control groups to firms otherwise identical to the treated ones.

First, we estimate a propensity score matching model where each firm experiencing a CEO turnover is matched to its most similar firm with no CEO turnover using standard propensity score matching methodology. We match firms using market capitalization (*Market Cap*), CEO age (*CEO Age*), past performance (L.ROA), industry, and year. We allow one match per turnover (treated) firm with replacement.

Then, we run a regression of our main dependent variable, changes in duality (*DualityChg*), on our main independent variable, ability changes (*AbilityChg*), including only the turnover observations and their matched pairs. We include the same set of control variables as in Table 3 column (3), year and industry fixed effects. We show our results in Table 5 Panel A. In column (1), we find that hiring a high-ability CEO is associated with a 7.2% greater probability of increasing duality with respect to firms hiring a low ability CEO when each firm is compared to its closest match. This result is significant at the 5% level. In columns (2) and (3), we repeat our analysis splitting our sample based on relay successions.[8] As in Table 3, we find that the role of CEO Chair duality as a selection mechanism is more prevalent in non-"relay successions."

5.2 Alternative ability measure

As talent differentials are likely to be reflected in pay differentials, we use *Pre-Appointment Comp* as an alternative measure of ability. We define *Pre-Appointment Comp* as the average residual on a regression of total compensation on firm size, dummies for different roles, and

[8]Specifically, we keep the matching methodology as in in column (1), that is, based on market capitalization, CEO age, industry, and year. Then, we use only the relay successions and its matched peers in columns (2) and the non-relay succession and its matched peers in columns (3).

industry and year fixed effects for a given individual at his/her previous job.[9] Then, we set *AbilityChg Alt*=1 if the current CEO ability measured by abnormal compensation is higher than the incumbent one, *AbilityChg Alt*=−1 if the current CEO ability is lower than the incumbent one, and *AbilityChg Alt*=0 if there is no turnover.

There are pros and con with the use of this variable. On the one hand, past compensation is definitely a relevant statistic available at the time of a new CEO appointment and informative about managerial quality, when it is set efficiently. On the other hand, executive compensation depends on a lot of factors beyond CEO ability and is available only for CEOs who are in the dataset prior to their appointment as CEOs.

Table 5 Panel B shows that higher abnormal pre-appointment compensation of the CEO is associated with higher likelihood that he/she will be granted CEO Chair duality at appointment. In column (1), we find that hiring a higher-ability CEO is associated with a 11% change in the probability of increasing duality compared with hiring a lower-ability CEO. In columns (2) and (3), we split the sample based on heirs apparent. Consistent with our hypotheses, we find positive and significant results for the non-relay succession sub-sample. In summary, the results are statistically and economically similar to the base case in which we use this alternative measure of ability. Hence, our specific measure of ability is not driving our results and it remains a valid measure to capture CEO ability in this context.

5.3 Turnover observations only

In this section, we show that our main results are robust to focusing exclusively on the CEO turnover year observations.

In Table 5 Panel C, we repeat the analysis on Table 3 but we restrict our sample only to CEO turnover observations.[10] In column (1), we include the whole sample and find statistically insignificant results. However, once we split the sample depending on whether they are relay and non-relay successions in columns (2) to (3), results are both statistically

[9]In more details, we use the residuals from the following regression: the logarithm of total compensation on market capitalization, a set of dummy variables for each of the executive roles (CEO, COO, Chair, Vice-Chair, President and Vice-President), the 49 Fama-French industry and year fixed effects.

[10]When using CEO turnover observations only, we do not use firm fixed effects but industry fixed effects since few firms have multiple CEO turnover events within our sample. We obviously exclude CEO tenure as a control as all CEOs have no tenure at appointment.

and economically similar to columns (5) to (6) in Table 3; indicating that controlling for relay successions to filter the mechanical changes in CEO Chair duality is specially important when focusing only on CEO turnover observations only. Overall, the economic significance of the results is smaller than in Table 3 but they remain substantial: in a non-heirs related successions, hiring a higher-ability CEO is associated with a 13.2% change in the probability of increasing duality compared with hiring a lower-ability CEO.

5.4 Dynamics

We now examine the dynamic relation between CEO turnover and duality. To do so, we include *AbilityChg* leads and lags to our main regression specification in Table 3 column (3).

In Figure 4, we show the leads and lags regression coefficients. In the top plot, we show that when we include lead-lag controls for two years before and after CEO turnover the economic (and statistical) significance of *AbilityChg* does not significantly change from the results in Table 3: the point estimate on the contemporaneous effect remains similar. Additionally, none of the leads and lags are statistically different from zero, showing no anticipation or delay in the changes of duality. In the bottom plots, we distinguish between relay and non-relay successions and we also find similar results to Table 3 columns (5) and (6): our results are driven by non-heirs apparent.

In untabulated results, we also split our sample into two subsamples before and after the Sarbanes-Oxley Act (SOX) of 2002. As expected, we find that CEO Duality was more popular before the SOX passed than after: 66% of the observations had CEO-Chair duality before 2002 compared to 54% for the after period. More importantly, we find similar results across the different sub-periods in all the specifications in Table 3, which indicate that CEO-Chair duality is still a popular mechanism to attract highly talented managers in the recent years.

5.5 Additional model predictions

In this section, we provide empirical support for two additional empirical predictions from our model. First, we show that duality and executive compensation are positively correlated; a prediction that follows immediately from comparing w_L (CEO pay in case of separation)

to w_H (CEO pay in case of CEO Chair duality) in Proposition 2. Second, we show that CEO ability is also related to other corporate governance measures such as board independence and anti-takeover provisions.

In Table 6 Panel A, we show that CEOs receive higher executive compensation when they are also Chair of the board. Specifically, Table 6 Panel A, shows that CEO-Chair duality is associated with higher total pay, incentive pay, bonus and salary (measured all in logs) in columns (1) to (4), respectively. Overall, the CEOs that are also appointed Chair of the board receive about a 10% larger compensation across all the executive compensation components, which is statistically significant at the 1% level.

