Competition for Managers, Corporate Governance and Incentive Compensation

Viral Acharya (NYU), Marc Gabarro (LBS) and Paolo Volpin (LBS)

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Abstract

We propose a model in which firms compete to attract better managers using corporate governance as part of an optimal executive compensation scheme. In our setting, higher corporate governance decreases the cost of taking disciplinary actions against managers. When managerial talent is scarce, we show that competition among firms to attract better managers implies that firms choose lower levels of corporate governance. The reason is that managerial rents are determined by the managerial reservation value when employed elsewhere. Hence, if a firm chooses a high level of governance, the remuneration package and pay for performance has to increase to meet the managerial reservation value. It is therefore the firm, and not the manager, that ends up bearing the costs of higher governance. We also provide empirical support for the model. First, we show that a firm's executive compensation is not chosen in isolation but it also depends on other firms' corporate governance. Then, we document that firms use (weak) corporate governance as a substitute for executive compensation to attract better managers. In particular, better managers are matched to firms with weaker corporate governance.

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Authors' e-mail addresses: vacharya@stern.nyu.edu; mgabarro.phd2006@london.edu; pvolpin@london.edu.

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1 Introduction

The recent public outcry for the pay of investment bankers (see for instance, WSJ, February 7, 2009, and FT, February 9, 2009) is just the latest manifestation of the ongoing debate on executive pay that has kept academics busy for the last twenty years (at least since Jensen and Murphy, 1990). The critical questions are always the same: Why are executive (and other professional individuals) paid so much? Are they paid like bureaucrats (that is, independently of their performance)? Or are they bearing the consequences of their poor performance? What can be done to make them internalize the costs of poor performance?

In the first part of the paper, we develop a theoretical model to explain how competition among firms to attract better managers plays a crucial role in this discussion. In our model, firms can incentivize managers to take the right action rewarding them when things go well (using pay for performance) and can punish them when things go badly (using corporate governance). When firms do not have to compete with each other to attract top quality managers, firms choose a combination of pay for performance and corporate governance that just meets the manager incentive compatibility condition.

However, when managerial talent is rare and firms have to compete to attract one of 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 top quality managers' rents as these managers can always work for another firm. In other words, managerial rents for top quality managers are exogenous for a given firm. Therefore, it becomes inefficient for a firm that wants to employ a top quality manager to choose high corporate governance as it would have to compensate the manager via an increase in her pay for performance. In short, it is the firm (and not the manager) that ends up bearing the costs of higher corporate governance.

Even if firms are ex ante identical, the market equilibrium features separation between two groups of firms: some hire the better-quality managers, pay them a rent, underinvest in corporate governance and in size; the rest of the firms hire the worse-quality managers, and choose the optimal investment in corporate governance and firm size. The rent paid to better-quality managers is exactly equal to the difference in profitability between better and worse managers. In other words, it is firms – and not managers – that end up bearing the costs of implementing corporate governance.

In the second part of the paper, we provide empirical support for these results. We employ balance-sheet data from Compustat on unregulated firms in the United States over the period 1993 to 2007, on the compensation they award their CEO's and their turnover from ExecuComp, and on their corporate governance using the indices constructed by Gompers et al. (2003) and Bebchuk et al. (2008).

First, we show that the choice of corporate governance in one firm has a positive spillover on other firms: the executive compensation in a given firm and year is decreasing in the lagged score of corporate governance in the firm itself *and* in the average governance score of the 20 worst-governed firms for the year. This result holds even after controlling for other determinants of executive compensation, such as market capitalization (as suggested by Gabaix and Landier, 2008).

Second, we find evidence consistent with the idea that governance is chosen as part of the incentive contract offered to newly hired managers. We find that executive compensation of the newly employed CEO differs form the previous CEO compensation only if corporate governance is changed contemporaneously. In these cases, we observe an increase in total compensation when there is a decrease in the quality of corporate governance.

Third, we show that the allocation of CEOs and firms is consistent with the matching equilibrium predicted by the model. Our empirical strategy follows a two-stage approach. In the first stage, managerial talent is measured as the CEO fixed effect in a regression of firm's operating performance on several control variables. In the second stage, we correlate these predicted measures of managerial talent with corporate governance, executive compensation, and Tobin's Q. Consistent with the predictions of our model, we find that better managers are employed by firms with weaker governance and higher Tobin's Q, and are paid more.

To summarize, competition amongst firms for scarce managerial talent appears to be an important determinant of observed executive compensation and governance practices.

1.1 Related Literature

The paper is related to a large literature on executive compensation and corporate governance. The canonical view on the executive compensation problem is that it is the solution of the principal-agent problem between a set of risk-neutral investors and a risk-averse manager (Holmstrom, 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. Three main economic views have been suggested to overcome these limitations and explain executive compensation trends: managerial rent extraction, firm heterogeneity (mainly size), and the specificity of managerial skills.

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

The second explanation relates the level of pay to exogenous heterogeneity in firm size. Gabaix and Landier (2008), Terviö (2008), and Edmans, Gabaix and Landier (2009) present matching models à la Rosen (1981) in which the differences in size across firms predict some of the well documented empirical facts on executive compensation. Gabaix and Landier (2008) and Terviö (2008) show that the empirically documented positive cross-sectional correlation between firm size and compensation may optimally arise in a setup where managerial talent has a multiplicative effect on firm performance and managers are compensated according to their increase in productivity as better managers will be matched to larger firms. Similarly, Edmans, Gabaix and Landier (2009) present a model in which both the low ownership and its negative correlation with firm size arise as part of an optimal contract. Our model improves on this part of the literature because we treat size as an endogenous variable. In particular, we explore the impact of the extent of real investment on the market for managerial talent and corporate governance. We show that investment size may be a viable way to attract better managers and thereby determine the equilibrium choice of size by firms. We find that indeed firms that invest more will attract better managers but choose worse corporate governance. Conversely, firms that invest less will attract worse managers and choose better corporate governance.

Third, academics have related the recent rise in compensation to changes in the types of managerial skills required by firms. For example, Murphy and Zábojník (2007) argue that CEO pay has risen because of the increasing importance of general managerial skills relative to firm-specific abilities. Supportive evidence is provided by Frydman and Saks (2008). Our model suggests that an increase in competition for managers may be the reason for the large increase in executive compensation over the last three decades.

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

The paper is also related to a growing literature on spillover and externality effects in corporate governance initiated by Hermalin and Weisbach (2006), who provide a framework for assessing corporate governance reforms from a contracting standpoint and justify the need for regulation in the presence of negative externalities arising from governance failures. Acharya and Volpin (2009) and Dicks (2009) formalize this argument in a model where the choice of corporate governance in one firm is a strategic substitute for corporate governance in another firm. As in this paper, the externality therein is due to competition for managerial talent among firms. In a somewhat different context, Nielsen (2006) and Cheng (2009) model the negative externalities caused by earnings manipulation across firms. Nielsen (2006) considers a setting where governance improves publicly disclosed information about a firm and facilitate managerial assessment in competing firms. Cheng (2009) shows that earnings management in one firm may cause earnings management in other firms in the presence of relative performance compensation.

The rest of the paper is structured as follows. Section 2 presents the model. Section 3 presents the empirical evidence for our testable hypotheses. Section 4 concludes.

2 Theoretical Analysis

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

2.1 Setup of the Model

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

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

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

At $t = 1$, firms choose professional CEOs from a pool of candidates of observable quality

$\widetilde{e} \in \{e, 1\}$. Managers are risk averse and have the following utility function:

$$U = E(w) - \frac{1}{2} A \; Var(w) \tag{1}$$

where $A \geq 0$ is the coefficient of absolute risk aversion, w is the (random) total pay received by the manager. Managers have an outside option which is normalized to 0. At this stage, firms make offers and managers choose. If a manager is not employed at the end of this stage, he receives the reservation utility equal to 0. Similarly, a firm that does not employ any managers receives an output equal to 0.[1]

The founder offers a contract of the following general form: a fixed payment b, which is paid independently of performance (the signing bonus); a performance-related bonus p, which is contingent on the verifiable output X and paid at $t = 4$; and a severance payment s, which is conditional on the manager leaving the firm voluntarily at $t = 3$.[2] Moreover, as part of the incentive package, at $t = 1$ the firm also chooses the level of corporate governance $g \in [0, 1]$, which comes at a cost $kIg^2/2$. This cost reflects the costs of investing in auditing and information technology to make sure that the board of directors can detect and replace poorly performing managers. It also captures the indirect costs of hiring truly independent directors rather than directors who are better at advising the CEO on strategic decisions. The benefit of corporate governance is that it reduces the cost of firing the manager in the future, if shareholders desire to do so, and thus it reduces managerial entrenchment. For instance, governance increases coordination among shareholders and makes board of directors more effective and independent. Specifically, we assume that shareholders receive a fraction g of the surplus from renegotiation (replacement decision at $t = 3$) and the manager a fraction $1 - g$.

