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BOARD INDEPENDENCE AND THE DESIGN OF EXECUTIVE COMPENSATION

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Board Independence and the Design of Executive Compensation

Preliminary Draft

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Abstract

In this paper, I analyze how the influence of executives affects the compensation decisions of boards of directors. Boards vary in their degree of independence, and compensation decisions not only serve to motivate executives and allocate rents, but also affect a board's reputation for independence. Although greater managerial influence over the board has the obvious effect of increasing the *level* of pay, there is a more subtle relationship between the extent of this influence and the *composition* of pay. The theory predicts that it is not necessarily the most captured boards that are prone to choose inefficient pay-for-performance sensitivities and transfer rents in opaque ways as commonly argued. Reputational concerns may cause comparatively independent boards to place excessive weight on investor perception at the expense of efficiency, resulting in pay packages that, for example, provide excessive incentives. By making the decisions of boards extremely visible, mandatory disclosure of executive compensation lowers the level of pay at the expense of distortions in the structure. Finally, I show that boards exploit investor uncertainty about the outside opportunities of executives and the appropriate strength of incentives to justify higher levels of compensation.

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1 Introduction

Much of agency theory centers on the role of compensation in resolving conflicts of interests. In principal-agent models, it is assumed that the principal designs the appropriate compensation contract for the agent, which includes choosing the right performance measures and calibrating the weights on these measures. However, for the very reason a principal often hires an agent—lack of expertise—these decisions are commonly delegated to a third-party. Delegation, of course, introduces another layer of agency and raises the possibility of distortions in the choice of compensation schemes. The arguably canonical example of this type of delegation is in public corporations, in which directors set the compensation of executives on behalf of investors.

It has long been the popular belief that executives are overcompensated, and academics are also increasingly adopting the view that managers use their control over the board to obtain favorable compensation contracts.[1] Bertrand and Mullainathan (2001) find that CEO compensation varies with factors beyond CEO control ("luck"), particularly in poorly governed firms, and suggest that managers in these firms use the compensation process to skim resources from investors.[2] Similarly, Bebchuk, Fried, and Walker (2002) and Bebchuk and Fried (2003) argue that managerial power manifests itself both in the level and composition of pay. They suggest that to obscure the large wealth transfers away from investors, boards adopt opaque and inefficient pay practices, including the excessive use of options and perks.

Although this work is extremely suggestive, there has been almost no formal analysis of how the influence executives exert on the pay-setting process affects their compensation. This paper is a first step towards addressing this problem and, more generally, towards understanding the consequences of having agents, who themselves have imperfect incentives, design compensation contracts for other agents.[3] I analyze a traditional managerial agency problem, with the additional element that investors must delegate the task of designing the manager's compensation contract to the board due to their limited knowledge about the firm. In particular, the board chooses both the manager's base wage and the level of incentives.

An important assumption is that boards vary in their degree of independence from management. The corporate governance regulations of the New York Stock Exchange define independence as having "no material relationship with the listed company (either directly or as a

[1]See Crystal (1991) for a practitioner's perspective on the excesses associated with executive compensation and the lack of arm's-length bargaining between the board and executives over compensation arrangements.

[2]In a related paper, Garvey and Milbourn (2004) show that pay is more responsive to luck when external events are positive rather than negative.

[3]Scharfstein and Stein (2000) is one the few existing papers that analyzes agency in the design of compensation agreements. In their paper, a CEO inefficiently uses preferential capital budgeting allocations to compensate division managers.

partner, shareholder or officer of an organization that has a relationship with the company)."[4] At the most basic level, this and other definitions of independence capture that an independent director has fewer ties with management and, as a consequence, is likely to place relatively greater weight on investor interests.

A direct implication is that as boards become more independent, they grant managers a lower level of compensation. However, all boards choose the value-maximizing pay-for-performance sensitivity, regardless of their degree of independence. Boards that favor managers increase the non-contingent portion of executive compensation and opt not to transfer rents through incentive pay to avoid placing undue risk on managers and distorting their behavior. As described above, Bebchuk, Fried, and Walker argue that the form of transfers to managers is often inefficient since captured boards must camouflage excessive rents to avoid "outrage costs"—costs associated with a loss of reputation. Although in a different context, Coate and Morris (1995) make a similar argument and show that to preserve their reputation, politicians in some situations redistribute wealth to special interests through policies that they know are inefficient. Such policies must also sometimes be efficient so that voters cannot be certain of the politician's motive.

To analyze how a board's concern about its reputation affects its behavior, I assume that investors are not fully informed about any given board's degree of independence. A board can influence investor perception through its actions, and compensation decisions therefore send an important signal about the board. As argued by Jensen and Fama (1983), directors "have incentives to develop reputations as experts in decision control," which includes ensuring that executives do not engage in self-dealing (p. 315). Yermack (2004) provides evidence that outside directors have roughly an equal mix of explicit and implicit (reputational) incentives. The primary source of implicit incentives are the opportunities for new directorships when directors sit on boards of firms that perform well. In addition, Dyck and Zingales (2002) and Louis, Joe, and Robinson (2004) provide evidence that boards are responsive to media pressure, which is suggestive of the importance of reputational concerns. Similarly, Johnson, Porter, and Shackell (1997), in a study focused specifically on compensation decisions, find that negative press is associated with smaller subsequent increases in pay and higher future pay-for-performance sensitivities.