Table 6 Panel B shows that higher CEO ability is correlated with other corporate governance mechanism. Specifically, column (1) shows that higher *Ability* is associated with lower fraction of independent directors. Columns (2) and (3) show that higher *Ability* is associated with higher anti-takeover provisions, as measured by the the GIM-Index (Gompers et al, 2003), and higher CEO entrenchment, as measured by the "E-Index" (Bebchuk et al, 2009); respectively. We find that a one standard deviation increase in CEO ability leads to a 0.4% increase in the fraction of independent directors, statistically significant at the 10% level. Moreover, a one standard deviation increase in CEO ability leads to a 0.2 point increase in the GIM-Index, statistically significant at the 5% level. However, we do not find statistically significant results for the "E-Index".

The results using these alternative measures of monitoring the CEO and corporate governance are both economically smaller and statistically less significant than our baseline measure, CEO Chair duality.[11] At least two factors are likely to drive these differences. First, these measures are slower to adjust. Second, these alternative governance measures are more likely to be determined by additional firm characteristics over and above the choice of the CEO. For instance, the advising role of independent directors might affect shareholder value directly; or the design of anti-takeover provisions is likely to affect shareholder value through its effect on the chances of being acquired.

[11] We obtain the GIM-Index and the "E-Index" from the Institutional Shareholder Services (ISS) database. The GIM-Index is only available for 1995, 1998, 2000, 2002, 2004, and 2006 within our sample period. The "Entrenchment Index" is only available for 1995, 1998, 2000, 2002, 2004, and 2006-2013 within our sample period. As common practice, we have filled the missing data years using the latest available data value. Results are economically and statistically similar if we do not fill in these data gaps. The smaller sample size in column (2) is driven by the shorter data availability of the GIM-Index.

6 Conclusion

In this paper, we study the effect of corporate governance on the competition among firms in the market for managers. We show that when managerial ability is observable and managerial skills are scarce, competition among firms to hire better CEOs leads to an equilibrium in which firms hiring high-quality CEOs opt for lower levels of corporate governance, i.e. duality. The theoretical result follows from the fact that rents for scarce managerial talent are outside the control of an individual firm but instead are determined by other firms. This externality makes investing in high level of corporate governance (i.e., separation between CEO and Chair) counterproductive.

We show that the measure of CEO ability developed by Demerjian et al. (2012) is positively correlated with CEO duality: duality significantly changes when a new CEO is hired, with better CEOs being more likely to receive duality. We also find that industries with more competitive markets for CEOs display a stronger correlation between CEO ability and duality. This indicates that duality affects the matching between managers and firms.

Our finding has important implications for the debate on corporate governance. Specifically, while better governance may incentivize managers to perform better, it also reduces firms' ability to attract the best managers. These two effects offset each other and may explain why it has proven so hard so far to find direct evidence that corporate governance features (like, the separation between CEO and Chair) increase firm performance.

Our results also have important corollaries for corporate governance regulation as we show that an individual firm choice of corporate governance affects all firms in the economy via the allocation of managerial talent. Hence, sector specific regulation (for instance, regulation targeted exclusively to the financial sector) might backfire. Sector specific regulation on corporate governance might distort the allocation of talent across different sectors in the economy, as top quality managers might migrate to sectors were corporate governance regulation is laxer. Intuitively, this pattern is further magnified if the sector specific tightening in corporate governance comes hand in hand with a sector specific public scrutiny on executive pay.

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Table 1: **Summary statistics**

This table presents the summary statistics for the variables used in the empirical section, which are defined in Appendix B. Panel A includes summary statistics for all the continuous and dummy variables. Panel B tabulates the categorical variables. The sample consists of 14,801 firm-year observations that correspond to 2,982 different CEOs and 1,783 different firms, covering the 1996-2013 period.

Panel A: Summary Statistics

	Mean	Std Dev	Min	p25	Median	p75	Max
Ability	0.018	0.111	-0.392	-0.055	0.009	0.080	0.518
Board Size	9.133	2.298	3	7	9	11	22
Bonus	475.247	856.710	0	0	57	600	5000
Book Lev	0.311	0.245	0.000	0.087	0.307	0.467	1.082
CEO Age	55.841	7.215	33	51	56	60	96
Duality	0.574	0.495	0	0	1	1	1
E-Index	2.369	1.356	0	1	2	3	6
External Dummy	0.284	0.451	0	0	0	1	1
Fract Indep	0.710	0.163	0.000	0.613	0.750	0.846	1.000
GIM-Index	9.254	2.653	2	7	9	11	17
Heirs Apparent	0.363	0.481	0	0	0	1	1
Incentive Comp	3994.540	5197.520	0	698.903	2181.166	5110.501	29460.530
Market Cap	8.049	1.522	3.798	6.946	7.884	9.061	11.583
ROA	0.058	0.092	-0.348	0.024	0.061	0.103	0.318
Salary	747.837	343.747	36.923	500	700	950	2000
Tenure	7.348	7.644	0	2	5	10	61
Total Comp	5274.584	5838.287	249.624	1577.587	3288.055	6514.530	33228.690
Turnover	0.116	0.320	0	0	0	0	1

Panel B: Categorical Variables

	-1	0	1
DualityChg	934	11,298	824
AbilityChg	846	11,548	662

Table 2: **Duality as part of the CEO incentive contract**

In this table, we tabulate the changes in Duality and the changes in CEOs. *Turnover* is a dummy variable that takes value 1 if there is CEO turnover in that fiscal year, 0 otherwise. *DualityChg* is a categorical variable that takes value 1 if duality increases, 0 if it does not change, and −1 if it decreases. *Heirs Apparent* is a dummy variable that takes value 1 for CEOs appointed after a succession consistent with relay successions, and 0 otherwise.

