Competition for Managers, Corporate Governance and Incentive Compensation

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Abstract

Stronger corporate governance incentivizes managers to perform better and thus saves on the cost of providing pay for performance. However, when managerial talent is scarce, firms' competition to attract better managers reduces an individual firm's incentives to invest in corporate 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, in a sample of US firms, we show that (i) better CEOs are matched to firms with weaker corporate governance and more so in industries with stronger competition for managers, and, (ii) corporate governance is more likely to change when there is CEO turnover, with governance weakening when the incoming CEO is better than the departing one.

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Stronger corporate governance incentivizes managers to perform better and thus saves on the cost of providing pay for performance. However, when managerial talent is scarce, firms' competition to attract better managers reduces an individual firm's incentives to invest in corporate 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, in a sample of US firms, we show that (i) better CEOs are matched to firms with weaker corporate governance and more so in industries with stronger competition for managers, and, (ii) corporate governance is more likely to change when there is CEO turnover, with governance weakening when the incoming CEO is better than the departing one.

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). Why are executives (and other professionals) paid so much and, apparently, independently of performance?

The literature has evolved into two conflicting camps. The first one, 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 also Bertrand and Mullainathan, 2001, Bebchuk and Fried, 2004, among others). The second camp suggests an efficient explanation: better managers can generate greater value at larger firms and competition for scarce 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 in fact 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. Some firms 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 an efficient 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. In other words, the individual rationality constraint is binding and thus the overall 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 individual rationality constraint by setting a high pay for performance. Thus, shareholders would end up bearing the full costs of better corporate governance in the form of higher executive pay, while they would share (for instance, with potential raiders) the benefits of corporate governance (in the form of more takeovers).

With ex-ante identical firms and observable managerial talent, in equilibrium firms are indifferent between hiring a better- and a worse-quality manager. Then, the better-quality managers extract all the rents, which are exactly equal to the difference in profitability between better and worse managers. The firms that hire worse-quality managers feature the optimal combination of corporate governance and managerial pay. Those that hire better-quality managers rationally choose to underinvest in corporate governance and pay managers more.

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 governance standards. These associations are ex-ante rational as firms offered these compensation and governance packages to attract scarce managerial talent.

If we can measure managerial talent, our main empirical prediction is that better quality managers are matched to firms that have weaker governance and receive higher pay. Moreover, takeovers should be negatively correlated with CEO quality, as takeover defenses are a principal form of weaker governance that can be offered to attract better-quality managers. Finally, since governance is part of optimal compen-

sation package, changes in corporate governance should primarily arise when there is CEO turnover and should depend on the quality of the new CEO relative to the old one: governance standards should improve when the new CEO is of worse quality than the old one and should worsen when on the contrary the new CEO is of better quality than the old one.

We test these predictions using 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 CEOs and on their turnover, M&A data from Thompson Deals, and firm-level corporate governance data from Riskmetrics. We focus on the *G-Index* developed by Gompers et al. (2003) and its individual components as our measures of outside corporate governance and find evidence in favor of our predictions.

To show that the allocation of CEOs and firms is consistent with the matching equilibrium predicted by the model, our cross-sectional test 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. In particular, we extract a measure of the CEO's talent relative to other CEOs in the industry. In the second stage, we correlate these predicted measures of managerial talent with corporate governance, executive compensation, firm size, CEO tenure and takeovers. We find that better managers are employed by larger firms, face *weaker* governance regimes, are paid more, are less likely to be replaced, and are less likely to be taken over, results that are consistent with the model's predictions. We find these associations even after controlling for proxies of CEO power (his tenure, age and whether he is externally hired), thus alleviating the concern that CEO *power* is the omitted variable behind the association between greater CEO quality and weaker firm governance. Moreover, we show that there is a stronger negative relationship between corporate governance and CEO quality in industries with greater competition for managers, as measured by the frequency of external hires.

In time-series tests, we show that the changes in governance primarily happen around CEO turnovers. Further, as predicted by the model, when the new CEO is

better than the old one, the quality of corporate governance decreases; while governance increases if the new CEO is of worse quality than the old one. When we examine which components of the G-Index are more correlated with changes in CEO talent we find that the most important provisions are the ones shielding directors and officers from legal liability and the ones restricting shareholder voting rights. These provisions increase when the new CEOs are better than the old ones, both in a cross-sectional setup when we compare different firms and in a time-series setting when we consider CEO turnover. These provisions empower the CEO and enable him to fight takeovers more effectively. The results for the other sub-indexes are not robust across specifications. In particular, we do not find any significant relationship between State Law and CEO quality. This latter finding alleviates concerns that the *G-Index* is measuring anti-takeover rules outside the control of individual firms and indicates that our findings seem to come from differences in corporate governance arrangement that are indeed within the control of shareholders.

The evidence from these tests provides 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 discusses robustness checks and alternative explanations. Section 6 concludes.

2 Related Literature

This paper is related to a large literature on executive compensation and corporate governance, but our approach is closer to the structural modeling of endogenous corporate choices as analyzed most recently in Coles, Lemmon and Meschke (2011), and the references therein.

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 alternative economic views have been suggested to explain executive compensation trends: one, managerial rent extraction, and second, 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, 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 executive 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 low ownership concentration and its negative correlation with firm size arise as part of an optimal contract.[1] In a similar setup, Edmans and Gabaix (2011) show that inefficient incentive contracts and CEO allocation across firms arise when firms differ in terms of risks or disutilities for managers.

Our model departs from this part of the literature because we treat firm 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 ex-ante identical 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. Inefficiently low choices of governance and over-investment emerge as equilibrium outcomes because of the externality associated with the competition for managerial talent.

Also, managers in our model can be incentivized by 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-

[1]Within this framework, the recent rise in compensation can be related to changes in the types of managerial skills required by firms. Murphy and Zábojník (2007) 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 (2010). Cremers and Grinstein (2010) 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.

performance sensitivity relative to the control group.

Finally, this 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 (2010) 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 (2011) model the negative externalities caused by earnings manipulation across firms. Nielsen (2006) considers a setting where governance improves publicly disclosed information about a firm and facilitate managerial assessment in competing firms. Cheng (2011) shows that earnings management in one firm may induce earnings management in other firms in the presence of relative performance compensation.

3 Theoretical Analysis

The basic idea of our model is that firms compete for managers by choosing governance as part of an optimal incentive contract. We show in this section that in the presence of competition for scarce managerial talent, in equilibrium, ex-ante identical firms are indifferent between hiring a better manager, investing more and choosing weaker governance regime, and hiring a worse manager, investing less and setting a stronger governance regime.

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, or less-experienced, managers (L-type). All type L have low productivity $e_L < 1$. $H-$type manager's productivity is uniformly distributed over

the $[e_L, 1]$ interval. Productivity is observable: we consider the case of unobservable productivity in the extension. We assume that the number of L-type managers is greater than the number of firms, $m_L > n$, while the H-type managers are not numerous enough to be hired by all firms, $m_H < n$. Managers and shareholders are risk neutral. All firms are ex-ante identical.

The timeline is as described in Figure 1: At $t = 1$, each firm's founder hires a CEO from a pool of candidates of observable quality $e \in [e_L, 1]$. Given that abilities are observable, each firm sets a compensation contract which is a function of the manager's quality e. Managers apply for one of the jobs. If a manager is not employed at the end of this stage, he receives a reservation utility equal to 0. Similarly, a firm that does not employ any managers receives an output equal to 0. Compensation contracts are represented by a performance-related bonus $p \geq 0$, which is contingent on the verifiable output X produced at $t = 4$.[2] Moreover, as part of the incentive package, at $t = 1$ the firm also chooses the investment size $I \geq 0$ at a cost rI (with $r > 1$ being the cost of capital) and the level of corporate governance $g \in [0, 1]$. As we explain below, the benefit of corporate governance is that it increases the probability of a takeover at $t = 3$, and thus reduces managerial entrenchment.

At $t = 2$, managers choose action $Z \in \{M, S\}$, where choice M generates a private benefit B for the manager and no output ($X = 0$) for the firm; while action S generates output $X = Y(I) > I$ with probability $\widetilde{e}$ and $X = 0$ otherwise, and no private benefit for the manager. We assume $Y(I) > I$, $Y' > 0$, $Y'' < 0$, $\lim_{I \to 0} Y'(I) = \infty$, $\lim_{I \to \infty} Y'(I) < 1$ to ensure an internal solution for the choice of investment. The choice of action is not observable by shareholders and the manager must stay employed until $t = 4$ for the firm to produce output X.

At $t = 3$, shareholders and managers observe a signal $\widetilde{x} \in \{Y(I), 0\}$ on the expected output X. After observing this signal, shareholders can sell to a raider. The value produced by the raider, Y_R, is uniformly distributed over the interval $[0, R]$, with $R < Y(I)$. With probability g, the manager has no power to stop the

[2]This assumption is without loss of generality because allowing for a further payment that is independent of performance would be inefficient: it would simply increase the amount of compensation needed in the case of good performance.

takeover: the takeover happens if the raider and the target shareholders agree on a price. With probability $1-g$, the incumbent manager can fight the takeover and thus needs to agree for the takeover to succeed.[3]

At $t=4$, output is realized and distributed, the performance-related bonus p is paid, and, if still in control, the initial manager receives a private benefit $b<R$.

