Competition for Managers, Corporate Governance and Incentive Compensation

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Abstract

We propose a model in which firms compete to attract talented managers by using corporate governance as part of an optimal compensation scheme: better governance incentivizes managers to perform better and thus saves on the cost of providing pay for performance. However, when managerial talent is scarce, firms compete to attract better managers. This reduces an individual firm’s incentives to invest in corporate governance because managerial rents are determined by the manager’s reservation value when employed elsewhere and thus by other firms’ governance. In equilibrium, better managers end up at firms with weaker governance, and conversely, better-governed firms have lower-quality managers. Consistent with these implications, we show empirically that a firm’s executive compensation is not chosen in isolation but also depends on other firms’ governance and that better managers are matched to firms with weaker corporate governance.

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1 Introduction

The public outcry against the pay of investment bankers following the crisis of 2007-08 is just the latest manifestation of the ongoing debate on executive pay that has kept academics busy for the last twenty years. Executives receive large pay for performance when their firm does well and they are also paid well when their firm does poorly (for instance, in the form of severance payments and golden parachutes). The critical question is: Why are executives (and other professional individuals) paid so much and, apparently, independently of performance?

The literature has evolved into two conflicting camps. The first one directly starting with Jensen and Murphy (1990) argues that entrenchment, or poor corporate governance, allows managers to skim profits away from the firm in the form of high pay (see Bertrand and Mullainathan, 2001, Bebchuk and Fried, 2004, among others). The second camp suggests an efficient explanation: competition for managerial talent forces large firms to pay managers a lot (see Rosen, 1981, and Gabaix and Landier, 2008). In this paper, we show that these views are not in conflict and there is a natural link between them.

We develop a model of the managerial labor market in which poor corporate governance and entrenchment arise because of competition in the market for managerial talent. Firms may on purpose choose lower governance and higher pay to attract and retain better managers. The key insight is that corporate governance affects the matching between managers and firms. Better governance may incentivize managers to perform better for a lower pay. However, it also reduces firms’ ability to attract the best managers.

In our model, firms can incentivize managers to choose the right action via (i) pay for performance, that is, by rewarding them when things go well, and (ii) corporate governance, that is, by punishing them when things go badly. When firms do not have to compete with each other to attract top quality managers, they choose a combination of pay for performance and corporate governance that just meets the manager’s incentive compatibility condition.
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. This result follows from the inability of a firm to affect the rents of the top quality managers as these managers can always find another firm to employ them, that is, the compensation of top-quality managers is exogenous for a given firm. Therefore, it becomes inefficient for a firm that wants to employ a top quality manager to set high levels of corporate governance as it would in any case have to match the manager’s reservation wage by increasing pay for performance. In other words, shareholders end up bearing the costs of implementing corporate governance without enjoying its benefits in the form of lower executive pay.

With ex-ante identical firms, the market equilibrium features mixed strategies: with some probability firms hire the better-quality managers, pay them a rent and underinvest in corporate governance; otherwise, they hire the worse-quality managers, and choose the optimal investment in corporate governance. The former ones optimally choose to be larger than the latter ones, although they are smaller than they would be with no competition for managerial talent. The rent paid to better-quality managers is exactly equal to the difference in profitability between better and worse managers. In short, the scarcity of managerial talent leads to managers accruing as rents all the surplus generated by their superior talent.

Our model delivers three main empirical predictions that are tested in the second part of the paper. First, because a firm’s participation constraint is a function of competitors’ corporate governance, the choice of poor governance by one firm generates a negative spillover for other firms. Specifically, because of their poor corporate governance, these firms must offer higher wages than other firms to managers in order to incentivize them. When managerial talent is scarce, the option to work for firms with weaker governance raises the participation constraint for managers and forces all firms to pay managers more. Hence, our first empirical prediction is that executive compensation in a firm is decreasing in the quality of firm’s own corporate governance and in the quality of governance of its competitors.

Second, a critical assumption in the model is that governance is chosen as part of
an optimal incentive contract offered to a manager. In particular, corporate governance and executive compensation are substitutes from the firm’s standpoint. Hence, our second prediction is that pay for performance and corporate governance should be negatively correlated.

Third, the main result of the model is that, in equilibrium some firms attract better managers by paying them more and choosing more lax governance standards; others attract weaker managers by paying them less and choosing stricter corporate standards. If we can find a way to measure managerial talent, our main empirical prediction is that better quality managers are matched to firms that have weaker governance and receive higher pay.

We test these predictions on a dataset that combines balance-sheet data from Compustat on unregulated firms in the United States over the period 1993 to 2007, data from ExecuComp on the compensation they award their CEO’s and on their turnover, and firm-level corporate governance indices from Riskmetrics. We focus on two measures of corporate governance: the G-Index developed by Gompers et al. (2003), which is a proxy for the quality of outside corporate governance, and CEO Duality, which is a dummy variable that takes value one when the CEO is also the Chairman of the Board (and zero otherwise) and is a proxy for the quality of internal corporate governance. Using both indicators, we find evidence in favor of all three our predictions.

To start with, we show that the choice of corporate governance in one firm has a positive spillover on other firms: the executive compensation in one firm is decreasing in the quality of corporate governance in the firm itself and of its size-matched competitors. The result that governance of competitors affects a firm’s executive compensation holds even after controlling for other determinants of executive compensation, such as market capitalization (as suggested by Gabaix and Landier, 2008). We also control for CEO age, tenure, external/internal CEO and board composition to alleviate the concern that CEO power is the omitted variable that is behind the association between higher compensation and weak governance, as argued by Hermalin and Weisbach (1998).
In particular, we find that the use of pay-for-performance compensation (bonuses and stock options) is greater in firms with weaker governance. This is consistent with the finding in Fahlenbrach (2009) that pay for performance and corporate governance are substitute mechanisms. We also show that the governance quality of competitors is also negatively correlated with the use of flexible pay.

Last, we show that the allocation of CEOs and firms is consistent with the matching equilibrium predicted by the model. Our empirical strategy follows a two-stage approach. In the first stage, managerial talent is measured as the CEO fixed effect in a regression of firm’s operating performance on several control variables. That is, we extract a CEO’s talent relative to other CEOs hired by the firm or the industry. In the second stage, we correlate these predicted measures of managerial talent with corporate governance, executive compensation and firm size. We find that better managers are employed by larger firms, face weaker governance regimes and are paid more, results that are consistent with the model’s predictions. Once again, we find these associations even after controlling for proxies of CEO power (his tenure, age and whether he is externally hired).

The evidence from the three tests taken together provides strong support for our theoretical starting point that competition amongst firms for scarce managerial talent is an important determinant of observed executive compensation and governance practices.

The rest of the paper is structured as follows. Section 2 discusses related literature. Section 3 presents the model. Section 4 presents the empirical evidence for our testable hypotheses. Section 5 presents robustness checks and alternative explanations. Section 6 concludes.

2 Related Literature

The paper is related to a large literature on executive compensation and corporate governance. The neoclassical view is that executive compensation is the solution of the principal-agent problem between a set of risk-neutral investors and a risk-averse
manager (Holmström, 1979). In this setting, pay for performance solves the trade-off between the need to incentivize the manager and the desire to insure him against idiosyncratic risk. According to this view, a firm chooses low- or high-powered compensation packages depending on the relative importance of managerial risk-aversion and incentives. Starting with Jensen and Murphy (1990), skepticism grew among academics on whether this view provides a satisfactory explanation for the recent trends in executive compensation. Two main economic views have been suggested to overcome these limitations and explain executive compensation trends: managerial rent extraction and efficient matching between managerial skills and firm characteristics.

The first explanation links executive compensation to managers’ ability to extract rents (see Bertrand and Mullainathan 2001, Bebchuk and Fried 2004, Kuhnen and Zwiebel 2009). According to this view, weaker corporate governance allows managers to skim profits from the firm, thereby leading to higher executive compensation. Even though this is currently the most popular explanation for the high executive pay, it begs several questions: If better corporate governance is the solution to excessive executive compensation, why don’t all shareholders demand better corporate governance? Moreover, why are CEOs of well-governed firms also paid a lot? In our model, we treat corporate governance as a choice of the firm. We show that better corporate governance could indeed reduce managerial pay. However, competition for managers among firms limits the ability of firms to use corporate governance as an effective tool to reduce managerial rents. Specifically, when there is an active market for scarce managerial talent, firms are forced to choose weaker corporate governance and to leave rents for managers. In this respect, our contribution is to clarify the link between corporate governance, pay for performance and scarcity of managerial talent.

The second explanation relates the level of pay to exogenous heterogeneity in firm size. Gabaix and Landier (2008), Terviö (2008), and Edmans, Gabaix and Landier (2009) present matching models à la Rosen (1981) in which the differences in size across firms predict some of the well documented empirical facts on executive compensation. Gabaix and Landier (2008) and Terviö (2008) show that the empirically
documented positive cross-sectional correlation between firm size and compensation may optimally arise in a setup where managerial talent has a multiplicative effect on firm performance and managers are compensated according to their increase in productivity as better managers will be matched to larger firms. Similarly, Edmans, Gabaix and Landier (2009) present a model in which both the low ownership and its negative correlation with firm size arise as part of an optimal contract. Our model improves on this part of the literature because we treat size as an endogenous variable. In particular, we explore the impact of the extent of real investment on the market for managerial talent and corporate governance. We show that investment size may be a viable way to attract better managers and thereby determine the equilibrium choice of size by firms. We find that indeed firms that invest more will attract better managers but will choose worse corporate governance. Conversely, firms that invest less will attract worse managers and will choose better corporate governance. Within this framework, the recent rise in compensation can be related to changes in the types of managerial skills required by firms. For example, Murphy and Zábojník (2007) argue that CEO pay has risen because of the increasing importance of general managerial skills relative to firm-specific abilities. Supportive evidence is provided by Frydman and Saks (2008). Cremers and Grinstein (2009) 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 model suggests that an increase in competition for managers may be the reason for the large increase in executive compensation over the last three decades.

In our model, managers can be incentivized to behave in the interest of their shareholders through a combination of incentive contracts and corporate governance, where governance acts as a substitute for compensation, as shown by Core et al. (1999) and Fahlenbrach (2009). Fahlenbrach (2009), in particular, 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, Chung (2008) studies the adoption of the Sarbanes-Oxley Act of 2002 and shows that firms required to have more than 50% of outside directors (interpreted as an improvement in shareholder governance) decreased significantly their CEO pay-performance sensitivity relative to the control group.

The paper is also 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 (2009) 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. In a somewhat different context, Nielsen (2006) and Cheng (2009) 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 (2009) shows that earnings management in one firm may cause earnings management in other firms in the presence of relative performance compensation.

3 Theoretical Analysis

The basic idea is that firms compete for managers by choosing governance as part of an optimal incentive contract. In the presence of competition for scarce managerial talent, the only symmetric equilibrium features mixed strategies, whereby firms are indifferent between hiring a better manager and paying him more and hiring a worse manager and paying him less. In this setup, we derive endogenously the optimal choice of governance and firm size.
3.1 Setup of the Model

Consider an economy with \( n \) firms and \( m \) managers. There are two types of managers, \( m_H \) are high-quality, well established managers with a strong track-record (H-type), and \( m_L \) are low-quality, possibly less-experienced managers (L-type): type \( H \) have high productivity \( e_H = 1 \), while type \( L \) have low productivity \( e_L = e < 1 \). We assume that the number of \( L \)-type managers is greater than the number of firms: \( m_L > n \). However, the \( H \)-type managers may or may not be numerous enough to be hired by all firms: in what follows, we will consider the case when \( m_H < n \) so that there is competition for managerial talent. In the extension, we discuss what happens when \( m_H \geq n \) and thus there is no effective competition for managerial talent; we also consider the case in which there are more than two types.

All firms are ex-ante identical and have to make the following decisions (described in Figure 1):

At \( t = 0 \), firms are set up: the founder chooses the level of investment \( I \) at a cost \( rI \), where \( r \geq 1 \) is the gross rate of return demanded by lenders.