Panel A: Changes in Duality around CEO Turnover

	Turnover = 0	Turnover = 1	Total
DualityChg = -1	1.6%	49.7%	934
DualityChg = 0	92.4%	41.9%	11,298
DualityChg = 1	6.0%	8.4%	824
Total	11,548	1,508	13,056

Panel B: Changes in Duality around CEO Turnover by Heirs Apparent

	Turnover = 0		Turnover = 1	
Heirs Apparent?	No	Yes	No	Yes
DualityChg = -1	1.6%	1.6%	37.4%	60.3%
DualityChg = 0	93.5%	90.1%	47.9%	36.7%
DualityChg = 1	4.9%	8.3%	14.7%	3.0%
Total	7,626	3,922	697	811

Table 3: **Matching CEO ability and duality**

In this table, we report results of regressions of changes in Duality on changes in managerial ability. *DualityChg* is a categorical variable that takes value 1 if duality increases, 0 if it does not change, and −1 if it decreases. *AbilityChg* is a categorical variable that takes value 1 if there is CEO turnover in that fiscal year and the new CEO has higher ability than the previous one, 0 if there is no turnover and −1 there is CEO turnover in that fiscal year and the new CEO has lower ability than the previous one. *Market Cap* is the firm market capitalization; *CEO Age* is the current CEO age; *L.ROA* is the previous fiscal year return on assets; *Book Lev* is the ratio of book leverage to total assets; *External Dummy* is a dummy variable that takes value 1 if the CEO is externally appointed, 0 otherwise; *Tenure* is the difference between the current year and the year the executive became CEO; *Fract Indep* is the number of board members classified as independent divided by the total number of board members; *Board Size* is the number of board members; *Heirs Apparent* is a dummy variable that takes value 1 for CEOs appointed after a succession consistent with relay successions, and 0 otherwise. To simplify the comparison across our results, we estimate linear probability models in all specifications. All regressions include year dummies and firm fixed effects. Standard errors are clustered at the firm level and *, **, or *** indicates that the coefficient is statistically significantly different from zero at the 10%, 5%, or 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Dep Variable	DualityChg	DualityChg	DualityChg	DualityChg	DualityChg	DualityChg
Heirs Apparent?	All	All	All	All	Yes	No
AbilityChg	0.085***	0.068***	0.066***	0.109***	0.035	0.108***
	(0.027)	(0.023)	(0.024)	(0.034)	(0.034)	(0.036)
AbilityChg*				-0.080*		
Heirs Apparent				(0.045)		
Heirs Apparent				-0.064***		
				(0.015)		
Market Cap	0.000	0.000	-0.005	-0.002	0.025	-0.014
	(0.009)	(0.009)	(0.010)	(0.010)	(0.024)	(0.011)
CEO Age	0.009***	0.009***	0.005***	0.004***	0.003	0.003*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)
L.ROA			0.091	0.097	0.127	0.099
			(0.062)	(0.061)	(0.135)	(0.073)
Book Lev			-0.013	-0.018	-0.092	0.016
			(0.029)	(0.029)	(0.075)	(0.033)
External Dummy		-0.009	-0.024	-0.029	-0.003	
		(0.014)	(0.015)	(0.052)	(0.023)	
Tenure			0.006***	0.005***	0.022***	0.004**
			(0.001)	(0.001)	(0.005)	(0.002)
Fract Indep			0.223***	0.219***	0.473***	0.065
			(0.041)	(0.041)	(0.096)	(0.052)
Board Size			-0.105***	-0.099***	-0.093	-0.078**
			(0.033)	(0.033)	(0.075)	(0.038)
Year FE	N	Y	Y	Y	Y	Y
Firm FE	N	Y	Y	Y	Y	Y
Observations	13,056	13,056	12,500	12,500	4,571	7,929
R-squared	0.008	0.098	0.109	0.112	0.187	0.174

Table 4: **Competition for CEOs and duality**

In this table, we show the impact of competition for managers on the choice of corporate governance. *DualityChg* is a categorical variable that takes value 1 if duality increases, 0 if it does not change, and −1 if it decreases. *AbilityChg* is a categorical variable that takes value 1 if there is CEO turnover in that fiscal year and the new CEO has higher ability than the previous one, 0 if there is no turnover and −1 if there is CEO turnover in that fiscal year and the new CEO has lower ability than the previous one. *Within Industry* is the percentage of CEOs in that industry that had the previous employment within the same industry, as measured by Cremers and Grinstein (2014). *Market Cap* is the firm market capitalization; *CEO Age* is the current CEO age; *L.ROA* is the previous fiscal year return on assets; *Book Lev* is the ratio of book leverage to total assets; *External Dummy* is a dummy variable that takes value 1 if the CEO is externally appointed, 0 otherwise; *Tenure* is the difference between the current year and the year the executive became CEO; *Fract Indep* is the number of board members classified as independent divided by the total number of board members; *Board Size* is the number of board members; To simplify the comparison across columns, we estimate linear probability models in all specifications. All regressions include year dummies and industry fixed effects or firm fixed effects. Standard errors are clustered at the firm level and *, **, or *** indicates that the coefficient is statistically significantly different from zero at the 10%, 5%, or 1% level, respectively.

	(1)	(2)
Dep Variable	DualityChg	DualityChg
AbilityChg* Within Ind	-0.480**	-0.407**
	(0.196)	(0.200)
AbilityChg	0.455***	0.397**
	(0.160)	(0.163)
Market Cap	0.001	0.003*
	(0.001)	(0.002)
CEO Age	0.003***	0.002***
	(0.000)	(0.000)
L.ROA		0.050
		(0.036)
Book Lev		-0.009
		(0.013)
External Dummy		-0.000
		(0.006)
Tenure		0.002***
		(0.000)
Fract Indep		0.150***
		(0.019)
Board Size		-0.039***
		(0.013)
Year FE	Y	Y
Ind FE	Y	Y
Observations	12,926	12,376
R-squared	0.025	0.030