Consistent with this evidence, I show that the presence of reputational concerns has the beneficial effect of inducing boards to lower the level of pay. Moreover, if executive compensation is well disclosed, boards have little incentive to manipulate the mix of pay and generally choose the optimal level of incentives. For example, although it is commonly argued that options are vehicle to transfer rents, it is not clear there is any benefit from substituting from cash

[4]See the NYSE's corporate governance rule filing, SR-NYSE-2002-33.

to options given that boards must disclose the grant value of such options. Indeed, firms commonly disclose the Black-Scholes value of option grants, which arguably *overstate* their value to risk-averse executives.[5]

However, if there are gaps in the reporting requirements, the reputational concerns of boards cause them to substitute from well disclosed forms of pay to less transparent forms, such as perks. Such substitution is likely to be inefficient. Therefore, an implication of the model is that the career concerns of boards in conjunction with imperfect disclosure requirements result in inefficient pay practices.[6] Strikingly, although the level of pay is increasing in the degree of managerial influence, there is no clear relationship between independence and the extent to which boards adopt inefficient pay practices. Comparatively independent boards may feel greater pressure to reduce the disclosed level of pay from their preferred level and thus substitute into less transparent and efficient forms of pay.

Distortion in the design of compensation contracts may also arise when the high level of pay is largely driven by the market for CEO and boards cannot signal their responsiveness to the concerns of investors by simply lowering the level of wages. In such a scenario, boards choose to signal their independence in other ways. For example, boards may adopt an excessively high pay-for-performance sensitivity if this policy is associated with good governance. This behavior is most pronounced among boards that are highly sensitive to investor perception and place excessive weight on "optics" at the expense of efficiency. In these circumstances, investors are better off when directors have weaker career concerns. This result links this paper with the literature on the perverse effects of career concerns (see, for example, Ricart i Costa and Holmstrom, 1986, Scharfstein and Stein, 1990, and Ely and Välimäki, 2003).

There is significant variation in the level of pay executives can command in the market. Moreover, investors are generally less informed than boards about the outside opportunities of any given executive. I show that boards exploit this uncertainty to justify the amount they pay their executives. In particular, boards benchmark the pay of executives to the compensation levels of other executives, although these benchmarks may not accurately reflect the pay required to retain their executives. In addition to exploiting uncertainty about the outside opportunities of their executives, boards have an incentive to exploit their superior knowledge of future revenues and profits to increase the level of pay of their managers. For example, Yermack (1997) finds that boards often grant options just prior to the release of good news, inflating their value. This type of behavior leads boards to adopt compensation schemes that provide a level of incentives that can be either too low or high, depending on the circumstances. However,

[5]See Hall and Murphy (2002) for estimates of the amount executives discount the Black-Scholes value of options.

[6]Jensen and Murphy (1990) make a related point when they conjecture that "political forces" together with disclosure requirements creates distortions in the structure of compensation schemes.

as in Coate and Morris, the level of incentives has to be efficient in some circumstances in order to be justifiable and not plainly indicative of self-dealing. While a management-oriented board will certainly be more inclined to use these strategies to extract rents, well-governed boards have an incentive to avoid those incentive instruments associated with self-dealing, which itself may be distortionary.

A theme that emerges from the analysis is that while managerial influence over the pay-setting process has the intuitive effect of increasing the level of pay, there is a more subtle relationship between extent of this influence and the composition of pay. Existing empirical work on the relationship between firm governance and executive pay provides significant evidence that in poorly governed firms, executives have higher pay (see, for example, Borokhovich, Brunarski, and Parrino, 1997 and Core, Holthausen, and Larcker, 1999). There is much less evidence on the relationship between the quality of firm governance results and the use of incentives. Hartzell and Starks (2003) find that institutional ownership concentration is associated with higher pay-for-performance sensitivities (and a lower level of pay). The theory suggests that findings such as these must be interpreted with caution, as there is no guarantee that the higher pay-for-performance sensitivity is in fact optimal. Boards subject to pressure from institutional investors boards may adopt policies indicative of good governance not because they are always beneficial, but to signal that they are responsive to investors.

It should be noted that this result is actually quite general and potentially applies to a host of decisions beyond compensation decisions. For example, Fisman, Khurana, and Rhodes-Kropf (2004) argue that boards sensitive to shareholder pressure may inefficiently terminate their CEO's in response to such pressure. These findings are particularly suggestive in light of the difficulty of establishing an empirical link between board independence and firm performance.[7] Independence ensures that directors are not too closely aligned with management, but does not ensure that directors actually make value maximizing decisions. Moreover, the career concerns of independent directors do not always lead to good decision-making. In the following section, I describe the model. Sections 3-8 provide the key results; and, finally, Section 9 concludes.