At \( t = 1 \), firms choose professional CEOs from a pool of candidates of observable quality \( \tilde{e} \in \{e, 1\} \). Managers are risk averse and have the following utility function:

\[
U = E(w) - \frac{1}{2}A\text{Var}(w)
\]

where \( A \geq 0 \) is the coefficient of absolute risk aversion, \( w \) is the (random) total pay received by the manager. If a manager is not employed at the end of this stage, he receives the reservation utility equal to 0. Similarly, a firm that does not employ any managers receives an output equal to 0.\(^1\)

The founder offers a contract of the following general form: a fixed payment \( b \), which is paid independently of performance (the signing bonus); a performance-related bonus \( p \), which is contingent on the verifiable output \( X \) and paid at \( t = 4 \); and a severance payment \( s \), which is conditional on the manager leaving the firm.

\(^1\)As a tie-breaking assumption, we assume that in case of indifference firms prefer to hire a \( H \)-type manager.
voluntarily at \( t = 3 \). Moreover, as part of the incentive package, at \( t = 1 \) the firm also chooses the level of corporate governance \( g \in [0, 1] \), which comes at a cost \( kIg^2/2 \). The benefit of corporate governance is that it reduces the cost of firing the manager in the future, if shareholders desire to do so, and thus it reduces managerial entrenchment. For instance, governance increases coordination among shareholders and makes board of directors more effective and independent. Specifically, we assume that shareholders receive a fraction \( g \) of the surplus from renegotiation (when the replacement decision is taken at \( t = 3 \)) and the manager a fraction \( 1 - g \).

At \( t = 2 \), managers choose action \( A \in \{M, S\} \), where choice \( M \) generates a payoff \( X = 0 \) for the firm and a private benefit \( B \) for the manager; while action \( S \) generates a payoff \( X = Y(I) \) with probability \( \tilde{e} \) and \( X = 0 \) otherwise, and no private benefits for the manager. The choice of action is not observable by shareholders.\(^4\)

At \( t = 3 \), shareholders and managers observe a signal \( \tilde{x} \in \{Y(I), 0\} \) on the expected output \( X \). After observing this signal, the manager can choose to leave voluntarily, in which case he is paid the severance pay \( s \). Otherwise, he can bargain with the firm, in which case the firm and the manager receive a fraction \( g \) and \( 1 - g \) of the surplus, respectively, as explained earlier. If there is a turnover, a replacement manager produces at \( t = 4 \) an output \( y_T(I) = \delta I \) net of his compensation, where \( \delta \in (0, 1) \).

At \( t = 4 \), output is realized and distributed; and \( p \) is paid.

We make the following technical assumptions:

(i) Types are observable: in the extensions, we consider the case in which types

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\(^2\)In this we follow Almazan and Suarez (2003), who show that severance payments are part of an optimal incentive scheme for managers.

\(^3\)This cost reflects the costs of investing in auditing and information technology to make sure that the board of directors can detect and replace poorly performing managers. It also captures the indirect costs of hiring truly independent directors rather than directors who are better at advising the CEO on strategic decisions.

\(^4\)An alternative interpretation of the \( L \)-type managers is that they are managers with uncertain productivity. With probability \( e \), they are as good as \( H \)-type managers. Otherwise, they produce 0.
are not known by anyone (symmetric information) or are only known by the managers (asymmetric information).

(ii) $k > \delta$: to ensure an internal solution for the choice of governance.

(iii) $e \geq 1 - \frac{1}{\zeta AB}$: to ensure that there is a solution to the incentive problem of the manager.

(iv) $Y(I) > I, Y' > 0, Y'' < 0, \lim_{I \to 0} Y'(I) = \infty, \lim_{I \to \infty} Y'(I) = 1$: to ensure an internal solution for the choice of investment.

(v) The signal $\tilde{x}$ at $t = 3$ is perfectly informative: this assumption can be relaxed without changing the substance of the paper.

3.2 Competition for Managers

To find the equilibrium, we proceed by backwards induction, starting from the replacement of incumbent CEO at $t = 3$.

3.2.1 Severance Payment and Turnover

Firing the CEO generates an output $\delta I < Y(I)$ (from the replacement manager). Hence, the manager will not be fired if $\tilde{x} = Y(I)$. Now, consider the case in which $\tilde{x} = 0$. In this case, since $\delta I > 0$ there is a case for managerial turnover (as without it both the firm and the manager receive a payoff of 0).

If $s \geq (1 - g)\delta I$, there is a voluntary turnover and the manager leaves with the severance pay $s$. If $s < (1 - g)\delta I$, there is a forced turnover but the manager extracts a compensation equal to $(1 - g)\delta I$. We focus on renegotiation-proof contracts. Hence, we restrict the choice of contracts such that $s = (1 - g)\delta I$ must hold in equilibrium. The firm’s payoff if $\tilde{x} = 0$ is therefore $g\delta I$.

3.2.2 Compensation Contract and Corporate Governance

Now consider the firm’s choice of incentive contract and corporate governance at $t = 1$. Given that types are observable, firms offer a menu of contracts $(b_i, g_i, p_i)$ for
each type $i = \{H, L\}$. Each firm advertises two jobs, one for $L$-type managers and one for $H$-type managers. Managers apply for the jobs. After the manager’s choices, firms look at the managers who have accepted their offers. If they have two managers to choose from, they choose whom to employ between the $L$- and the $H$-type who have accepted their offer. If they have only one manager to choose from, they hire him. Managers who are rejected and firms without a manager stay on the market and match in the next round. We assume market clearing happens instantaneously and therefore we ignore discounting.

To solve for the choice of contracts, first we need to derive the manager’s incentive compatibility and participation constraint. Starting with the incentive compatibility condition, if the manager chooses action $A = M$, output always equals 0 and manager’s utility equals

$$U(M) = b_i + (1 - g_i)\delta I + B$$  \hspace{1cm} (2)

If he chooses action $S$, then his utility equals

$$U(S) = b_i + (1 - g_i)\delta I + e_i[p_i - (1 - g_i)\delta I] - \frac{1}{2} Ae_i(1 - e_i) [p_i - (1 - g_i)\delta I]^2$$  \hspace{1cm} (3)

Hence, we can derive the incentive compatibility (IC) condition $U(S) \geq U(M)$ as follows

$$[p_i - (1 - g_i)\delta I] - \frac{1}{2} A(1 - e_i) [p_i - (1 - g_i)\delta I]^2 \geq \frac{B}{e_i}$$  \hspace{1cm} (4)

The corresponding participation constraint (PC) is

$$b_i + (1 - g_i)\delta I + e_i[p_i - (1 - g_i)\delta I] - \frac{1}{2} Ae_i(1 - e_i) [p_i - (1 - g_i)\delta I]^2 \geq \pi_i$$  \hspace{1cm} (5)

where $\pi_i$ is manager’s $i$ reservation utility. It is useful to rewrite the (IC) and (PC) conditions in terms of the net incentive contract $\xi_i \equiv [p_i - (1 - g_i)\delta I]$: the IC condition becomes

$$\xi_i - \frac{1}{2} A(1 - e_i)\xi_i^2 \geq \frac{B}{e_i}$$  \hspace{1cm} (6)

while the PC condition takes the form

$$b_i + (1 - g_i)\delta I + e_i\xi_i - \frac{1}{2} Ae_i(1 - e_i)\xi_i^2 \geq \pi_i$$  \hspace{1cm} (7)
Then, we can solve the second order equation in $\xi_i$ to find the IC-compatible incentive contract

$$\xi_i = \begin{cases} \frac{1-\sqrt{1-2AB \frac{1-e}{B}}}{A(1-e)} \equiv \xi(e) & \text{if } i = L \\ B & \text{if } i = H \end{cases}$$ (8)

Because of the definition of $\xi_i$, the IC condition becomes:

$$p_i \geq (1 - g_i)\delta I + \xi_i.$$ (9)

Given that there are lots of $L$-type managers, their participation constraint is redundant (that is, $\overline{\pi}_L = 0$) and the incentive compatibility condition is strictly binding for the $L$-type managers. Hence,

$$p_L = (1 - g)\delta I + \xi(e)$$ (10)

and $b_L = 0$.

Conversely, because of the scarcity of $H$-type managers, their participation constraint is strictly binding. Thus:

$$p_H + b_H = \overline{\pi}_H \text{ and } p_H \geq (1 - g_H)\delta I + B.$$ (11)

where $\overline{\pi}_H$ is the firm's expectation of the lowest utility that a $H$-type manager receives: in other words, $\overline{\pi}_H$ is the outside option of the worst off $H$-type manager whom the firm could target. Because we focus on symmetric equilibria, all $H$-type managers share the same $\overline{\pi}_H$.

The incentive and participation constraints for the two types of managers are represented in Figure 2 in the space $(g, p)$, where the bonus is set at $b = 0$ without loss of generality. For the $L$ types, the binding constraint is the IC constraint, which is represented as the continuous downward-sloping line IC-L in the figure. The optimal choice of governance is given by the tangency point $(p_L^*, g_L^*)$ between the isocosts of the firms and the IC-L line. The participation contraint is redundant as $\overline{\pi}_L = 0$. For the $H$ types, the IC constraint is the dotted, downward-sloping line in the figure, while the PC constraint is the horizontal, dotted line at $p_H^* = \overline{\pi}_H$. In the case represented in the Figure, the IC constraint is redundant and the best firms can do is to choose $g_H^* = 0$.
Given these considerations, we can prove the following result:

**Lemma 1:** 

(i) If \( u_H \leq (1 - \frac{\delta}{k}) \delta I + B \), then firms prefer to hire a \( H \)-type manager, by offering an incentive contract

\[
(b, g, p) = \left( 0, \frac{\delta}{k}, (1 - \frac{\delta}{k}) \delta I + B \right);
\]

(ii) If \( u_H \in \left( (1 - \frac{\delta}{k}) \delta I + B, (1 - e) Y(I) + e [\delta I + \xi(e)] - \frac{\delta^2 I}{2k} \right) \), then firms prefer to hire a \( H \)-type manager, by offering an incentive contract

\[
(b, g, p) = (0, 0, u_H);
\]

(iii) If \( u_H = (1 - e) Y(I) + e [\delta I + \xi(e)] - \frac{\delta^2 I}{2k} \), then firms are indifferent between hiring a \( H \)-type or a \( L \)-type manager, by offering an incentive contract

\[
(b, g, p) = (0, 0, u_H) \text{ or } (b, g, p) = \left( 0, \frac{\delta}{k}, (1 - \frac{\delta}{k}) \delta I + \xi(e) \right);
\]

(iv) Finally, if \( u_H > (1 - e) Y(I) + e [\delta I + \xi(e)] - \frac{\delta^2 I}{2k} \), then firms prefer to hire a \( L \)-type manager, by offering an incentive contract

\[
(b, g, p) = \left( 0, \frac{\delta}{k}, (1 - \frac{\delta}{k}) \delta I + \xi(e) \right).
\]

**Proof:** See Appendix.

In Figure 3, we show the choice of manager in the space \((I, u_H)\): the case of indifference between hiring an \( H \)- or a \( L \)-type manager is represented by the increasing and concave line \( u_H = (1 - e) Y(I) + e [\delta I + \xi(e)] - \frac{\delta^2 I}{2k} \). Consider two alternative values of \( u_H \). If \( u_H \) is low (\( u_H = u_H^1 \) in the figure), then hiring a \( H \)-type manager is quite cheap and thus all firms, independently of their investment, will do so. If instead \( u_H \) is high (\( u_H = u_H^2 \) in the figure), then hiring a \( H \)-type manager is quite expensive. Therefore, all firms with \( I < \hat{I} \) will be above the indifference curve and would prefer to hire a low quality manager as their reservation value for a \( H \)-type manager is below the other firms. In contrast, a firm with high investment (at a level
\( I > \hat{I} \) in the figure) would prefer to hire the \( H \)-type manager. We have therefore shown that high-investment firms will beat the competition of low-investment firms for \( H \)-type managers. This is akin to the point made by Gabaix and Landier (2008): as in Figure 3, in their model too, larger firms attract better managers and pay them more. Crucially, we also show that larger firms choose lower corporate governance.