At $t = 2$, managers choose action $A \in \{M, S\}$, where choice M generates a payoff $X = 0$ for the firm and a private benefit B (for sure) for the manager; while action S generates a payoff $X = Y(I)$ with probability e and $X = 0$ otherwise, and no private benefits for the manager. The choice of action is not observable by shareholders.[3]

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

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[1] As a tie-braking assumption, we assume that in case of indifference firms prefer to hire a H-type manager.

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

[3] An alternative interpretation of the L-type managers is that they are managers with uncertain productivity. With probability e, they are as good as H-type managers. Otherwise, they produce 0.

At $t = 4$, output is realized and distributed; and p is paid.

We make the following technical assumptions:

(i) Types are observable: this assumption is relaxed in an extension.

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

(iii) $e \geq 1 - \frac{1}{2AB}$: to ensure that there is a solution to the incentive problem of the manager.

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

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

2.2 Competition for Managers

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

2.2.1 Severance Payment and Turnover

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

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

In the timing of the compensation presented above, severance payments are agreed upon employment of the manager and are not an outcome of the negotiation happening when the manager is fired. This is consistent with empirical evidence from Rusticus (2006) that shows that severance agreements are agreed upon when the CEO is appointed.

2.2.2 Compensation Contract and Corporate Governance

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

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

$$U(M) = b_i + (1 - g_i)\delta I + B$$

If he chooses action S, then his utility equals

$$U(S) = b_i + (1 - g)\delta I + e_i [p_i - (1 - g_i)\delta I] - \frac{1}{2} A e_i (1 - e_i) [p_i - (1 - g_i)\delta I]^2$$

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

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

The corresponding participation constraint (PC) is

$$b_i + (1 - g_i)\delta I + e_i [p_i - (1 - g_i)\delta I] - \frac{1}{2} A e_i (1 - e_i) [p_i - (1 - g_i)\delta I]^2 \geq \overline{u}_i \tag{3}$$

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

$$\xi_i - \frac{1}{2} A (1 - e_i) \xi_i^2 \geq \frac{B}{e_i} \tag{4}$$

while the PC condition takes the form

$$b_i + (1 - g_i)\delta I + e_i \xi_i - \frac{1}{2} A e_i (1 - e_i) \xi_i^2 \geq \overline{u}_i \tag{5}$$

Then, we can solve the second order equation in ξ_i to find the IC-compatible incentive contract

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

Because of the definition of ξ_i, the corresponding pay for performance is:

$$p_i = (1 - g_i)\delta I + \xi_i. \tag{6}$$

Given that there are lots of L-type managers, there is no competition for them. Therefore, the participation constraint is redundant and the incentive compatibility condition is strictly binding for the L-type managers. Hence,

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

and $b_L = 0$.

Without loss of generality, we can also assume that the IC condition for the H-type manager is binding. The intuition for this result is that for any effort $e < 1$, the pay for performance p is chosen at the lowest possible level since paying a higher p is more expensive for the firm than paying a higher b. Specifically, a firm which wants to increase the manager's utility by \$1 in certainty equivalence, is better off by increasing b than p (as \$1 increase in certainty equivalence terms costs exactly \$1 in expectation when done through b and more than $\$1/e > \$1$ if done through p). We assume that this argument also applies for $e = 1$. However, in this case, managers are indifferent between b and p as there is no uncertainty on their productivity. Therefore, p_H is set to satisfy the incentive compatibility condition with equality:

$$p_H = (1-g)\delta I + B.$$

Importantly, when analyzing the H-type managers, we should take account of the fact that they are rare. Hence, a firm that wants to hire them faces a non-trivial participation constraint, as the managers' outside option is to work for another firm. Let us denote with $\overline{u}_H$ the firm's expectation of the lowest utility that a H-type manager receives: in other words, $\overline{u}_H$ is the outside option of the worst off H-type manager whom the firm could target. We focus on symmetric equilibria. Hence, all H-type managers share the same $\overline{u}_H$.

Given these considerations, we can prove the following result:

Lemma 1: *(i) If $\overline{u}_H < (1-e)\,Y(I) + e\,[\delta I + \xi(e)] - \frac{\delta^2 I}{2k}$, then firms prefer to hire a H-type manager, by offering an incentive contract*

$$(b, g, p) = (\overline{u}_H - B - \delta I, 0, \delta I + B)$$

with associated profit

$$\Pi\,(I, \overline{u}_H) = Y(I) - \overline{u}_H.$$

(ii) If $\overline{u}_H > (1-e)\,Y(I) + e\,[\delta I + \xi(e)] - \frac{\delta^2 I}{2k}$, then firms prefer to hire a L-type manager, by offering an incentive contract

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

with associated profit

$$\Pi\,(I) = e\,[Y(I) - \delta I - \xi(e)] + \frac{\delta^2}{2k} I.$$

(iii) Finally, if $\overline{u}_H = (1-e)\,Y(I) + e\,[\delta I + \xi(e)] - \frac{\delta^2 I}{2k}$, then firms are indifferent between the two types.

Proof: See Appendix.

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

2.2.3 Choice of Investment

We now analyze the choice of firm's investment, or in other words, firm size:

$$\max_I \ \Pi\left(I, \overline{u}_H\right) - rI$$

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

However, there is an asymmetric equilibrium (in pure strategies) in which a fraction μ of firms target the H-types by choosing $I = I_H^*$ and $(b, g, p) = (\overline{u}_H - B - \delta I, 0, \delta I + B)$; while the remaining ones target L-types and choose $I = I_L^*$ and $(b, g, p) = \left(0, \frac{\delta}{k}, (1 - \frac{\delta}{k})\delta I + \xi(e)\right)$. H-types would be paid a rent $\overline{u}_H$ that makes firms indifferent between these two strategies and deviations are not profitable.

Therefore,

Proposition 1 (Competition for scarce managerial talent) *The equilibrium choice of governance and investment is: (i) m_H firms choose corporate governance and investment respectively equal to*

$$g_H^* = 0, \quad I_H^* = Y'^{-1}\left(r\right)$$

and they hire the H-type managers with the following incentive contract:

$$b_H^* = \overline{u}_H - B - \delta I_H^* \ , \ p_H^* = \delta I_H^* + B \ ;$$

(ii) the remaining $(n - m_H)$ firms choose corporate governance and investment equal to

$$g_L^* = \frac{\delta}{k}, \quad I_L^* = Y'^{-1}\left(\delta + \frac{r}{e} - \frac{\delta^2}{2ke}\right)$$

and they hire the L-type managers with the following incentive contract:

$$b_L^* = 0 \ , \ p_L^* = (1 - \frac{\delta}{k})\delta I_L^* + \xi(e) \ ;$$

where $\overline{u}_H = Y(I_H^*) - e\left[Y(I_L^*) - \delta I_L^* - \xi(e)\right] - \frac{\delta^2}{2k} I_L^* - r\left(I_H^* - I_L^*\right)$.

Proof: See Appendix.

The intuition for this most important result of our paper on the labor-market equilibrium when managerial talent is scarce is as follows. When the quality of the manager is observable, the competition among firms to employ better managers implies that they will be given all the additional rents they produce. On the one hand, given that corporate governance is used by firms to reduce managerial rents, it is reasonable to expect that a firm intending to hire a high quality manager will be better off by saving the cost of investing in corporate governance in the first place. On the other hand, a firm that is willing to hire a low quality manager faces no competition and can, therefore, keep the manager down to the incentive compatibility constraint. Hence, these firms will choose the optimal level of corporate governance. Because the firms hiring the L-type managers choose the optimal level of governance, they also choose the optimal level of investment (conditional on hiring L-type managers). Conversely, the firms hiring the H-type managers choose a lower investment than optimal because they choose a lower than optimal level of corporate governance.

2.3 Extensions

In this section, we consider two extensions: first, the case in which there is no effective competition for managers as the number of H-type managers is greater than the number of firms; and second, the case in which there is no information on managerial quality. In both cases, unlike before, there is no distortion in the choice of corporate governance and investment.