For simplicity, we assume that (i) the manager has no negotiation power and thus only needs to be compensated for his outside option; and (ii) target shareholders receive a fraction $\delta \in [0,1]$ of their joint surplus with the raider (net of any compensation for the incumbent manager).

We make the following technical assumptions:

(1) $e_L Y(I) - B + (1-e_L)\frac{\delta R}{2} - rI \leq 0$, with the condition being met with quality for $I = I_L$: profits from hiring the low ability manager are normalized to zero.

(2) $Y(I) - B - rI - b > 0$ holds for some value of I: hiring the highest ability manager, $e=1$, is profitable even without considering the raider.

(3) The signal $\widetilde{x}$ is perfectly informative. This assumption can be relaxed without substantially changing the model.

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

3.2 Competition for Managers

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

[3]We assume that the firm must always settle any promised pay to the manager due at $t=4$ even if the takeover happens and independently on whether the takeover requires the manager agreement to succeed. This requirement ensures that firms do not behave strategically and fire a manager that will produce higher output purely to save on pay for performance.

3.2.1 Takeover

If $\widetilde{x} = Y(I)$, there is no takeover opportunity as no raider can produce an output greater than $Y(I)$. If instead $\widetilde{x} = 0$, then the raider can always increase productivity. With probability g, the incumbent manager has no control on the takeover process and thus does not need to be compensated for the loss of private benefits. Thus, the surplus that the raider can share with target shareholders is Y_R and target shareholders are paid δY_R. The takeover happens with probability 1.

With probability $1-g$ instead, the incumbent manager must be compensated for the loss of private benefits. Hence, he is paid b and the surplus from the takeover that the raider and target shareholders share is $Y_R - b$. The takeover probability is thus equal to the probability that $Y_R > b$ or $1 - (b/R)$.

Therefore, the expected takeover price equals $\delta R/2$ if the manager cannot fight the takeover (which happens with probability g) and $\delta \int_b^R (R-b)\frac{1}{R}dR = \delta\frac{(R-b)^2}{2R}$ if the manager can fight the takeover (which happens with probability $1-g$). Hence, the expected payoff for target shareholders if $\widetilde{x} = 0$ is

$$P = g\frac{\delta R}{2} + (1-g)\frac{\delta(R-b)^2}{2R} = \frac{\delta}{2R}\left[(R-b)^2 + gb(2R-b)\right]. \tag{1}$$

Notice that P is strictly increasing in corporate governance g: the benefit of high corporate governance is a higher expected value of the firm in the bad state of the world $\widetilde{x} = 0$.

3.2.2 Moral Hazard Problem

Now consider the manager of type e's incentive compatibility and participation constraint at $t = 2$. Starting with the incentive compatibility condition, if the manager chooses the private-benefit action $Z = M$, output always equals 0 and manager's utility equals:

$$U(M) = B + (1-g)\,b \tag{2}$$

The first term is the private benefit B from choosing action M, while the second term is the private benefit b from staying in control, which is paid only with probability

$1-g$. If he chooses the firm-value maximizing action $Z=S$, then his utility equals

$$U(S)=ep+(1-e)(1-g)b \tag{3}$$

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

$$p\geq \frac{B}{e}+(1-g)b. \tag{4}$$

Provided that the IC constraint is satisfied, the corresponding individual rationality (IR) constraint becomes

$$p\geq \frac{\overline{u}_e-(1-e)(1-g)b}{e} \tag{5}$$

where $\overline{u}_e$ is type e's reservation utility and will be endogenously determined so as to clear the market for managers. These constraints highlight the role of corporate governance from the manager perspective. Increasing corporate governance implies that the incentive compatibility condition is achievable with lower compensation. However, the same increase in corporate governance implies that higher pay is necessary to meet the individual rationality condition. This is because increasing corporate governance increases the probability of a non-managerial agreed takeover, increasing the probability of losing b.

3.2.3 Incentive Contract

Proceeding backwards to $t=1$, shareholders' expected profits equal $Y(I)-p$ if the project is successful (which happens with probability e) and the expected takeover price given by equation (1), if the project fails (which happens with probability $1-e$). Since the net of investment cost is rI, shareholders' problem is:

$$\max_{(p,g,I)} e\left[Y(I)-p\right]+(1-e)\frac{\delta}{2R}\left[(R-b)^2+gb(2R-b)\right]-rI \tag{6}$$

subject to the IC and IR conditions (4) and (5). Analyzing the optimal incentive contracts conditional on the manager's type, in Appendix A we derive the following result:

Lemma 1: *The optimal investment for a firm hiring a manager of type e is $I_e=Y'^{-1}\left(\frac{r}{e}\right)$. The optimal contract for a manager of type e depends on $\overline{u}_e$:*

(i) if $\overline{u}_e < B$*, the optimal incentive contract is* $(p_e, g_e) = \left(\frac{B}{e}, 1\right)$*, with associated profit equal to* $eY(I_e) - B - (1-e)\frac{\delta R}{2} - rI_e$*;*

(ii) if $\overline{u}_e \in [B, b+B]$*, the optimal incentive contract is* $(p_e, g_e) = \left(\frac{\overline{u}_e - (1-e)(\overline{u}_e - B)}{e}, 1 - \frac{\overline{u}_e - B}{b}\right)$*, with associated profit equal to* $eY(I_e) - \overline{u}_e + (1-e)\frac{1}{2R}\left\{\delta R^2 + (\overline{u}_e - B)\left[2R(1-\delta) + \delta b\right]\right\} - rI_e$*; and*

(iii) if $\overline{u}_e > b + B$*, the optimal incentive contract is* $(p_e, g_e) = \left(\frac{\overline{u}_e - (1-e)b}{e}, 0\right)$ *with associated profit equal to* $eY(I_e) - \overline{u}_e + (1-e)\left[b + \frac{\delta(R-b)^2}{2R}\right] - rI_e$*.*

Intuitively, the optimal incentive contract for a type-e manager depends on his reservation utility. If the manager reservation utility is very low ($\overline{u}_e < B$), the individual rationality constraint is redundant and thus firms can extract all possible surplus from the manager by increasing corporate governance to the maximum level and saving on pay. If instead manager's reservation utility is large ($\overline{u}_e > b + B$), governance does not work as a substitute for pay. Hence, shareholders fully internalize the costs of the takeover borne by the manager, and understand that compensating the manager with poor governance is efficient (compared with paying higher incentive pay).

The intermediate case in which $\overline{u}_e \in [B, b+B]$ is the most interesting. Figure 2 shows the IC and IR constraints in the (g, p) space. The IC constraint is the downward sloping line with intercept $b + B/e$ while the IR constraint is the upward sloping line with intercept $[\overline{u}_e - (1-e)b]/e$. The set of feasible choices of (g, p) is the shaded area in Figure 2. Given that shareholders' objective function is increasing in g and decreasing in p, the solution must lie on the IR constraint on the right of the IC line. Because the shareholder profits increase in g slower than managerial utility decreases in g, the optimal choice is the minimum level of corporate governance which satisfied both constraints. Hence, the optimal contract is at the intersection of the two lines (point A in the figure), where $g_e = 1 - \frac{\overline{u}_e - B}{b}$ and $p_e = \frac{\overline{u}_e - (1-e)(\overline{u}_e - B)}{e}$.

As proved in Appendix A, the equilibrium in the managerial market is a follows:

Proposition 1 (Competition for managerial talent) *A mass* m_H *of firms hire*

a H manager. The compensation contract for an H-type manager with ability e is

$$(p_e, g_e, I_e) = \begin{cases} \left(\frac{\overline{u}_e^1-(1-e)b}{e}, 0, Y'^{-1}\left(\frac{r}{e}\right)\right) & \text{if } e > \widehat{e} \\ \left(\frac{\overline{u}_e^2-(1-e)\left(\overline{u}_e^2-B\right)}{e}, 1-\frac{\overline{u}_e^2-B}{b}, Y'^{-1}\left(\frac{r}{e}\right)\right) & \text{if } e \leq \widehat{e} \end{cases}$$

where $\widehat{e}$, $\overline{u}_e^1$ *and* $\overline{u}_e^2$ *are defined in Appendix A.*

The remaining $n - m_H$ *firms hire* $L-$*type managers and offer the contract*

$$(p_L, g_L, I_L) = \left(\frac{B}{e_L}, 1, Y'^{-1}\left(\frac{r}{e_L}\right)\right).$$

This is the key result of the model. Because there is a scarcity of H-type managers, in equilibrium, competition among firms will be so that the rent awarded to H-type managers ($\overline{u}_e$) makes firms indifferent between hiring a H-type or a L-type manager. If hiring a H-type manager leads to higher profits than hiring a L-type manager, then a firm can marginally increase the compensation to H-type types, attracting one of them for sure, increasing profit. If instead hiring a L-type manager leads to a higher profit, all firms would hire a L-type manager and thus H-type managers would be willing to work for less. Given that corporate governance is used by firms to reduce managerial rent, firms hiring H-type managers find high level of corporate governance suboptimal. Conversely, firms hiring L-type managers face no competition for them and can, therefore, keep managerial compensation down to the incentive compatibility constraint. Thus, these firms choose the profit-maximizing level of corporate governance.

