Competition for Managers and Corporate Governance

Viral Acharya (NYU, CEPR, NBER)

Marc Gabarro (Erasmus University)

Paolo Volpin (City University London, CEPR)

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Abstract

Separation between CEO and Chairman of the Board is typically viewed as evidence of good corporate governance. Surprisingly, the literature has failed so far to uncover any significant relation between CEO/Chairman duality and firm performance. By distinguishing between periods with and without CEO turnover, we empirically identify two offsetting effects: the correlation between duality and performance is positive around CEO turnover and negative otherwise. This indicates that the competition for managerial talent forces firms to combine CEO and Chairman in order to attract more skilled CEOs at the cost of reducing governance standards.

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E-mail addresses: vacharya@stern.nyu.edu; gabarro@ese.eur.nl; paolo.volpin.1@city.ac.uk.

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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. I have never acceded that request." Scally and Crowe, NYSE: Corporate Governance Guide (2014).

The separation between CEO and Chairman of the Board 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 institutional investors have argued louder and louder that CEO/chairman separation and chairman independence are fundamental principles of corporate governance. Still, around 58% of the firm-year observations for the S&P 1500 companies in the period 1996-2013 have a combined Chairman/CEO position. Why do a significant proportion of U.S. firms choose to lower their governance standards by combining the Chairman/CEO roles in a single person (duality)? Interestingly, after tens of papers, academics have failed to find robust support for view that duality increases the potential for managerial rent extraction (see, for example Baliga et al., 1996; Boyd, 1995). Why is it the case?

We offer a combined answer for these two puzzling questions. We document that poor corporate governance arises *because* of competition in the market for managerial talent. We show that some firms choose duality (i.e., lower governance) on purpose, in order to attract better managers. The key insight is that corporate governance affects the matching between managers and firms. Better governance may improve managerial oversight. However, it also reduces firms' ability to attract better managers. These offsetting mechanisms explain the limited impact of duality on firm performance uncovered by the academic literature: a positive direct effect of corporate governance on firm performance combines with a negative indirect impact of corporate governance on the firm's capacity to attract high quality managers.

Our conceptual framework is based on the view that when there is little competition for managers, firms choose an efficient level of corporate governance to optimally

monitor the manager. However, when managerial talent is scarce and firms have to compete to attract the few top quality managers, firms depart from the optimal level of corporate governance and underinvest in CEO monitoring. This follows from the inability of a firm 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 and thus top quality CEOs can choose their preferred (below optimal) level of managerial monitoring. Therefore, a firm that wants to employ a top quality manager does not hire an independent Chairman of the Board.

With heterogeneity across CEOs, in equilibrium, some firms attract better managers by choosing laxer governance standards (i.e., CEO duality); others attract weaker managers choosing stricter governance standards (i.e., independent Chairmen of the Board). These associations are ex-ante rational as firms offer these governance packages as a response to the scarcity of managerial talent.

Two empirical predictions follow from this argument. The first one is that CEO-Chairman separation has two offsetting effects on firm performance. On the one hand, separation increases managerial oversight, thus (directly) increasing firm performance. On the other hand, it impedes the recruitment of top quality CEOs, thus (indirectly) decreasing firm performance. The second prediction is that shareholders use duality as part of a recruitment package offered to newly appointed CEOs: shareholders are more likely to adopt duality when they appoint a higher-quality CEO.

To test these predictions, we use a dataset that combines balance-sheet data from Compustat on unregulated firms in the United States over the period 1996 to 2013, ExecuComp on CEO turnover, and ISS on firm-level corporate governance variables. CEO duality, which is an indicator that takes value 1 if the CEO is also the Chairman of the Board, and 0 otherwise. We obtain our measure of managerial ability from Demerjian et al. (2012), who proxy managerial ability as the manager-specific efficiency in generating revenues and measure it using data envelopment analysis.

Consistent with the first prediction, we find that duality has two confounding effects on firm performance. As in the existing literature, when we regress return on assets (ROA) on time-variant firm characteristics, industry and year dummies and our measure of corporate governance (duality), we find no significant effect of duality on firm performance. When we add a dummy variable that takes value one for years with CEO turnover and 0 otherwise, the results change dramatically: we find a negative relation between duality and ROA.

Methodologically, the dummy for years with CEO turnover separates the two confounding effects of duality on firm performance as it absorbs all actions around CEO turnover with an impact on firm performance. Specifically, it absorbs any changes in duality due to CEO turnover, filtering out the CEO turnover observations from the set of observations that define the coefficient of duality on firm performance. In other words, introducing the turnover dummy separates the (positive) role of duality as a recruitment mechanism from the (negative) effect of duality due to weaker corporate governance.

Then, to highlight the role of CEO Duality in the market for managerial talent, we document that changes in duality are indeed more frequent at the time of a CEO turnover than in year without CEO turnover. The frequency of changes in duality increases by 50.5% around turnover. This result is economically large: on average, firms change duality about 13.4% of the years so changes in duality are more than three time more likely around turnover. This result survives when we control for firm fixed effects and a set of time varying control variables.

More importantly, consistent with the second prediction, we find that increases in duality are associated with increases in CEO ability. This result indicates that duality is used to attract the high-ability managers. In terms of economic significance, hiring a higher-ability CEO is associated with a 13.6% change in the probability of duality compared with hiring a lower-ability CEO.

We then focus on several robustness checks. One concern is that our results are

driven by "heirs successors" in a "relay succession" as described by Vancil (1987). This type of successions mechanically generate changes in duality without effects on corporate governance. Our explanation would predict a stronger effect in competitive CEO appointments rather than in pre-defined (and less affected by competition for talent) "relay successions". Consistent with this prediction, when we split our sample among CEO successions consistent with "relay successions" and those that are not, we find insignificant results for "relay succession" and stronger results for the competitive open-market CEO hiring.

Then, we show that our results are also 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 at his/her previous job.[1] 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 10.6% change in the probability of duality compared with hiring a lower-ability CEO. Furthermore, we use propensity score matching to pair each firm experiencing a CEO turnover with its closest match (that did not experience a CEO turnover) and repeat the analysis focusing only on these paired firms. We obtain similar results. Moreover, we examine the dynamics of duality in the years preceding the CEO turnover and we find no lead or lag changes around CEO turnover.

Finally, we focus on chairman of the board (rather than CEO) turnover. We show that only high-quality CEOs get appointed as Chairmen, and hence granted duality, when the chairman steps down. Although this result is not direct evidence that firms use duality as a recruitment mechanism, it supports our hypothesis that higher ability managers are granted duality (possibly as part of a retention strategy).

As a whole, our empirical analysis provides support for our hypothesis that com-

[1]Specifically, we use the average residual on a regression of total compensation on firm size, dummies for different roles, and industry and year fixed effects for a given individual at his/her previous job (see Appendix A for details).

petition among firms for scarce managerial talent is an important determinant of governance practices chosen by firms.

The remaining of the paper is organized as follows. Section 2 discusses related literature. Section 3 develops the testable hypotheses and explains the empirical strategy. Section 4 presents the empirical evidence and section 5 discusses robustness issues. Section 6 concludes.

2 Related Literature

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. Similarly, Edmans et al. (2009) present a model in which both low ownership concentration and its negative correlation with firm size arise as part of an optimal contract. Within this framework, the recent rise in compensation can be related to changes in the types of managerial skills required by firms. Murphy and Zábojník (2007) and Custodio et al. (2013) argue that CEO pay has risen because of the increasing importance of general managerial skills relative to firm-specific abilities.