2.3.1 No competition

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

$$P_i = \begin{cases} e\left[Y(I) - \delta I\right] - e\xi(e) + g_L \delta I - rI - \frac{kIg_L^2}{2} & \text{if } i = L \\ Y(I) - \delta I - B + g_H \delta I - rI - \frac{kIg_H^2}{2} & \text{if } i = H \end{cases} \tag{7}$$

Notice that the optimal choice of governance is independent of the manager's type: from the first order condition,

$$g_L = g_H = \frac{\delta}{k}.$$

Also notice that the profits are strictly greater with $i = H$. Hence, all firms hire H-types and we obtain the following result:

Lemma 2: *The optimal incentive contract is:*

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

All firms hire H-types for a profit

$$P(I) = Y(I) - \delta I - B + \frac{\delta^2}{2k} I - rI \tag{8}$$

At $t = 0$, the founder chooses I to maximize the expected profits:

$$\max_I \ Y(I) - \delta I - B + \frac{\delta^2}{2k} I - rI \tag{9}$$

so we can solve for the optimal level of investment using the first order condition

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

To summarize our analysis:

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

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

The corresponding incentive contracts are:

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

This solution can be considered the benchmark (the first-best case) for analysis that precedes.

2.3.2 Unobservable managerial quality

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

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

$$\frac{m_H}{n} + \frac{m_L}{n} e \equiv \overline{e}$$

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

Proposition 3 (No information about managerial talent) *The optimal incentive contract is:*

$$b^* = 0,\ g^* = \frac{\delta}{k},\ p^* = (1 - \frac{\delta}{k})\delta I + \xi(\overline{e})$$

and the chosen level of investment is

$$I^* = Y'^{-1}\left(\delta + \frac{r}{\overline{e}} - \frac{\delta^2}{2k\overline{e}}\right)$$

Proof: See Appendix.

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

3 Empirical Analysis

In this section, we will test some of the empirical predictions of our main model in which managerial talent was assumed to be scarce so that there was effective competition amongst firms for high quality managers. First we develop the three main empirical predictions from the model and explain the econometric methodology used to test them. Then, we present the data and discuss the results.

3.1 Empirical Predictions

The model is based on the idea that competing firms with poor corporate governance generate a negative externality for other firms. Specifically, because of their poor corporate governance, these firms must offer higher wages than other firms to managers in order to incentivize them. The option to work for firms with weaker governance raises the level of the participation constraint $\overline{u}_H$ for managers and forces all firms to pay managers more. Hence, our first test is:

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

Second, a critical assumption in the model is that governance is chosen as part of an optimal incentive contract offered to a manager of known quality. Moreover, from the IC constraint, $p_i = (1 - g_i)\delta I + \xi(e_i)$, that is, corporate governance g_i and executive compensation p_i are substitutes. Hence, our second test is:

Prediction 2 (Governance as incentive contract): *Executive compensation and governance should mainly change when new managers are hired and contracts rewritten. In such cases, increases in corporate governance should be correlated with decreases in executive compensation and vice versa.*

These two predictions serve as a test for the key assumptions of the model. However, the main result of the model given these assumptions is that, in equilibrium some firms will attract better managers by paying them more and choosing more lax governance standards; others will attract worse managers by paying them less and choosing stricter corporate standards. Proposition 2 predicts a negative correlation between corporate governance and managerial talent when different firms compete to attract managerial talent; it also predicts a positive correlation between managerial talent and firms' investment opportunities (say, measured by *Tobin's* q) and managerial compensation. The model also predicts the positive correlation between size and managerial compensation already documented by Gabaix and Landier (2008). Assuming that we can find a way to measure managerial talent, our main empirical prediction is:

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

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

3.2 Econometric methodology

To test for the presence of an externality in the choice of corporate governance, we regress total executive compensation of in firm i at the end of year t on a lagged measure of governance at firm i and a lagged “worst" corporate governance indicator in a given year. The latter is measured as the average governance score in the 20 worst governed firms in a given year. In other words, we estimate the following specification:

$$\text{Compensation}_{it} = \beta X_{it-1} + \alpha_G \times \text{Governance}_{it-1} + \alpha_E \times \text{Worst Governance}_{t-1} + \varepsilon_{it} \quad (10)$$

where X_{it-1} are time variant and time invariant firm-specific controls that affect compensation. 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.

This approach is akin to the one employed by Gabaix and Landier (2008), who show that compensation is increasing in firm's market capitalization and the market capitalization of a medium-size firm. The logic for their test is that the medium-size firm represents the outside option available to firm-i managers and thus should be positively correlated with compensation paid in firm i. Similarly, in our specification, the average governance score in the 20 worst governed firms in a given year represents the outside option of firm-i manager. To make sure that the governance channel is independent of the effect of size uncovered by Gabaix and Landier (2008), we will control for the market capitalization of firm i, the market capitalization of a benchmark firm (the 220th largest firm as employed and motivated by Gabaix and Landier), and industry fixed effects. The benchmark firm is included in their specification because it represent the outside option for a manager.

Our second test is to check whether governance is chosen as part of an optimal incentive contract, in particular, as a substitute for executive compensation. For this purpose, we study the changes of compensation as firms changes managers and/or corporate governance. We estimate the following specification:

$$\begin{aligned} \text{Compensation}_{it} = \quad & \alpha_C \times \Delta\text{Governance}_{it} + \alpha_T \times \text{Turnover}_{it} + \\ & + \alpha_S \times \text{Turnover}_{it} \times \Delta\text{Governance}_{it} + z_i + d_t + \varepsilon_{it} \end{aligned} \quad (11)$$

where $\Delta\text{Governance}_{it}$ is the change in corporate governance during year t, Turnover_{it} is a dummy variable that takes value 1 if there is a change of CEO during year t and 0 otherwise, z_i is a firm fixed effect, and d_t is a year dummy. Our model would predict that α_C and α_T should not be statistically different from zero, while $\alpha_S < 0$. The first prediction ($\alpha_C = 0$) follows from the fact that, without a turnover, governance should already be at the optimal level for the incumbent CEO. Hence, on average changes in governance should not have any effects on total compensation. Similarly, the second prediction ($\alpha_T = 0$) follows from the fact that, if there is no change in governance, the replacement CEO should be of similar quality as the incumbent CEO. Hence, there should be no need to change compensation. The critical prediction is the third one ($\alpha_S < 0$): this is a clear test of the assumption that governance and compensation are substitutes. In fact, according to the model, we expect to see an increase in compensation only when there is a turnover and a contemporaneous decrease in corporate governance.

Finally, to be able to test our main empirical prediction, we need to develop a measure of managerial ability (γ_j). Then, we could test our main empirical prediction regressing corporate governance on these managerial ability measures:

$$\text{Governance}_{it}^{j} = \beta_G \times \gamma_j + \chi_t + \xi_{it} \tag{12}$$

where χ_t is a year dummy, with our model predicting $\beta_G < 0$. However, obtaining this measure γ_j requires that we take into account both the presence of endogenous manager-firm matching and the low managerial mobility across firms. If we had a large set of managers randomly moving across a limited set of firms, we could obtain a measure of managerial ability to test our model by regressing

$$\text{Firm Performance}_{it} = \beta X_{it} + \delta_t + \gamma_j + \varepsilon_{it} \tag{13}$$

where δ_t is a year dummy; Firm Performance$_{it}$ would be any adequate firm performance measure; X_{it} would be a set of time variant and time invariant controls that affect firm i performance; and γ_j would be manager fixed effects, our measure of managerial ability. In this case, the identification of γ_j would arise from the difference in performance for firms employing manager j when they employ j compared to when they don't. The random assignment and mobility across firms would ensure that managers are employed in a wide selection of firms and so all managers would face the same average firm quality over their life.

The main identification problem with this approach arises from the fact that firms differ along other dimensions than the CEO they employ. Suppose that a subset of firms has better performance than the rest of firms. For instance, different industries have different returns on assets. Then, if our governance measure also changes for each of these subset of firms, we could find a spuriously negative coefficient in regression (12). To correct for this problem, we need to control for industry or firm dummies in regression (13). However, we should bear in mind the implications these dummies will have for regression (12). If the average managerial quality differs across subsets of firms, the estimated $\widehat{\gamma}_j$ would not be comparable across subsets as they would be contaminated by the different managerial ability mean for each subset.