### 3.2.3 Choice of Investment

We now analyze the choice of firm’s investment and type:

\[
\max_{(I,\delta)} \Pi_i (I) - rI \tag{12}
\]

We will show that there is no (symmetric) equilibrium in pure strategies. The intuition is as follows: in a pure strategy equilibrium all firms would choose the same investment \( I \), they would hire the \( H \)-type with probability \( m_H/n \) and would be indifferent between hiring a \( H \)-type or a \( L \)-type in equilibrium. However, because the optimal choice of investment for each type of manager is different, firms have an incentive to deviate from the symmetric equilibrium to target a specific type (\( H \) or \( L \)) by choosing the optimal level of investment for that type.

Therefore,

**Proposition 1 (Competition for managerial talent)** The equilibrium is:

(i) with probability \( m_H/n \), firms choose investment equal to

\[ I^*_H = Y'^{-1}(r) \]

and they hire the \( H \)-type managers with contract

\[ (b, g, p) = (0, 0, \overline{u}_H) ; \]

(ii) with probability \( (n - m_H)/n \), firms choose investment equal to

\[ I^*_L = Y'^{-1}\left(\frac{\delta}{e} - \frac{\delta^2}{2ke}\right) \]

and they hire the \( L \)-type managers with contract

\[ (b, g, p) = \left(0, \frac{\delta}{\bar{K}}, (1 - \frac{\delta}{\bar{K}})\delta I + \xi(e)\right) , \]
where
\[
\bar{u}_H = Y(I_{H}^*) - e [Y(I_{L}^*) - \delta I_{L}^* - \xi(e)] - \frac{\delta^2}{2k} I_{L}^* - r (I_{H}^* - I_{L}^*).
\]

**Proof:** See Appendix.

The intuition for this result is as follows. When the quality of the manager is observable, the competition among firms to employ better managers implies that the latter ones appropriate all the additional rents they produce. Given that corporate governance is used by firms to reduce managerial rents, a firm intending to hire a high quality manager will be better off by saving the cost of investing in corporate governance in the first place. Conversely, a firm that is willing to hire a low quality manager faces no competition and can, therefore, keep the manager down to the incentive compatibility constraint. Hence, these firms will choose the optimal level of corporate governance. Because the firms hiring the \(L\)-type managers choose the optimal level of governance, they also choose the optimal level of investment (conditional on hiring \(L\)-type managers). Conversely, the firms hiring the \(H\)-type managers choose a lower investment than optimal because they choose a lower than optimal level of corporate governance.

### 3.3 Extensions

In this section, we briefly discuss three extensions of the basic model. First, we consider the case in which there is no effective competition for managers as the number of \(H\)-type managers is greater than the number of firms. In such case, there is no distortion in the choice of corporate governance and investment. We then consider the impact of different assumptions on the information structure. If there is no information on managerial quality, there is no distortion in the choice of corporate governance and investment. The case in which the managers know their types is instead very different: in such case, governance could be used to separate the better managers.
3.3.1 No competition

In this section we consider the special case in which $m_H \geq n$ and thus there is no effective competition for managerial talent. Given that there are enough managers of both types, the participation constraint is redundant for both types and the incentive compatibility condition is strictly binding. Hence:

**Proposition 2** (No effective competition for managerial talent) *The equilibrium choice of investment is:*

$$I^* = Y^t - 1 \left( \frac{\delta}{2} + r \right).$$

*The corresponding incentive contracts are:*

$$b^* = 0, \quad g^* = \frac{\delta}{k}, \quad p^*_i = \begin{cases} 
(1 - \frac{\delta}{k})\delta I^* + \xi(e) & \text{if } i = L \\
(1 - \frac{\delta}{k})\delta I^* + B & \text{if } i = H 
\end{cases}$$

**Proof:** See Appendix.

This solution can be considered the benchmark (the first-best case) for the analysis that precedes. In particular, when comparing this benchmark to Proposition 1, we obtain that without competition for managerial talent, the $H$-type managers are paid less and work in firms with better governance and larger size; whereas there is no difference for firms that hire the $L$-type managers.

3.3.2 Unknown managerial quality

We have assumed so far that managerial quality is perfectly observable. This is an important assumption but it can be relaxed. The results can be extended to the cases in which there are only imperfect signals about the quality of managers. As long as these signal contain some information, so that the expected productivity of $H$-type managers is strictly greater than the productivity of $L$-type managers, the analysis would be unchanged.

If instead, there are no informative signals about the quality of managers, the results are quite different. In that case, since all managers are ex-ante identical
and they are more than the number of firms \((m_H + m_L > n)\), there is no effective competition for managers. Notice that this happens independently of the size of \(m_H\) compared to \(n\). Hence, the manager’s outside option is equal across types and equal to the reservation utility from being unemployed \((\bar{\pi} = 0)\). The manager’s expected profitability is then
\[
\frac{m_H}{n} + \frac{m_L}{n} \equiv \bar{\pi}
\] (13)

Adapting the analysis done before, we can show the following result:

**Proposition 3 (No information about managerial talent)** The optimal incentive contract is:
\[
b^* = 0, \quad g^* = \frac{\delta}{k}, \quad p^* = (1 - \frac{\delta}{k})\delta I + \xi(\bar{\pi})
\]

and the chosen level of investment is
\[
I^* = Y^{r-1} \left( \frac{\delta}{\bar{\pi}} + \frac{r}{\bar{\pi}} - \frac{\delta^2}{2k\bar{\pi}} \right)
\]

**Proof:** See Appendix.

Notice that the choice of corporate governance is (on average) higher than in the case with known type and competition among firms for scarce managerial talent. The reason is that with no information there is no effective competition. However, the level of investment is higher than optimal if ex post the firm finds out that the manager is a \(L\)-type and lower than optimal if the type is \(H\).

### 3.3.3 Asymmetric information

Let’s assume now that \(\tilde{e}\) is private information of the manager.\(^5\) We can first show that there is no pooling equilibrium with \(g_P < 1\). In fact, if there were one, a firm can marginally increase \(g\) so that to attract the \(H\)-type but not the \(L\)-type managers. Indeed, this is possible since the \(L\)-type manager utility decreases more than the \(H\)-type manager utility for any increase in \(g\). Therefore, this deviation will ensure

\(^5\)For simplicity, in this section we assume that the investment size is fixed.
that this firm will hire an $H$-type manager and so it will increase profits: it comes at an infinitesimal cost but generates a significant increase in the probability of hiring the more productive $H$-type manager (the probability increases from $m_H/n$ to 1). Hence, there is no pooling equilibrium for $g_p < 1$.

If there is a pooling equilibrium it must be with $g_p = 1$. Firms will choose $b^* = 0$ and $p^* = \xi(e) > B$ so that the incentive compatibility for both types is met. For this to be an equilibrium, firms must prefer to bear the cost of such a high governance level at the benefit of being able to attract the $H$-type managers. Otherwise, they could deviate and offer the optimal compensation contract for the $L$ type. Hence, the pooling equilibrium exists only on a subset of parameters (as shown in Proposition 4).

Let’s consider separating equilibria. Intuitively, the $H$ type faces a lower cost of working in a high-governance firm than the $L$-type manager because he never runs the risk of producing $X = 0$ and being replaced. Hence, firms may be able to use corporate governance as a screening device. As before, in equilibrium, firms must be indifferent between hiring the $L$ type with the optimal level of governance ($\frac{\delta}{k}$) and hiring (at least some) $H$ type with a higher than optimal level of governance. The details are in the following result:

**Proposition 4 (Asymmetric information on managerial talent)** There are three cases to distinguish:

(i) if $(1 - e) [Y(I) - \delta I - \xi(e)] \leq (k^2 - \delta^2) \frac{I}{2k}$, there is a separating equilibrium in which a fraction $1 - \frac{m_H}{n}$ of firms choose governance $g^* = \frac{\delta}{k}$ (and hire $L$ types), while a fraction $\frac{m_H}{n}$ chooses $g = \sqrt{\left(\frac{\delta}{k}\right)^2 + \frac{2[Y(I) - \delta I - \xi(e)](1 - e)}{kI}} > \frac{\delta}{k}$ (and hire $H$ types). All firms offer the same incentive contract, $b^* = 0$ and $p^* = \left(1 - \frac{\delta}{k}\right) \delta I + \xi(e)$.

(ii) If $(1 - e) [Y(I) - \delta I - \xi(e)] \in \left((k^2 - \delta^2) \frac{I}{2k}, \frac{n}{m_H} (k - \delta)^2 \frac{I}{2k}\right]$, there is a separating equilibrium in which a fraction $\phi > \frac{m_H}{n}$ of firms choose $g^* = 1$ (and hire a mixture of $H$ and $L$ types) while a fraction $1 - \phi$ chooses $g^* = \frac{\delta}{k}$ (and hire only $L$ types),
where
\[
\phi = \frac{(1 - e) [Y(I) - \delta I - \xi(e)]}{(k - \delta)^2} \frac{2k m_H}{I - n}
\]

All firms offer the same incentive contract

\[b^* = 0 \quad \text{and} \quad p^* = (1 - \frac{\delta}{k}) \delta I + \xi(e)\]

(iii) If \((1 - e) [Y(I) - \delta I - \xi(e)] > \frac{m_H}{m_H} (k - \delta)^2 \frac{1}{2k}\), there is a pooling equilibrium in which the optimal incentive contract is

\[b^* = 0, \quad g^* = 1, \quad p^* = \xi(e)\]

Proof: See Appendix.

This equilibrium highlights the role of corporate governance as a screening mechanism. Increasing their choice of corporate governance above the optimal level, firms ensure that low quality managers will not want to work for them. It is also relevant to highlight that higher-than-optimal level of governance are used purely as a screening mechanism. Given that high quality managers output is always \(Y(I)\) and that their remuneration is taken as given for a firm due to competition among them, firms do not obtain any other benefit from choosing high governance than to screen better managers.

Notice that there is a big difference in the effect of competition between the case with complete and with asymmetric information. In the case with complete information, top quality managers receive a rent and the choice of corporate governance is lower than optimal. On the contrary, the competition for managers in a market with a high degree of information asymmetry produces no managerial rent but an excessively high investment in corporate governance (which is a deadweight cost for society). Which of the two views prevails is an empirical question. Our prior is that CEO talent in our sample is likely to be observable given that we focus on large firms that employ CEOs after a (long) career as executives. As we will show in the next Section, the evidence confirms this prior and is consistent with the benchmark model with observable talent.
4 Empirical Analysis

In this section, we test some of the empirical predictions of our model. First we develop the three main testable implications of the model. Then, we present the empirical methodology. Finally, we discuss our results.

4.1 Empirical Predictions

The model is based on the idea that competing firms with poor corporate governance generate a negative spillover for other firms. Specifically, because of their poor corporate governance, these firms must offer managers more generous pay-for-performance contracts than other firms. The option to work for firms with weaker governance raises the participation constraint for managers and forces all firms to pay managers more.\(^6\)

Hence, our first test is:

**Prediction 1 (Externality in corporate governance):** Executive compensation in a firm is decreasing in the quality of the governance of the firm itself and the governance of its competitors.

Second, a critical assumption in the model is that pay-for-performance and corporate governance are substitute mechanisms to solve an agency problem.\(^7\) Hence, our second test is:

**Prediction 2 (Pay-for-performance and corporate governance):** Firm that have weaker corporate governance themselves or whose competitors have weaker corporate governance should rely more intensively on variable pay (bonuses and stock options) in their executive compensation.

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\(^6\)This follows from the participation constraint after replacing the outside option for a manager who works in firm \(i\), \(\pi_i\) with the IC constraint of a competitor \(j\): \(\pi_i = (1 - g_j)\delta I + B\), which is decreasing in \(g_j\).

\(^7\)Formally, from the IC constraint, \(p_i = (1 - g_i)\delta I + \xi(e_i)\), so that corporate governance \(g_i\) and executive compensation \(p_i\) are substitutes.
The main result of the model is that, in equilibrium some firms will attract better managers by paying them more, choosing more lax governance standards and larger size; others will attract worse managers by paying them less, choosing stricter corporate standards and smaller size. Proposition 2 predicts a negative correlation between corporate governance and managerial talent when different firms compete to attract managerial talent. The model also predicts the positive correlation between size and managerial compensation already documented by Gabaix and Landier (2008). Assuming that we can find a way to measure managerial talent, our main empirical prediction is:

**Prediction 3 (Matching equilibrium):** Better quality managers are matched to firms that are larger, have weaker governance and receive higher pay.

In the remaining part of the section, we discuss the econometric methodology, describe the data and then present the results.