In a similar setup, Biais and Landier (2015) argue that the time series increase in both job complexity and compensation may be explained by an overlapping generations model where managers can choose to increase the level of job complexity in order to extract greater rents. Bénabou and Tirole (2016) study the impact of labor market competition on compensation, short-termism and fraud in a multitasking Hotelling framework. They find that labor market competition increases pay inequality and performance-based pay, and decreases the effort put in long-term investments and work ethics; generating what they call a "Bonus Culture". Thanassoulis (2013) also explores the interaction of competition for talent with executive compensation and

short-termism and derives the optimal compensation contract, which under certain circumstances, tolerates managerial myopia.

Empirically, Fabbri and Marin (2016) document using panel data Germany firms over 1977-2009 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 inefficient choices of governance emerge as equilibrium outcomes because of the externality associated with the competition for managerial talent. In this respect, our paper is related to a growing literature on spillover and externality effects in corporate governance initiated by Hermalin and Weisbach (2006), who provide a framework for assessing corporate governance reforms from a contracting standpoint and justify the need for regulation in the presence of negative externalities arising from governance failures. Acharya and Volpin (2010) and Dicks (2012) formalize this argument in a model where the choice of corporate governance in one firm is a strategic substitute for corporate governance in another firm. As in this paper, the externality therein is due to competition for managerial talent among firms. Levit and Malenko (2016) also explore the externalities in corporate governance arising from the directors reputational concerns. In a different context, Nielsen (2006) and Cheng (2011) model the negative externalities caused by earnings manipulation across firms. Nielsen (2006) considers a setting where governance improves publicly disclosed information about a firm and facilitate managerial assessment in competing firms. Cheng (2011) shows that earnings management in one firm may induce earnings management in other firms in the presence of relative performance compensation.

This paper is also related to the long standing literature on CEO/Chairman duality and CEO succession. Jensen (1993), in his Presidential Address at the American Finance Association, argues in favor of companies separating the CEO and Chairman position so that the board of directors can effectively oversee the management. Fahlenbrach (2009) finds that there is more pay for performance in firms with weaker corporate governance, as measured by less board independence, more CEO/Chairman duality, longer CEO tenure, and less ownership by institutions. 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. Similarly, Baliga et al. (1996) show that there is no stock market reaction to combination (or separation) of the CEO/Chairman position and Boyd (1995) finds no impact of the separation of the CEO/Chairman roles on the performance of the firm in a meta-analysis.

The decision on the separation between the Chairman of the Board and the CEO position is also influenced by "relay successions". 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 Executive Officer (COO) position. Then, the incumbent CEO, who is also holding the Chairman position, hands the CEO position to the incumbent manager. When the training of the new CEO is complete, the Chairman steps down and the CEO also holds the position of Chairman 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.

We add to this debate documenting the importance of the competition for managerial talent in explaining the choice of separation between the CEO and Chairman of the board positions. We present two offsetting mechanism that affect the correlation between CEO/Chairman duality and firm performance. This novel result may have clouded the previous empirical research and explains the difficulty in finding conclusive evidence regarding the impact of CEO/Chairman separation on firm

performance.

3 Empirical Strategy

In this section, we discuss the effect of competition for talent on the impact of CEO Chairman duality on firm performance and develop our empirical strategy.

In section 3.1, we develop the empirical predictions. A theoretical model to clarify the rationale behind our hypotheses is presented in Appendix B. In section 3.2, we explain how we test our empirical predictions.

3.1 Hypotheses Development

The common view among investors and regulators is that CEO/Chairman 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 separation between the CEO and Chairman of the Board are necessary for an adequate board monitoring of the CEO. However, empirically, Baliga et al. (1996) and Boyd (1995) finds no correlation between the separation of the CEO/Chairman roles and firm performance.

In this paper, we argue that firms choose CEO/Chairman duality as a mechanism to attract high talent managers. In Appendix B, we provide a model to clarify our argument. The model builds on two important ingredients. First, tight corporate governance (i.e. separation between CEO and Chairman) reduces 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 render the incentive compatibility condition for talented CEOs redundant. Hence, firms hiring highly talented CEOs find it inefficient to (costly) monitor their CEO by hiring an independent Chairman of the Board. In equilibrium, some firms choose duality and attract the better CEOs while

others choose separation and attract the worse CEOs.

Two testable predictions follow from this model. First:

Prediction 1 (Direct and indirect effect of duality on firm performance): *CEO Chairman duality impacts firm performance through two different offsetting mechanisms. On the one hand, CEO Chairman duality facilitates rent extraction, decreasing firm performance. On the other hand, it allows the firm to attract better managers, increasing firm performance.*

Second, provided that we can find an appropriate measure of managerial talent, the model predicts that:

Prediction 2 (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 Chairman roles.*

3.2 Empirical Specification

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

First, to show that CEO-Chairman duality affects firm performance in two partially offsetting ways (directly and indirectly through CEO selection), we estimate the following specification:

$$ROA_{it} = \alpha + \beta_1 Duality_{it} + \beta_2 Turnover_{it} + \omega_{it} + \chi_t + \gamma_{ind} + \xi_{it} \tag{1}$$

where ROA_{it} is return on assets, $Duality_{it}$ is an indicator that takes value 1 if the CEO holds the position of Chairman of the Board in year t and firm i, and 0 otherwise; $Turnover_{it}$ is an indicator that takes value 1 if the CEO at the end of the current fiscal year is different than the previous fiscal year end CEO and 0 otherwise; ω_{it}, χ_t, and γ_{ind} are time varying firm characteristics, time, and industry fixed effects, respectively. Our empirical predictions is that $\beta_1 < 0$, that is, CEO-Chairman duality

has a negative direct effect on firm performance when β_2 is allowed to take any value; while β_1 is undistinguishable from zero (i.e., the two opposing effects of CEO-Chairman duality on firm performance offset each other) when β_2 is restricted to be equal to zero.

We focus our analysis on cross sectional regressions: we include industry fixed effects and not firm fixed effects. We do so for several reasons. First, most of the empirical evidence on the role of CEO Chairman duality on firm performance is indeed cross sectional. Second, our indirect mechanism of duality on firm performance relates to the allocation of (talented) CEOs across firms. Hence, it seems appropriate to focus on cross-firms analysis rather than within firm. In this test, we are precisely interested in comparing firms that maintain CEO-Chairman duality to keep attracting high-quality CEOs compared to other firm without CEO-Chairman duality.

To test the second 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:

$$DualityChg_{it} = \alpha + \beta\, Turnover\ Sign_{it} + \omega_{it} + \chi_t + \gamma_i + \xi_{it} \tag{2}$$

where $DualityChg_{it}$ is a categorical variable that takes value 1 in year t if duality increases from year $t-1$ to year t in firm i, 0 if it does not change, and -1 if it decreases; $Turnover\ Sign_{it}$ is a categorical variable that takes value 1 if $Turnover_{it} = 1$ and the new CEO has higher *Ability* than the old one, 0 if $Turnover_{it} = 0$, and -1 if $Turnover_{it} = 1$ and the new CEO has lower *Ability* than the old 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 the Data section 4.1. We control for time varying firm characteristics, time, and firm fixed effects (ω_{it}, χ_t, and γ_i, respectively).