The following example may clarify this point. Suppose firm $i = 1$, in industry $h = 1$, employs managers $j = 1$ and $j = 2$ and firm $i = 2$, in industry $h = 2$, employs managers $j = 3$ and $j = 4$. Suppose that managers 1 to 4 are ordered from better to worse, i.e. better managers work in industry 1. If we run regression (13) including industry dummies, we could find that $\widehat{\alpha}_1 > \widehat{\alpha}_2$; $\widehat{\gamma}_1 > 0 > \widehat{\gamma}_2$ and $\widehat{\gamma}_3 > 0 > \widehat{\gamma}_4$; leading us to the wrong conclusion that manager 2 is worse than manager 3. Only high managerial mobility across industries would ensure that all managers face the same α_h over their life and so their γ's are comparable. In short, when using regression (13), a given γ_j can only be compared with managerial talent estimates of other managers that worked in a firm that could have hired manager j. Obviously, some firms attract better managers than others.

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

To estimate regression (13), we follow Bertrand and Schoar (2003) and Graham, Li and Qiu (2008) and compute the (unobserved) CEO fixed effect on performance, as measured by return on assets. Precisely, we estimate

$$ROA_{it}^{j} = \beta X_{it}^{j} + \delta_t + z_{ind/i} + \widetilde{\gamma}_j + \varepsilon_{it}, \tag{14}$$

where ROA_{it}^{j} stands for return on assets for firm i in period t. Throughout the section, we use superscript j to indicate that manager j was working for firm i during year t. X_{it}^{j} are some time variant firm characteristics that include size, book leverage, cash, interest coverage, dividend earnings, Tobin's q and governance measures. δ_t are time fixed effects. $z_{ind/i}$ are either industry or firm level dummies, respectively. The parameter $\widetilde{\gamma}_j$ is a CEO-firm match fixed effect, i.e. a dummy variable that takes value one when a given CEO worked for a given firm and zero otherwise. This is our measure of managerial ability as it captures the unobserved (and time invariant) managerial effect on return on assets. As we have discussed above, $\widetilde{\gamma}_j = \gamma_j - \overline{\gamma_j}$ or, in words, $\widetilde{\gamma}_j$ is the difference between j^{th} CEO's ability and the industry or firm average CEO ability. Hence, these dummy variables do not capture absolute CEO ability, but *relative* CEO ability. If return on assets is different from the value predicted from its time varying and time invariant characteristics while a specific CEO was employed, then we assume this is due to the CEO ability.

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

$$\text{Governance}_{it}^{j} = \beta_G \times \widehat{\widetilde{\gamma}}_j + \chi_t + z_{ind/i} + \xi_{it} \tag{15}$$

where $\text{Governance}_{it}^{j}$ is a measure of corporate governance, $\widehat{\widetilde{\gamma}}_j$ are the CEO-firm match coefficients predicted on regression (14) and χ_t and $z_{ind/i}$ are time and either industry or firm dummies, respectively. Our model would predict $\beta_G < 0$. Time dummies should control for any time trend in the governance measure while industry and firm dummies control for the average quality of CEOs hired in a given industry or firm. These are crucial for our analysis since we can only analyze governance up to the reference subsample average. Additionally, regression (15) presents a problem of generated regressors. We partially correct for this problem by adjusting the weight of each observation by the inverse of the $\widehat{\widetilde{\gamma}}_j$ standard error from the first-stage estimation.

There are two additional empirical implications of our model, which can be tested is a similar fashion. First, we expect that better managers are paid more:

$$\text{Total Compensation}_{it}^{j} = \beta_C \times \hat{\hat{\gamma}}_j + \chi_t + z_{ind/i} + \varsigma_{it} \quad (16)$$

with $\beta_C > 0$. Second, given that they invest less than is optimal, we expect firms with better managers to have greater marginal value of investment (or greater marginal q), which can be proxied by the Tobin's q:

$$\text{Tobin's q}_{it}^{j} = \beta_Q \times \hat{\hat{\gamma}}_j + \chi_t + z_{ind/i} + \nu_{it} \quad (17)$$

with $\beta_Q > 0$.

To sum up, we test the main prediction of the model by running a within-firm (or within-industry) two-stage analysis. In the first stage, we obtain from specification (14) individual CEO skills relative to the other CEOs employed by the firm (or the industry). In the second stage, we run regressions (15), (17) and (16) to test whether these relative CEOs abilities are correlated with corporate governance, total compensation and investment opportunities, as predicted by our model.

3.3 Data description

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

We use firm-level financial variables from the annual Compustat database and follow Bertrand and Schoar (2003) for most of its specifications: *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`). *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`) and *Market Cap 220* is the market capitalization of the firm ranked 220th in that year when ordered by market capitalization. Variables are winsorized at the 1% level.

As usual, 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 construct two-digit SIC code industry dummies. Our final sample includes 56 different industries according to this classification.

Our principal measure of firm corporate governance is the Gompers et al. (2003) governance index, which we obtain from RiskMetrics. The *GIM* index ranges from 1 to 24 and one point is added for each governance provision restricting shareholders right with respect to managers (for further details see Gompers et al. (2003)). A higher *GIM* index score indicates more restrictions on shareholder rights or a greater number of anti-takeover measures. Therefore, a higher value of the *GIM* index corresponds to a lower g in our theoretical representations. Hence, all coefficient signs on the empirical predictions using the *GIM* index switch sign with respect to the ones using our theoretical g governance measure. To fill the gaps between reported values, we choose to linearly interpolate the *GIM* index in order to obtain a corporate governance measure with annual frequency. As a robustness analysis, we consider the Bebchuk et al. (2008) entrenchment index (*E-index*) instead of the *GIM* index. The *E-index* is based on six of the twenty-four *GIM* index provisions: supermajority merger, classified board, poison pill and golden parachute, supermajority by-law, and supermajority charter. Also in this case, we use linear interpolation to fill the gaps in the *E-index*. Additionally, we construct the following variables: *GIM-Index Max* is the average Gompers et al. (2003) governance index of the 20 firms with the lowest GIM index in that year; *GIM Change Sign* takes value one if the firm GIM index has increased, value zero if it has not changed and value minus one if it has decreased; *GIM Change Up* takes value one if the firm GIM index has increased, zero otherwise and *GIM Change Down* takes value one if the firm GIM index has decreased, zero otherwise.

For some of our specifications, we need the *GIM* index of a given firm to change across time. Hence, Figure (3) reports the within-firm *GIM* index standard deviation histogram. We can see that 25% of the firms do not change their *GIM* index while about 40% of the firms have *GIM* index standard deviation between 0 and 0.5. The question we are trying to answer is whether these changes in *GIM* index correspond to the employment of new CEOs as our model would predict. The *E-index* behaves similarly except that it concentrates more firms at the zero standard deviation.

We obtain our measures of executive compensation from ExecuComp. We measure *Total Compensation* as natural logarithm of item `tdc1` and *Salary* as the natural logarithm of item `salary`. All ExecuComp variables are winsorized at the top 1% level.

We also use ExecuComp to analyze CEO turnover. We define *Turnover* as a dummy variable that takes value one if, for a given firm, the `execid` variable changes during that year, and zero otherwise.

Statistics regarding the number of firms and CEOs are as follows. Our complete merged sample contains 9826 firm-year observations that correspond to 2231 different CEOs and 1376 different firms. When using firm fixed effects, due to multicollinearity problems, we cannot identify those CEOs who are employed only in one firm if this firm only employed one CEO. This means we are left with 7997 observations, with 1931 CEOs and 1038 firms and a total of 1971 different CEO-firm match. Additionally, there are only 64 CEOs changing firm, of which around 40% are the only CEO in one of the firms. We do not think this multicollinearity problem causes any bias in our regressions using firm fixed effects as we focus on within firm analysis in that case. Specifically, we do not think that firms changing

CEO more often do it because they face higher competition for managerial talent. Even if low managerial turnover may be a consequence of hiring better managers, this does not bias our results as long as these firms face competition to retain these better managers and so have to compensate them as another firm would do.

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.

3.4 Results

Table 2 tests for the presence of a positive externality in the choice of corporate governance across firms, by estimating specification (10). The dependent variable is Total Compensation in firm i at year t. In Column 1, we simply show that firms with weaker governance (that is, a higher GIM score) pay their CEOs more. This result is consistent with the idea that governance is a substitute for executive compensation but it is not a conclusive test, as it does not control for the choice of managers. Table 3 will offer more conclusive evidence on that. In Column 2, we add the average GIM score for the 20 worst-governed firms in year $t-1$. This measure proxies for the outside option of the CEO employed by firm i. As predicted by the model, we find that an increase in GIM Index Max (namely, a deterioration of corporate governance in the economy) is associated with a significant increase in executive compensation. In other words, a worsening of governance standards in the economy is costly for the firm (even controlling for its own governance), as it is associated with higher CEO compensation.