The solution also highlights a potential reason for the non-perfect substitutability of corporate governance and executive compensation. Proposition 1 shows that firms mechanism to increase rents to the H-type managers is to choose a suboptimal level of corporate governance instead of implementing the optimal level of corporate governance and increasing executive compensation. The reason is because shareholders do not internalize the externality their choices of corporate governance impose on other firms' stakeholders. Specifically, in our model, when firms increase corporate governance, they increase the probability of takeover, but firms only obtain a fraction δ of this increase in takeover profits. However, given that the individual rationality

condition is binding, the firm must compensate the manager for the entire cost of this increase in corporate governance. Hence, the firm bears all the cost of higher governance but only enjoys part of the benefits.

3.3 Extension: No Competition for Managerial Talent

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 signals contain some information, so that managers have different expected utility, the analysis would follow similarly.

If instead, there is no information about the quality of managers, the results are quite different. We define $\overline{e}$ as the expected ability of a randomly picked manager. 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. Hence, the manager's outside option is equal across types and equal to the reservation utility from being unemployed ($\overline{u}_{\overline{e}} = 0$). Therefore, from Lemma 1,

Proposition 2 (No competition for managerial talent) *All firms offer the contract*

$$(p_{\overline{e}}, g_{\overline{e}}, I_{\overline{e}}) = \left(\frac{B}{\overline{e}}, 1, Y'^{-1}\left(\frac{r}{\overline{e}}\right) \right) ,$$

and hire any manager.

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. This results emphasizes the main intuition behind the model: it is the competition for scarce managerial talent (and not the higher ability of some managers) that affects the choice of corporate governance. Specifically, we can compare the contract that a manager with ability $\overline{e} > e_L$ is offered under the two informational contexts. In the case with known managerial talent $g_{\overline{e}} = \max\left\{1 - \frac{\overline{u}_{\overline{e}}^2 - B}{b}, 0\right\} < 1$, while in the case with unknown managerial talent $g_{\overline{e}} = 1$, a higher level of governance than in the case with known managerial talent.

4 Empirical Analysis

We now turn to the empirical analysis. First, we develop the two main testable implications of the model. Then, we present the empirical methodology. Finally, we describe our data and discuss our results.

4.1 Empirical Predictions

The main result of the model is that in equilibrium some firms will attract better managers by paying them more, choosing weaker governance standards and larger size; others will attract worse managers by paying them less, choosing stricter corporate standards and smaller size.[4] Thus, provided that we can find an appropriate measure of managerial talent, our main empirical prediction is:

Prediction 1 (Matching equilibrium): *Better quality managers receive higher pay, are matched to firms that have weaker governance standards, larger size and are less likely to be taken over.*

The comparison between Propositions 1 and 2 highlights how the role of corporate governance as part of an optimal compensation contract depends on the degree of competition for managers. Specifically, our model predicts that better managers are matched to firms that have lower corporate governance only when the competition among firms to attract them is high. Therefore, conditionally on us finding a relevant measure of the effective competition for managers, our model predicts:

Prediction 2 (Competition for Managers): *The more intense the competition for managers, the greater is the role of corporate governance as part of an optimal compensation contract. Specifically, the relationship between high quality managers and weaker governance standards should be stronger in sectors with stronger competition for managers.*

[4]Given that $\frac{\partial \bar{u}_e}{\partial e} > 0$, it is straight forward to prove that $\frac{\partial g}{\partial e} \geq 0$, with a strict inequality for $e \leq \widehat{e}$.

4.2 Empirical methodology

To test our main empirical prediction, that is, Prediction 1, we need to develop a measure of managerial ability (γ_j). 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.[5] The idea is to attribute to CEO ability the return on assets in excess of the value predicted by firm-level and time-varying control variables. More precisely, we estimate

$$ROA_{it} = \beta X_{it} + \delta_t + z_{ind} + \gamma_j + \varepsilon_{it}, \tag{7}$$

where ROA_{it} stands for return on assets for firm i in period t. X_{it} are some time variant firm characteristics, which include size, book leverage, cash, interest coverage, dividend earnings, Tobin's q and governance measures; δ_t are time fixed effects; and z_{ind} are industry fixed effects. The parameter γ_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 *relative* to the industry.

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 (2010) document that most of the managerial mobility takes place within an industry so industry dummies constitute a natural starting point.[6]

We test Prediction 1 in two ways: (i) by focusing on the cross-sectional differences across firms; and (ii) by emphasizing the time-series changes within a firm.

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[5] An alternative approach is to proxy CEO quality with observable characteristics, like press coverage (as in Milbourn, 2003) or MBA education (Murphy and Zaboknik, 2007).

[6] To control for any endogenous manager-firm matching, we repeat the estimation of γ_j including firm fixed effects instead of industry dummies. Results are qualitatively similar but some coefficients lose statistical significance. Including only industry dummies is more appropriate to preserve the power of the test, given the low mobility of CEOs across firms.

4.2.1 Prediction 1: Cross-sectional test

In the first approach, we use the estimated fixed effects $\widehat{\gamma}_j$ as regressors in the following specification:

$$\mathrm{Y}_{it} = \beta_\gamma \times \widehat{\gamma}_j + \upsilon_{jt} + \chi_t + z_{ind} + \xi_{it}, \tag{8}$$

where $\widehat{\gamma}_j$ are the CEO Ability coefficients estimated from regression (7); χ_t and z_{ind} are time and industry dummies and υ_{it} are a set of CEO characteristics. Time dummies should control for any time pattern while industry dummies control for the average quality of CEOs hired in a given industry. We correct for the fact that $\widehat{\gamma}_j$ are generated regressors by weighting each observation by the inverse of the $\widehat{\gamma}_j$ standard error from the first-stage estimation.

We estimate the specification above for different dependent variables Y_{it}, that correspond to different empirical predictions. Y_{it} will in turn be our measures of corporate governance, executive compensation and firm size. Our model predicts that (i) better managers work in firms that have lower corporate governance (that is, we expect $\beta_\gamma < 0$ when Y_{it}=Governance$_{it}$); (ii) better managers are paid more (that is, $\beta_\gamma > 0$ when Y_{it}=Compensation$_{it}$); and (iii) better managers work in larger firms (that is, $\beta_\gamma > 0$ when Y_{it}=Firm Size$_{it}$).

An additional empirical implication of our model is that poor-quality managers should face stronger corporate governance, for instance, takeovers, more often. Therefore, we also estimate the specification above with Y_{it} being a dummy variable for takeovers, with our model predicting $\beta_\gamma < 0$. Moreover, takeovers are only one of the many mechanisms available to replace managers. In our model when a firm expected output is low, managers get replaced. As lower quality managers obtain low outputs more frequently, they are replaced more frequently. We test this empirical prediction using a duration model as follows

$$h[t; X(t)] = F(\beta_\gamma \times \widehat{\gamma}_j + \upsilon_{jt} + \chi_t + z_{ind} + \xi_{it}) \tag{9}$$

where $h[t; X(t)]$ is the hazard function; defining the failure event as manager turnover. As usual, $h[t; X(t)]$ describes the instantaneous rate of turnover at T given that there has been no turnover until t. As above, χ_t and z_{ind} are time and industry

dummies and υ_{it} are a set of CEO characteristics. The model's prediction is a positive correlation between CEO quality and employment length.

To sum up, we test the main prediction of the model by running a within-industry two-stage analysis. In the first stage, we obtain individual CEO skills relative to the other CEOs employed in the industry from specification (7). In the second stage, we run regressions (8) and (9), to test whether these relative CEO abilities (compared with other CEO abilities in the industry) are correlated with corporate governance, CEO compensation, firm size and turnover, as predicted by our model.

4.2.2 Prediction 1: Time-series test

Our model highlights the role of corporate governance as part of an optimal compensation contract. Therefore, changes in corporate governance should happen around turnover, when the new compensation contract is agreed. More precisely, we should observe a negative correlation between the change in the manager quality and the change in firms' governance standards. To test this prediction we estimate the following logit model:

$$\text{Governance Chg}_{it} = F(\beta_T Turnover_{it} + \upsilon_{jt} + \chi_t + z_{ind} + \xi_{it}), \tag{10}$$

where Governance Chg_{it} measure the changes in corporate governance and Turnover_{it} captures the changes in managerial ability ($\widehat{\gamma}_j$). As in all the previous regressions, χ_t and z_{ind} are time and industry dummies and υ_{it} are a set of CEO characteristics.

4.2.3 Prediction 2

Finally, we test whether the use of corporate governance as part of an optimal compensation contract varies across sectors as a function of the degree of the competition for managers in those sectors (Prediction 2). To do so, we repeat the estimation of equation (8) separately for each Fama-French 49 industry,

$$\text{Governance}_{it} = \beta_{\gamma}^{ind} \times \widehat{\gamma}_j + \upsilon_{jt} + \chi_t + \xi_{it} \tag{11}$$

where $\widehat{\gamma}_j$ are the CEO Ability coefficients estimated from regression (7), χ_t are time dummies, υ_{it} are a set of CEO characteristics and ind is a different code for each

industry. Then, we estimate the correlation between the different coefficients β_γ^{ind} and our measure of the competition for managers: the percentage of insider promotions calculated by Cremers and Grinstein (2010). The identification assumption is that sectors with more frictions to cross-firm mobility would be associated with both a larger number of internal promotions and a lower degree of competition for managers. Therefore, our model predicts a negative correlation between β_γ^{ind} and the percentage of insider promotions.