Prediction 2 implies that $\beta > 0$, that is, firms increase (decrease) CEO Chairman duality to attract better (worse) CEOs. We focus our analysis on time series regres-

sions: we include 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 Chairman duality. Second, in this test we are interested in how a given firm changes CEO Chairman duality to attract a better CEO so we are focusing on a within-firm analysis.

4 Empirical Results

In this section, we start describing the data and then we present our results. First, we identify the direct and indirect impact of duality by estimating specification (1). Second, we show that duality is used as part of CEO recruitment since most of duality changes happen contemporaneously with CEO turnovers. Third, we show that increases with duality are associated with the selection of better quality CEOs by estimating specification (2).

4.1 Data description

We obtain our CEO data from ExecuComp, ISS (former RiskMetrics) and Demerjian et al. (2012). Using ExecuComp, we define *Turnover* as an indicator that takes value 1 if the current CEO is different from the last fiscal year end one.

We use the measure of managerial ability developed by Demerjian et al. (2012). In essence, 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

talent as the residual firm score unexplained by firm characteristics. We define a 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.[2]

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

We define *Turnover Sign* as follows: *Turnover Sign* $= 1$ if *Turnover* $= 1$ and the current CEO has higher *Ability* than the previous one; *Turnover Sign* $= -1$ if *Turnover* $= 1$ and the current CEO has lower *Ability* than the previous one; and, *Turnover Sign* $= 0$ if *Turnover* $= 0$.

In the robustness section, 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 at the previous appointment as

[2]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.

the residual on a regression of total compensation on firm size, dummies for different positions and industry and year fixed effects.[3] Then, we take the average of all the residuals for that CEO while working at the previous employment. Hence, *Pre-Appointment Comp* is defined at the CEO-firm level. We define *Turnover Sign Alt* as follows: *Turnover Sign* $= 1$ if *Turnover* $= 1$ and the current CEO has higher *Pre-Appointment Comp* than the previous one; *Turnover Sign Alt* $= -1$ if *Turnover* $= 1$ and the current CEO has lower *Pre-Appointment Comp* than the previous one; and, *Turnover Sign Alt* $= 0$ if *Turnover* $= 0$.

We obtain *Duality* from ISS/RiskMetrics: it is an indicator that takes value 1 if the CEO holds the position of Chairman 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*).

Our main alternative explanation focuses on "relay successions" or "passing-the-baton", as described by Vancil (1987). In these cases, an internal heir apparent is selected some years before the current CEO is expected to step down and it is

[3]In more details, we use the residuals from the following regression: the logarithm of total compensation on market capitalization; a dummy for for the following roles: CEO, COO, Chairman, Vice-chairman, President and Vice-President; 49 Fama-French industry and year fixed effects.

trained until the current CEO step down. Then, the incumbent CEO usually stays as chairman 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 succession", 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.

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

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) both because their measure of return on assets may not be appropriate and/or because their competition for managerial talent may be distorted. 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 period from 1996 to 2013, covers 2982 different CEOs and 1783 different firms.

4.2 Direct and Indirect effect of Duality on Performance

In this section, we focus on unveiling the direct and indirect effect of CEO Chairman duality on firm performance as suggested by Prediction 1.

In Table 2, we report the effect of duality on firm performance, as measured by return on assets (*ROA*). Column (1) reports results similar to the previous literature: when we regress *ROA* on *Duality* and other firm characteristics, we find no statistically significant correlation between duality and ROA. This result is consistent with Prediction 1: the coefficient on duality is undistinguishable from zero when we bind

together the two offsetting mechanisms. However, in columns (2) to (4), we show that, after filtering out CEO turnover periods, the effect of CEO Chairman duality on firm performance is strictly negative. Specifically, in column (2), we add *Turnover* to control for years with CEO turnover and find that *Duality* is associated with a reduction in *ROA* by 0.6%, around 1/10 of its standard deviation. In column (3), we also add lagged *Turnover* to control for some possible delays in the impact of turnover on firm performance. Finally, in column (4), we add additional firm characteristics as controls.

In untabulated tests, we repeat our analysis including firm fixed effects. We find point estimates consistent with our empirical predictions but the results are not statistically different from zero. As discussed in section 3.2, comparing across firms seems more appropriate than comparing within firms: we are interested in studying how different firms choose CEO Chairman duality and its (direct and indirect) effect on firm performance.

Overall, we find results that are supportive of our argument that duality has a direct effect and an indirect effect on firm performance, the latest through the selection of CEO. We further explore the later in the next section.

4.3 Duality as selection mechanism

In this section, we study whether duality is used as part of the section mechanism for new CEOs. As suggested by Prediction 2, we should expect a higher frequency of changes of duality when there is a CEO turnover than otherwise.

In Table 3, we report the changes in CEO-Chairman duality around 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-Chairman duality changes around CEO turnover. Consistent with Naveen (2006), we show that "relay successions" drive this specific result. That is, decreases in CEO Chairman duality are specially common when there is a heirs apparent (*Heirs Apparent*= 1). CEO-Chairman decreases 60% of the turnover cases when there is a heirs apparent while it only decreases 37% of the times in other successions.

Overall, we read these results as supportive of our maintained hypothesis: CEO-Chairman duality plays a role in the CEO selection mechanism. We show that changes in duality are especially common around turnover. Moreover, after discarding mechanical changes in duality that arise from "relay successions", we document both an increase and a decrease in duality around turnover when firms recruit CEOs in the competitive executive labor market. These results highlight the importance of duality as a selection mechanism as compared to role of duality as an entrenchment outcome. If CEO entrenchment was the only 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.

4.4 Matching CEO ability and duality

In this section, we estimate specification (2) to test whether shareholders grant duality to high ability managers while they separate the chairman and CEO role for low ability managers.

Consistent with Prediction 2, in column (1) of Table 4, we find that the coefficient on *Turnover Sign* 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 appre-

ciate the economic significance of this result notice that hiring a higher-ability CEO is associated with a 13.6% change in the probability of increasing duality compared with hiring a lower-ability CEO. In other words, we document that firms are more likely to implement the separation between CEO and Chairman 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 Chairman duality for changes in ability around turnover. As discussed in section 3.2, we are interested in how a given firm changes CEO Chairman duality to attract a certain (higher ability) CEO.

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 Chairman duality. If this is the case, some firms would increase CEO Chairman 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.[4] Moreover, in the robustness section, we repeat the analysis both including a dummy for CEO turnover periods and 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

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

Chairman 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 (2) of Table 4, our results indicate that, given the average CEO employment length of 6 years, the probability of CEO Chairman duality at the end of a given CEO appointment will increase only by 3.6% due to power.[5] This suggests that the effect of increasing duality 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 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-Chairman duality changes are also correlated with changes in other board characteristics such as board independence (*Fract Indep*) and board size (*Board Size*).

In columns (3) to (5) of Table 4, we explore the role of "relay successions". In column (3), 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 (4) and (5) we repeat the analysis splitting between heirs-

[5]We do this calculations as follows. Given the coefficient on tenure in column (2) of Table 4, 0.006, this implies an increase in 0.036 in *DualityChg* when tenure increases from 1 to 7 years.

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 Chairman 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. We use linear probability models in our main specifications to improve the comparison across settings.