### 4.2 Econometric methodology

To test for the presence of spillover effects in the choice of corporate governance, we regress the total CEO compensation of firm $i$ at the end of year $t$ on a measure of firm $i$’s own corporate governance and on the corporate governance of the firms that constitute the outside option for firm $i$’s CEO. We calculate this outside option as follows: we assume that a current CEO can find a CEO job in another firm of similar size operating in the same Fama-French industry. Further details on how we construct the outside option of each firm’s CEO are provided along with the data description in Section 4.3.

Hence, to test the first prediction, we estimate the following equation:

$$
\text{Compensation}_{it} = \alpha_G \times \text{Governance}_{it} + \alpha_E \times \text{Outside Governance}_{it} + \beta X_{it} + \varphi_i + \lambda_t + \epsilon_{it}
$$

(14)

where $X_{it}$ are time variant firm-specific controls that could affect compensation and $\lambda_t$ and $\varphi_{ind/i}$ are time and either industry or firm dummies, respectively. Our model
would predict that both $\alpha_G$ and $\alpha_E$ should be negative. The first prediction ($\alpha_G < 0$) captures the idea that corporate governance is a substitute for executive compensation. The second prediction ($\alpha_E < 0$) reflects the idea that there is a positive externality in the choice of corporate governance across firms: the firm can pay the CEO less if the outside option is worse. The inclusion of year dummies is to capture any economy-wide time pattern in managerial compensation.

To make sure that the governance channel is independent of the effect of size uncovered by Gabaix and Landier (2008), our time variant firm-specific controls ($X_{it}$) include the firm’s market capitalization. We also control for CEO characteristics (age, tenure and whether the CEO is an external hire) and board composition (its size, the proportion of independent directors and whether the CEO is also the Chairman of the Board). We do so to make sure that our effect is not due to an unobservable variable that captures the power or the influence of the CEO, as argued by Bebchuk and Fried (2004). We control for board size because larger boards are less effective at monitoring CEOs (as argued by Yermack, 1996). Similarly, we control for the fraction of independent directors because firms with more independent directors are more effective at disciplining managers (Weisbach, 1998).

Our second test is to check whether governance is chosen as part of an optimal incentive contract, in particular, as a substitute for executive compensation. For this purpose, we estimate the specification above by replacing a measure of the use of variable pay (the size of bonuses and stock option as a percentage of total compensation) as dependent variable instead than total compensation. As before, our model would predict that both $\alpha_G$ and $\alpha_E$ should be negative.

Finally, to be able to test our main empirical prediction, we need to develop a measure of managerial ability ($\gamma_j$). However, obtaining this measure $\gamma_j$ requires that we take into account both the presence of endogenous manager-firm matching and the low managerial mobility across firms.

For this purpose, we follow Bertrand and Schoar (2003) and Graham, Li and Qiu (2008) and compute the (unobserved) CEO impact on performance, where the latter is measured by return on assets. The idea is to attribute to CEO ability the return
on assets in excess from the value predicted by firm-level and time-varying control variables. More precisely, we estimate

$$ROA_{it} = \beta X_{it} + \delta_t + z_i + \gamma_j + \varepsilon_{it},$$  \hspace{1cm} (15)$$

where $ROA_{it}$ stands for return on assets for firm $i$ in period $t$. Throughout the section, we use superscript $j$ to indicate the manager $j$, $i$ to indicate a firm and $t$ to indicate a year. $X_{it}$ are some time variant firm characteristics that include size, book leverage, cash, interest coverage, dividend earnings, Tobin’s $q$ and governance measures. $\delta_t$ are time fixed effects. $z_i$ are industry (or firm) fixed effects. The parameter $\gamma_j$ is a fixed effect for a CEO, i.e., a dummy variable that takes value one when CEO $j$ works in firm $i$ and zero otherwise. This is our measure of managerial ability as it captures the unobserved (and time invariant) managerial effect on return on assets. There is an important caveat in this analysis: $\gamma_j$ does not capture absolute CEO ability, but CEO ability relative to the industry (or the firm) depending on whether $z_i$ are industry (or firm) fixed effects.

Thus, the crucial identification strategy for our model is that the firm could have attracted any other manager in their industry if it wanted. Cremers and Grinstein (2009) document that most of the managerial mobility takes place within an industry so industry dummies constitute a natural starting point. When deciding between industry or firm dummies, we face a trade off. On the one hand, introducing industry dummies may imply that different unobserved firm characteristics that allow firms to recruit better managers within an industry may distort our results if these unobserved characteristics are related to corporate governance. On the other hand, employing the most encompassing identification of unobserved firm characteristics, i.e., firm fixed effects, implies that managerial talent cannot be estimated when there is no managerial mobility for a given firm. Given these trade-offs, we show results under both specifications.

We use the estimated fixed effects $\hat{\gamma}_j$ as regressors in the following specification:

$$\text{Governance}_{it} = \beta_G \times \hat{\gamma}_j + \chi_t + z_i + \xi_{it},$$  \hspace{1cm} (16)$$

where $\text{Governance}_{it}$ is a measure of corporate governance, $\hat{\gamma}_j$ are the CEO-industry (or CEO-firm) match coefficients estimated from regression (15) and $\chi_t$ and $z_i$ are
time and either industry or firm dummies. Our model would predict $\beta_G < 0$. Time dummies should control for any time pattern in the governance measure while industry and firm dummies control for the average quality of CEOs hired in a given industry or firm. These are crucial for our analysis since we can only analyze governance up to the reference subsample average. Additionally, regression (16) presents a problem of generated regressors. We correct for it by adjusting the weight of each observation by the inverse of the $\hat{\gamma}_j$ standard error from the first-stage estimation.

There are two additional empirical implications of our model: better managers should be paid more. This prediction can be tested in a similar fashion:

$$\text{CEO Compensation}_{it} = \beta_C \times \hat{\gamma}_j + \chi_t + z_i + \varsigma_{it}$$  (17)

with $\beta_C > 0$, where CEO Compensation is measured as Total Compensation, and each of its components (Salary, Bonus, and Stock Options). Moreover, better CEO should work in larger firms:

$$\text{Firm Size}_{it} = \beta_C \times \hat{\gamma}_j + \chi_t + z_i + \varsigma_{it}$$  (18)

with $\beta_C > 0$, where Firm Size is the logarithm of total market capitalization.

To sum up, we test the main prediction of the model by running a within-industry (or within-firm) two-stage analysis. In the first stage, we obtain individual CEO skills relative to the other CEOs employed in the industry (or the firm) from specification (15). In the second stage, we run regressions (16), (17) and (18) to test whether these relative CEOs abilities (compared with the industry or firm) are correlated with corporate governance, CEO compensation and firm size, as predicted by our model.

4.3 Data description

In this section we describe the data used in our empirical tests.

We use firm-level financial variables from Compustat: $ROA$ is the ratio of EBITDA (item $ib$) over lagged total assets (item $at$); $Cash$ is cash and short-term investments (item $che$) over net property, plant, and equipment at the beginning of
the fiscal year (item \texttt{ppent}); \textit{Interest Coverage} is earnings before depreciation, interest, and tax (item \texttt{oibdp}) over interest expenses (item \texttt{xint}); and \textit{Dividend Earnings} is the ratio of the sum of common dividends and preferred dividends (items \texttt{dvc} and \texttt{dvp}) over earnings before depreciation, interest, and tax (item \texttt{oibdp}). We define \textit{Book Leverage} as the ratio of long and short term debt (items \texttt{dltt} and \texttt{dlc}) to the sum of long and short term debt plus common equity (items \texttt{dltt}, \texttt{dlc} and \texttt{ceq}) and Tobin’s \textit{q} as the ratio of firm’s total market value (item \texttt{prcc,f} times the absolute value of item \texttt{csho} plus items \texttt{at} and \texttt{ceq} minus item \texttt{txdb}) over total assets (item \texttt{at}). \textit{Market Cap} is the firm’s total market value (item \texttt{prcc,f} times the absolute value of item \texttt{csho} plus items \texttt{at} and \texttt{ceq} minus item \texttt{txdb}). All variables are winsorized at the 1 percent level.

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 use the 49 Fama-French Industry classification: our final sample includes 36 different industries.

Our principal measure of firm corporate governance is the Gompers et al. (2003) governance index, which we obtain from RiskMetrics. The \textit{G-Index} ranges from 1 to 24 and one point is added for each governance provision restricting shareholders right with respect to managers (for further details see Gompers et al. (2003)). A higher \textit{G-Index} indicates more restrictions on shareholder rights or a greater number of anti-takeover measures. Therefore, a higher value of the \textit{G-Index} corresponds to a lower \textit{g} in our theoretical representations. Hence, all coefficient signs on the empirical predictions using the \textit{G-Index} switch sign with respect to the ones using our theoretical \textit{g} governance measure. To fill the gaps between reported values, we follow Gompers et al. (2003) and assume that any change happens at the end of the missing period.\footnote{We check for robustness by using linear interpolation, finding no significant change in the results.}

One limitation of the \textit{G-Index} is that it measures outside governance, that is the
strength of anti-takeover rules. As such, it is only partly in the control of shareholders as differences in this index may be driven by state legislation. As a complementary proxy for corporate governance we use *CEO Duality*, which is a dummy variable that takes the value 1 if the CEO is also the Chairman of the board. This has been emphasized as an important measure of corporate governance by Fahlenbrach (2009).

As a robustness check, we also control for *Board Size*, which is defined as the logarithm of the number of board members, and the *Fraction of Independent Directors*, which is the proportion of independent directors on the board.

We obtain our measures of executive compensation from ExecuComp focusing on the CEO as the “manager”. We measure *Total Compensation* as natural logarithm of item tdc1. We define as *Pay for Performance* as the ratio of bonuses and stock options (the latter is the natural logarithm of the Black Scholes value of options granted: item option_awards_blk_value) and total compensation, measured in percentage terms.

As control variables, we also use ExecuComp to define: *CEO Tenure* as the difference between the current year and the year the executive became CEO (item becameceo); and *External* as a dummy variable that takes value one if the CEO was not an executive in the firm the year before being appointed as CEO, and zero otherwise.

Summary statistics for all the variables are reported in Table 1. Our dataset spans the period from 1993 to 2007 as this corresponds to the RiskMetrics data availability.

### 4.4 Results

Table 2 tests for the presence of a positive externality in the choice of corporate governance across firms, by estimating specification (14).

To measure a CEO’s outside option in a given year, we need to define the firms he could potentially work for if he is to leave the current firm. We match the firm for which the CEO is currently working with one firm in each of the 49 Fama-French industries, according to their market capitalization. Specifically, we select the two
firms in that industry that are closest in market capitalization to the firm the CEO is currently working for. We then calculate Competitor Governance, using the G-Index scores and the CEO Duality indicator of the two comparable firms.\footnote{As a robustness check, we also calculate this outside option by as the weighted average of the governance indicators in similar-sized firms operating in different industries, where the weights are the CEO-transition probabilities estimated by Cremers and Grinstein (2009). Results are very similar.}

The dependent variable in Table 2 is Total Compensation in firm $i$ in year $t$. In Column 1, we show that, as predicted by our model, firms with weaker governance and in their own and their competitors’ governance (that is, firms having competitors with a higher G-Index in Panel A and higher likelihood of CEO being also the Chairman of the board in Panel B) pay their CEOs more. In other words, a worsening of governance standards in the competitors for managerial talent is costly for the firm (even after controlling for its own governance), as it is associated with higher CEO compensation.

Since we control for market capitalization, the finding that governance matters for executive compensation is not due to spurious correlation with firm size. We confirm the result in Gabaix and Landier (2008) that executive compensation is highly correlated with firm size but we show that the correlation between executive compensation and governance is statistically significant even after controlling for firm size.

The basic results are robust to several changes in specifications. First, as shown in Columns 2, the results do not change when we control for board composition, as measured by the size of the board and the proportion of independent directors. Hence, the effect we are uncovering is not due to other governance variables. While own governance is a strong predictor of executive compensation, according to both governance variables, G-Index seems to have a stronger effect than CEO Duality as far as competitor governance is concern.