Table 5: **Robustness results**

In this table, we present the robustness results of regressions of changes in Duality on changes in managerial ability. In Panel A, we show results using propensity score matching. *DualityChg* is a categorical variable that takes value 1 if duality increases, 0 if it does not change, and −1 if it decreases. *AbilityChg* is a categorical variable that takes value 1 if there is CEO turnover in that fiscal year and the new CEO has higher ability than the previous one, 0 if there is no turnover and −1 there is CEO turnover in that fiscal year and the new CEO has lower ability than the previous one. *Heirs Apparent* is a dummy variable that takes value 1 for CEOs appointed after a succession consistent with relay succession, 0 otherwise. In Panel B, we use our alternative measure of managerial ability. *AbilityChg Alt* is a categorical variable that takes value 1 if there is CEO turnover in that fiscal year and the new CEO has higher pre-appointment abnormal compensation than the incumbent one, 0 if there is no turnover and −1 if there is CEO turnover in that fiscal year and the new CEO has lower pre-appointment abnormal compensation than the incumbent one. In Panel C, we restrict our sample only to turnover years. To simplify the comparison across our results, we estimate linear probability models in all specifications. The additional controls are the same controls as Table 3, column (3). All regressions include year dummies and industry fixed effects. Standard errors are clustered at the firm level and *, **, or *** indicates that the coefficient is statistically significantly different from zero at the 10%, 5%, or 1% level,respectively.

Panel A: Propensity score matching

	(1)	(2)	(3)
Dep Variable	DualityChg	DualityChg	DualityChg
Heirs Apparent?	All	Yes	No
AbilityChg	0.036**	-0.004	0.081***
	(0.015)	(0.020)	(0.020)
Controls, Year & Ind. FE	Y	Y	Y
Observations	2,735	1,247	1,488
R-squared	0.121	0.196	0.114

Panel B: Alternative ability measure

	(1)	(2)	(3)
Dep Variable	DualityChg	DualityChg	DualityChg
Heirs Apparent?	All	Yes	No
AbilityChg Alt	0.055*	0.029	0.086*
	(0.028)	(0.033)	(0.041)
Controls, Year & Ind. FE	Y	Y	Y
Observations	9,166	4,091	5,075
R-squared	0.120	0.183	0.192

Panel C: Turnover subsample only

	(1)	(2)	(3)
Dep Variable	DualityChg	DualityChg	DualityChg
Heirs Apparent?	All	Yes	No
AbilityChg	0.015	-0.030	0.066**
	(0.018)	(0.021)	(0.029)
Controls, Year & Ind. FE	Y	Y	Y
Observations	1,370	740	630
R-squared	0.131	0.121	0.192

Table 6: **Robustness: Additional model predictions**

In this table, we present results on the additional model predictions. In Panel A, we show the regressions of executive compensation on duality. *Total Comp*, *Incentive Comp*, *Bonus*, and *Salary* are the different components of CEO executive compensation. *Duality* is a dummy variable that takes value 1 if the CEO is also the Chair on the board, 0 otherwise. In Panel B, we show the regressions of both alternative monitoring of the CEO and corporate governance measures on CEO ability. *Fract Indep* is the fraction of independent directors, *GIM-Index* is the GIM-Index from Gompers et al. (2003), and *E-Index* is the "Entrenchment-Index" from Bebchuk et al. (2009). *Ability* is the CEO ability from Demerjian et al. (2012). The additional controls are the same controls as Table 3, column (3). All regressions include year dummies and industry fixed effects. Standard errors are clustered at the firm level and *, **, or *** indicates that the coefficient is statistically significantly different from zero at the 10%, 5%, or 1% level, respectively.

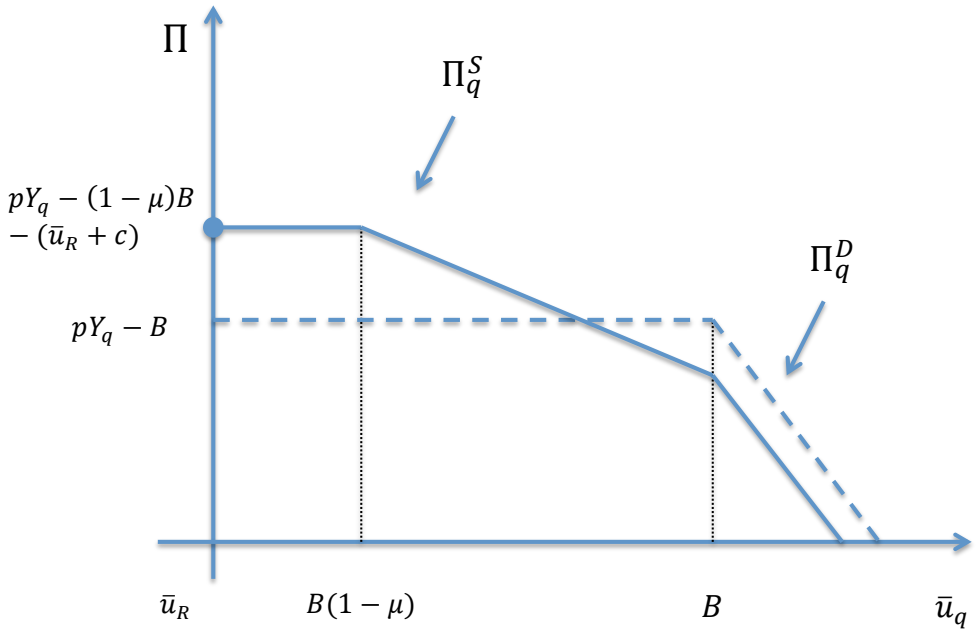
Panel A: Executive Compensation and Duality

	(1)	(2)	(3)	(4)
Dep. Variable	ln(Total Comp)	ln(Incentive Comp)	ln(Bonus)	ln(Salary)
Duality	0.096***	0.105*	0.112**	0.105***
	(0.026)	(0.056)	(0.050)	(0.018)
Controls, Year & Ind. FE	Y	Y	Y	Y
Observations	12,458	12,301	6,559	12,458
R-squared	0.544	0.298	0.344	0.404