5 Robustness Results

In this section, we provide additional results to complement our analysis. First, 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 the current CEO appointment as a measure of his/her ability. Second, we show that our results are robust to controlling for lead and lag effects of CEO turnover on CEO Chairman duality. Third, we obtain similar results when performing a propensity score matching. Fourth, results do not change when we restrict our sample exclusively to turnover observations. Finally, we focus on changes on CEO Chairman duality around Chairman (and not CEO) turnover. We document that higher ability CEOs are more likely to gain duality than lower ability ones when an incumbent Chairman steps down.

5.1 Alternative Ability measure

In table 5, we show that our main results are robust to an alternative measure of ability based on abnormal compensation.

In this section, 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 industry and year fixed effects for a given individual at his/her previous job (see Appendix A for details). Then, we set *Turnover Sign Alt*=1 if the current CEO ability measured by abnormal compensation is higher than the incumbent one, *Turnover Sign Alt*=−1 if the current CEO ability is lower than the incumbent one, and *Turnover Sign Alt*=0 if there is no turnover. This alternative measure of ability relies on the assumption that executive compensation is proportional to the ability of a manager. On the one hand, past compensation is definitely a relevant statistic available at the time of a new CEO appointment and, if executive pay is set efficiently, aggregates relevant hard to quantify information into a measurable variable. 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 shows that higher abnormal pre-appointment compensation of the CEO leads to higher likelihood that he/she will be granted CEO Chairman duality at appointment. In column (1), we find that hiring a higher-ability CEO is associated with a 10.6% change in the probability of increasing duality compared with hiring a lower-ability CEO. The result is similar in column (2), where we control for other firm characteristics. The statistical and economic significance of the (untabulated) controls remains similar to Table 4. In column (3), the interaction effect does not show statistically significant results. Interestingly, when we split the sample, we find positive and significant results for the non-"relay succession" sub-sample, consistent with our hypothesis.

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.

5.2 Dynamics

To examine the dynamic relation between CEO turnover and duality, in columns (1) and (2) of Table 6, we show that when we include lead-lag controls for two years before and after CEO turnover the economic (and statistical) significance of *Turnover Sign* does not significantly change from the results in Table 4: the point estimate on the contemporaneous effect remains similar.

Similarly, in column (3), we include an interaction effect to distinguish "relay successions", together with its leads and lags and find similar results to column (3) of Table 4. Specifically, we first calculate the interaction values and then we lead and lag them. That is, for example, *L.Turnover Sign*Heirs Apparent* takes value 1 if there is CEO turnover the next fiscal year and the CEO to be appointed next fiscal year is a heirs apparent, 0 otherwise. In other words, the lagged variables contain information about the future CEO "heirs apparent" and not the contemporaneous one.

Columns (2) and (3) in Table 6 include the same controls as in column (2) of Table 4 but we do not report the results for brevity as we find no differences in the magnitude and significance of the coefficients.

5.3 Propensity score matching

In this section, we use propensity score matching as a robustness test for our results.

First, we estimate a propensity score matching model where we match each turnover firm to its most similar non-turnover firm using standard propensity score matching methodology. We match firms using market capitalization (*Market Cap*), CEO age (*CEO Age*), 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 (*Turnover Sign*),

including only the turnover observations and their matched pairs. In column (1) of Table 7, we find that hiring a high-ability CEO is associated with a 8.2% 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 1% level. In column (2), we repeat our analysis including a complete set of controls to ensure that our results are not driven by unmatched observable characteristics. We find economically (and statistically) similar results.

In columns (3) to (6) of Table 7, we repeat our analysis splitting our sample based on "relay successions". In columns (3) and (4), we focus on "relay successions" and its matched peers while in columns (5) and (6) we focus on non-"relay successions" and its matched peers.[6] As in Table 4, we find that the role of CEO Chairman duality as a selection mechanism is more prevalent in non-"relay successions".

5.4 Turnover Observations Only

In this section, we show that our main results are robust to further robustness analysis regarding turnover, including focusing exclusively on CEO turnover observation.

First, in Table 8 Panel A, we explicitly control for turnover years by adding a turnover dummy variable to our baseline specification. Specifically, we include *Turnover* in equation (2). We define *Turnover* as an indicator that takes value 1 if the CEO at the end of the current fiscal year is different than the previous fiscal year end CEO, 0 otherwise;.

In columns (1) and (2), we find results in the direction suggested by our hypothesis, but their economical (and statistical) significance is relatively small. This result seems due to the confounding effect of "relay successions" so we split or sample between "relay" and non-"relay" successions. Once we control for "relay successions"

[6]Specifically, in columns (3) to (6), we keep the matching methodology as in in columns (1) and (2), that is, based on market capitalization, CEO age, industry, and year. Then, we use only the "relay successions" and its matched peers in columns (3) and (4) and the non-"relay succession" and its matched peers in columns (5) and (6).

in columns (3) to (5), we show that results are statistically and economically similar to columns (3) to (5) in Table 4: in a non-heirs related successions, hiring a higher-ability CEO is associated with a 16.4% change in the probability of increasing duality compared with hiring a lower-ability CEO.

More importantly, in Table 8 Panel B, we repeat the analysis on Table 4 focusing only on CEO turnover observations. Similar to Panel A, in columns (1) and (2), we find statistically insignificant results. However, once we split the sample by "relay" and "non-relay" successions in columns (3) to (5), results are both statistically and economically similar to columns (3) to (5) in Table 4. This result shows that controlling for "relay successions" to filter the mechanical changes in CEO Chairman duality is specially important when focusing only on CEO turnover observations. The economic significance of the results is smaller than in Table 4 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.

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.

5.5 Chairman Turnover

In this section, we focus on another event that can (potentially) trigger changes in CEO Chairman duality: Chairman turnover. The motivation for this test is to show that better CEOs are more likely to become also the Chairman on the board when the Chairman leaves. Although this result is not direct evidence that firms use duality to attract better CEOs, it provides additional evidence in favour of our motivation that higher ability managers are granted duality (possibly to retain them).

This robustness result provides evidence against the alternative hypothesis that

there is an alternative unobserved mechanism around CEO turnover that correlates directional changes in duality and directional changes in CEO ability. We would expect any CEO turnover specific mechanism not to be present during Chairman turnover.

We estimate a model akin to specification (2), where $DualityChg_{it}$ is a categorical variable that takes value 1 in year t if duality increases from year $t-1$ to t in firm i, 0 if it does not change, and -1 if it decreases; $Ability_{it}$ is the average CEO ability as measured by Demerjian et al. (2012) for a given CEO-firm match. We control for time varying firm characteristics, time, and industry fixed effects (ω_{it}, χ_t, and γ_i, respectively). This is a cross sectional result as, in this specification, we only include Chairman turnover years. Moreover, as this is a Chairman (and not a CEO) turnover period, we focus on $Ability_{it}$ rather than $Turnover\ Sign_{it}$. $Turnover\ Sign_{it}$ only takes values different than zero during CEO turnover periods so it is not appropriate in this setting.

We present the results in Table 9. As shown in columns (1), better CEOs are more likely to become Chairman when the incumbent Chairman steps down. Economically, a one standard deviation increase (decrease) in CEO ability (*Ability*) implies a 10% increase (decrease) in the probability that the current CEO is also granted the Chairman position. In column (2), we show that our results are robust to inclusion of additional controls. One possible concern with this results is that joint Chairman and CEO turnover events are driving our results. This would provide empirical support for our hypothesis but would simply replicate the results in Table 4. Therefore, in columns (3) and (4) we focus only on Chairman turnover periods that do not coincide with CEO turnover periods. We find economically and statistically similar results, supporting our hypothesis.