The basic results are robust to several changes in specifications. First, as shown in Columns 3 to 5, the finding that governance matter for executive compensation is not due to spurious correlation with firm size. We confirm the result in Gabaix and Landier (2008) that executive compensation is highly correlated with firm size but we show that the correlation between executive compensation and governance is statistically significant even after controlling for firm size. Second, the results are robust to different specifications for clustering the standard errors. The table reports standard errors clustered at the firm and at the year level. The only difference is that the significance of the coefficients on GIM Index Max weakens with year-level clusters. However, this is to be expected given that GIM Index Max is constant across firms in a given year and varies very little over time.

Table 3 offers a direct test of the assumption that governance and executive compensation are substitutes. To produce a clean test, we isolate from all effects discussed above by controlling for both firm and year fixed effects. As argued in Section 3.1, if indeed governance is chosen as part of an optimal compensation package, we expect it to affect compensation only when there is a change of control. However, as shown in Column 1, a turnover of CEO is associated with no significant change in compensation. This result is entirely consistent with the model as the new manager may be better or worse than the previous one, in which case compensation may increase or decrease. Similarly, in Column 2 we find that the change in governance (as measured by an indicator variable that takes value 1 if there is an increase in GIM, -1 is there is a decrease, and 0 if there is no change in GIM during year t) is associated with a small (but marginally significant) increase in compensation. This is also consistent with the model, as, without turnover, the compensation should already be at the optimal level.

The interesting result is in Column 3, where we show that the change in compensation happens when there is both turnover and a change in corporate governance. Specifically, we find that turnover and a decrease in corporate governance (that is, an increase in GIM) is associated with a significant increase in compensation. This is consistent with the prediction of the model that governance and compensation are substitutes. In Columns 4 and 5, we allow for asymmetric effects between the cases when governance went up and cases in which it went down. Interestingly, the effect is limited to the cases in which governance went down at the time of the turnover, which are the more common cases (264 cases compared to 119 cases for improvement in governance).

This finding is somewhat surprising: Why would a firm decrease corporate governance when they hire a new manager? Our model suggests that it may do it to attract a better manager. To test this prediction, first, we need to estimate CEO fixed effects. In Table 4, we show the results from regression (14) with different time dependent regressors (X_{it}^{j}) and time independent control variables ($z_{ind/i}$). We report the regression coefficients, information on the overall fitting of the model and some descriptive statistics on the CEO fixed effects obtained. We report the mean, minimum, maximum and standard deviation of the CEO fixed effects to show that CEO choice does indeed matter for firm performance. As one would expect, the distribution of CEO abilities in the specification using industry dummies has higher dispersion than in the specification using firm fixed effects as some of the firm specific components are captured by the CEO ability measures. However, these differences are relatively small, suggesting that within industry firms differences are well captured by our control variables. The lower managerial talent dispersion could also be a consequence of the additional restrictions the model with firm fixed effects imposes, such as the mean CEO fixed effect being equal to zero.

We are aware that the inclusion of *GIM* index in the first stage regression specification (3) causes an identification problem. If our model is correct and corporate governance is used as a selection mechanism to attract managerial ability, corporate governance can be re-expressed as a function of CEO-firm fixed effects. Therefore, the coefficients on *GIM* index and CEO-firm fixed effects cannot be identified. The reason for its inclusion is clear: we want to make sure that our managerial ability is not capturing any direct relation between *GIM* index and return on assets nor any unobserved characteristic that is related to corporate governance and performance; which could then be influencing our second stage regression. As there is always noise in any selection process, when both corporate governance and manager fixed effects are introduced in a regression, any unobserved characteristic that is correlated with corporate governance will be captured by this variable and not by the manager fixed effect. Our finding in specification (3) is in line with previous research and documents a very small effect of the *GIM* index on return on assets.

Table 5 presents the results of regressions (15), (17) and (16). Specifically, we test regression (15) in Columns 1 and 2; regression (17) in Column 3 and regression (16) in Columns 4 and 5. In panels A to C, we use Ordinary-Least-Squares estimators, giving the same weight on all observations, while in panels D to E 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. The second approach is more correct as it takes into account that the CEO fixed effects are estimated in the first stage, while the traditional OLS estimator does not. We report both for robustness and do not find significant difference in the results between the two approaches.

First, let's focus on Columns 1 and 2, as they test the main empirical prediction of our paper: the relation between corporate governance and managerial ability. To undertake this test, we use the *GIM* index and the *E-index* as dependent variables in Columns 1 and 2, respectively. We use the CEO fixed effects obtained in the different specifications of regression (14) as independent variables across the different panels. The sign of the coefficients are as predicted by our model and they are generally statistically significantly different from zero. Additionally, the magnitude of the coefficient when the dependent variable is the *GIM* index is larger than when the dependent variable is the *E-index*, consistent with the fact that the *GIM* index has a wider range than the *E-index*. Hence, our finding support the main prediction of the model: increases in managerial quality are indeed associated with decreases in governance.

Column 3 shows light on the relation between investment opportunities and managerial talent. The positive relation between investment opportunities and managerial talent is widely supported by all our specifications A possible criticism to this finding is that *ROA* and *Tobin's q* are positively related in an unconditional regression of *ROA* on *Tobin's q* and other control variables. This may even be a mechanical finding as both variables have the same denominator. Precisely to reduce this concern, we had introduced *Tobin's q* in the first stage regression as a control variable.

In Columns 4 and 5, we report the correlations between managerial talent (as proxied by the CEO fixed effect) and total compensation and salary, respectively. Overall, we find support for our empirical prediction that better managers get paid more. The results are stronger for total compensation but are also there for salaries.

4 Conclusion

In this paper, we theoretically explored the joint role of competition among firms to attract better managers and corporate governance. 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 with little benefit.

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

Our finding that corporate governance affects the matching between managers and firms has important implications for the debate on executive pay and governance. Specifically, while better governance may incentivize managers to perform better, it also reduces firms' ability to attract the best managers. These two effects offset each other and may explain why it has proven so hard so far to find direct evidence that corporate governance increases firm performance.

Appendix

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

$$(1-e)\left[Y(I)-(1-g)\delta I\right]-B+e\xi(e)\geq b_H$$

Second, the H-type must be applying for the job posted by the specific firm: if we define as χ such probability, then χ will be a function of the bonus b_H, the outside option $\overline{u}_H$, as well as g and I:

$$\chi=\begin{cases} 1 & \text{if } b_H>\overline{u}_H-B-(1-g)\delta I \\ \kappa\in(0,1) & \text{if } b_H=\overline{u}_H-B-(1-g)\delta I \\ 0 & \text{if } b_H<\overline{u}_H-B-(1-g)\delta I \end{cases}$$

In other words:

$$\begin{aligned}\gamma &= \chi I_{\{(1-e)[Y(I)-(1-g)\delta I]-B+e\xi(e)\geq b_H\}}= \\ &= \begin{cases} 1 & \text{if } b_H\in\left(\overline{u}_H-B-(1-g)\delta I,(1-e)\left[Y(I)-(1-g)\delta I\right]-B+e\xi(e)\right] \\ \kappa\in(0,1) & \text{if } b_H=\overline{u}_H-B-(1-g)\delta I\leq(1-e)\left[Y(I)-(1-g)\delta I\right]-B+e\xi(e) \\ 0 & \text{otherwise}\end{cases}\end{aligned}$$

Firms can affect γ via their choice of b_H and g. Hence, they face the following problem:

$$\max_{\gamma,b_H,g}\left\{\gamma+(1-\gamma)e\right\}\left[Y(I)-(1-g)\delta I\right]+(1-\gamma)(1-e)g\delta I-\gamma(b_H+B)-(1-\gamma)e\xi(e)-k\frac{g^2}{2}I$$

subject to

$$\gamma=\begin{cases} 1 & \text{if } b_H\in\left(\overline{u}_H-B-(1-g)\delta I,(1-e)\left[Y(I)-(1-g)\delta I\right]-B+e\xi(e)\right] \\ \kappa & \text{if } b_H=\overline{u}_H-B-(1-g)\delta I\leq(1-e)\left[Y(I)-(1-g)\delta I\right]-B+e\xi(e) \\ 0 & \text{otherwise}\end{cases}$$