4.3 Data description

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 `ppent`); *Interest Coverage* is earnings before depreciation, interest, and tax (item `oibdp`) over interest expenses (item `xint`); and *Dividend Earnings* is the ratio of the sum of common dividends and preferred dividends (items `dvc` and `dvp`) over earnings before depreciation, interest, and tax (item `oibdp`). We define *Book Leverage* as the ratio of long and short term debt (items `dltt` and `dlc`) to the sum of long and short term debt plus common equity (items `dltt`, `dlc` and `ceq`) and Tobin's q as the ratio of firm's total market value (item `prcc_f` times the absolute value of item `csho` plus items `at` and `ceq` minus item `txdb`) over total assets (item `at`). *CAPX* is total capital expenditures (item `capx`) over total assets (item `at`). *Accruals* are the discretionary accruals calculated using the modified Jones model as in Dechow et al. (1995). *Market Cap* is the firm's total market value (item `prcc_f` times the absolute value of item `csho` plus items `at` and `ceq` minus item `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 *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).[7] A higher *G-Index* indicates more restrictions on shareholder rights or a greater number of anti-takeover measures. Therefore, a higher value of the *G-Index* corresponds to a lower g in our theoretical representations. Hence, all coefficient signs on the empirical predictions using the *G-Index* switch sign with respect to the ones using our theoretical 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.[8]

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 *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. We also use ExecuComp to define: *CEO Tenure* as the difference between the current year and the year the executive became CEO (item `becameceo`); *CEO Age* as the age of the CEO 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. We also control for CEO Duality, which is a dummy variable that takes the value 1 if the CEO is also the Chairman of the board.

We obtain data on takeovers from Thompson Deals. We require the percentage

[7]The list of provisions included in the *G-Index* are as follows: Antigreenmail, Blank Check, Business Combination laws, Bylaw and Charter amendment limitations, Control-share Cash-out laws, Classified Board (or Staggered Board), Compensation Plans, Director indemnification Contracts, Control-share Acquisition laws, Cumulative Voting, Directors Duties provisions, Fair-Price provisions, Golden Parachutes, Director Indemnification, Limitations on director Liability, Pension Parachutes, Poison Pills, Secret Ballot, Executive Severance agreements, Silver Parachutes, Special Meeting limitations, Supermajority requirements, Unequal Voting rights, and Limitations on action by Written Consent.

[8]We check for robustness by using linear interpolation, finding no significant change in the results.

of shares held by the acquiror after the transaction to be higher than 20% and the percentage of shares held by the acquiror 6 months prior to the transaction to be lower than 20%. We observe 462 takeovers in our merged sample. We define *Takeover* as a dummy variable that takes value 1 if that manager-firm match experiences a takeover, zero otherwise. *Takeover Completed* takes value 1 if the variable *Takeover* takes value one and the deal was ultimately completed.

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. Moreover, Appendix B includes details on the individual components of the *G-Index*.

4.4 Results

To show that indeed firms choose weaker governance to attract better quality managers, first we need to estimate CEO fixed effects. In Table 2, we show the results from regression (7) with several time dependent regressors (X_{it}) and time independent industry fixed effects (z_{ind}). We report the regression coefficients, overall fit of the model and some descriptive statistics of the estimated CEO fixed effects. We report the mean, minimum, maximum and standard deviation of the estimated CEO ability to show that CEO choice does indeed matter for firm performance.

4.4.1 Cross-sectional evidence

Table 3 presents our main empirical result. In Panel A we find empirical support for equation (9); we show that better managers are employed by firms with lower corporate governance (Column 1), are paid more (Columns 2 and 3) and work in bigger firms (Columns 4 and 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. We control for industry/year fixed effects, and CEO characteristics (CEO tenure, age and external dummy).

In Column 1 we consider the relation between corporate governance and managerial ability. As predicted by the model, increases in managerial quality are associated

with decreases in governance. In Column 2 and 3, we report the correlations between managerial talent (as proxied by the CEO fixed effect) and total compensation and pay for performance. Better managers are paid more, and are paid more in the form of flexible pay (bonuses and options). In Column 4, we also confirm that better CEOs work in larger firms, as also argued by Gabaix and Landier (2008). In Column 5, we show that better managers also invest more (in terms of capital expenditure), an alternative interpretation of the parameter I in our model.

In terms of economic magnitude, Panel A implies that holding all else constant, one standard deviation increase in CEO talent (which corresponds to an increase by 0.1794 according to Table 2) implies a 0.4 point increase in *G-Index* (or decrease in governance), and a 14% increase in flexible pay.

In Panel B, we test the model predictions regarding takeover and CEO employment lengths. Columns (1) and (2) find empirical support for equation (8) with takeover as the dependent variable. Column (1) analyzes all deals while column (2) focuses only on completed transactions. Moreover, better-quality managers stay longer in their firms. Using the estimated measure of CEO quality, we test a Cox model (in Columns 3 and 4). Column 3 present our baseline analysis, while column 4 focuses on those CEOs under 65 years of age as these CEOs are less likely to be affected by retirement. Overall, we find support for our hypothesis in all the specifications: one standard deviation increase in CEO ability leads to around 14% decrease in the hazard rate (column 3). In un-tabulated results, we estimate the model with constant hazard rates and find very similar results.

4.4.2 Time-series evidence

In Table 4, we sharpen the test of the key prediction of the model by looking at changes in governance around CEO turnovers. If poor corporate governance is chosen as part of the CEO incentive contract to attract better quality managers, we would expect that changes in corporate governance should be more common in times when the CEO is turned over. Moreover, we would expect governance to increase when the new CEO is of lower quality than the earlier CEO; and vice-versa, governance

should decrease when the new CEO is of better quality than the older one.

Changes in governance happen in 31 percent of the observations: in 22 percent of the cases governance worsens (as the *G-Index* increases) while in 9 percent of the cases governance improves (as the *G-Index* decreases). There is a CEO turnover in about 19 percent of the observations. In 8 percent of the observations, the new CEO is of better quality than the earlier one (*Turnover Up*), while in 10 percent of the cases the new CEO is of worse quality of the earlier one (*Turnover Down*).

In Panel A of Table 4, we conduct the main test. In Column 1, we show that CEO turnovers are associated with a higher frequency of governance change. This is consistent with the model's assumption that governance is chosen as part of the CEO incentive scheme. In Columns 2 and 3, we test whether governance increases around turnover when the new CEO is worse than the old one and decreases when the new CEO is better than the old one. The indicator *Turnover Up* is indeed positively correlated with increases in governance in Column 2, highlighting the role of lower corporate governance as part of the optimal compensation contract to attract high quality managers. Column 3 reports however that the employment of worse managers is not associated with increases in governance (as our model would predict).[9]

In Panel B, we restrict the sample to the observations in which there is CEO turnover, thus excluding all observations for which there is no turnover. We confirm the results found in Panel A: as shown in Column 1, governance worsens when the new CEO is of better quality than the old one. There is no symmetric increase in governance when the new CEO is worse than the old one, as shown in Column 2. Moreover, Columns 3 to 6 show that the changes in managerial ability are associated with changes in compensation: when better managers are employed, compensation rises; and when worse managers are employed, compensation decreases.

Overall, these results provide evidence that better managers are paid more and

[9]The reason for the smaller number of observations in this table compared to the previous ones is that the *G-Index* is not available every year and we do not want to impose any assumptions on the specific year in which the actual change happens. Hence, we restrict the set of observations to all and only the observations for which we have a *G-Index* and evaluate whether turnover happened within two different observations of the *G-Index*.

are offered weaker corporate governance at the time of their hiring.

4.4.3 Components of G-index

Table 5 provides a detailed analysis of the evidence that better managers are employed in firms with weaker corporate governance by examining individual components of the *G-Index*. In Panel A, we report the correlation between CEO quality (as estimated in Table 2) and each of the 5 sub-indexes of the *G-index*: Delay (measuring the ability to delay an hostile takeover), Protection (which considers the six provisions protecting directors and officers from legal liability or job termination), Voting (which measures shareholder voting rights), Other (which includes miscellaneous indicators, like limits on director duties and pension parachutes) and State Law (focusing on the six state takeover laws: antigreenmail, business combination freeze, control share acquisition, fair price, director duties laws and redemption rights statutes). The indicators that are more strongly positively correlated with CEO quality are Protection, Voting and Other. State Law is (if anything) negatively correlated with CEO quality; while Delay is not significantly correlated with CEO quality.

In Panel B, we consider the changes in each indicator at the time of a turnover. In particular, we focus on the whether governance decreases around turnover when the new CEO is better than the old one using the same specification estimated in Table 4 (Panel A, Column 4). We find that the indicators of Protection and Voting increase significantly when the new CEO is better than the old one. Delay instead decreases significantly in such instances; while the other indicators do not change.