In summary, this section provide evidence than better CEOs are granted duality when the incumbent Chairman steps down. This provides supportive evidence in favour of our hypothesis that CEO Chairman decisions depend on the CEO ability.

6 Conclusion

In this paper, we explore the joint role played by corporate governance and competition among firms to attract better managers. We show that when managerial ability is observable and managerial skills are scarce, competition among firms to hire better CEOs implies that in equilibrium firms hiring high-quality CEOs have to choose lower levels of corporate governance, i.e. duality.

Intuitively, the result follows from the fact that rents for scarce managerial talent are not under the control of an individual firm but instead are determined by the value of managers when employed somewhere else. Hence, it is inefficient to choose a high level of corporate governance (i.e., separation between CEO and Chairman).

We use the measure of CEO ability developed by Demerjian et al. (2012), and find that it is positively correlated with CEO duality: we find that corporate governance changes significantly when a new CEO is hired, with better CEOs being offered weaker governance.

Our finding that corporate governance affects the matching between managers and firms 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 increases firm performance.

Hence, our results also have important corollaries for corporate governance regulation as firms do not internalize the positive externality corporate governance causes to other firms in the economy through the high-ability managers' reservation utility. From this perspective, our findings prescribe that mandating separation between CEO and Chairman of the Board across all firms would be optimal.

However, sector specific regulation (for instance, regulation targeted exclusively to the financial sector) might backfire. Sector specific regulation on corporate gover-

nance 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 latter path is more likely to occur 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. Appendix A includes variables definitions. 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 2982 different CEOs and 1783 different firms, covering the period from 1996 to 2013.

Panel A: Summary Statistics

	Mean	Std Dev	Min	p25	Median	p75	Max
ROA	0.058	0.092	-0.348	0.024	0.061	0.103	0.318
Duality	0.574	0.495	0	0	1	1	1
Turnover	0.116	0.320	0	0	0	0	1
Market Cap	8.049	1.522	3.798	6.946	7.884	9.061	11.583
CEO Age	55.841	7.215	33	51	56	60	96
Book Lev	0.311	0.245	0.000	0.087	0.307	0.467	1.082
External Dummy	0.284	0.451	0	0	0	1	1
Tenure	7.348	7.644	0	2	5	10	61
Fract Indep	0.710	0.163	0.000	0.613	0.750	0.846	1.000
Board Size	9.133	2.298	3	7	9	11	22
Heirs Apparent	0.363	0.481	0	0	0	1	1

Panel B: Categorical Variables

	-1	0	1
Duality Chg Sign	934	11,298	824
Turnover Sign	846	11,548	662

Table 2: **Duality effect on firm performance**

In this table, we report results of the regression of firm performance on duality including and excluding CEO turnover. *ROA* is the firm return on assets, *Duality* is dummy variable that takes value 1 if the firm has duality, 0 otherwise; *Turnover* is a dummy variable that takes value 1 if there is CEO turnover in that fiscal year, 0 otherwise. *L.* indicates one fiscal year lagged variables and *L2.* indicates two fiscal years lagged variables. *Market Cap* is the firm market capitalization; *CEO Age* is the current CEO age; *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. 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.

	(1)	(2)	(3)	(4)
Dep Variable	ROA	ROA	ROA	ROA
Duality	-0.002	-0.006**	-0.008**	-0.005***
	(0.003)	(0.003)	(0.003)	(0.002)
Turnover		-0.022***	-0.033	-0.009
		(0.003)	(0.025)	(0.023)
L.Turnover			-0.072	-0.036
			(0.046)	(0.042)
L2.Turnover			-0.010***	-0.004
			(0.003)	(0.002)
Market Cap	0.014***	0.014***	0.015***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)
CEO Age	0.000	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
L.ROA				0.544***
				(0.021)
Book Lev				-0.063***
				(0.006)
External Dummy				-0.002
				(0.002)
Tenure				0.000
				(0.000)
Fract Indep				0.003
				(0.006)
Board Size				-0.025***
				(0.004)
Year FE	Y	Y	Y	Y
Ind FE	Y	Y	Y	Y
Observations	14,801	14,801	8,391	8,368
R-squared	0.110	0.115	0.135	0.473

Table 3: **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 dummy variable that takes value 1 if the CEO appointment. *Heirs Apparent* is a dummy variable that takes value 1 for CEOs appointed after a succession consistent with "relay succession", 0 otherwise.

Panel A: Changes in Duality around CEO Turnover

	Turnover		
DualityChg	0	1	Total
-1	1.6%	49.7%	934
0	92.4%	41.9%	11,298
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		1		
	Heirs Apparent		Heirs Apparent		
DualityChg	0	1	0	1	Total
-1	1.6%	1.6%	37.4%	60.3%	934
0	93.5%	90.1%	47.9%	36.7%	11298
1	4.9%	8.3%	14.7%	3.0%	824
Total	7,626	3,922	697	811	13,056

Table 4: **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. *Turnover Sign* 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 succession", 0 otherwise. To simplify the comparison across our results, we estimate linear probability models in all specification. 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)
Dep Variable	DualityChg	DualityChg	DualityChg	DualityChg	DualityChg
Heirs Apparent?	All	All	All	Yes	No
Turnover Sign	0.068***	0.066***	0.109***	0.035	0.108***
	(0.023)	(0.024)	(0.034)	(0.034)	(0.036)
Turnover Sign*			-0.080*		
Heirs Apparent			(0.045)		
Heirs Apparent			-0.064***		
			(0.015)		
Market Cap	0.000	-0.005	-0.002	0.025	-0.014
	(0.009)	(0.010)	(0.010)	(0.024)	(0.011)
CEO Age	0.009***	0.005***	0.004***	0.003	0.003*
	(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)
Observations	13,056	12,500	12,500	4,571	7,929
R-squared	0.098	0.109	0.112	0.187	0.174
Year FE	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y

Table 5: **Matching CEO ability and duality: Alternative Ability Measure**

In this table, we present results of regression of changes in Duality on changes in our alternative measure of 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. *Turnover Sign 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) 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 (pre-appointment abnormal compensation) 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. To simplify the comparison across our results, we estimate linear probability models in all specification. The additional controls, where included, are the same controls as Table 4, column (2). 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)
Dep Variable	DualityChg	DualityChg	DualityChg	DualityChg	DualityChg
Heirs Apparent?	All	All	All	Yes	No
Turnover Sign	0.053*	0.055*	0.097**	0.025	0.090*
	(0.032)	(0.032)	(0.048)	(0.043)	(0.051)
Turnover Sign Alt*			-0.072		
Heirs Apparent			(0.059)		
Heirs Apparent			-0.071***		
			(0.019)		
Market Cap	-0.007	-0.009	-0.005	0.019	-0.026*
	(0.011)	(0.011)	(0.011)	(0.025)	(0.014)
CEO Age	0.008***	0.005***	0.004***	0.003	0.001
	(0.001)	(0.001)	(0.001)	(0.004)	(0.003)
Controls	N	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y
Observations	9,194	9,166	9,166	4,091	5,075
R-squared	0.115	0.120	0.123	0.183	0.192