Notice that the objective function is strictly decreasing in b_H. If $\overline{u}_H>(1-e)Y(I)+e\xi(e)+e(1-g)\delta I$, then $b_H=0$, $\gamma=0$ and $g=\frac{\delta}{k}$. If $\overline{u}_H\leq(1-e)Y(I)+e\xi(e)+e(1-g)\delta I$, there are three cases to compare: (i) $b_H=0$, $\gamma=0$, $g=\frac{\delta}{k}$, then the profit is $e\left[Y(I)-\delta I-\xi(e)\right]+\frac{\delta^2}{2k}I$; (ii) $b_H=\overline{u}_H-B-(1-g)\delta I$, which implies that $\gamma=\kappa$ and profits are: $\kappa Y(I)+(1-\kappa)e\left[Y(I)-\delta I-\xi(e)\right]+(1-\kappa)g\delta I-\kappa\overline{u}_H-\frac{kg^2I}{2}$. In this case, the optimal choice of governance is $g=\frac{(1-\kappa)\delta}{k}$ (from first order conditions); and (iii) $b_H=\overline{u}_H-B-(1-g)\delta yI+\varepsilon$ for $\varepsilon>0$ small, then $\gamma=1$ and $g=0$, then the profit is $Y(I)-\overline{u}_H-\varepsilon$. Hence,

$$(b_H,g,\gamma)=\begin{cases} \left(0,\frac{\delta}{k},0\right) & \text{if } \overline{u}_H>(1-e)Y(I)+e\xi(e)+e(1-g)\delta I \\ \left(\overline{u}_H-B-(1-g)\delta I,\frac{(1-\kappa)\delta}{k},\kappa\right) & \text{if } \overline{u}_H=(1-e)Y(I)+e\xi(e)+e(1-g)\delta I \\ \left(\overline{u}_H-B-(1-g)\delta I+\varepsilon,0,1\right) & \text{if } \overline{u}_H<(1-e)Y(I)+e\xi(e)+e(1-g)\delta I\end{cases}$$

The associated profit (net of investment cost) is:

$$\Pi(I,\overline{u}_H)=\begin{cases} e\left[Y(I)-\delta I-\xi(e)\right]+\frac{\delta^2}{2k}I \\ \left\{\kappa+(1-\kappa)e\right\}Y(I)-\kappa\overline{u}_H-(1-\kappa)e\xi(e)+(1-\kappa)\left(\frac{(1-\kappa)\delta}{k}-e\right)\delta I \\ Y(I)-\overline{u}_H \end{cases}$$

Notice that the intermediate case is always dominated as

$$\begin{aligned} & \left\{\kappa+(1-\kappa)e\right\}Y(I)-\kappa\overline{u}_H-(1-\kappa)e\xi(e)+(1-\kappa)\left(\frac{(1-\kappa)\delta}{k}-e\right)\delta I \\ < \; & \max\{Y(I)-\overline{u}_H, e\left[Y(I)-\delta I-\xi(e)\right]+\frac{\delta^2}{2k}I\} \end{aligned}$$

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

$$(b,g,p)=\begin{cases} \left(0,\frac{\delta}{k},(1-\frac{\delta}{k})\delta I+\xi(e)\right) & \text{if } \overline{u}_H>(1-e)Y(I)+e\left[\delta I+\xi(e)\right]-\frac{\delta^2 I}{2k} \\ (\overline{u}_H-B-\delta I,0,\delta I+B) & \text{if } \overline{u}_H\leq(1-e)Y(I)+e\left[\delta I+\xi(e)\right]-\frac{\delta^2 I}{2k} \end{cases}$$

and the profit is:

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

■

Proof of Proposition 1: First, we will prove by contradiction that there is no symmetric equilibrium in pure strategies. Then, we will build the asymmetric pure strategy equilibrium (which is also the unique symmetric equilibrium in mixed strategies).

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

In a symmetric equilibrium each firms would hire a H type with probability $\frac{m_H}{n}$. Hence, if $\overline{u}_H=(1-e)Y(I)+e\left[\delta I+\xi(e)\right]-\frac{\delta^2 I}{2k}$, the problem becomes:

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

The solution is:

$$I^* = Y'^{-1}\left(\frac{r + \left(1 - \frac{m_H}{n}\right)e\delta - \left(1 - \frac{m_H}{n}\right)\frac{\delta^2}{2k}}{\frac{m_H}{n} + \left(1 - \frac{m_H}{n}\right)e}\right) \equiv I_\mu$$

For this to be an equilibrium, $\overline{u}_H = (1-e)\,Y(I_\mu) + e\left[\delta I_\mu + \xi(e)\right] - \frac{\delta^2 I_\mu}{2k}$. However, suppose that all firms choose the above I. Then, a firm will have an incentive to deviate to $I = I_H^*$, where $I_H^* = Y'^{-1}(r)$, as this strategy would lead to an increase in profits. The argument is as follows. First, we need to analyze which type of manager this firm will hire. As shown in Figure 2, a firm with higher I will beat the competition for the H-type manager. Hence, if all firms choose I_μ and one firm deviates to $I = I_H^*$, this firm will hire the H-type manager for sure.

Second, we need to show that this deviation increases profits. Since profits obtained by the firm if the H-type manager is hired are maximized for $I = I_H^*$, we know that this deviation increases profits from the proposed symmetric equilibrium when the H-type is hired. Because the profits from hiring the H-type manager are equal to the profits of hiring the L-type manager (in the proposed symmetric equilibrium), the profits with I_μ are smaller than with the suggested deviation to $I = I_H^*$. Hence, there is no equilibrium in symmetric strategies.

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

$$\overline{u}_H = Y(I_H^*) - e\left[Y(I_L^*) - \delta I_L^* - \xi(e)\right] - \frac{\delta^2}{2k}I_L^* - r\left(I_H^* - I_L^*\right)$$

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

$$Y(I_H^*) - Y(I_L^*) > r\left(I_H^* - I_L^*\right)$$

This is satisfied since for continuous function: $\frac{Y(I_H^*) - Y(I_L^*)}{I_H^* - I_L^*} = Y'(\widehat{I})$ for some $\widehat{I} \in [I_L^*, I_H^*]$ and given the definition of I_H^* and I_L^*, $Y'(\widehat{I}) \in \left(r, \delta + \frac{r}{e} - \frac{\delta^2}{2ke}\right)$.

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

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

or

$$\frac{Y(I_H^*) - Y(I_L^*)}{I_H^* - I_L^*} < \frac{r}{e} + \delta - \frac{\delta^2}{2ek}$$

which is satisfied since $\frac{Y(I_H^*)-Y(I_L^*)}{I_H^*-I_L^*} = Y'(\widehat{I}) \in \left(r, \delta + \frac{r}{e} - \frac{\delta^2}{2ke}\right)$. ■

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

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

If he chooses action S, then his utility equals

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

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

$$[p - (1-g)\delta I] - \frac{1}{2}A(1-\overline{e})\,[p - (1-g)\delta I]^2 \geq \frac{B}{\overline{e}} \tag{1}$$

The corresponding participation constraint is

$$b + (1-g)\delta I + \overline{e}[p - (1-g)\delta I] - \frac{1}{2}A\overline{e}(1-\overline{e})\,[p - (1-g)\delta I]^2 \geq 0 \tag{2}$$

At $t = 1$, the founder chooses p to minimize the incentive pay subject to the incentive compatibility condition (1) and participation constraint (2):

$$\min_{(b,g,p)} \; b + (1-g)\delta I + \overline{e}[p - (1-g)\delta I] - \frac{kg^2 I}{2}$$
$$s.t.(1) \text{ and } (2)$$

Given that there are enough managers of both types, there is no competition for them. Since any contract offered to a manager must give them utility equal to, at least, $B > 0$, to ensure they do not choose $A = M$, the participation constraint is redundant and the incentive compatibility condition is strictly binding for both managers. Given this, we can write the incentive compatibility condition as

$$\xi - \frac{1}{2}A(1-e)\xi^2 = \frac{B}{\overline{e}}$$

where $\xi = [p - (1-g)\delta I]$. By solving this second order equation in ξ, we find that

$$\xi = \frac{1 - \sqrt{1 - 2AB\frac{1-\overline{e}}{\overline{e}}}}{A(1-\overline{e})} \equiv \xi(\overline{e})$$

This implies that:

$$p = (1-g)\delta I + \xi(\overline{e})$$

and the associated profit is:

$$\Pi_i = \overline{e}\left[Y - \delta I\right] - \overline{e}\xi(\overline{e}) + g\delta I - rI - \frac{kg^2 I}{2}$$

Governance is chosen to maximize this expression:

$$g^* = \frac{\delta}{k}$$

At $t = 0$, the founder chooses I to maximize the expected profits:

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

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

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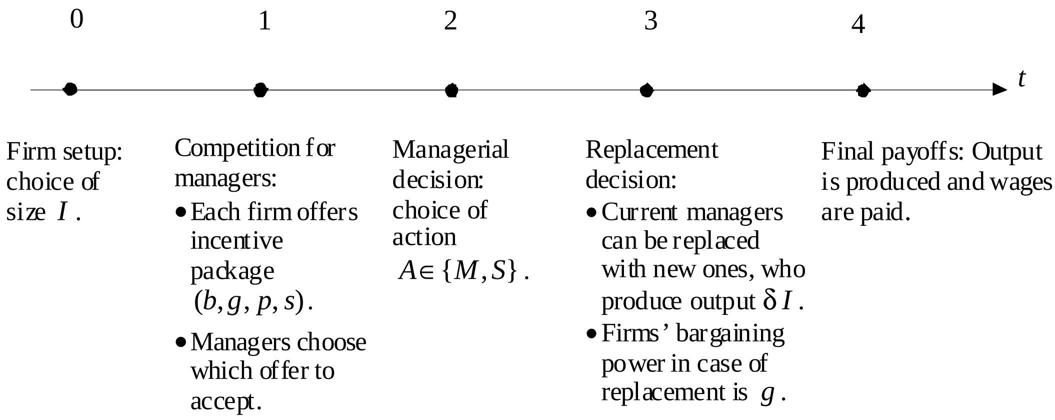

Figure 1: Timeline

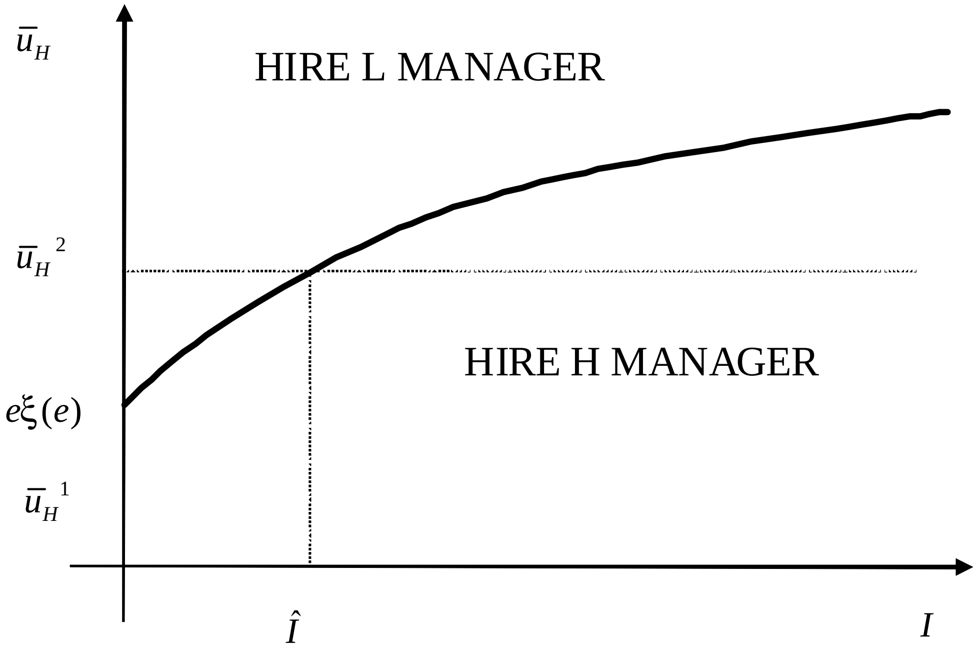

Figure 2. Choice of managers' type when there is competition for scarce talent

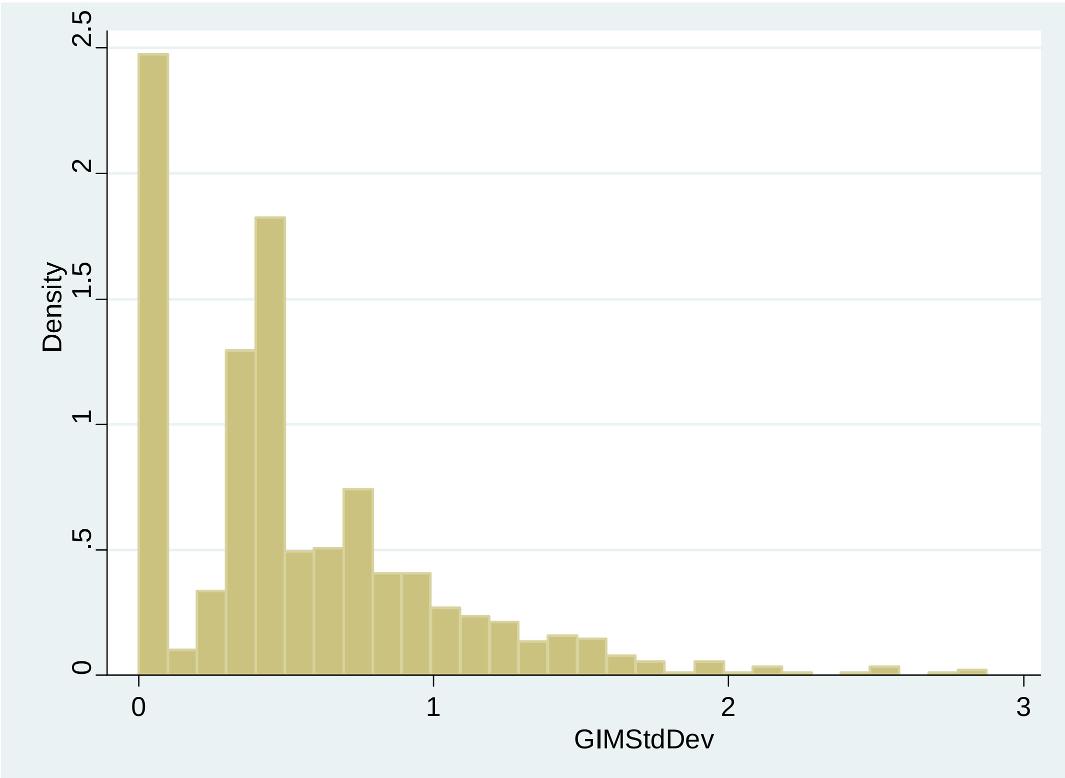

Figure 3: GIM index within-firm standard deviation

Table 1. Summary Statistics.

This table presents the summary statistics of the variables used in the empirical section: *Return on Assets* is the ratio of operating cash flow over lagged total assets. *Book Leverage* is the ratio of long and short term debt to the sum of long and short term debt plus common equity. *Cash* is the sum of cash and short-term investments over net property, plant, and equipment at the beginning of the fiscal year. *Interest Coverage* is earning before depreciation, interest, and tax over interest expenses. *Dividend earnings* is the sum of common dividends and preferred earnings over earning before depreciation, interest, and tax. *Tobin's q* is the ratio of firm's total market value over total assets. *GIM-Index* is the Gompers et al. (2003) governance index and *E-Index* is the Bebchuk et al. (2008) entrenchment index. *Total Comp* is the logarithm of total compensation. *Salary* is the natural logarithm of salary. *Market Cap* is the market capitalization, *Market Cap 220* is the market capitalization of the firm ranked 220th in that year when ordered by market capitalization and *GIM-Index Max* is the average Gompers et al. (2003) governance index of the 20 companies with the lowest GIM-Index in that year. *Turnover* is a dummy variable that takes value one if the company has changed CEO during that year and zero otherwise, *GIM Change Sign* takes value one if the firm GIM-Index has increased, value zero if it has not changed and value minus one if it has decreased, *GIM Change Up* takes value one if the firm GIM-Index has increased, zero otherwise and *GIM Change Down* takes value one if the firm GIM-Index has decreased, zero otherwise. The final sample consists of 9826 firm-year observations that correspond to 2231 different CEOs and 1376 different firms.