Panel B: Monitoring the CEO/corporate governance measures and CEO ability

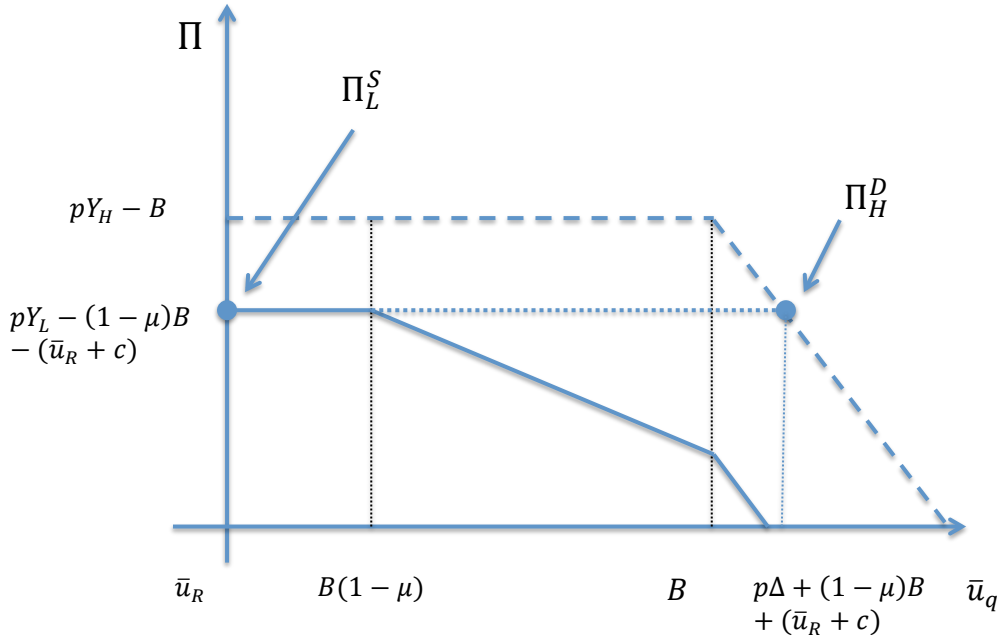
Dep. Variable	(1)	(2)	(3)
	Fract Indep	GIM-Index	E-Index
Ability	-0.041*	1.433**	0.191
	(0.024)	(0.697)	(0.268)
Controls, Year & Ind. FE	Y	Y	Y
Observations	12,508	6,687	11,897
R-squared	0.309	0.159	0.290

Figure 1: **Separation versus duality with managerial competition**



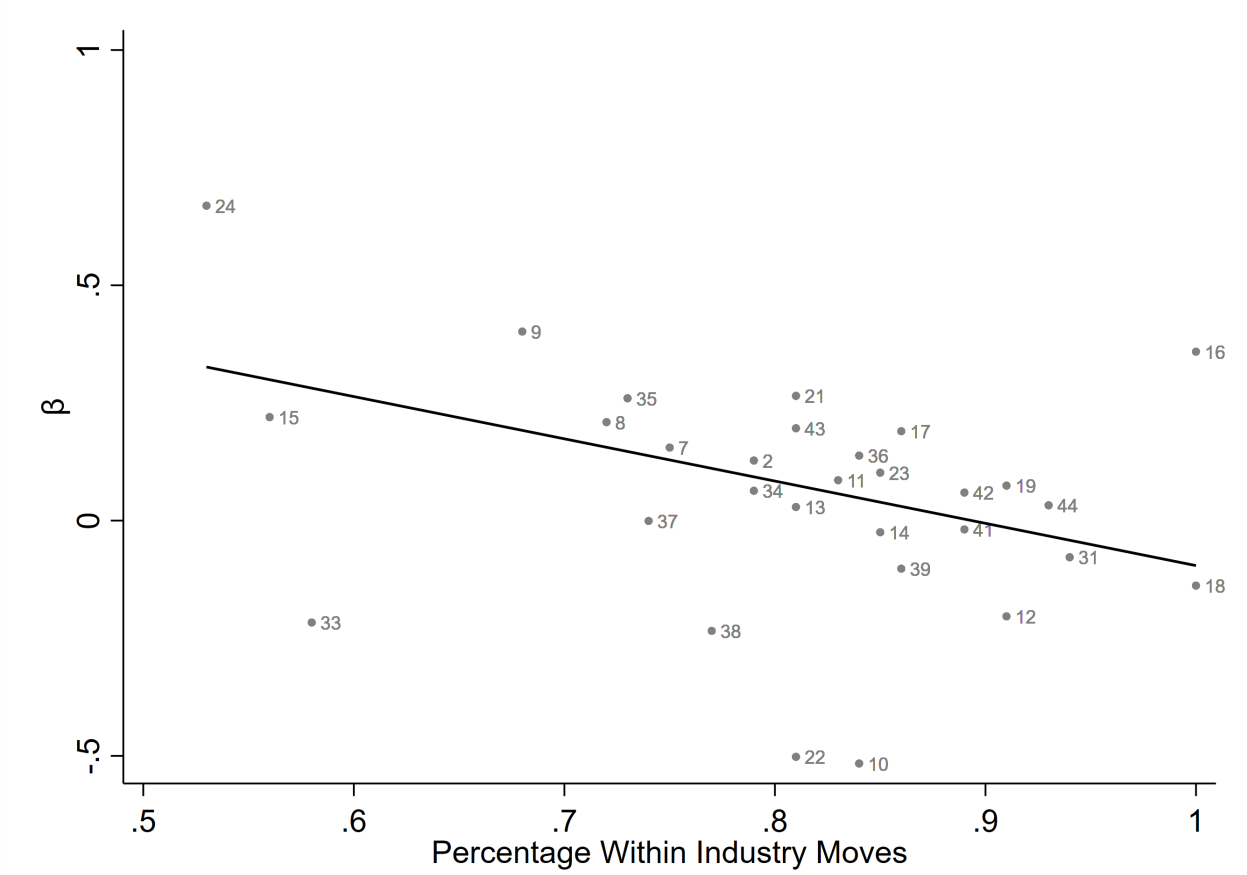
The figure plots the expected profit Π_q^S associated with separation (the continuous line) and the expected profit Π_q^D associated with duality (the dashed line) as a function of the reservation utility of the CEO ($\overline{u}_q$).