Second, in Column 3, results weaken a little but do not change significantly when we control for CEO characteristics. In particular, the effect we are emphasizing is not due to CEO tenure, age or whether the CEO is an external (rather than an internal)
hire. Third, the inclusion of firm fixed effects in Column 4 leads to similar point estimates but no statistical significance. However, this is to be expected given that most of our variables are not changing much over time at the firm level. Finally, the results are robust to different specifications for clustering the standard errors; the table reports standard errors clustered at the firm and at the year level.  

Table 3 offers evidence that governance and pay for performance are substitutes. We estimate the same specification as in Table 2, while using the proportion of flexible pay as a percentage of total pay as a dependent variable. According to the model pay for performance $p$ is decreasing in the quality of corporate governance $g$ of the firm itself and of its competitors. Consistent with the evidence in Fahlenbrach (2009), in Column 1 we find that firm with weaker corporate governance (and thus higher G-Index or CEO Duality) make greater use of pay for performance. We extend Fahlenbrach’s analysis to show that also competitors’ corporate governance matters: if competitors have weaker corporate governance firms pay a larger portion of total compensation in the form of bonuses and stock options.

In Columns 2, we show that the results for the G-Index do not change when we control for board composition, as measured by the size of the board and the proportion of independent directors; while they are no longer statistically significant for CEO Duality. Results do not change in Column 3, where we control for CEO characteristics. In particular, the effect we are emphasizing is not due to CEO tenure, age or whether the CEO is an external (rather than an internal) hire. As in Table 2, the inclusion of firm fixed effects in Column 4 leads to similar point estimates but no statistical significance for G-Index. The coefficient on competitors’ CEO Duality is positive and statistically significant even if firm fixed effects.

\[ \text{In terms of economic magnitude, Table 2, column 2 implies that a one standard deviation higher G-Index is associated with a 5\% higher total compensation for the CEO. A similar increase in the Outside G-Index is associated with a 2.5\% higher total compensation for the CEO. A one point increase in Own CEO Duality is associated with 12\% higher pay; a similar worsening of competitors’ corporate governance is associated with a 6\% increase in total compensation.} \]

\[ \text{In terms of economic magnitude, Table 3, column 2 implies that a one standard deviation higher G-Index is associated with a 1\% greater use of variable pay. A similar increase in the Outside G-Index is associated with a slightly smaller effect. A one point increase in Competitor’s CEO Duality is associated with 1.5\% greater use of pay for performance.} \]
We now turn to the third and main prediction of the model: firms might choose a low level of corporate governance to attract a better manager. To test this prediction, we first need to estimate CEO fixed effects. In Table 4, we show the results from regression (15) with different time dependent regressors ($X_{it}$) and time independent control variables ($z_i$). We report the regression coefficients, information on the overall fitting of the model and some descriptive statistics on the CEO fixed effects obtained. We report the mean, minimum, maximum and standard deviation of the CEO fixed effects to show that CEO choice does indeed matter for firm performance. As one would expect, the distribution of CEO abilities in the specification using industry dummies has higher dispersion than in the specification using firm fixed effects as some of the firm specific components are captured by the CEO ability measures. However, these differences are relatively small, suggesting that within-industry firm differences are well captured by our control variables. The lower managerial talent dispersion could also be a consequence of the additional restrictions the model with firm fixed effects imposes, such as the mean CEO fixed effect being equal to zero.

Table 5 presents the results of regressions (16), (17) and (18). Specifically, we test regression (16) in Columns 1 and 2, regression (17) in Columns 3 and 4, and regression (18) in Column 5. We use Weighted-Least-Squares estimators, where the weights are the inverse of the standard deviation of the CEO fixed effects estimated in the first stage. In panel A, we use specification (1) in Table 4, which controls for industry/year fixed effects, as the first stage regression to estimate the CEO Fixed Effects; while in Panel B we specification (2) in Table 4, which controls for year dummies and firm fixed effects, as the first stage regression to estimate the CEO Fixed Effects. Additionally, in all regressions we control for CEO characteristics (CEO tenure, age and external dummy).

First, in Columns 1 and 2 we focus on the main empirical prediction of our paper: the relation between corporate governance and managerial ability. To undertake this test, we use the G-Index and CEO Duality as dependent variables. We use the CEO fixed effects obtained in the 2 different specifications of regression (15) as independent variables across the different panels. The results in Panel A are statistically significantly different from zero: as predicted by the model: increases in
managerial quality are indeed associated with decreases in governance. In Panel B, statistical significance is lost. The likely reason is that firm fixed effects absorb most of the cross-sectional variation in the governance variables.

In Column 3 and 4, we report the correlations between managerial talent (as proxied by the CEO fixed effect) and total compensation and pay for performance. Overall, we find strong support for our empirical prediction that better managers are paid more, and that they are paid more in the form of flexible pay (bonuses and options).

In terms of economic magnitude, Table 5 panel A implies that holding all else constant, one standard deviation increase in CEO talent (which correspond to an increase by 0.1216 according to Table 4) implies a 0.4 point increase in G-Index (or decrease in governance), a 6% increase in the probability of CEO Duality, and a 12% increase in flexible pay.

In Column 5, we also confirm that better CEOs work in larger firms, as argued by Gabaix and Landier (2008).

Overall, these results provide evidence that better managers are paid more and are associated with companies with weaker corporate governance, consistent with our model.

5 Discussion

5.1 CEO power and governance

In our model, governance is chosen by firms as part of an optimal compensation arrangement taking account also the governance choices of other firms. Weak governance arises in the model as a mechanism for attracting better CEOs. This is consistent with the models by Almazan and Suarez (2003) and Marino and Zabojnik (2008), and the evidence in Rajan and Wulf (2006). Almazan and Suarez (2003) show that under certain conditions, shareholders find it optimal to relinquish some power to the CEO in order to save on the overall compensation costs. Marino and Zabojnik
(2008) argue that perks may be part of an efficient incentive scheme when there are complementarities between consumption of perks and managerial effort. Rajan and Wulf (2006) consider a broad range of perks that are offered to CEOs and divisional managers and provide evidence that perks are used to enhance productivity.

A plausible alternative is that weak governance is not chosen by firms but is in fact an outcome of influence exercised by entrenched CEOs over time, a view that is consistent with Hermalin and Weisbach (1998) and Bebchuk and Fried (2004). To alleviate the concerns that CEO power and influence are the missing variables that explain the correlation between pay and governance, we control for CEO characteristics and board composition in Tables 2 and Table 3. Moreover, in Table 5, we show that those CEO to get entrenched are more likely to be of higher quality, which is not necessarily value destroying for shareholders.

5.2 Compensation versus governance trade-off

A key feature of our model is the assumption that there is a trade-off each firm faces in providing incentives to managers through pay and through stronger governance. If the costs of designing and enforcing governance were relatively low, such trade-off would not have much bite. At a fundamental level though, such costs are at the heart of agency problems due to separation of ownership and control. Acharya and Volpin (2010) model such costs as arising due to the dispersed nature of ownership of firms. Intuitively, each owner does not internalize the full benefit of her investment in monitoring or information generation and thereby incentives to govern are weak. The owners may choose delegated monitors, e.g., Board of Directors, but this delegation involves its own set of monitoring needs and agency problems. Conversely, if firms were financially constrained, then the costs of providing incentives through pay might become enormously high relative to costs of governance.

While we did not fully explore the relative costs of pay and governance in setting optimal compensation arrangements, this seems to be a fruitful avenue for further research. In particular, it would be interesting to test if the governance externality we have highlighted is even more perverse in financially constrained firms. Such firms
cannot afford to raise their CEO pay in response to weak governance of competitors, and must weaken their governance as well. As Acharya and Volpin (2010) point out, this may render these firms even more financially constrained, precipitating their exit (or precluding their entry in the first place). Studying financially constrained firms may thus also help investigate the full efficiency costs of firms being forced by the labor market to pick weak governance while hiring better talent.

5.3 Implications for regulation of corporate governance

Finally, it is interesting to consider implications of our model and results for regulation of governance. At a direct level, it provides a rationale for why governance standards might help. It would prevent firms from weakening governance too much for luring better managers and thereby allow all firms to retain stronger governance practices. In equilibrium, this would imply lower reservation wages for top management. As discussed above, when firms are financially constrained, this can free up pledgeable cash flows, lead to greater external financing and investments, and potentially even greater entry of new firms.

However, our model and results are not structurally calibrated to provide a firm recommendation on what this level of governance standards might be. Indeed, if they were picked to be too high, the ability of firms to use pay for providing incentives would get curbed excessively and the governance costs might in themselves reduce pledgeable cash flows and ability to invest. Subject to this important caveat, since the weak governance in our model is an outcome of externality and coordination problem between firms, it provides a more reasonable justification for governance regulation than one that is based on according greater contracting powers to regulators relative to investors.

6 Conclusion

In this paper, we theoretically explored the joint role played by corporate governance and competition among firms to attract better managers. In our principal agent prob-
lem, there are two ways to induce the manager to make the right decision: paying compensation in case of better performance and investing in corporate governance to punish managers if things go badly. We showed that when managerial ability is observable and managerial skills are scarce, competition among firms to hire better managers implies that in equilibrium firms will choose lower levels of corporate governance. Intuitively, the result follows from the fact that managerial rents cannot be influenced by an individual firm but instead are determined by the value of managers when employed somewhere else. Hence, if a firm chooses a high level of corporate governance, the remuneration package will have to increase accordingly to meet the participation constraint of the manager. It is therefore firms (and not managers) that end up bearing the costs of higher corporate governance with little benefit.

We provided novel empirical evidence supporting our model. Consistent with the presence of externality in corporate governance, executive compensation in a given firm is decreasing in the quality of firm’s own corporate governance as well as in the governance of a matched competitor firm. In support of the assumption that executive compensation and corporate governance are chosen as part of an optimal compensation package, executive compensation changes significantly when a new CEO is hired only if corporate governance is changed at the same time. Finally, the allocation of CEOs and firms is consistent with the model: we provided an empirical measure of managerial talent and found it is negatively correlated with indicators of corporate governance.

Our finding that corporate governance affects the matching between managers and firms has important implications for the debate on executive pay and 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. A notable exception is the link between governance and performance found in firms owned by private equity: Private equity ownership features strong corporate governance, high pay-for-performance but
also significant CEO co-investment, and superior operating performance.\textsuperscript{12} Since private equity funds hold concentrated stakes in firms they own and manage, they internalize better (compared, for example, to dispersed shareholders) the benefits of investing in costly governance. Our model and empirical results can be viewed as providing an explanation for why there exist governance inefficiencies in firms that private equity can “arbitrage” through its investments in active governance.