The combination of the results in Panels A and B suggests that the important provisions are the ones shielding directors and officers from legal liability and the ones restricting shareholder voting rights. These provisions increase when the new CEOs are better than the old ones, both in a cross-sectional setup when we compare different firms and in a time-series setting when we consider CEO turnover.[10]

[10]The results for the other indicators are not robust across specifications. Other is statistically significant in the cross-section but not in the time-series test; while Delay is not significant in the cross-section but negatively correlated with CEO quality in the time-series test.

Importantly, State Law conversely is negatively correlated in the cross-sectional test but not significant in the time-series test. This latter finding alleviates some of the concerns on the use of the *G-Index* as a measure of corporate governance. The fact that state law indicators are not significantly correlated with CEO quality indicates that our findings are not driven by differences in the strength of anti-takeover rules across states; instead they seem to come from differences in corporate governance arrangement within the control of shareholders.

4.4.4 Cross-industry test

We now turn to study how the role of corporate governance as part of an optimal compensation contract depends on the competition for managers, in order to test Prediction 2. Figure 3 plots the relationship between CEO ability and corporate governance as a function of the degree of competition for managers. Specifically, the graph axes are as follows: the vertical axis is the coefficient of the regression of corporate governance (*G-Index*) on CEO ability for a given industry; that is, β_{γ}^{ind} as per equation (11). The horizontal axis is the percentage of internally promoted CEOs in that industry, as reported by Cremers and Grinstein (2010).

Each point in the figure corresponds to a different industry. The number reported next to each point is the number of the industry that generated that data point, coded following the 49 Fama French industries. To ensure robust results, we only include industries that have at least 100 observations.

As evidence supporting Prediction 2, we also plot the linear fit of all the different data points. The figure shows that higher competition for managers implies a steeper relationship between corporate governance and managerial ability. This implies a more important role of corporate governance as part of an optimal compensation contract. In numbers, the correlation between the different β_{γ}^{ind} and the percentage of internal promotions is -0.338, which is statistically different from zero. Weighting each data point by the inverse of the β_{γ}^{ind} standard error or by the number of observations in that industry does not change the results: the point estimate is very similar and it is also statistically different from zero.

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

5 Discussion

5.1 The market for CEOs as a source of externality

The key result in our paper is that better CEOs are matched with firms with weaker governance. The channel through which the matching happens is the competition for talent in the market for CEOs. Specifically, the option to work for firms with weaker governance raises the participation constraint for managers and forces other firms to pay managers more.

In regressions reported in Table A1 in Appendix C, we show that the executive compensation in one firm is decreasing in the quality of corporate governance in the firm itself *and* of its size-matched competitors. For this purpose, we estimate the following equation:

$$\begin{aligned} \text{Compensation}_{it} = \; & \alpha_G \times \text{Governance}_{it} + \alpha_E \times \text{Outside Governance}_{it} + \\ & + \beta X_{it} + \varphi_{ind} + \lambda_t + \varepsilon_{it} \end{aligned} \tag{12}$$

where the dependent variable is total compensation, X_{it} are time variant firm-specific controls that could affect compensation and λ_t and φ_{ind} are time and industry dummies, respectively. Our model would predict that both α_G and α_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.

Although consistent with our story, these results should be interpreted with some caution because governance, size and compensation are all endogenous variables and we do not have an exogenous shock to make statements about causality.

5.2 The effect of corporate governance on performance

Throughout the paper, we argue that there is a relationship between a firm's choice of corporate governance and the ability of the manager it can employ, measuring the latest as the firm performance while this manager is CEO in excess of the industry (see equation 7). One possible concern with our approach is that corporate governance might have a direct effect on our measure of firm performance (*ROA*), and our findings may pick up this effect rather than being evidence that lower corporate governance serves to attract better managers, as we argue.

To control for this possible alternative explanation, we add corporate governance and executive compensation as controls in the first stage regression (equation 7). Then, we replicate our empirical predictions using this alternative first stage. In regressions reported in Appendix C, Table A2, we find that results improve both in economic magnitude and in statistical significance. For instance, holding all else constant, one standard deviation increase in CEO talent implies a 1.6 point increase in *G-Index* (or decrease in governance), which is significantly different from zero at the 1% level.

The reason for the improvement in the results under this new specification is intuitive. As previous literature on governance has suggested, the direct effect of corporate governance on firm performance is positive and thus not controlling for it works against finding support for our empirical predictions; while controlling for it strengthens our finding.

As a final remark, this robustness analysis may shed some light on the discussion regarding the impact of corporate governance on some measures of firm performance, such as *ROA*. When we regress *ROA* on time-variant firm characteristics, industry and year dummies and our measure of corporate governance (*G-Index*), we find no significant effect of the *G-Index* on firm performance. However, when we add CEO fixed effects to the previous specification, there is a positive correlation between corporate governance and firm performance. This seems to imply that the direct (positive) effect of corporate governance on firm performance and the (negative) impact of corporate governance on the firm's capacity to attract high quality managers

(the latter being the effect highlighted in this paper) partially offset each other. In other words, the role of corporate governance as part of an optimal executive compensation contract has likely clouded the empirical support for the prior that higher corporate governance increases firm performance.

5.3 Compensation versus governance trade-off

Why do firms choose to affect corporate governance to increase managerial rents instead of increasing executive compensation and leaving corporate governance unchanged? The reason is because the choices of corporate governance also affect the rents of other agents such as riders in a takeover context, debtholders, firm employees, etc. When there is fierce competition for high ability managers, firms cannot affect the manager rents. Hence, when choosing the executive compensation, shareholders know that they will have to compensate the manager for any increase in corporate governance. As a result, shareholders find it suboptimal to do so if the majority of the rents obtained by this increase in corporate governance accrue to other stakeholders. To the extend that this rents accruing to other stakeholders can not be renegotiated with shareholders, the competition for managers will affect the choices of corporate governance. Instead, when there is no competition for managerial talent, firms choose the optimal level of corporate governance because they do not have to compensate the manager for this increase in corporate governance.

While we did not fully explore in our model and empirical tests the relative costs of pay and governance in 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. 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 managerial labor market to pick weak governance while hiring better talent.

5.4 Implications for regulation of corporate governance

Finally, it is interesting to consider implications of our model and results for regulation of governance.

From a social perspective, the socially optimal level of corporate governance in our model is the minimum possible. This result arises because only "no governance"ensures that value decreasing takeovers (those with $Y_r < b$) do not happen. This result does not seem robust to a model that includes debtholders and firm employees. These agents would (possibly) benefit from higher levels of corporate governance that leads to better investment choices by the manager. Therefore, in this augmented model, a "maximum governance"may be socially optimal and shareholders may be choosing an excessively low level of governance as they would not consider the negative impact their choices of corporate governance has on these stakeholders.

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 reducing pledgable cash flows and ability to invest. Subject to this important caveat, since 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 explore the joint role played by corporate governance and competition among firms to attract better managers. In our principal agent problem, 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 while the benefit of corporate governance (due to more frequent takeovers) are partly shares with the acquirers.

We provided novel empirical evidence supporting our model. The observed 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, firm size, takeovers, and CEO tenure. Moreover, we find a stronger negative relationship between corporate governance and CEO quality in industries with greater competition for managers, where the latter is measured as the frequency of external hires. Finally, in support of the assumption that compensation and governance are chosen as part of an optimal incentive package, corporate governance changes significantly when a new CEO is hired with better CEOs being offered weaker governance.

Our finding that corporate governance affects the matching between managers and firms has important implications for the debate on 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.[11] Since

[11]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, Gottschalg, Hahn and Kehoe (2010) on the LBOs during 1995 to 2005 (in the U.K. and the Western Europe).

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 with dispersed shareholders that concentrated private equity investors can "arbitrage" through their investments in active governance.

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Table 1: **Summary Statistics**

This table presents the summary statistics for the variables used in the empirical section. *Return on Assets (ROA)* 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. *Accruals* are the discretionary accruals calculated using the modified Jones model as in Dechow et al. (1995), *Market Cap* is the firm market capitalization. *G-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 Perf* is the proportion of variable pay (bonuses and stock options) over total pay in percentage. *CEO Tenure* is the difference between the current year and the year the executive became CEO; *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.

Variable	Mean	Std. Dev.	Min	Max
ROA	0.051	0.097	-0.470	0.319
Book Leverage	0.361	0.249	0	1.329
Cash	0.949	2.780	0.001	40.827
Interest Coverage	51.154	184.598	-31.232	1545.536
Dividend Earnings	0.082	0.104	-0.061	0.615
Tobin's q	1.906	1.202	0.737	9.181
Accruals	0.005	0.065	-1.069	0.802
Market Cap.	8.071	1.516	4.474	12.272
G-Index	9.415	2.624	2	18
CEO Duality	0.653	0.175	0	1
Total Comp.	7.827	1.027	4.738	9.864
Pay for Perf	68.761	22.693	0	99.897
CAPX	0.063	0.053	0.001	0.480
Tobin's q	1.931	1.3314	0.501	27.087
CEO Tenure	7.914	7.406	0	56
CEO Age	56.236	7.335	33	91
External	0.131	0.337	0	1
Takeover	0.223	0.4164	0	1

Table 2: **Estimation of CEO 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 dependent variable is *Return on Assets* and the control variables are *Market Cap*, *Book Leverage*, *Cash*, *Interest Coverage*, *Dividend earnings*, Tobin's *q*, *Accruals* and year dummies. All explanatory variables are lagged one year. We include dummy variables that take value 1 for a specific CEO in a given firm and zero otherwise. 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 for the estimated CEO Ability are also reported.