Figure 2: **Equilibrium in the market for CEOs**



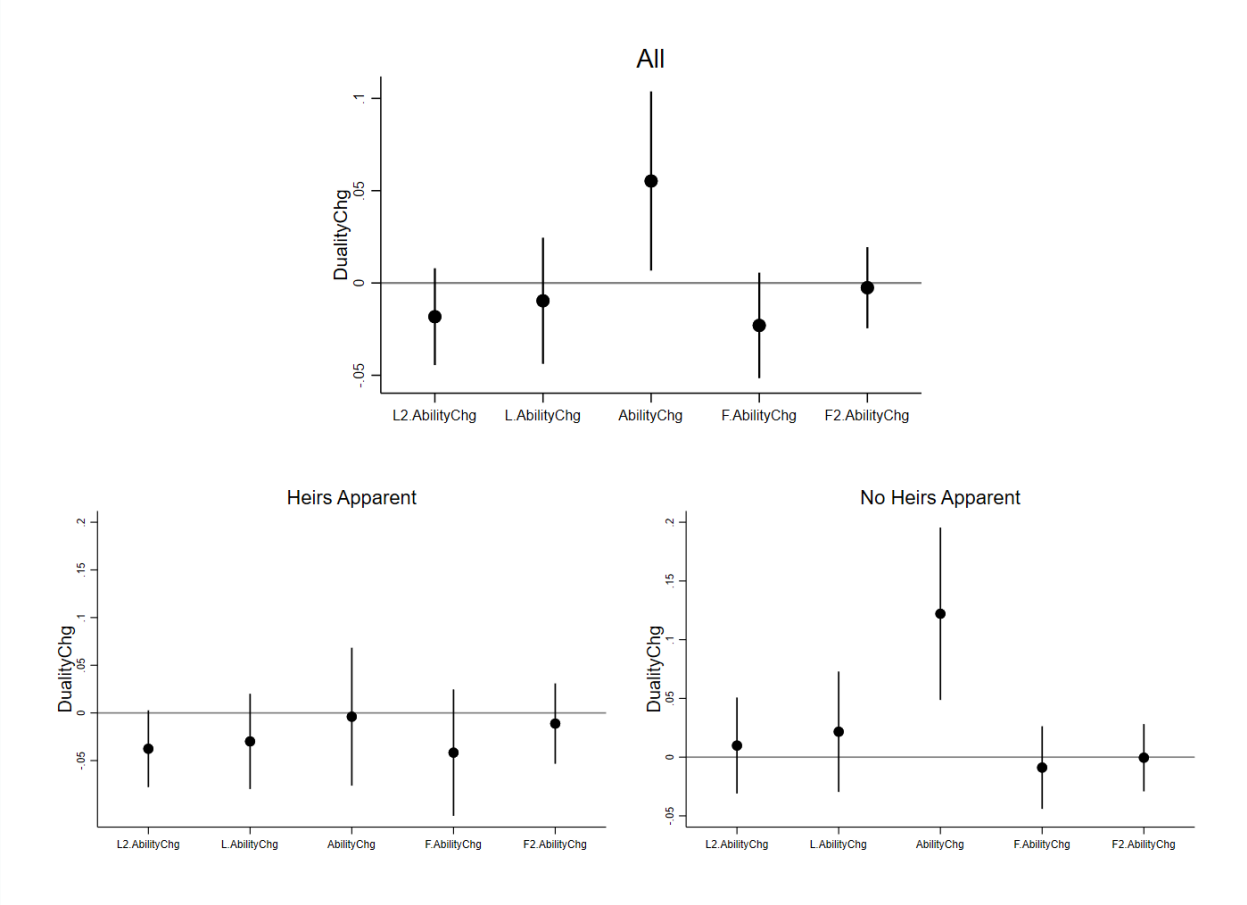
The figure plots the expected profit Π_L^S associated with choosing the L type and separation (the continuous line) and the expected profit Π_H^D associated with choosing the H type and duality (the dashed line) as a function of the reservation utility of the H-type ($\overline{u}_H$).

Figure 3: **Competition for CEO and duality across industries**



The figure plots the coefficients β^{ind} when we estimate the equation (4) separately for each industry on the vertical axis, and the percentage of within industry hires (*Within Industry*) on the horizontal axis. Each point in the plot corresponds to a different industry, indicated by the number reported next to each point, coded following the 49 Fama French industries. We also plot the linear fit of all the different data points. The number next to each data point indicates the industry code: 2 = Food Products, 7 = Entertainment, 8 = Printing and Publishing, 9 = Consumer Goods, 10 = Apparel, 11 = Healthcare, 12 = Medical Equipment, 13 = Pharmaceutical Products, 14 = Chemicals, 15 = Rubber and Plastic Products, 16 = Textiles, 17 = Construction Materials, 18 = Construction, 19 = Steel Works Etc, 21 = Machinery, 22 = Electrical Equipment, 24 = Aircraft, 33 = Personal Services, 34 = Business Services, 35 = Computers, 36 = Computer Software, 37 = Electronic Equipment, 38 = Measuring and Control Equipment, 39 = Business Supplies, 41 = Transportation, 42 = Wholesale, 43 = Retail, 44 = Restaurants, Hotels, Motels. We include only industries with more than 100 observations.

Figure 4: **Leads and lags**



The figure plots the leads and lags of changes in Duality on changes in managerial ability. We include the same controls as Table 3, column (3). We show the 10% confidence intervals.