\textsuperscript{12}See, for example, Jensen (1989) for theoretical argument, Kaplan (1989) for evidence on operational improvements due private equity ownership in early wave of leveraged buyouts (LBOs), and Acharya, Hahn and Kehoe (2008) on the LBOs during 1995 to 2005 (in the U.K. and the Western Europe).
Appendix

Proof of Lemma 1: First, consider the probability of hiring each type of manager. The probability of hiring an $L$-type manager if the firm would like to do so is $1$ as there are more $L$-type managers than firms. Let $\gamma$ be the probability of hiring a $H$-type manager for a representative firm with a given $g$ and $I$: this probability is the product of two components. First, the firm needs to prefer hiring a $H$-type (and incentivize him) rather than a $L$-type: assuming that $b_H = 0$ this happens if

$$(1 - e) Y(I) + e(1 - g)\delta I + e\xi(e) \geq p_H \geq (1 - g)\delta I + B$$

Second, the $H$-type must be applying to the job posted by the specific firm: if we define as $\chi$ such probability, then $\chi$ will be a function of the bonus $p_H$, the outside option $\bar{\pi}_H$:

$$\chi = \begin{cases} 
1 & \text{if } p_H > \bar{\pi}_H \\
\kappa \in (0, 1) & \text{if } p_H = \bar{\pi}_H \\
0 & \text{if } p_H < \bar{\pi}_H
\end{cases}$$

In other words:

$$\gamma = \begin{cases} 
1 & \text{if } p_H \in (\max\{\bar{\pi}_H, B + (1 - g)\delta I\}, (1 - e) Y(I) + e(1 - g)\delta I + e\xi(e)] \\
\kappa \in (0, 1) & \text{if } p_H = \bar{\pi}_H & \bar{\pi}_H \in [B + (1 - g)\delta I, (1 - e) Y(I) + e(1 - g)\delta I + e\xi(e)] \\
0 & \text{otherwise}
\end{cases}$$

(A1)

Firms can affect $\gamma$ via their choice of $p_H$ and $g$. Hence, they face the following problem:

$$\max_{\gamma, p_H, g} \{\gamma (1 - \gamma) e Y(I) - e (1 - \gamma) (1 - g)\delta I + (1 - \gamma) (1 - g)\delta I - \gamma p_H - (1 - \gamma) e\xi(e) - k \frac{g^2}{2} I\}$$

subject to (A1). Notice that the objective function is strictly decreasing in $p_H$. If $\bar{\pi}_H > (1 - e) Y(I) + e\xi(e) + e(1 - g)\delta I$, then $H$-types are too expensive: thus $\gamma^* = 0$ and $p_H$ is irrelevant, with profits $e [Y(I) - \delta I - \xi(e)] + \frac{g^2}{2} I$. If $\bar{\pi}_H \in ((1 - g)\delta I + B, (1 - e) Y(I) + e(1 - g)\delta I + e\xi(e)]$, there are three subcases to compare: (i) $\gamma^* = 0$ & $g^* = \frac{\kappa}{2} I$, with profits $e [Y(I) - \delta I - \xi(e)] + \frac{g^2}{2} I$; (ii) $p_H = \bar{\pi}_H$, with profits $\kappa [Y(I) - \bar{\pi}_I] + (1 - \kappa) e [Y(I) - \delta I - \xi(e)] + (1 - \kappa) g\delta I - \frac{k \bar{\pi}_I^2}{2}$ [in this case, the optimal choice of governance is $g = \frac{(1 - \kappa) Y(I)}{(1 - \kappa)\delta I}$ (from first order conditions)]; and (iii) $p_H = \bar{\pi}_H + e$ for $\epsilon > 0$ small, with profits $Y(I) - \bar{\pi}_I$ and $g^* = 0$. If $\bar{\pi}_H \leq (1 - g)\delta I + B$, there are the same three subcases as before with the only change that in case (iii) $p_H = (1 - g)\delta I + B$ and thus $g^* = \frac{\kappa}{2}$, with profits $Y(I) - \delta I - B + \frac{\kappa^2}{4} I$.

Notice that the intermediate case is always dominated as

$$\{\kappa (1 - \kappa) e Y(I) - \kappa \bar{\pi}_I - (1 - \kappa) e\xi(e) + (1 - \kappa) \left(\frac{(1 - \kappa) \delta I}{k} - e\right)\delta I \}$$

< $\max\{Y(I) - \bar{\pi}_I, e [Y(I) - \delta I - \xi(e)] + \frac{\kappa^2}{2} I\}$

Hence, firms prefer to hire $H$-type managers if $\bar{\pi}_H < (1 - e) Y(I) + e[\delta I + \xi(e)] - \frac{\kappa^2}{2k} I$, $L$-type managers if $\bar{\pi}_H > (1 - e) Y(I) + e[\delta I + \xi(e)] - \frac{\kappa^2}{2k} I$ and are indifferent if $\bar{\pi}_H = (1 - e) Y(I) + e[\delta I + \xi(e)] - \frac{\kappa^2}{2k} I$. The corresponding optimal incentive contract is:

$$(b, g, p) = \begin{cases} 
(0, \frac{\kappa}{k}, (1 - \frac{\kappa}{k}) \delta I + \xi(e)) & \text{if } \bar{\pi}_H > (1 - e) Y(I) + e[\delta I + \xi(e)] - \frac{\kappa^2}{2k} I \\
(0, 0, \bar{\pi}_I) & \text{if } \bar{\pi}_H = (1 - e) Y(I) + e[\delta I + \xi(e)] - \frac{\kappa^2}{2k} I \\
(0, \frac{\kappa}{k}, (1 - \frac{\kappa}{k}) \delta I + B) & \text{if } \bar{\pi}_H \in ((1 - \frac{\kappa}{k}) \delta I + B, (1 - e) Y(I) + e[\delta I + \xi(e)] - \frac{\kappa^2}{2k} I) \\
(0, 0, \bar{\pi}_I) & \text{if } \bar{\pi}_H \leq (1 - \frac{\kappa}{k}) \delta I + B
\end{cases}$$
with corresponding profit is:

\[
\Pi(I, \pi_H) = \begin{cases} 
  e[Y(I) - \delta I - \xi(e)] + \frac{\delta^2 I}{2k} & \text{if } \pi_H > (1 - e)Y(I) + e[\delta I + \xi(e)] - \frac{\delta^2 I}{2k} \\
  Y(I) - \pi_H & \text{if } \pi_H \in \left( (1 - \frac{e}{2})\delta I + B, (1 - e)Y(I) + e[\delta I + \xi(e)] - \frac{\delta^2 I}{2k} \right) \\
  Y(I) - \delta I - B + \frac{\delta^2 I}{2k} & \text{if } \pi_H \leq (1 - \frac{e}{2})\delta I + B 
\end{cases}
\]

\[
\blacksquare
\]

**Proof of Proposition 1:** First, we will prove by contradiction that there is no symmetric equilibrium in pure strategies. Then, we will build the unique symmetric equilibrium in mixed strategies.

As shown in Lemma 1, a symmetric pure strategy equilibrium (where all firms choose the same \( I \)) requires that \( \pi_H = (1 - e)Y(I) + e[\delta I + \xi(e)] - \frac{\delta^2 I}{2k} \). Otherwise, all firms will strictly prefer either the \( H \)- or the \( L \)-types and this cannot be an equilibrium because: (i) if all firms prefer the \( H \)-types, there are not enough of them to hire; (ii) if all firms prefer the \( L \) type, \( \pi_H = 0 \) and so all firms would deviate and hire the \( H \)-type. In a symmetric equilibrium each firms would hire a \( H \) type with probability \( \frac{m_H}{n} \). Hence, if \( \pi_H = (1 - e)Y(I) + e[\delta I + \xi(e)] - \frac{\delta^2 I}{2k} \), the problem becomes:

\[
\max_I \frac{m_H}{n} [Y(I) - \pi_H] + \left( 1 - \frac{m_H}{n} \right) \left( e[Y(I) - \delta I - \xi(e)] + \frac{\delta^2 I}{2k} \right) - rI
\]

The solution is:

\[
I^* = Y^{r-1} \left( \frac{r + (1 - \frac{m_H}{n}) e\delta - \left( 1 - \frac{m_H}{n} \right) \frac{\delta^2}{2k}}{\frac{m_H}{n} + (1 - \frac{m_H}{n}) e} \right) = I_H
\]

For this to be an equilibrium, \( \pi_H = (1 - e)Y(I_H) + e[\delta I_H + \xi(e)] - \frac{\delta^2 I_H}{2k} \). However, suppose that all firms choose the above \( I \). Then, a firm will have an incentive to deviate to \( I = I'_H \), where \( I'_H = Y^{r-1}(r) \), as this strategy would lead to an increase in profits. The argument is as follows. First, we need to analyze which type of manager this firm will hire. As shown in Figure 3, a firm with higher \( I \) will beat the competition for the \( H \)-type manager. Hence, if all firms choose \( I_H \) and one firm deviates to \( I = I'_H \), this firm will hire the \( H \)-type manager for sure. Second, we need to show that this deviation increases profits. Since profits obtained by the firm if the \( H \)-type manager is hired are maximized for \( I = I'_H \), we know that this deviation increases profits from the proposed symmetric equilibrium when the \( H \)-type is hired. Because the profits from hiring the \( H \)-type manager are equal to the profit of hiring the \( L \)-type manager (in the proposed symmetric equilibrium), the profit with \( I_H \) are smaller than with the suggested deviation to \( I = I'_H \). Hence, there is no equilibrium in symmetric strategies.

We will now present an equilibrium in which firms choose different \( I \), and as a consequence target different managers with different incentive packages. The discussion above suggests an symmetric equilibrium in mixed strategies in which a fraction \( \mu \) of firms target the \( H \)-type managers by choosing \( I = I'_H \), where \( I'_H = Y^{r-1}(r) \), and the remaining ones target \( L \)-type managers by choosing \( I = I'_L \), where \( I'_L = Y^{r-1}(\delta + \frac{r}{e} - \frac{\delta^2}{2ke}) \). For this to be an equilibrium, the profits from the two strategies must be the same, that is

\[
\pi_H = Y(I'_H) - e[Y(I'_L) - \delta I'_L - \xi(e)] - \frac{\delta^2 I'_L}{2k} - r(I'_H - I'_L)
\]

Moreover, we need to ensure that the equilibrium is time consistent. It could be that under the choices of \( I \) defined above, firms would end up not hiring the managers stated by the proposition. This could happen because at \( t = 1 \) the choice of \( I \) is sunk. From Lemma 1 we know that the firms
who are supposed to hired the L-type will do so if \( \pi_H > (1 - e) Y(I_H^L) + e [\delta I_H^L + \xi(e)] - \frac{\delta^2 I_H^L}{2k} \). Notice that \( I_H^* > I_L^* \) since \( r \geq 1 + \delta + \frac{\xi}{e} - \frac{\delta^2}{2k} \). Given the equilibrium condition on \( \pi_H \), this requires

\[
Y(I_H^*) - Y(I_L^*) > r (I_H^* - I_L^*)
\]

This is satisfied since for continuous function: \( \frac{Y(I_H^*) - Y(I_L^*)}{I_H^* - I_L^*} = Y'(\tilde{I}) \) for some \( \tilde{I} \in [I_L^*, I_H^*] \) and given the definition of \( I_H^* \) and \( I_L^* \), \( Y'(\tilde{I}) \in (r, \delta + \frac{\xi}{e} - \frac{\delta^2}{2k} \). Hence, \( \frac{Y(I_H^*) - Y(I_L^*)}{I_H^* - I_L^*} > r \).

The firms that are supposed to hire the H type will do so if \( \pi_H < (1 - e) Y(I_H^*) + e [\delta I_H^* + \xi(e)] - \frac{\delta^2 I_H^*}{2k} \). Given the equilibrium condition on \( \pi_H \), this requires

\[
e [Y(I_H^*) - Y(I_L^*)] < r (I_H^* - I_L^*) + e \delta (I_H^* - I_L^*) - \frac{\delta^2 (I_H^* - I_L^*)}{2k}
\]

or

\[
\frac{Y(I_H^*) - Y(I_L^*)}{I_H^* - I_L^*} < r + \frac{\delta^2}{2k}
\]

which is satisfied since \( \frac{Y(I_H^*) - Y(I_L^*)}{I_H^* - I_L^*} = Y'(\tilde{I}) \in (r, \delta + \frac{\xi}{e} - \frac{\delta^2}{2k} \). ■

**Proof of Proposition 2:** The firm’s profit can be written as:

\[
P_I = \begin{cases} 
  e \{ Y(I) - \delta I \} - e \xi(e) + g_L \delta I - r I - \frac{k I g_H^2}{2} & \text{if } i = L \\
  Y(I) - \delta I - B + g_L \delta I - r I - \frac{k I g_H^2}{2} & \text{if } i = H
\end{cases}
\]

Notice that the optimal choice of governance is independent of the manager’s type: from the first order condition, \( g_L = g_H = \frac{\delta}{k} \). Also notice that the profits are strictly greater with \( i = H \). Hence, all firms hire H-types and the optimal incentive contract is:

\[
b^* = 0, \quad g^* = \frac{\delta}{k}, \quad p^*_I = \begin{cases} 
  (1 - \frac{\delta}{k}) \delta I + \xi(e) & \text{if } i = L \\
  (1 - \frac{\delta}{k}) \delta I + B & \text{if } i = H
\end{cases}
\]

with a profit \( P(I) = Y(I) - \delta I - B + \frac{\delta^2}{2k} I - r I \). At \( t = 0 \), the founder chooses \( I \) to maximize the expected profits:

\[
\max_I Y(I) - \delta I - B + \frac{\delta^2}{2k} I - r I
\]

so we can solve for the optimal level of investment using the first order condition \( I^* : Y'(I^*) = \delta \left(1 - \frac{\delta}{2k}\right) + r \). ■