Dependent Variable:	ROA
L.Market Cap.	-0.0062
	(0.0067)
L.Book Leverage	0.0048
	(0.0096)
L.Cash	0.0018
	(0.0010)
L.Interest Coverage	-9.91E-08
	(-1.77E-05)
L.Dividend Earnings	-0.0010
	(0.0111)
L.Tobin's q	0.0183
	(0.0039)***
L. Accruals	-0.0002
	(0.0211)
Industry/ Year F.E.	Y
Observations	10103
CEO-Industry effects identified	2831
CEO Ability Mean	0.0696
CEO Ability Std. Dev.	0.1794
CEO Ability Min	-0.9282
CEO Ability Max	0.8645

Table 3: **CEO Ability, Governance, Compensation & Size**

In Panel A, we regress corporate governance, firm size and different components of compensation on the CEO ability obtained in Table 2. In Panel B, we estimate the probability of takeover (in Columns 1 and 2) and a Cox model (in Columns 3 and 4) of CEO employment duration. In Panel A, we use *G-Index* as measure of corporate governance. Executive compensation (*Total Comp*) is the logarithm of CEO total compensation and *Pay for Perf* is the proportion of variable pay (bonuses and stock options) over total pay in percentage. Firm size is measured as *Market Cap* and *CAPX*. *CEO Ability* are the coefficients on the CEO fixed effects obtained in Table 4. All regressions in Panel A include CEO Characteristics (CEO Tenure, CEO Age, External dummy), industry fixed effects and year dummies and coefficients are estimated with Weighted Least Squares to correct for estimation errors in the first stage. In Panel B, Columns 1 and 2 we report a tobit model on takeovers. *Takeover* takes value one if that firm-CEO match experiences a takeover, zero otherwise. Columns 3 and 4 report a Cox duration model to estimate CEO employment length. Column 3 uses the entire sample of CEOs, while column 4 only includes those CEOs under 65 years of age. Results are reported in terms of Hazard Rates. Regressions in Panel B include market capitalization, CEO Characteristics (CEO Age, External dummy), industry fixed effects and year dummies. 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: Governance, Compensation & Size

Dependent Variable	G-Index	Total Comp.	Pay for Perf.	Market Cap.	CAPX
	(1)	(2)	(3)	(4)	(5)
CEO Ability	2.575	2.749	75.462	5.678	0.053
	(1.363)*	(0.413)***	(9.530)***	(0.552)***	(0.024)**
	(0.991)**	(0.250)***	(6.940)***	(0.267)***	(0.012)***
Industry/ Year F.E.	Y	Y	Y	Y	Y
CEO Characteristics	Y	Y	Y	Y	Y
Observations	9102	9102	9102	9102	9012
R-squared	0.208	0.423	0.369	0.591	0.443

Panel B: CEO Employment Length

Model	Tobit	Tobit	Cox	Cox
Observations	Takeover	Completed Takeover	All Ages	Age $\leq$ 65
	(1)	(2)	(3)	(4)
CEO Ability	-2.934	-2.770	0.102	0.090
	(0.733)***	(0.731)***	(0.077)***	(0.075)***
	(0.412)***	(0.469)***	(0.067)***	(0.051)***
Industry/ Year F.E.	Y	Y	Y	Y
Market Cap.	Y	Y	Y	Y
CEO Characteristics	Y	Y	Y	Y
Observations	9102	9102	9102	8209

Table 4: **CEO Turnover and Corporate Governance**

In these table, we regress the change in corporate governance (as measured by *G-Index*) on CEO turnover and and *CEO Quality*. We also analyze the changes in compensation around turnover. *Chg* is a dummy variable that takes value 1 if *G-Index* changes from the previous period and 0 otherwise. *Chg Up* is a dummy variable that takes value 1 if *G-Index* increases from the previous period and 0 otherwise. *Chg Down* is a dummy variable that takes value 1 if *G-Index* decreases from the previous period and 0 otherwise. *Turnover* is a dummy variable that takes value 1 if the CEO changes over the period since the last measurement of *G-Index* and 0 otherwise. *Turnover Up* is a dummy variable that takes value 1 if the CEO changes over the period since the last measurement of *G-Index* and the new CEO is better than the previous one (that is, CEO quality goes up over the period) and 0 otherwise. *Turnover Down* is a dummy variable that takes value 1 if the CEO changes over the period since the last measurement of *G-Index* and the new CEO is worse than the previous one (that is, CEO quality goes down over the period) and 0 otherwise. *Up* is a dummy variable that takes value 1 if the current CEO is better than the previous one, 0 otherwise. In Panel A, we estimate a logit specification of the changes in corporate governance regressed on the measures of CEO turnover defined above. In Panel B, we restrict the sample to the observations in which there is a CEO turnover and also analyze the changes in compensation. *Av Comp* is the average total compensation for a given CEO and *Av Perf* is the average pay for performance for a given CEO. All regressions include industry fixed effects and year dummies. 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: All Observations

Dependant Variable:	Chg	Chg Up	Chg Down
	(1)	(2)	(3)
Turnover	0.353	-0.274	0.134
	(0.072)***	(0.115)**	(0.165)
	(0.162)**	(0.143)*	(0.202)
Turnover Up		0.472	
		(0.186)**	
		(0.285)*	
Turnover Down			-0.319
			(0.252)
			(0.305)
Up		-0.241	0.194
		(0.120)**	(0.153)
		(0.189)	(0.249)
Market Cap.	0.008	-0.108	0.215
	(0.023)	(0.026)***	(0.038)***
	(0.017)	(0.037)***	(0.040)***
Observations	4249	4228	4236
R-squared	0.031	0.057	0.045

Table 4 (Cont.)

Panel B: Turnover Only

Dep Variable:	Chg Up	Chg Down	Av Comp	Av Perf	Av Comp	Av Perf
	(1)	(2)	(3)	(4)	(5)	(6)
Turnover Up	0.280		0.093	2.271		
	(0.160)*		(0.038)**	(0.987)**		
	(0.175)		(0.030)**	(0.891)*		
Turnover Down		-0.194			-0.093	-2.271
		(0.209)			(0.038)**	(0.987)**
		(0.235)			(0.030)**	(0.891)*
Market Cap.	-0.128	0.130	0.458	6.460	0.458	6.460
	(0.051)**	(0.076)*	(0.013)***	(0.361)***	(0.013)***	(0.361)***
	(0.053)**	(0.076)*	(0.017)***	(0.399)***	(0.017)***	(0.399)***
Observations	1108	1056	1132	1132	1132	1132
R-squared	0.091	0.077	0.601	0.309	0.601	0.309

Table 5: **Individual Components of G-Index and CEO Ability**

In these tables, we show detailed results regarding the relationship between our proxy of CEO ability and the sub-components of the *G-Index*. In Panel A, regressions include CEO Characteristics (CEO Tenure, CEO Age, External dummy), industry fixed effects and year dummies and coefficients are estimated with Weighted Least Squares to correct for estimation errors in the first stage. We only report the coefficient on CEO ability. In Panel B, we regress the change in corporate governance (as measured by *Chg Up*) on CEO turnover and changes in *CEO Quality*. *Chg Up* is a dummy variable that takes value 1 if each sub-index of *G-Index* increases from the previous period and 0 otherwise. *Turnover* is a dummy variable that takes value 1 if the CEO changes over the period since the last measurement of the sub-index of *G-Index* and 0 otherwise. *Turnover Up* is a dummy variable that takes value 1 if the CEO changes over the period since the last measurement of the subindex of *G-Index* and the new CEO is better than the previous one (that is, CEO quality goes up over the period) and 0 otherwise. *Up* is a dummy variable that takes value 1 if the current CEO is better than the previous one, 0 otherwise. Regressions include market capitalization, industry fixed effects and year dummies. Standard errors are reported in parenthesis below the coefficient and clustered at the firm level at the top and at the year level at the bottom. *, **, or *** indicates that the coefficient is statistically significantly different from zero at the 10%, 5%, or 1% level, respectively.