Appendix A Proofs

Proof of Lemma 1: Starting from the payoffs at $t = 3$, there are six cases to consider: (i) If the CEO chooses action M and shareholders choose duality, the payoffs for the CEO is B and the payoffs for shareholders are 0; (ii) if the CEO chooses action M and the Chair exerts monitoring at intensity m, the firm payoffs for the CEO is $B(1 - m\mu)$, the payoff for the Chair is $-cm$, and for shareholders is 0; (iii) if the CEO chooses action S and the firm produces $X = Y_q$ and shareholders choose duality, the payoff for the CEO is w_q, the payoff for the Chair is w_C and for shareholders is $Y_q - w_q - w_C$; (iv) if the CEO chooses action S and the firm produces $X = 0$, and shareholders choose duality, the payoff for the CEO is 0, the payoff for the Chair is 0, and for shareholders is 0; (v) if the CEO chooses action S and the firm produces $X = Y_q$ and the Chair exerts monitoring at level m, the payoff for the CEO is w_q, the payoff for the Chair of the board is $w_C - cm$, and for shareholders is $Y_q - w_q - w_C$ and (vi) if the CEO chooses action S and the firm produces 0, and the Chair exerts monitoring at level m, the payoff for the CEO is 0, the payoff for the Chair is $-cm$, and for shareholders is 0.

Given that the probability of success conditional on the choice of action S is p, the expected payoffs for the CEO, Chair and shareholders are as follows:

	Separation	Duality
Action M	CEO: $B(1 - m\mu)$ Chair: $-cm$ Shs: 0	CEO: B Shs: 0
Action S	CEO: pw_q Chair: $pw_C - cm$ Shs: $p(Y_q - w_q - w_C)$	CEO: pw_q Shs: $p(Y_q - w_q)$

Looking at the table above, one can immediately derive the IC conditions for the CEO. In case of duality, the CEO chooses action S iff $pw_q \geq B$; in case of separation, the CEO chooses action S iff $pw_q \geq B(1 - m\mu)$. Intuitively, monitoring reduces the wage required to satisfy the incentive compatibility condition.

From the table, we can also see that the Chair will monitor only if her monitoring activity affects the CEO's decision. If the Chair expects that the CEO chooses action M (or action S) independently of her monitoring effort, she would not exert any effort. The Chair will monitor at intensity m if and only if monitoring induces the CEO to switch from action M to action S or $pw_q \leq B(1 - m\mu)$ and if she is compensated for the monitoring costs $pw_C \geq cm$.

Summing up the results, there are three cases: (i) If $pw_q \geq B$, the CEO chooses action S and the Chair (if present) exerts no monitoring; (ii) if $B > pw_q = B(1 - m\mu)$ and $pw_C \geq cm$, the CEO chooses action S if $g = 1$ and the Chair monitors at level m; and (iii) in all other cases, the CEO chooses action M and the Chair does not monitor.

Proof of Proposition 1: The IC constraint of the CEO is strictly binding in equilibrium as

otherwise the firm can reduce w_q a little while still meeting the IC constraint and increasing expected profits. So, $w_q = (1 - m\mu)B/p$. Under this condition the IC constraint of the Chair is also met. The IR constraint of the Chair is $pw_C \geq \overline{u}_R + cm$ and is also binding in equilibrium following the same argument made above for the IC constraint of the CEO. So, $w_C = (\overline{u}_R + cm)/p$. Since $\mu B > c$ (by assumption (A1)), firms choose $m = 1$ when $g = 1$.

The only decision left for the firm is whether to opt for duality or separation. The expected profit for a firm employing a CEO of quality $q \in \{H, L\}$ is $p(Y_q - w_q - w_C)$. Replacing the expressions for w_q and w_C found above, the expected profit is $pY_q - B$ in case of duality and $pY_q - (1 - \mu)B - c - \overline{u}_R$ in case of separation. From assumption (A1), $\mu B > c + \overline{u}_R$ and thus firms prefer separate CEO/Chair.

Proof of Lemma 2: There are two cases to consider: (i) if $\overline{u}_q \geq B$, the IC constraint is redundant. Thus, problem (2) only needs to satisfy the IR constraint. This constraint is binding in equilibrium so that $w_q = \overline{u}_q/p$ and thus the expected profit is $pY_q - \overline{u}_q$. (ii) If $\overline{u}_q < B$, the IR constraint is redundant. Thus, problem (2) only needs to satisfy the IC constraint. This constraint is in equilibrium so that $w_q = B/p$ and thus the expected profit is $pY_q - B$.

Proof of Lemma 3: There are three cases to consider: (i) if $\overline{u}_q \geq B$, the IC constraint of the CEO is redundant. Thus, problem (3) only needs to satisfy the IR constraint, which is binding (for the same argument made in the proof of Proposition 1): $w_q = \overline{u}_q/p$. Since the IC constraint of the CEO is irrelevant, monitoring is useless (i.e., the IC constraint of the Chair is redundant). Thus $m = 0$ and the IR constraint of the Chair is binding: $w_C = \overline{u}_R/p$. Substituting the expressions for w_q and w_C into the objective function (3), the associated expected profit is $pY_q - \overline{u}_q - \overline{u}_R$. (ii) If $\overline{u}_q < B(1 - \mu)$, the IR constraint is redundant. The IC constraint of the CEO is binding and $w_q = B(1 - m\mu)/p$. Since $\mu B > c$, $m = 1$ and the IR constraint of the Chair is binding as well: $w_c = (\overline{u}_R + c)/p$. Using these results, the expected profit is $pY_q - (1 - \mu)B - (\overline{u}_R + c)$. (iii) If $\overline{u}_q \in [B(1 - \mu), B)$, both the IC and the IR constraints of the CEO must be binding in equilibrium. The intuition for this result comes from the fact that neither $m = 0$ nor $m = 1$ can be equilibria in this case. A choice of $m = 1$ would make the IC constraint redundant, and thus making investing in m useless. This causes a firm to reduce m. Similarly, a choice of $m = 0$ would make the IR constraint redundant, and thus making investing in m useful. Only when both IR and IC constraints are met, shareholders have no incentives to change m. Therefore, the level of monitoring m must be such that $\overline{u}_q = B(1 - \mu m)$ or $m = (1 - \overline{u}_q/B)/\mu$. The associated expected profits are $pY_q - \overline{u}_q - [\overline{u}_R + (c/\mu)(1 - \overline{u}_q/B)]$.