**Proof of Proposition 3:** As before, the severance payment is \( s = (1 - g) \delta \). If the manager chooses action \( A = M \), output will always equal 0 and his utility equals

\[
U_M(M) = b + (1 - g) \delta I + B
\]

If he chooses action \( S \), then his utility equals

\[
U_M(S) = b + (1 - g) \delta I + \tau [p - (1 - g) \delta I] - \frac{1}{2} A (1 - \tau) [p - (1 - g) \delta I]^2
\]

Hence, we can derive the incentive compatibility condition \( U_M(S) \geq U_M(M) \) as follows

\[
[p - (1 - g) \delta I] - \frac{1}{2} A (1 - \tau) [p - (1 - g) \delta I]^2 \geq \frac{B}{\tau} \quad (A2)
\]
The corresponding participation constraint is
\[ b + (1 - g)\delta I + \tau[p - (1 - g)\delta I] - \frac{1}{2}A\tau(1 - \tau)|p - (1 - g)\delta I|^2 \geq 0 \] \hspace{1cm} (A3)

At \( t = 1 \), the founder chooses \( p \) to minimize the incentive pay subject to the incentive compatibility condition (A2) and participation constraint (A3):
\[ \min_{(b,g,p)} b + (1 - g)\delta I + \tau[p - (1 - g)\delta I] - \frac{kg^2 I}{2} \]
s.t. (A2) and (A3)

Given that there are enough managers of both types, there is no competition for them. Since any contract offered to a manager must give them utility equal to, at least, \( B > 0 \), to ensure they do not choose \( A = M \), the participation constraint is redundant and the incentive compatibility condition is strictly binding for both managers. Given this, we can write the incentive compatibility condition as
\[ \xi - \frac{1}{2}A(1 - e)\xi^2 = \frac{B}{e} \]
where \( \xi = |p - (1 - g)\delta I| \). By solving this second order equation in \( \xi \), we find that
\[ \xi = \frac{1 - \sqrt{1 - 2AB\frac{1}{A(1 - e)}}}{A(1 - e)} \equiv \xi(\tau) \]
This implies that:
\[ p = (1 - g)\delta I + \xi(\tau) \]
and the associated profit is:
\[ \Pi_i = \tau[Y - \delta I] - \tau\xi(\tau) + g\delta I - rI - \frac{kg^2 I}{2} \]
Governance is chosen to maximize this expression:
\[ g^* = \frac{\delta}{k} \]
At \( t = 0 \), the founder chooses \( I \) to maximize the expected profits:
\[ \max_I \tau[Y - \delta I] - \tau\xi(\tau) + \frac{\delta^2 I}{2k} - rI \]
so we can solve for the optimal level of investment using the first order condition \( I^* : Y'(I^*) = \delta \left(1 - \frac{\delta}{2k}\right) + \frac{\delta}{2} \).

Proof of Proposition 4: First, suppose that all companies choose the same \( g, p \) and \( b \), with \( g \neq 1 \) Firms could increase profits by raising \( g \) and therefore ensuring that they will hire an \( H \)-type manager. Hence, only \( g = 1 \) could be part of a pooling equilibrium. If this is the case, firms will choose \( b^* = 0 \) and \( p^* = \xi(e) > B \) so that the incentive compatibility for both types is met. For this to be an equilibrium, it must be that the expected profit from choosing the pooling equilibrium
\[ \left[ \frac{m_H}{n} + e\left(1 - \frac{m_H}{n}\right) \right][Y(I) - \xi(e)] + \left(1 - \frac{m_H}{n}\right)(1 - e)\delta I - \frac{k}{2}I - rI \]
exceeds the profit from deviating and hiring a \( L \) type (with the optimal compensation package):
\[ e[Y(I) - \delta I - \xi(e)] + \frac{\delta^2 I}{2k} - rI. \]
This happens if

\[(1 - e) [Y(I) - \delta I - \xi(e)] > \frac{n}{m_H} (k - \delta)^2 \frac{I}{2k}\]

Is there a separating equilibrium? Firms with the same \(g\) will never be able to perfectly separate types by offering different compensation packages \((b_H, p_H)\) and \((b_L, p_L)\) as the unemployed managers will always prefer \((b_H, p_H)\) rather than staying unemployed. Hence, suppose that, in the first period, some firms choose \(g_1\) while others choose \(g_2\) and, without loss of generality, \(g_1 > g_2\). For expositional purposes, we will call firms choosing \(g_1\) type 1 firms and firms choosing \(g_2\) type 2 firms, respectively; even if they are ex-ante identical. Then, in the second stage, many possibilities can happen.

Suppose that \(p_1 < p_2\). If this is indeed the case, type 2 firms offer a contract that is strictly better for all types of managers so firms will be unable to separate the managers. Therefore, the probability of hiring an H-type manager will be \(\mu\). This is clearly not optimal since playing this strategy has higher costs compared to mimic type 1 firms at no benefit.

Suppose that \(p_1 > p_2\). In this case, type 2 firms will only attract the L-type managers and will therefore choose the optimal level of \(g\), \(p\) and \(b\). If the proportion of companies choosing \(g_1\) and \(p_1\) is smaller than \(\frac{m_H}{n}\), this implies that companies choosing \(g_2\) have a chance to hire H-type managers. Therefore, a firm in this group will find it profitable to marginally increase \(g\) and therefore ensure they hire an H-type manager. If the proportion of companies choosing \(g_1\) and \(p_1\) is equal to \(\frac{m_H}{n}\), this cannot be an equilibrium since type 1 firms have no reason to choose \(p_1 > p_2\). If they choose \(p_1 = p_2\), they still attract only the H-type managers (recall that \(g_1 > g_2\)) and their profit increases.

If the proportion of companies choosing \(g_1\) and \(p_1\) is higher than \(\frac{m_H}{n}\), this implies that companies choosing \(g_1\) have a chance to hire L-type managers. Therefore, for any \(g_1\) and \(p_1\), a type 1 firm will find it profitable to marginally increase \(g\) so that they hire an H-type manager for sure.

Therefore, in equilibrium, \(p_1 = p_2 \equiv p\). In this case, type 2 firms will only attract the L-type managers and will therefore choose the optimal level of \(g\), \(p\) and \(b\). We also know that type 1 firms’ strategy should lead to the same profit. Given the contracts above, the profit from hiring the L type with the optimal level of governance is:

\[e[Y(I) - \delta I - \xi(e)] + \frac{\delta^2}{2}\frac{I}{k} - rI\]

while the profits from hiring a H type with a higher than optimal level of governance (\(\overline{g}\)) is

\[Y - \left(1 - \frac{\delta}{k}\right) \delta I - \xi(e) - k\frac{\overline{g}^2I}{2} - rI\]

We find \(\overline{g}\) by equating the two profits:

\[\overline{g} = \sqrt{\left(\frac{\delta}{k}\right)^2 + \frac{2[Y(I) - \delta I - \xi(e)](1 - e)}{kI}}\]

Since \(g \leq 1\), the separating equilibrium described above exists only if

\[(1 - e) [Y(I) - \delta I - \xi(e)] \leq (k^2 - \delta^2) \frac{I}{2k}\]

If \((1 - e) [Y(I) - \delta I - \xi(e)] \in \left\{(k^2 - \delta^2) \frac{I}{2k}, \frac{n}{m_H} (k - \delta)^2 \frac{I}{2k}\right\}\), there is no pooling equilibrium and no perfectly separating equilibrium. In equilibrium firms must be indifferent between choosing \(g = \frac{\delta}{k}\) and attracting (at least some of) the H types and choosing \(g = \frac{\delta}{k}\) and attracting only L types. For this to happen, let \(\phi\) be the fraction of firms choosing the first strategy. It must be that the expected utility choosing \(g = 1\)

\[\left[\frac{m_H}{\phi n} + e \left(1 - \frac{m_H}{\phi n}\right)\right][Y(I) - \xi(e)] + \left(1 - \frac{m_H}{\phi n}\right)(1 - e) \delta I - \frac{k}{2}I - rI\]
must equal the expected utility choosing \( g = \frac{\delta}{k} \)

\[
\delta [Y(I) - \delta I - \xi(e)] + \frac{\delta^2}{2k} I - rI
\]

For this equality to hold \( \phi = \frac{(1-e)[Y(I) - \delta I - \xi(e)]}{(k-\delta)^2} \frac{2k}{T} \sum_{m=1}^{M} \frac{m^2}{n} \).
References


Figure 1: Timeline.

0 1 2 3 4 $t$

Firm setup: choice of size $I$.

Competition for managers:
- Each firm offers incentive package $(b, g, p, s)$.
- Managers choose which offer to accept.

Managerial decision: choice of action $A \in \{M, S\}$.

Replacement decision:
- Current managers can be replaced with new ones, who produce output $\delta I$.
- Firms' bargaining power in case of replacement is $g$.

Final payoffs: Output is produced and wages are paid.
Figure 2: Competition for managers.
Figure 3: Choice of manager’s type.
Table 1. Summary Statistics.
This table presents the summary statistics for the variables used in the empirical section. Return on Assets is the ratio of operating cash flow over lagged total assets. Book Leverage is the ratio of long and short term debt to the sum of long and short term debt plus common equity. Cash is the sum of cash and short-term investments over net property, plant, and equipment at the beginning of the fiscal year. Interest Coverage is earning before depreciation, interest, and tax over interest expenses. Dividend earnings is the sum of common dividends and preferred earnings over earning before depreciation, interest, and tax. Tobin’s q is the ratio of firm’s total market value over total assets. Market Cap is the firm market capitalization. GIM-Index is the Gompers et al. (2003) governance index. CEO Duality is a dummy variable that takes value one if the CEO is also the Chairman on the board, zero otherwise. Total Comp is the logarithm of CEO total compensation. Pay for Performance is the proportion of variable pay (bonuses and stock options) over total pay in percentage. Board Size is the logarithm of the number of board members. Fract Indep is the proportion of independent directors that sit in the board. CEO Tenure is the difference between the current year and the year the executive became CEO and CEO Age is the age of the CEO. The sample consists of 10126 firm-year observations that correspond to 2610 different CEOs and 1551 different firms, covering the period from 1992 to 2008. CEO Age and CEO Tenure is only available for 7623 observations and directors data (which is needed to define Board Size, Duality and Fraction of Independent directors) is only available from 1996.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>0.051</td>
<td>0.097</td>
<td>-0.470</td>
<td>0.319</td>
</tr>
<tr>
<td>Book Leverage</td>
<td>0.361</td>
<td>0.249</td>
<td>0</td>
<td>1.329</td>
</tr>
<tr>
<td>Cash</td>
<td>0.949</td>
<td>2.780</td>
<td>0.001</td>
<td>40.827</td>
</tr>
<tr>
<td>Interest Coverage</td>
<td>51.154</td>
<td>184.598</td>
<td>-31.232</td>
<td>1545.536</td>
</tr>
<tr>
<td>Dividend Earnings</td>
<td>0.082</td>
<td>0.104</td>
<td>-0.061</td>
<td>0.615</td>
</tr>
<tr>
<td>Tobin’s q</td>
<td>1.906</td>
<td>1.202</td>
<td>0.737</td>
<td>9.181</td>
</tr>
<tr>
<td>Market Cap.</td>
<td>8.071</td>
<td>1.516</td>
<td>4.474</td>
<td>12.272</td>
</tr>
<tr>
<td>G-Index</td>
<td>9.415</td>
<td>2.624</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>CEO Duality</td>
<td>0.653</td>
<td>0.175</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total Comp.</td>
<td>7.827</td>
<td>1.027</td>
<td>4.738</td>
<td>9.864</td>
</tr>
<tr>
<td>Pay for Performance</td>
<td>68.761</td>
<td>22.693</td>
<td>0</td>
<td>99.897</td>
</tr>
<tr>
<td>Board Size</td>
<td>2.208</td>
<td>0.264</td>
<td>1.099</td>
<td>3.258</td>
</tr>
<tr>
<td>Fract Indep</td>
<td>0.791</td>
<td>0.406</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>CEO Tenure</td>
<td>7.914</td>
<td>7.406</td>
<td>0</td>
<td>56</td>
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<tr>
<td>CEO Age</td>
<td>56.236</td>
<td>7.335</td>
<td>33</td>
<td>91</td>
</tr>
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Table 2. Corporate Governance Externality

In this two tables, we regress CEO total compensation (Total Comp.) on market capitalization and measures of corporate governance for the firm and its size-matched comparables. In Panel A, the proxy for corporate governance is the G-Index; in Panel B, it is CEO Duality. In columns 1-3 regressions include industry/year fixed effects; in column 4 we control for year dummies and firm fixed effects. In columns 2-4, we also control for CEO characteristics (CEO Tenure, CEO Age and External). In columns 3 and 4 we control for board composition (Board Size, Fraction of Independent Directors and CEO Duality in Panel A and G-Index in Panel B). Standard errors are reported in parentheses and are clustered at the firm level in the first line and at the year level in the second line. *, **, or *** indicates that the coefficient is statistically significantly different from zero at the 10%, 5%, or 1% level, respectively, under that clustering.