Panel A: Cross-sectional evidence

Dependent Variable	Delay	Protection	Voting	Other	State Law
	(1)	(2)	(3)	(4)	(5)
CEO Ability	0.795	0.834	0.412	1.578	-0.846
	(0.658)	(0.628)	(0.410)	(0.480)***	(0.648)
	(0.498)	(0.325)**	(0.148)**	(0.320)***	(0.214)***
Observations	9102	9102	9102	9102	9102
R-squared	0.188	0.204	0.152	0.200	0.165

Panel B: Turnover Results

Dependant Variable:	Chg Up	Chg Up	Chg Up	Chg Up	Chg Up
	Delay	Protection	Voting	Other	State Law
	(1)	(2)	(3)	(4)	(5)
Turnover	-0.159	-0.354	-0.800	-0.481	-0.119
	(0.213)	(0.152)**	(0.375)**	(0.233)**	(0.395)
	(0.140)	(0.156)**	(0.209)***	(0.367)	(0.462)
Turnover Up	-0.711	0.633	1.132	0.492	-0.316
	(0.350)**	(0.252)**	(0.576)**	(0.384)	(0.695)
	(0.404)*	(0.514)	(0.299)***	(0.602)	(0.937)
Up	0.273	-0.428	-0.587	-0.089	0.026
	(0.188)	(0.159)***	(0.347)*	(0.231)	(0.430)
	(0.240)	(0.282)	(0.319)*	(0.328)	(0.489)
Observations	3810	3841	3662	3783	3191

Appendix A: Proofs

Proof of Lemma. Shareholders' maximization problem is defined in (6). First, it is important to notice that the choice of investment is independent of the choice of the other endogenous variables: $I_e = Y'^{-1}\left(\frac{r}{e}\right)$. The choice of (p, g) will depend on the value of $\overline{u}_e$.

If $\overline{u}_e < B$, the IR constraint (5) in problem (6) is redundant, and the only relevant constraint is the IC constraint (4). Replacing the binding IC constraint in shareholders' objective function, we have

$$\max_{g\in[0,1]} e\left[Y(I_e) - (1-g)b\right] - B + (1-e)\frac{\delta}{2R}\left[(R-b)^2 + gb(2R-b)\right] - rI_e$$

which is strictly increasing in g. Hence, $g_e = 1$ and $p_e = B/e$.

In the symmetric case in which $\overline{u}_e > b + B$, the IC constraint is redundant. Thus, the only relevant constraint is the IR constraint (5). Replacing the binding IR constraint in shareholders' objective function, we have

$$\max_{g\in[0,1]} eY(I_e) - \overline{u}_e + (1-e)\frac{\delta}{2R}(R-b)^2 + (1-e)b - g\frac{(1-e)b}{2R}\left[2R(1-\delta) + \delta b\right] - rI_e$$

which is strictly decreasing in g. Hence, $g_e = 0$ and $p_e = \frac{\overline{u}_e - (1-e)b}{e}$.

For intermediate values of $\overline{u}_e$, $\overline{u}_e \in [B, b+B]$, both the IR and IC constraints can be binding. The set of feasible choices of (g, p) is the shaded are in Figure 2. Given that shareholders' objective function is increasing in g and decreasing in p, the solution must lie on the IR constraint. Moreover, since both the shareholders' maximization, equation (6), as well as the IR constraint, equation (5), are linear on g, the problem will have a corner solution. Shareholders will choose between $(p_e, g_e) = \left(\frac{\overline{u}_e - (1-e)(\overline{u}_e - B)}{e}, 1 - \frac{\overline{u}_e - B}{b}\right)$, which is represented as point A in Figure 2, and $(p_e, g_e) = \left(\frac{\overline{u}_e}{e}, 1\right)$, which is point B in the figure. It is straightforward to show that the former one leads to higher profits. ■

Proof of Proposition 1. By assumption, there is an excess of L managers. Hence, $\overline{u}_L = 0$. It follows from Lemma 1 that firms hiring a L manager set $g_L = 1$, $p_L = B/e_L$ and $I_L = Y'^{-1}\left(\frac{r}{e_L}\right)$ with associated profits

$$\pi_L = e_L Y(I_L) - B + (1-e_L)\frac{\delta R}{2} - rI_L = 0$$

with the last equality following from Assumption 1. Any firm can achieve this level of profit, and they may be able to do better by hiring the more productive H-type

manager. Given Lemma 1, the expected profits from hiring a H managers are:

$$\pi_e = \begin{cases} eY(I_e) - B + (1-e)\frac{\delta R}{2} - rI_e & \text{if } \overline{u}_e < B \\ eY(I_e) - \overline{u}_e - rI_e + \\ (1-e)\frac{1}{2R}\left\{\delta R^2 + (\overline{u}_e - B)\left[2R(1-\delta) + \delta b\right]\right\} & \text{if } \overline{u}_e \in [B, b+B] \\ eY(I_e) - \overline{u}_e + (1-e)\left[b + \frac{\delta(R-b)^2}{2R}\right] - rI_e & \text{if } \overline{u}_e > b+B \end{cases}$$

where $I_e = Y'^{-1}\left(\frac{r}{e}\right)$.

To find the optimal contract for the H-type managers, we need to solve for the endogenously determined $\overline{u}_e$. First, we can establish the following result: in equilibrium, firms must obtain the same profits hiring the H-type or the L-type manager. The reasoning is as follows. Given $m_H < n$, $m_L > n$ and Assumption 1, in any equilibrium, some firms employ L-type managers. Suppose there is an equilibrium in which firm j employs an H- type with contract (p_e^j, g_e^j, I_e^j) and obtains higher profits than firms employing an L-type. This cannot be an equilibrium because a firm employing an L-type would profitably deviate to $(p_e^j + \varepsilon, g_e^j, I_e^j)$, with ε close enough to zero, would hire the H-type manager previosuly employed by firm j for sure and would increase profits. On the contrary, suppose there is an equilibrium in which firm k employs an H-type with contract $\left(p_e^k, g_e^k, I_e^k\right)$ and obtains lower profits than firms employing an L-type. Then, this firm would always find it profitable to employ and L-type manager and offer the contract $(p_L, g_L, I_L) = \left(\frac{B}{e_L}, 1, Y'^{-1}\left(\frac{r}{e_L}\right)\right)$.[12]

Therefore, it must be that employing an H-type manager leads to the same profits than employing an L-type manager ($\pi_e = 0$). Under these conditions, Assumption 4 implies that all H-type managers and only $n - m_H$ of the L-type managers will be employed. The condition that employing an H-type manager leads to zero profit can be solved for $\overline{u}_e$. From equation (8), it is clear that $\overline{u}_e > B$. Otherwise, π_e is not a function of $\overline{u}_e > B$. If $\overline{u}_e > B + b$, then

$$\overline{u}_e = eY(I_e) + \left[b + \frac{\delta(R-b)^2}{2R}\right] - rI_e \equiv \overline{u}_e^1,$$

This is an equilibrium if $e > \widehat{e}$ where $\widehat{e}$ is such that

$$\widehat{e}\left[Y(I_{\widehat{e}}) - b - \delta\frac{(R-b)^2}{2R}\right] - rI_{\widehat{e}} = B - \delta(R-b)^2/(2R),$$

If instead $\overline{u}_e \leq B + b$, then

$$\overline{u}_e = \frac{eY(I_e) - rI_e + (1-e)\left[\frac{\delta R}{2} - B(1 - \delta + \delta b/(2R)) - \delta b(1 - b/(2R))\right]}{1 - (1-e)(1 - \delta + \delta b/(2R))} \equiv \overline{u}_e^2.$$

This is an equilibrium if $e \leq \widehat{e}$. ■

[12]We develop this argument for completeness. However, given Assumption 1, an equilibrium in which a firm has lower profits than a firm employing and L-type manager is never possible as this would imply negative profits and thus the firm's participation constraint would be violated.

Appendix B: G-Index

For each of component and subindex of the *G-Index*, the table reports mean, minimum, maximum and both within and between variation across Fama-French industries.

	Mean	Min	Max	Within	Between
G-Index	**9.020**	**1**	**19**	**7.054**	**110.582**
Delay	2.206	0	4	1.421	9.193
Blank Check	0.868	0	1	0.112	0.773
Classified Board	0.583	0	1	0.236	2.512
Special Meeting	0.385	0	1	0.234	0.988
Written Consent	0.369	0	1	0.227	1.888
Protection	2.203	0	6	1.438	21.248
Compensation Plan	0.670	0	1	0.218	1.090
Contracts	0.101	0	1	0.089	0.702
Golden Parachutes	0.629	0	1	0.226	2.429
Indemnification	0.259	0	1	0.185	2.308
Liability	0.460	0	1	0.235	4.437
Severance	0.084	0	1	0.076	0.317
Voting	2.181	0	6	0.603	6.365
Bylaws	0.191	0	1	0.153	0.706
Charter	0.029	0	1	0.028	0.211
Cumulative Voting	0.884	0	1	0.098	1.723
Secret Ballot	0.903	0	1	0.085	0.852
Supermajority	0.346	0	1	0.214	3.798
Unequal Voting	0.017	0	1	0.017	0.102
Other	0.951	0	5	0.780	12.550
Antigreenmail	0.165	0	1	0.133	1.687
Directors' duties	0.106	0	1	0.093	0.691
Fair Price	0.486	0	1	0.230	6.278
Pension Parachutes	0.022	0	1	0.021	0.166
Poison Pill	0.533	0	1	0.240	2.978
Silver Parachutes	0.023	0	1	0.022	0.240
State Law	1.622	0	6	1.377	21.483
Antigreenmail Law	0.130	0	1	0.109	1.374
Business Combination Law	0.875	0	1	0.106	1.144
Cash-Out Law	0.030	0	1	0.029	0.163
Directors Duties Law	0.038	0	1	0.036	0.258
Fair Price Law	0.322	0	1	0.204	4.379
Control Share Acquisition Law	0.227	0	1	0.167	2.607

Appendix C: Further Evidence

Table A1. Market for CEOs as the source of corporate governance externality

In this table, we regress CEO compensation (*Total Comp.*) on market capitalization and measures of corporate governance for the firm and its size-matched comparables. We use the *G-Index* as our measure of corporate governance. 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*, *Fract Indep* and *CEO Duality*). 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.