Table 6: **Lead-Lag analysis**

In this table, we present results of regressions of changes in Duality on changes in managerial ability, including leads and lags. *DualityChg* is a categorical variable that takes value 1 if duality increases, 0 if it does not change, and −1 if it decreases. *TurnoverSign* 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. *L.* indicates one-year lagged variables and *L2.* indicates two-year lagged variables. *F.* indicates one-year lead variables and *F2.* indicates two-year lead variables. To simplify the comparison across our results, we estimate linear probability models in all specification. Where indicated, regressions include the same controls as Table 4, column (2), 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)
Dep Variable	DualityChg	DualityChg	DualityChg
Turnover Sign	0.061**	0.056*	0.099**
	(0.030)	(0.029)	(0.043)
L. Turnover Sign	-0.004	-0.008	-0.004
	(0.020)	(0.021)	(0.031)
F. Turnover Sign	-0.020	-0.022	-0.009
	(0.017)	(0.017)	(0.026)
L2. Turnover Sign	-0.016	-0.018	-0.006
	(0.016)	(0.016)	(0.023)
F2. Turnover Sign	0.003	0.003	0.002
	(0.013)	(0.014)	(0.021)
Turnover Sign*Heirs Apparent			-0.115**
			(0.053)
L. Turnover Sign*Heirs Apparent			0.015
			(0.039)
F. Turnover Sign*Heirs Apparent			-0.014
			(0.033)
L2. Turnover Sign*Heirs Apparent			-0.014
			(0.031)
F2. Turnover Sign*Heirs Apparent			0.013
			(0.028)
Market Cap	0.002	0.001	0.007
	(0.013)	(0.015)	(0.014)
CEO Age	0.008***	0.005***	0.003*
	(0.001)	(0.002)	(0.001)
Controls	N	Y	Y
Year FE	Y	Y	Y
Firm FE	Y	Y	Y
Observations	7,502	7,481	7,481
R-squared	0.114	0.120	0.196

Table 7: **Propensity score matching**

In this table, we present robustness 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. *Turnover Sign* 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. The controls, where included, are the same controls as Table 4, column (2). *, **, 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
Observations	Matched Sample	Matched Sample	Matched Sample	Matched Sample	Matched Sample	Matched Sample
Heirs Apparent?	All	All	Yes	Yes	No	No
Turnover Sign	0.041***	0.033**	0.003	-0.010	0.075***	0.078***
	(0.014)	(0.014)	(0.020)	(0.020)	(0.019)	(0.020)
Controls	N	Y	N	Y	N	Y
Year FE	N	Y	N	Y	N	Y
Observations	3,066	2,817	1,396	1,287	1,670	1,530
R-squared	0.003	0.098	0.000	0.159	0.009	0.081

Table 8: **Matching CEO ability and duality: Turnover Subsample**

In this table, we present results of regression of changes in Duality on changes in managerial ability adding turnover dummies (Panel A) and only around turnover years (Panel B). *DualityChg* is a categorical variable that takes value 1 if duality increases, 0 if it does not change, and −1 if it decreases. *Turnover Sign* 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. *Turnover* is a dummy variable that takes value 1 if there is CEO turnover in that fiscal year, 0 otherwise. *Market Cap* is the firm market capitalization; *CEO Age* is the current CEO age; *Heirs Apparent* is a dummy variable that takes value 1 for CEOs appointed after a succession consistent with "relay succession", 0 otherwise. To simplify the comparison across our results, we estimate linear probability models in all specification. The additional controls, where included, are the same controls as Table 4, column (2). 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.

Panel A: Controlling for turnover

	(1)	(2)	(3)	(4)	(5)
Dep Variable	DualityChg	DualityChg	DualityChg	DualityChg	DualityChg
Observations	All	All	All	All	All
Heirs Apparent?	All	All	All	Yes	No
Turnover Sign	0.020	0.022	0.066**	-0.028	0.082**
	(0.020)	(0.020)	(0.033)	(0.025)	(0.034)
Turnover Sign*			-0.082**		
Heirs Apparent			(0.039)		
Heirs Apparent			-0.053***		
			(0.014)		
Turnover	-0.493***	-0.507***	-0.506***	-0.720***	-0.315***
	(0.020)	(0.021)	(0.021)	(0.030)	(0.035)
Market Cap	-0.011	-0.003	-0.001	0.045**	-0.010
	(0.008)	(0.009)	(0.009)	(0.019)	(0.011)
CEO Age	0.001	0.004***	0.003**	0.001	0.004**
	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)
Controls	N	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y
Observations	13,056	12,500	12,500	4,571	7,929
R-squared	0.246	0.252	0.254	0.428	0.222

Panel B: Turnover year sub-sample

	(1)	(2)	(3)	(4)	(5)
Dep Variable	DualityChg	DualityChg	DualityChg	DualityChg	DualityChg
Observations	TurnOnly	TurnOnly	TurnOnly	TurnOnly	TurnOnly
Heirs Apparent?	All	All	All	Yes	No
Turnover Sign	0.018	0.015	0.062**	-0.030	0.066**
	(0.017)	(0.018)	(0.027)	(0.021)	(0.029)
Turnover Sign*			-0.303***		
Heirs Apparent			(0.038)		
Heirs Apparent			-0.096***		
			(0.033)		
Market Cap	-0.031***	0.002	0.008	0.029	-0.012
	(0.010)	(0.014)	(0.013)	(0.018)	(0.022)
CEO Age	0.019***	0.020***	0.016***	0.004	0.022***
	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)
Controls	N	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y
Observations	1,508	1,370	1,370	740	630
R-squared	0.098	0.131	0.175	0.121	0.192

Table 9: **Matching CEO ability and duality: Chairman Turnover**

In this table, we present results of regressions of changes in Duality on 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. *Ability* is the average of the CEO talent for each CEO-firm match. *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 our results, we estimate linear probability models in all specification. Columns (1) and (2) include all chairman turnover event, while columns (3) and (4) include only chairman turnover events that do not coincide with CEO turnover. 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.

	(1)	(2)	(3)	(4)
Dep Variable	DualityChg	DualityChg	DualityChg	DualityChg
Observations	All Ch Turnover	All Ch Turnover	Ch Turnover Only	Ch Turnover Only
Ability	0.386*	0.460**	0.428**	0.493***
	(0.210)	(0.223)	(0.193)	(0.187)
Market Cap	-0.021	-0.014	-0.008	-0.010
	(0.013)	(0.017)	(0.013)	(0.016)
CEO Age	0.000	0.002	-0.007**	-0.002
	(0.003)	(0.003)	(0.003)	(0.003)
L.ROA		0.110		0.158
		(0.225)		(0.203)
Book Lev		0.183*		0.209**
		(0.101)		(0.100)
External Dummy		0.030		-0.001
		(0.046)		(0.043)
Tenure		-0.005		-0.016***
		(0.003)		(0.003)
Fract Indep		0.067		0.080
		(0.162)		(0.140)
Board Size		-0.212**		-0.166*
		(0.096)		(0.094)
Year FE	Y	Y	Y	Y
Ind FE	Y	Y	Y	Y
Observations	818	772	655	626
R-squared	0.156	0.175	0.227	0.283

Appendix A Variable Definition

This appendix provides a detailed definition of the variables in our analysis.

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

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.

Duality is a dummy variable that takes value 1 if the CEO is also the Chairman 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.

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

Turnover Sign 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.