Proof of Proposition 2: To prove this proposition, we need to establish three preliminary results. First, in equilibrium, firms must obtain the same profits hiring the H-type or the L-type CEO. The reasoning is as follows. Given $m_H < n$, $m_L > n$, in any equilibrium, all H-type managers are employed and some firms employ L-type managers. Suppose there is an equilibrium in which firm j employs an H- type at a wage w_H^j and obtains higher profits than firms employing an L-type. This cannot be an equilibrium because a firm employing an

L-type would profitably offer a wage $w_H^j + \varepsilon$, with ε close enough to zero, hiring the H-type manager previously employed by firm j for sure and increasing profits. On the contrary, suppose there is an equilibrium in which firm k employs an H-type paying w_H^k and obtains lower profits than firm j, which is employing an L-type. Then, firm k would always find it profitable to employ an L-type manager, who are in excess supply, offering the same contract as firm j.

Second, there can only be three types of equilibria: (i) both types are offered duality; (ii) both types are offered separation; and (iii) type-H has duality while type-L has separation. To see that there cannot be a case in which type-L has duality and type-H has separation, notice that the difference in expected utility between duality and separation is $G(\overline{u}_q) = (\overline{u}_R + c) + \max\{B(1-\mu), \overline{u}_q\} - \max\{B, \overline{u}_q\}$, which is weakly increasing in $\overline{u}_q$ (which is also weakly increasing in q). So, if it is optimal to choose duality with type L, it must also be optimal to choose duality when the type is H.

Third, in equilibrium $\overline{u}_L = \overline{u}_R$ and $\overline{u}_H \geq (1-\mu)B$. The first equality follows from the fact that there is an excess of L-type CEOs. For an L type rejecting an offer implies unemployment and thus the outside option of an L type is $\overline{u}_R$. Notice that $\overline{u}_R \leq (1-\mu)B$, by assumption (A1). The second inequality follows from the fact that $B(1-\mu)$ is the lowest rent that can offered to H-type. As all of them are hired in equilibrium, the outside option by rejecting an offer for a H-type is $\overline{u}_H \geq (1-\mu)B$.

Now consider case (i). Both types are offered duality if $G(\overline{u}_L) \geq 0$, that is $\mu B \leq \overline{u}_R + c$, which is ruled out by assumption (A1). Consider next case (ii). Both types are offered separation if $G(\overline{u}_H) < 0$. To equate the expected profits from hiring H or L types, $\overline{u}_H = B(1-\mu) + p\Delta$. Replacing this expression into $G(\overline{u}_H)$, we obtain $\mu B > p\Delta + \overline{u}_R + c$, which is violated by assumption (A1).

It follows that for values of the parameters that satisfy assumption (A1) (i.e., for $\mu B \in (\overline{u}_R + c, p\Delta + \overline{u}_R + c]$), the equilibrium is as in case (iii): type-H CEO has duality; while type-L CEO has separation. This happens when $G(\overline{u}_L) < 0$ and $G(\overline{u}_H) \geq 0$. The first condition requires $\mu B > \overline{u}_R + c$ (given that $\overline{u}_L = B(1-\mu)(n - m_H)/m_L < B(1-\mu)$). To equate the expected profits from hiring H or L types, $\overline{u}_H = B(1-\mu) + p\Delta + \overline{u}_R + c$. Finally, firms indeed implement duality for the H type managers if $p\Delta + \overline{u}_R + c \geq \mu B$.

Appendix B Variable Definition

Ability is the average for a given CEO-firm match of the measure of CEO ability from Demerjian et al. (2012).

AbilityChg is a categorical variable that takes value 1 if *Turnover*= 1 and the new CEO has higher *Ability* than the previous one, 0 if *Turnover*= 0 and −1 if *Turnover*= 1 and the new CEO has lower *Ability* than the previous one.

AbilityChg Alt is a categorical variable that takes value 1 if *Turnover*= 1 and the new CEO has higher *Pre-appointment compensation* than the previous one, 0 if *Turnover*= 0 and −1 if *Turnover*= 1 and the new CEO has lower *Pre-appointment compensation* than the previous

one. We define *Pre-appointment compensation* as the the residual of the logarithm of total compensation (Compustat item `tdc1`) regressed on market capitalization; a set of dummies for each of the following roles: CEO, COO, Chair, Vice-Chair, President and Vice-President; 49 Fama-French industry and year fixed effects.

Board Size is the number of board members.

Bonus is Execucomp item `bonus`

Book Lev is the ratio of book leverage (Compustat item `dltt` plus (Compustat item `dlc` divided by the sum of Compustat item `dltt` plus Compustat item `dlc` plus Compustat item `ceq`).

CEO Age is the CEO Age at the end of the fiscal year.

Duality is a dummy variable that takes value 1 if the CEO is also the Chair on the board and 0 otherwise.

DualityChg is a categorical variable that takes value 1 in year t if duality increases from year $t-1$ to year t, 0 if it does not change, and -1 if it decreases.

E-Index is the "Entrenchment Index" developed by Bebchuk et al.(2009)

External Dummy is a dummy variable that takes value 1 if the CEO was not previously an employee of the firm and 0 otherwise.

Fract Indep is the number of board members classified as independent (I) divided by the total number of board members.

GIM-Index is ISS item `Governance Index (Gompers, Ishii, Metrick)`

Heirs Apparent is dummy variable that takes value 1 if the current CEO was president or chief operating officer (COO) at the same firm the year before being appointed CEO, 0 otherwise.

Incentive Comp is Execucomp item `tdc1` minus Execucomp item `salary` minus Execucomp item `bonus`.

Market Cap is the firm's total market value (Compustat item `prcc_f` times the absolute value of Compustat item `csho` plus Compustat items `at` and Compustat item `ceq` minus Compustat item `txdb`).

ROA is the ratio of EBITDA (Compustat item `ib`) before CEO compensation (ExecuComp item `tdc1`) over lagged total assets (Compustat item `at`).

Salary is Execucomp item `salary`

Tenure is the difference between the calendar year and the year the executive became CEO.

Total Comp is Execucomp item `tdc1`

Turnover is a dummy variable that takes value 1 in year t if the CEO in year t differs from the CEO in year $t-1$ and takes value 0 otherwise.