	(1)	(2)	(3)	(4)
Market Cap	0.458	0.459	0.453	0.485
	(0.010)***	(0.010)***	(0.013)***	(0.029)***
	(0.007)***	(0.008)***	(0.009)***	(0.030)***
Own Governance	0.023	0.023	0.018	0.001
	(0.006)***	(0.006)***	(0.006)***	(0.010)
	(0.002)***	(0.002)***	(0.002)***	(0.007)
Competitor Governance	0.011	0.010	0.009	0.004
	(0.005)**	(0.005)*	(0.006)	(0.005)
	(0.003)***	(0.004)**	(0.003)**	(0.003)
Industry / Year F.E.	Y	Y	Y	N
CEO Characteristics	N	Y	Y	Y
Board Composition	N	N	Y	Y
Firm FE and Year dummies	N	N	N	Y
Observations	9,833	8,964	7,370	7,370
R-squared	0.527	0.533	0.535	0.776

Table A2. The effect of corporate governance on performance

In this table we regress corporate governance, firm size and different components of compensation on the CEO ability. CEO ability is obtained in Panel A by regressing ROA on the once-lagged values of market capitalization, book leverage, cash holdings, interest coverage, dividend over earnings, Tobin's q, accruals, industry and year fixed effects (as in Table 2), and with the addition of G-Index and total compensation. All regressions in panel B include CEO Characteristics (CEO Tenure, CEO Age, External dummy), industry fixed effects and year dummies and 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: First stage

Dependent Variable:	ROA
L.Market Cap.	-0.0086
	(0.0063)
L.Book Leverage	0.0090
	(0.0106)
L.Cash	0.0022
	(0.0026)
L.Interest Coverage	0.0000
	(0.0000)
L.Dividend Earnings	-0.0010
	(0.0134)
L.Tobin's q	0.0191
	(0.0065)***
L. Accruals	0.0029
	(0.0210)
L. G-Index	-0.0044
	(0.0018)**
L. Total Comp.	0.0014
	(0.0021)
Industry/ Year F.E.	Y
Observations	9662

Panel B: Second stage

Dependent Variable	G-Index	Total Comp.	Pay for Perf.	Market Cap.	CAPX
CEO Ability	8.396	3.222	58.593	7.610	0.040
	(1.002)***	(0.307)***	(7.033)***	(0.532)***	(0.016)**
	(0.837)***	(0.262)***	(3.978)***	(0.329)***	(0.006)***
Industry/ Year F.E.	Y	Y	Y	Y	Y
CEO Characteristics	Y	Y	Y	Y	Y
Observations	9102	9102	9102	9102	9012
R-squared	0.383	0.386	0.265	0.530	0.473

Figure 1: **Timeline**

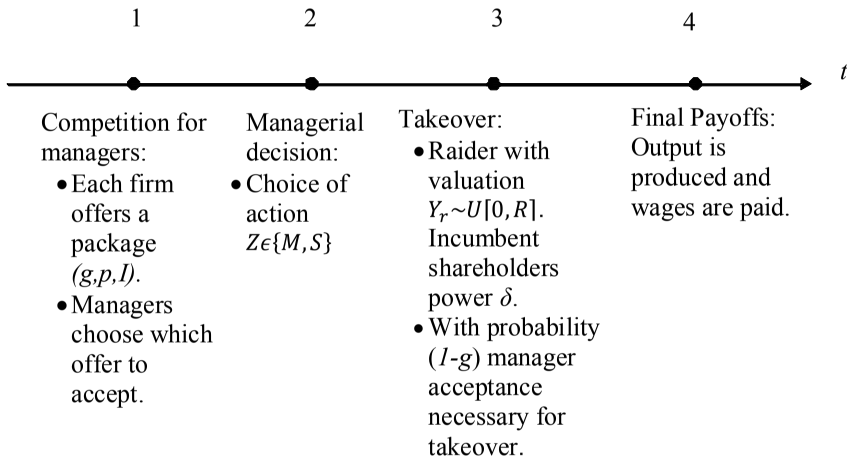

Figure 2: **Feasible Incentive Contracts**

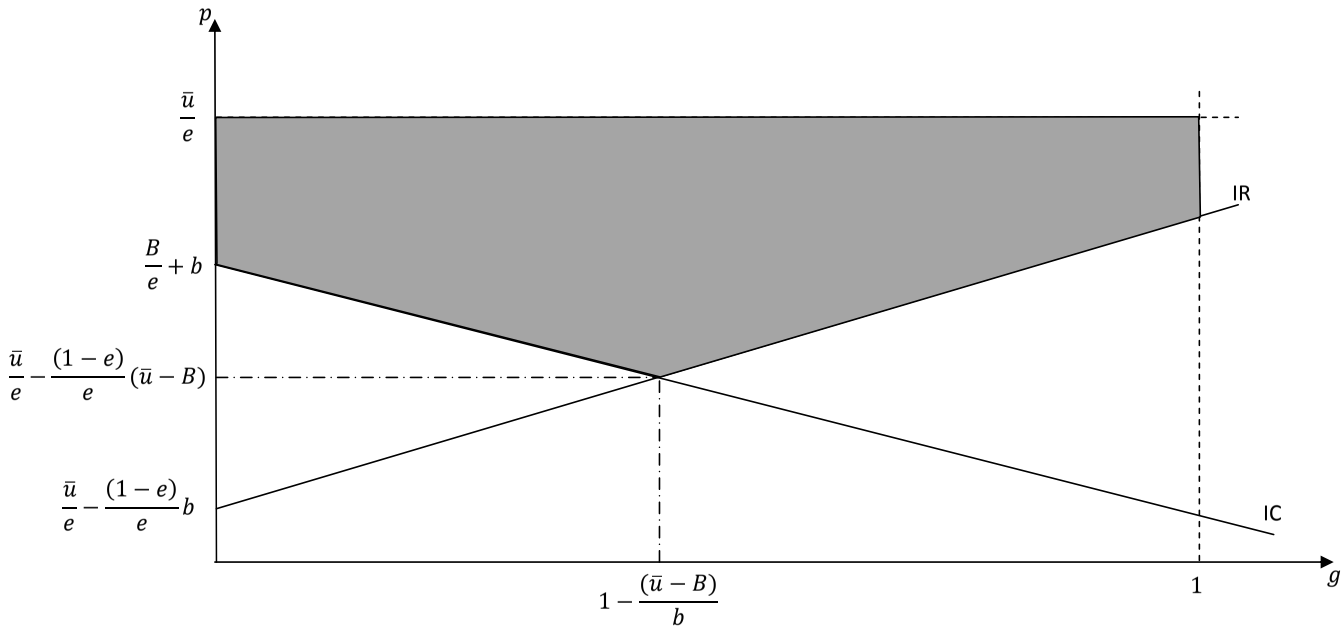

Figure 3: **Competition for Managers**

In this figure, we show the cross-industry differences in the correlation between corporate governance and managerial ability. We estimate regression $G-Index = \beta_{\gamma}^{ind} \times CEOAbility + \upsilon_{jt} + \chi_t + z_{ind} + \xi_{it}$, separately for each industry. The figure below plots the value of the estimated coefficient on *CEO Ability* (β_{γ}^{ind}) with respect to our measure of the degree of competition for managers in that industry (the *Percentage of Insider Promotions* as per Cremers and Grinstein, 2010). The number next to each data point indicates the industry code: 1 = Agriculture, 2 = Food Products, 3 = Candy & Soda, 4 = Beer & Liquor, 5 = Tobacco Products, 6 = Recreation, 7 = Entertainment, 8 = Printing and Publishing, 9 = Consumer Goods, 10 = Apparel, 11 = Healthcare, 12 = Medical Equipment, 13 = Pharmaceutical Products, 14 = Chemicals, 15 = Rubber and Plastic Products, 16 = Textiles, 17 = Construction Materials, 18 = Construction, 19 = Steel Works Etc, 20 = Fabricated Products, 21 = Machinery, 22 = Electrical Equipment, 23 = Automobiles and Trucks, 24 = Aircraft, 25 = Shipbuilding, Railroad Equipment, 26 = Defense, 27 = Precious Metals, 28 = Non-Metallic and Industrial Metal Mining, 29 = Coal, 30 = Petroleum and Natural Gas, 31 = Utilities, 32 = Communication, 33 = Personal Services, 34 = Business Services, 35 = Computers, 36 = Computer Software, 37 = Electronic Equipment, 38 = Measuring and Control Equipment, 39 = Business Supplies, 40 = Shipping Containers, 41 = Transportation, 42 = Wholesale, 43 = Retail, 44 = Restaurants, Hotels, Motels, 45 = Banking, 46 = Insurance, 47 = Real Estate, 48 = Trading. We include only industries with more than 100 observations.