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
GIM-Index	9.415	2.624	2	18
E-index	2.262	1.273	0	6
Total Comp.	7.827	1.027	4.738	9.864
Salary	6.378	0.537	3.433	7.090
Market Cap.	7.442	1.437	3.885	12.146
Market Cap. 220	8.791	0.448	6.165	9.123
Turnover	0.108	0.310	0	1
GIM Index Max	15.174	0.216	14.3	15.5
GIM Change Sign	0.120	0.539	-1	1
GIM Change Up	0.212	0.409	0	1
GIM Change Down	0.077	0.266	0	1

Table 2. Corporate Governance Externality

This table shows the impact of firms corporate governance choices on other firms choices. Specifically, it tests how the choice of governance by the worst governed firms in the economy affects other firms executive compensation. We regress *Total Comp* on the firm's lagged *GIM-Index* and *Market Cap* and lagged *GIM-Index Max* and *Market Cap 220.* The variables employed are as follows: *Total Comp* is the logarithm of total compensation, *GIM-Index* is the Gompers et al. (2003) governance index, *Market Cap* is the market capitalization, *GIM-Index Max* is the average Gompers et al. (2003) governance index of the 20 companies with the lowest GIM-Index in that year and *Market Cap 220* is the market capitalization of the firm ranked 220th in that year when ordered by market capitalization. All regressions include two-digit SIC code dummies. Standard errors are reported in brakets 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)	(5)
L.GIM index	0.0511	0.0511	0.0244	0.0242	0.0247
	(0.0092)***	(0.0092)***	(0.0057)***	(0.0057)***	(0.0056)***
	(0.0043)***	(0.0042)***	(0.0027)***	(0.0027)***	(0.0025)***
L.GIM Index Max		0.1966		0.3209	0.1144
		(0.0460)***		(0.0341)***	(0.0465)**
		(0.1338)		(0.0832)***	(0.0920)
L.Market Cap			0.4602	0.4624	0.4635
			(0.0097)***	(0.0097)***	(0.0097)***
			(0.0051)***	(0.0046)***	(0.0048)***
L.Market Cap 220					0.1468
					(0.0238)***
					(0.0616)**
Observations	8599	8599	8599	8599	8599
R-squared	0.105	0.107	0.496	0.501	0.503

Table 3. Corporate Governance and Turnover

This table shows the interation between firms corporate governance choices and executive compensation around turnover. We add firm fixed effects and year dummies to control for all other determinants of executive compensation. The variables employed are as follows: *Total Comp* is the logarithm of total compensation, *Turnover* is a dummy variable that takes value one if the company has changed CEO during that year and zero otherwise. *GIM Change Sign* takes value one if the firm GIM-Index has increased, value zero if it has not changed and value minus one if it has decreased, *GIM Change Up* takes value one if the firm GIM-Index has increased, zero otherwise and *GIM Change Down* takes value one if the firm GIM-Index has decreased, zero otherwise. All regressions include firm fixed effects and year dummies. Standard errors are reported in brakets 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. There are a total of 1117 cases of CEO turnover in our sample. There are 264 turnover cases associated with an increase in the GIM-Index and 119 cases associcated with a decrease in the GIM-Index. The sum of all the firms absolute changes in the GIM-Index in our sample is 1720. The sum of all firms absolute changes in GIM-Index around turnover is 408, a relevant 23.7 %.**

	(1)	(2)	(3)	(4)	(5)
Turnover	0.0110	0.0179	0.0039	0.0179	-0.0195
	(0.0255)	(0.0260)	(0.0267)	(0.0260)	(0.0321)
	(0.0307)	(0.0329)	(0.0346)	(0.0327)	(0.0298)
GIM Change Sign		0.0204	0.0037		
		(0.0163)	(0.0169)		
		(0.0111)*	(0.0104)		
Turnover*GIM Change Sign			0.1126		
			(0.0439)**		
			(0.0464)**		
GIM Change Up				0.0212	-0.0024
				(0.0225)	(0.0234)
				(0.0165)	(0.0177)
GIM Change Down				-0.0190	-0.0140
				(0.0326)	(0.0318)
				(0.0367)	(0.0356)
Turnover*GIM Change Up					0.1700
					(0.0602)***
					(0.0473)***
Turnover*GIM Change Down					-0.0152
					(0.0841)
					(0.0968)
Observations	8599	8599	8599	8599	8599
R-squared	0.721	0.736	0.736	0.735	0.735

Table 4. First Stage Regression: Estimation of CEOs Fixed Effects

This table presents the CEO ability estimation results. We regress *Return on Assets* on controls and CEO-Firm match dummies. We interpret the coefficients on these CEO dummies as managerial ability. The variables employed are as follows: *Return on Assets* is the ratio of operating cash flow over lagged total assets. *Market Cap* is the market capitalization. *Book Leverage* is the ratio of long and short term debt to the sum of long and short term debt plus common equity. *Cash* is the sum of cash and short-term investments over net property, plant, and equipment at the beginning of the fiscal year. *Interest Coverage* is earning before depreciation, interest, and tax over interest expenses. *Dividend earnings* is the sum of common dividends and preferred earnings over earning before depreciation, interest, and tax. *Tobin's q* is the ratio of firm's total market value over total assets. *GIM-Index* is the Gompers et al. (2003) governance index. All regressions include year dummies. The industry dummies are two-digit SIC code dummies. Standard errors are clustered at the firm level and *, **, or *** indicates that the coefficient is statistically significantly different from zero at the 10%, 5%, or 1% level, respectively. Summary statistics regarding the coefficients on the CEO dummies are presented.

	(1)	(2)	(3)
L.Market Cap.	-0.0168424***	-0.0239788***	-0.0235681***
L.Book Leverage	0.0061683	0.0342732**	0.0342832**
L.Cash	0.0004524	-0.0000634	-0.0000422
L.Interest Coverage	-2.59E-06	3.26E-07	-4.49E-07
L.Dividend Earnings	-0.0333704*	-0.0215025	-0.0221802
L.Tobin's q	0.0274881***	0.0290607***	0.0288698***
L.GIM-index	-0.0040228*		-0.0043973*
Includes Year Fixed Effects?	Y	Y	Y
Includes Firm Fixed Effects?	N	Y	Y
Includes Industry Fixed Effects?	Y	N	N
Includes Firm-CEO fixed Effects?	Y	Y	Y
Observations	9826	7997	7997
Firm effects identified	1376	1038	1038
CEO effects identified	2231	1931	1931
Firm-CEO matches	2271	1971	1971
CEO F.E. Mean	0.0236	0	0
CEO F.E. Std. Dev.	0.1520	0.0422	0.0423
CEO F.E. Min	-0.7671	-0.4225	-0.4209
CEO F.E. Max	0.5581	0.3091	0.3063

Table 5. Second Stage Regression: CEOs Fixed Effects and Firms Corporate Governance

This table presents the results from regressing CEOs Fixed Effects from the first stage regression on corporate governance, Tobin's q and total compensation. Each panel corresponds to a different specification in table (4). The variables employed are as follows: *GIM-Index* is the Gompers et al. (2003) governance index and *E-index* is the Bebchuk et al. (2008) entrenchment index. *Tobin's q* is the ratio of firm's total market value over total assets. *Total Comp* is the logarithm of total compensation. *Salary* is the natural logarithm of salary. *CEO Fixed Effects* are the CEO Fixed Effects obtained from the first stage regression model as specified. All regressions include year dummies. Panel A, B and C report the OLS estimates when specification (1), (2) and (3) are used in the first stage, respectively. Panel D, E and F report the Weighted Least Squares estimates according to the specification (1), (2) and (3) for the first stage, respectively. Standard errors are reported in brackets, and *, **, or * indicates that the coefficient is statistically significantly different from zero at the 10%, 5%, or 1% level, respectively. Standard errors are clustered at the CEO level in all panels.**

Dependent Variable:	GIM-Index	E-Index	Tobin's q	Total Comp	Salary
	(1)	(2)	(3)	(4)	(5)
Panel A: OLS in Second Stage with Specification 1 in First Stage					
CEO Fixed Effects	6.829***	1.422***	1.852***	3.676***	1.921***
	(0.634)	(0.306)	(0.547)	(0.255)	(0.138)
Panel B: OLS in Second Stage with Specification 2 in First Stage					
CEO Fixed Effects	0.380	0.435*	2.172***	1.181***	0.553**
	(0.365)	(0.238)	(0.474)	(0.316)	(0.261)
Panel C: OLS in Second Stage with Specification 3 in First Stage					
CEO Fixed Effects	1.098***	0.695***	2.169***	1.213***	0.599**
	(0.365)	(0.238)	(0.475)	(0.315)	(0.261)
Panel D: WLS in Second Stage with Specification 1 in First Stage					
CEO Fixed Effects	7.934***	1.363***	3.280***	4.580***	2.109***
	(0.779)	(0.413)	(0.442)	(0.285)	(0.158)
Panel E: WLS in Second Stage with Specification 2 in First Stage					
CEO Fixed Effects	0.337	0.429	2.473***	1.663***	0.640**
	(0.430)	(0.282)	(0.363)	(0.317)	(0.272)
Panel F: WLS in Second Stage with Specification 3 in First Stage					
CEO Fixed Effects	1.149***	0.679***	2.510***	1.726***	0.725***
	(0.383)	(0.263)	(0.367)	(0.319)	(0.270)