Panel A: Governance = G-Index

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Cap</td>
<td>0.458</td>
<td>0.459</td>
<td>0.453</td>
<td>0.485</td>
</tr>
<tr>
<td></td>
<td>(0.010)***</td>
<td>(0.010)***</td>
<td>(0.013)***</td>
<td>(0.029)***</td>
</tr>
<tr>
<td>Own Governance</td>
<td>0.025</td>
<td>0.023</td>
<td>0.018</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(0.006)***</td>
<td>(0.006)***</td>
<td>(0.006)***</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Competitor Governance</td>
<td>0.011</td>
<td>0.010</td>
<td>0.009</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>(0.005)**</td>
<td>(0.005)*</td>
<td>(0.006)</td>
<td>(0.005)</td>
</tr>
<tr>
<td>Industry / Year Fixed Effect</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>CEO Characteristics</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Board Composition</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Firm FE and Year dummies</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Observations</td>
<td>9,833</td>
<td>8,964</td>
<td>7,370</td>
<td>7,370</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.527</td>
<td>0.533</td>
<td>0.535</td>
<td>0.776</td>
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</tbody>
</table>

Panel B: Governance = CEO Duality

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
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<th>(4)</th>
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</thead>
<tbody>
<tr>
<td>Market Cap</td>
<td>0.463</td>
<td>0.462</td>
<td>0.454</td>
<td>0.486</td>
</tr>
<tr>
<td></td>
<td>(0.010)***</td>
<td>(0.011)***</td>
<td>(0.013)***</td>
<td>(0.029)***</td>
</tr>
<tr>
<td>Own Governance</td>
<td>0.117</td>
<td>0.135</td>
<td>0.094</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>(0.034)***</td>
<td>(0.036)***</td>
<td>(0.036)***</td>
<td>(0.029)</td>
</tr>
<tr>
<td>Competitor Governance</td>
<td>0.063</td>
<td>0.056</td>
<td>0.054</td>
<td>0.034</td>
</tr>
<tr>
<td></td>
<td>(0.033)*</td>
<td>(0.034)</td>
<td>(0.034)</td>
<td>(0.029)</td>
</tr>
<tr>
<td>Industry / Year Fixed Effect</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>CEO Characteristics</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Board Composition</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Firm FE and Year dummies</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Observations</td>
<td>8,024</td>
<td>7,357</td>
<td>7,357</td>
<td>7,357</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.521</td>
<td>0.527</td>
<td>0.534</td>
<td>0.776</td>
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</table>
Table 3. Pay for Performance

In this two tables, we regress the proportion of variable pay over total pay (Pay for Performance) on market capitalization and measures of corporate governance for the firm and its size-matched comparables. In Panel A, the proxy for corporate governance is the G-Index; in Panel B, it is CEO Duality. In columns 1-3 regressions include industry/year fixed effects; In column 4 we control for year dummies and firm fixed effects. In columns 2-4, we also control for CEO characteristics (CEO Tenure, CEO Age and External). In columns 3 and 4 we control for board composition (Board Size, Fraction of Independent Directors and CEO Duality in Panel A and G-Index in Panel B). Standard errors are reported in parentheses and are clustered at the firm level in the first line and at the year level in the second line. *, **, or *** indicates that the coefficient is statistically significantly different from zero at the 10%, 5%, or 1% level, respectively, under that clustering.

Panel A: Governance = G-Index

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Cap</td>
<td>7.047</td>
<td>6.886</td>
<td>6.815</td>
<td>8.931</td>
</tr>
<tr>
<td></td>
<td>(0.235)***</td>
<td>(0.241)***</td>
<td>(0.286)***</td>
<td>(0.866)***</td>
</tr>
<tr>
<td>Own Governance</td>
<td>0.422</td>
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<td>0.215</td>
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</tr>
<tr>
<td></td>
<td>(0.137)***</td>
<td>(0.137)**</td>
<td>(0.142)</td>
<td>(0.260)</td>
</tr>
<tr>
<td>Competitor Governance</td>
<td>0.248</td>
<td>0.256</td>
<td>0.323</td>
<td>0.156</td>
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<tr>
<td></td>
<td>(0.133)*</td>
<td>(0.134)*</td>
<td>(0.143)**</td>
<td>(0.139)</td>
</tr>
<tr>
<td>Industry / Year Fixed Effect</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>CEO Characteristics</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Board Composition</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Firm FE and Year dummies</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Observations</td>
<td>9,833</td>
<td>8,964</td>
<td>7,370</td>
<td>7,370</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.302</td>
<td>0.318</td>
<td>0.320</td>
<td>0.611</td>
</tr>
</tbody>
</table>

Panel B: Governance = CEO Duality

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Cap</td>
<td>7.012</td>
<td>6.740</td>
<td>6.849</td>
<td>8.940</td>
</tr>
<tr>
<td></td>
<td>(0.257)***</td>
<td>(0.268)***</td>
<td>(0.294)***</td>
<td>(0.874)***</td>
</tr>
<tr>
<td>Own Governance</td>
<td>-0.156</td>
<td>1.266</td>
<td>0.503</td>
<td>0.550</td>
</tr>
<tr>
<td></td>
<td>(0.787)</td>
<td>(0.816)</td>
<td>(0.837)</td>
<td>(0.857)</td>
</tr>
<tr>
<td>Competitor Governance</td>
<td>1.867</td>
<td>1.464</td>
<td>1.432</td>
<td>1.501</td>
</tr>
<tr>
<td></td>
<td>(0.933)**</td>
<td>(0.938)</td>
<td>(0.934)</td>
<td>(0.868)*</td>
</tr>
<tr>
<td>Industry / Year Fixed Effect</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>CEO Characteristics</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Board Composition</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Firm FE and Year dummies</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Observations</td>
<td>8,024</td>
<td>7,357</td>
<td>7,357</td>
<td>7,357</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.292</td>
<td>0.312</td>
<td>0.319</td>
<td>0.611</td>
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</table>
Table 4. First Stage: Estimation of CEOs Ability

In this table we estimate CEO ability. To do so, we regress Return on Assets on a set of control variables and a dummy variable for each CEO-Firm match. The coefficients on these dummies are our proxy for CEO ability. The variables employed are as follows: Return on Assets is the ratio of operating cash flow over lagged total assets; Market Cap is the market capitalization; Book Leverage is the ratio of long and short term debt to the sum of long and short term debt plus common equity; Cash is the sum of cash and short-term investments over net property, plant, and equipment at the beginning of the fiscal year; Interest Coverage is earning before depreciation, interest, and tax over interest expenses; Dividend earnings is the sum of common dividends and preferred earnings over earning before depreciation, interest, and tax; Tobin’s q is the ratio of firm’s total market value over total assets. All explanatory variables are lagged one year. All regressions include dummy variables that take value one for a specific CEO and zero otherwise. All regressions include year dummies. 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. Summary statistics regarding the coefficients on the CEO dummies are presented.

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>ROA</th>
<th>ROA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>L.Market Cap.</td>
<td>-.0163***</td>
<td>-.02398***</td>
</tr>
<tr>
<td></td>
<td>(.0062)</td>
<td>(.0070)</td>
</tr>
<tr>
<td>L.Book Leverage</td>
<td>.0058</td>
<td>.0343**</td>
</tr>
<tr>
<td></td>
<td>(.0151)</td>
<td>(.0174)</td>
</tr>
<tr>
<td>L.Cash</td>
<td>.0025</td>
<td>-.0001</td>
</tr>
<tr>
<td></td>
<td>(.0026)</td>
<td>(.0032)</td>
</tr>
<tr>
<td>L.Interest Coverage</td>
<td>-5.81e-06</td>
<td>3.26e-07</td>
</tr>
<tr>
<td></td>
<td>(.0000)</td>
<td>(.0000)</td>
</tr>
<tr>
<td>L.Dividend Earnings</td>
<td>-.0346**</td>
<td>-.0215</td>
</tr>
<tr>
<td></td>
<td>(.0171)</td>
<td>(.0186)</td>
</tr>
<tr>
<td>L.Tobin’s q</td>
<td>.0307***</td>
<td>.0291***</td>
</tr>
<tr>
<td></td>
<td>(.0038)</td>
<td>(.0044)</td>
</tr>
</tbody>
</table>

Year Fixed Effects | Y | Y |
Industry Fixed Effects | Y | N |
Firm Fixed Effects | N | Y |
Observations | 10126 | 8324 |
Firm effects identified | 1551 | 1140 |
CEO effects identified | 2610 | 2227 |
Firm-CEO matches | 2674 | 2291 |
CEO F.E. Mean | .0058 | 0 |
CEO F.E. Std. Dev. | .1216 | .0422 |
CEO F.E. Min | -.7982 | -.4225 |
CEO F.E. Max | .5255 | .3091 |
Table 5. Second Stage: CEO Ability, Governance, Size & Compensation

In this table, we regress corporate governance, firm size and different components of compensation on the CEO ability obtained from the first stage regression. The measures of corporate governance are G-Index and CEO Duality. Executive compensation is measures as Total Comp and Pay for Performance, which is the percentage of variable pay (made up of bonuses and stock options) over total compensation. Firm size is Market Cap. CEO Fixed Effects are the CEO ability proxies obtained from the first stage regression model as specified. All regressions include CEO Tenure, CEO Age, External and year dummies (not reported). In Panel A they also include industry fixed effects; while in Panels B they include firm fixed effects. Coefficients are estimated with Weighted Least Squares to correct for estimation errors in the first stage. Standard errors are reported in parenthesis and clustered at the firm level in the first line and at the year level in the second line. *, **, or *** indicates that the coefficient is statistically significantly different from zero at the 10%, 5%, or 1% level, respectively.

Panel A: Table 4 column (1) in First Stage

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>G-Index</th>
<th>CEO Duality</th>
<th>Total Comp.</th>
<th>Pay for Performance</th>
<th>Market Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEO Fixed Effect</td>
<td>3.162</td>
<td>0.488</td>
<td>5.086</td>
<td>98.024</td>
<td>10.669</td>
</tr>
<tr>
<td></td>
<td>(1.697)*</td>
<td>(0.182)***</td>
<td>(0.445)***</td>
<td>(10.660)***</td>
<td>(0.719)***</td>
</tr>
<tr>
<td>Industry / Year Fixed Effect</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>CEO Characteristics</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Observations</td>
<td>8,571</td>
<td>7,108</td>
<td>8,610</td>
<td>8,610</td>
<td>8,610</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.241</td>
<td>0.245</td>
<td>0.506</td>
<td>0.428</td>
<td>0.714</td>
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</table>

Panel B: Table 4 column (2) in First Stage

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>G-Index</th>
<th>CEO Duality</th>
<th>Total Comp.</th>
<th>Pay for Performance</th>
<th>Market Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEO Fixed Effect</td>
<td>-0.080</td>
<td>-0.040</td>
<td>1.383</td>
<td>39.971</td>
<td>2.381</td>
</tr>
<tr>
<td></td>
<td>(0.430)</td>
<td>(0.306)</td>
<td>(0.404)***</td>
<td>(11.659)***</td>
<td>(0.312)***</td>
</tr>
<tr>
<td>Firm FE and Year dummies</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>CEO Characteristics</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Observations</td>
<td>7.027</td>
<td>5.800</td>
<td>7.078</td>
<td>7.078</td>
<td>7.078</td>
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<tr>
<td>R-squared</td>
<td>0.913</td>
<td>0.543</td>
<td>0.746</td>
<td>0.573</td>
<td>0.968</td>
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