Turnover Sign 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 average abnormal compensation in the immediately preceding firm-position match. We define abnormal compensation as the residual of the logarithm of total compensation (Compustat item `tdc1`) on market capitalization; a dummy for for the following roles: CEO, COO, Chairman, Vice-chairman, President and Vice-President; 49 Fama-French industry and year fixed effects.

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.

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`).

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

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`).

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

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

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

Board Size is the number of board members.

Appendix B Theoretical Model

To motivate our empirical predictions, we develop a simple model in which firms compete for CEOs by choosing duality as part of the optimal incentive contract. We show that in the presence of competition for scarce managerial talent, in equilibrium, ex-ante identical firms are indifferent between hiring a better CEO and appointing him/her also as Chairman of the Board (thus choosing a weaker governance regime), and hiring a worse CEO and appointing a separate, independent Chairman of the Board to monitor him/her (thus setting a stronger governance regime).

B.1 Setup of the Model

Consider an economy with n firms and m managers (potential CEOs). 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). 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 Chairmen of the Boards. CEOs and Chairmen have an exogenously given reservation utility $\overline{u}_R > 0$. Firms can hire at most one CEO and one Chairman of the Board. CEOs can also be Chairmen (of their own company) but not *vice versa*. Managers and shareholders are risk neutral. All firms are ex-ante identical.

The assumption that good CEOs are in short supply is the critical ingredient of our model. Without this assumption, there is no effective competition in the managerial market and no interesting interaction between the choice of duality (or corporate governance in general) 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 equal to 0. Compensation contracts are represented by a performance-related bonus $w_C \geq 0$, which is contingent on the verifiable output X produced at $t = 3$. Notice that a further payment that is independent of performance

would be inefficient: it would simply increase the amount of compensation needed in the case of good performance. Moreover, as part of the incentive package, at $t = 1$ the firm also chooses whether to appoint an independent Chairman of the Board or to allow duality (i.e., the CEO is also appointed to be the Chairman of the Board). An independent Chairman may monitor the CEO but needs to be incentivized. For that purpose the Chairman (if different from the CEO) is paid a performance related bonus $w_R \geq 0$, which is contingent on the verifiable output X produced at $t = 3$.

At $t = 2$, CEOs choose 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; while action M generates a private benefit B for the manager and no output ($X = 0$) for the firm. We assume $Y_H - Y_L \equiv \Delta > 0$ (i.e. the productivity of better ability managers is higher). The choice of action is not observable by shareholders. At the same time, if there is an independent Chairman of the Board (no duality), she can monitor the CEO. For an effort cost c, the Chairman can reduce the private benefits for the CEO from B to $(1 - \mu)B$, with $\mu < 1$. The choice of effort is not observable by shareholders.

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

We make the following technical assumptions, which simplify our analysis but are not critical for our results:

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

(2) $(1 - \mu)B \geq \overline{u}_R$: 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.

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

(4) When indifferent, firms prefer to hire a H-type manager rather than a L-type one: this tie-breaking assumption simplifies the analysis.

B.2 Incentive Contracts

To find the equilibrium, we proceed by backwards induction, starting from the payoffs at $t = 3$.

B.2.1 Payoffs

There are six cases to consider: (i) If the CEO chooses action M, and the Chairman exerts no effort or shareholders choose CEO duality, the payoffs for the CEO is B, the payoffs for the Chairman and the shareholders are 0; (ii) if the CEO chooses action M and the Chairman exerts effort, the firm payoffs for the CEO is $B(1-\mu)$, the payoff for the Chairman is $-c$, and for shareholders is 0; (iii) if the CEO chooses action S and the firm produces $X = Y_q$, depending on the manager's ability, and the Chairman exerts no effort or shareholders choose CEO duality, the payoff for the CEO is w_c, the payoff for the Chairman of the board is w_R, and for shareholders is $Y_q - w_C - w_R$; (iv) if the CEO chooses action S and the firm produces $X = 0$, and the Chairman exerts no effort or shareholders choose CEO duality, the payoff for the CEO is 0, the payoff for the Chairman of the board is 0, and for shareholders is 0; (v) if the CEO chooses action S and the firm produces $X = Y_q$ and the Chairman exerts effort, the payoff for the CEO is w_c, the payoff for the Chairman of the board is $w_R - c$, and for shareholders is $Y_q - w_C - w_R$ and (vi) if the CEO chooses action S and the firm produces 0, and the Chairman exerts effort, the payoff for the CEO is 0, the payoff for the Chairman of the board is $-c$, and for shareholders is 0.

Given that the probability of success conditional on the choice of action S is p, we can represent the expected payoffs for the CEO, Chairman of the Board and shareholders in Table B.1.

B.2.2 Moral hazard problems

Looking at Table B.1, we can immediately derive the incentive compatibility conditions for the CEO. If the CEO expects no monitoring, he chooses action S iff $pw_c \geq B$; conversely, if the CEO expects monitoring, he chooses action M iff $pw_c \geq B(1-\mu)$. Intuitively, monitoring reduces the wage required to satisfy the incentive compatibility condition.

From Table B.1, we can also see that the Chairman of the Board will monitor only if her monitoring activity affects the CEO's decision. If the Chairman of the Board expects that the CEO to chooses action M (or action S) independently of her monitoring effort, she would not exert any effort. This can be seen in Table B.1 as an horizontal comparison of the payoffs for the Chairman.

More precisely, the Chairman will monitor if only if monitoring induces the CEO to switch from action M to action S and if she is compensated for the monitoring costs $pw_R \geq c$.

Therefore, we can summarize our findings as follows:

Lemma 1 (IC Constraints): *There are three cases to consider: (i) If $pw_C \geq B$, the CEO chooses action S and the Chairman exerts no monitoring; (ii) if $B > pw_C \geq B(1-\mu)$ and $pw_R \geq c$, the CEO chooses action S and the Chairman monitors;*

and (iii) in all other cases, the CEO chooses action M and the Chairman does not monitor.

The results in Lemma 1 state intuitively that there are two ways to incentivize the CEO: (i) by paying him a relatively high wage $w_C \geq B/p$; and (ii) by paying him a relatively low wage ($w_C \in [B(1-\mu)/p, B/p)$) and providing the Chairman of the board with enough incentives to monitor the CEO (setting $w_R \geq c/p$).

So far, we have focused only on the incentive compatibility constraints. The pay for CEOs and Chairmans needs also to satisfy their participation constraints. These depend on the competition for CEOs.

B.3 Case without competition

Consider first the case in which there is no competition for CEO. 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. In such case, the participation constraint for any CEO is simply $pw_C \geq \overline{u}_R$. From assumption (2), this constraint is redundant once the IC contraint is satisfied.

The participation constraint for the Chairman of the Board is $pw_R \geq \overline{u}_R + c$, if the chairman needs to have incentives to monitor and $pw_R \geq \overline{u}_R$ otherwise.

We can easily show that firms separate the roles of CEO and a Chairman of the Board and pay them so that the (IC) constraint for the CEO and the participation constraint of the Chairman are binding. This follows from the comparison of the expected profits with and without CEO/Chairman duality. In case of duality, the expected profits for a firm employing a CEO of quality $q \in \{H, L\}$ are $pY_q - B$ while the expected profits for a firm that separate the two roles is $pY_q - (1-\mu)B - c - \overline{u}_R$. From assumption (1), $\mu B > c + \overline{u}_R$ and thus firms prefer separate CEO/Chairman. To summarize this discussion:

Proposition 1 (Governance without competition for CEOs) *A firm matched with a CEO of type $q \in \{H, L\}$ chooses separation between CEO and Chairman of the Board, offers incentive contracts for CEO and Chairman $(w_C, w_R) = (B/p, (\overline{u}_R + c)/p)$, and generates expected profits $pY_q - (1-\mu)B - c - \overline{u}_R$.*

Interestingly, both CEOs and Chairmen of the Board should be paid an incentive contract conditional on performance, while the CEO's pay is independent of its type.

B.4 Case with competition

Consider now the case in which firms can compete for CEOs. Specifically, we assume that firms advertise wage contracts conditional on each type (and can commit to

them) and CEOs have time to choose among the available firms.

In such case, the CEO's reservation utility depends on their 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. We can thus derive the individual rationality constraints as follows:

Lemma 2 (IR Constraints): *There are three cases to consider: (i) when only the IC constraint for the CEO is met, his IR constraint is $w_C \geq \overline{u}_q/p$ and the IR constraint for the Chairman is $w_R \geq \overline{u}_R/p$; (ii) when both the IC constraints for the CEO and the Chairman are met, the IR constraint of the CEO is $w_C \geq \overline{u}_q/p$ and the IR constraint for the Chairman is $w_R \geq (\overline{u}_R + c)/p$; and (iii) when the IC constraint for the CEO is not met, the IR constraint for the CEO is $B \geq \overline{u}_q/p$ and the IR constraint for the Chairman is not met.*

Lemma 2 emphasizes that the IR constraint for the CEO depends on his ability and is independent of whether there is an independent Chairman to monitor him or not: a CEO of ability $q \in \{H, L\}$ accepts an offer only if $w_C \geq \overline{u}_q/p$. Hiring an independent Chairman of the Board is possible only if shareholders pay her $w_R \geq \overline{u}_R/p$ (if she is not expected to exert effort) and $w_R \geq (\overline{u}_R + c)/p$ (if she is expected to exert effort). Notice that shareholders can hire a Chairman only if the latter expects that the IC constraint for the CEO is met; otherwise, there is simply no money to pay her.

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

B.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 Chairman of the board are irrelevant.

The shareholders' problem is then:

$$\begin{aligned} \max_{w_C} \quad & p\,(Y_q - w_C) \\ \text{s.t. (IC)} \quad & pw_C \geq B \\ \text{and (IR)} \quad & pw_C \geq \overline{u}_q \end{aligned} \tag{B.1}$$

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

Lemma 3 (Optimal contract with duality): *The optimal contract for a CEO of type q is $w_C = \max\{B, \overline{u}_q\}/p$ and shareholders' expected profits are $pY_q - \max\{B, \overline{u}_q\} \equiv \Pi_q^D$.*

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 ($w_C = \overline{u}_q/p$). The associated profit equals $pY_q - \overline{u}_q$.

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 ($w_C = B/p$). The associated profit equals $pY_q - B$, which is greater than 0 by Assumption (3). This observation combined with the fact that action M leads to 0 profits implies that inducing the CEO to choose action S is optimal for shareholders.

B.4.2 Incentive Contract with Separation of Chairman and CEO

Consider next the case in which there is separation.

In such case, shareholders have to decide whether they want the Chairman to monitor or not.

The shareholders' problem is to maximize:

$$\max_{(w_C, w_R)} p\left(Y_q - w_C - w_R\right) \tag{B.2}$$

subject to a set of IC and IR constraints that depend on whether they want the Chairman to monitor the CEO.

If they do not want the Chairman to monitor the CEO, problem (B.2) must satisfy the IC condition for the CEO ($pw_C \geq B$), the IR constraint of the CEO ($pw_C \geq \overline{u}_q$), and the IR constraint of the Chairman ($pw_R \geq \overline{u}_R$).

If they want the Chairman to monitor the CEO, problem (B.2) must satisfy the IC condition for the CEO ($pw_C \geq B(1-\mu)$), the IR constraint of the CEO ($pw_C \geq \overline{u}_q$), and the IR constraint of the Chairman ($pw_R - c \geq \overline{u}_R$). The IC constraint for the Chairman ($pw_R \geq c$) is redundant, as it is implied by her IR constraint.

Our first result is that having a Chairman who does not monitor is dominated. To see this, notice that shareholders would have to satisfy the same identical IC and IR constraints for the CEO as in problem (B.1) with the added IR constraint of the Chairman ($pw_R \geq \overline{u}_R$). The latter constraint will be binding (as $\overline{u}_R > 0$) and thus the associated shareholder profits would be strictly lower than in Lemma 3.

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

Lemma 4 (Optimal contract with separation): *The optimal contract for a CEO of type q is $w_C = \max\{B(1-\mu), \overline{u}_q\}/p$, the optimal contract for the Chairman is $w_R = (\overline{u}_R + c)/p$ and shareholders' expected profits are $pY_q - \max\{B(1-\mu), \overline{u}_q\} - (\overline{u}_R + c) \equiv \Pi_q^S$.*

Intuitively, the shareholders' payoff is higher than in the case of duality only if the manager's reservation utility is relatively low: i.e., only if $\overline{u}_q < B$. In other words, a necessary condition for firms to have separation is that the CEO has a relatively low outside option.

B.4.3 Market for CEOs

In the presence of competition for CEOs, the choice of governance is strictly connected with the competition for 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 and give them duality. The remaining $n - m_H$ hire a type-L CEO and choose separation. The CEO compensation for a CEO of type q is*

$$w_C = \begin{cases} \Delta + [B(1-\mu) + \overline{u}_R + c]/p \equiv w_H & \text{if } q = H \\ B(1-\mu)/p \equiv w_L & \text{if } q = L \end{cases}$$

Proof. To prove this, 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, that 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 be also 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 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 (1). 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 $\mu B < \overline{u}_R + c$, which is ruled out by assumption (1). 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 the expression for $\overline{u}_H = B(1-\mu)+p\Delta$ into $G(\overline{u}_H)$, we obtain $\mu B > p\Delta + \overline{u}_R + c$.

For intermediate values of the parameters, $\mu B \in (\overline{u}_R + c, p\Delta + \overline{u}_R + c]$, the equilibrium is as in case (iii). The type-H CEO has duality; while type-L CEOs have 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 $p\Delta + \overline{u}_R + c \geq \mu B$. ■

This is the key result of the model. Because there is a scarcity of type-H CEOs, in equilibrium, competition among firms will drive up the rent awarded to type-H CEOs ($\overline{u}_H$) so as to make firms indifferent between hiring type-H or L managers. 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 chairman 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.

Without competition, as shown in Proposition 1, it would be efficient to separate the roles of Chairman and CEO independently of the CEO type. However, competition for type-H CEOs forces firms to offer higher compensation and duality to type-H CEOs. 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 Chairman, 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.

Table B.1: **Payoffs**

＼ Chair: CEO: ＼	No Monitoring	Monitoring
Action M	CEO: B Chair: 0 Shs: 0	CEO: $B(1-\mu)$ Chair: $-c$ Shs: 0
Action S	CEO: pw_C Chair: pw_R Shs: $p(Y_q - w_C - w_R)$	CEO: pw_C Chair: $pw_R - c$ Shs: $p(Y_q - w_C - w_R)$