2 The Model

2.1 The Firm

Consider a firm comprised of three parties: an investor, a manager, and a board of directors. The firm's revenues are given by $r(e, \epsilon)$ where e is the manager's level of effort and ϵ is a

[7] See Hermalin and Weisbach (2003) for a review of the literature on board characteristics and firm performance.

disturbance term. I assume that the manager has exponential utility, $u(t,e) = -\exp\{-\rho(t - g(e))\}$, where t is the manager's realized wage and $g(e)$ is the cost of effort. The board can resolve the manager's moral hazard problem by offering performance-based compensation. I restrict the analysis to linear compensation contracts: $t(r) = \beta + \alpha r$. A well-known property of the exponential utility function is that there are no wealth effects, implying that the level of incentives, α, is independent of the level of compensation. Although not essential, this property simplifies the analysis and eliminates what is arguably a secondary effect (and is sole reason for restricting the form of the manager's utility).

Let $w(\alpha,\beta,e)$ denote the manager's certainty equivalent to such a contract, i.e., $w(\alpha,\beta,e)$ is the value of w that solves $u(w) = E[u(t(r),e)]$. In certainty equivalent terms, I assume that the manager has a reservation wage of $\underline{w}$. The investor is risk neutral and has an expected net profit $\pi(\alpha,\beta,e) = (1-\alpha)E[r(e,\epsilon)] - \beta$. As with the manager, I assume that in expectation the investor's profits must be above some minimum level $\underline{\pi}$ (possibly negative), or the investor will intervene and dissolve the firm. This last assumption is a regularity condition that ensures that there is an upper bound to the rents that can be extracted from the investor.

2.2 The Board

In this section, rather than specify a particular model of the arguably complex interaction between insiders and outsiders on the board, I take a reduced form approach and assume the board has preferences which reflect the following considerations: (1) boards vary in the degree to which they are captured by management; (2) boards place greater weight on the interests of management when the degree of capture is higher; and (3) the board prefers not to be perceived by investors as captured. In section 6, however, I provide a more detailed analysis of how such preferences may arise.

Suppose that there are two types of boards: boards that are management-oriented and have a type denoted by $\underline{\theta}$, and boards that are *comparatively* investor-oriented and have a type denoted by $\bar{\theta}$. I emphasize the word comparatively since neither type of board may be completely independent, as I discuss below. Nonetheless, I refer to the type $\bar{\theta}$ board as investor-oriented or independent. It is also worth noting that the results generalize quite naturally to an arbitrary number of types, but at the expense of making the exposition more technical and without contributing conceptually. The investor is not informed about the board's type and make inferences based on the board's decisions, which in this analysis is limited to compensation decisions. The prior probability that $\theta = \bar{\theta}$ is q. Based on the board's decisions, the investor updates her belief to μ, which is a measure of the board's reputation for independence.

The payoff of the board is given by $v(\pi, w, \mu, \theta)$ where v is continuously differentiable in all its arguments and increasing in the wages of the manager and strictly increasing in the profits of the investor and the measure of board reputation, μ.[8] The fact that v is increasing in μ is a reduced form way of capturing that both the board's and the firm's future opportunities are to tied to the board's reputation. For example, a decrease in investor perception that the board is independent may increase the likelihood that the board is removed in future periods or may reduce the opportunities for the board's members to sit on other boards. While I allow for the possibility that even an investor-oriented board places some weight on management interests, a natural case is that in which $v_w(\pi, w, \mu, \bar{\theta}) = 0$, where v_w is the partial derivative of v with respect to w.

For a fixed level of reputation, μ, I assume that the tradeoff between the π and w is unchanged. In particular, there is a function ϕ such that $v(\pi, w, \mu, \theta) = v(\phi(\pi, w, \theta), \mu, \theta)$. This separability assumption is satisfied in the typical model of reputation in which career concerns enter in additively and $v(\pi, w, \mu, \theta) = \phi(\pi, w, \theta) + \gamma(\mu, \theta)$. I also assume that ϕ is strictly quasiconcave in the investor's and manager's payoffs to ensure that subject to feasibility constraints the board chooses a compensation contract that yields a unique level of π and w. These assumptions simplify the analysis, but are not essential for the key implications.

Since an investor-oriented board has fewer ties with management, it places great weight on investor interests relative to a management-oriented board. An implication of this conceptualization of independence is that the marginal rate of substitution between the manager's wage and investor's payoff, $-v_w/v_\pi$, is strictly larger for a more independent board:

Assumption S1 *A Board that is more independent is less willing to sacrifice investor welfare for an increase in the manager's welfare. Equivalently, $v_w/v_\pi = \phi_w/\phi_\pi$ is strictly decreasing in θ.*

While this assumption has strong implications for how each type of board trades off investor welfare against management welfare, it has no implications about the relative sensitivity of each type of board to changes to its reputation. Another intuitive consequence of independence is:

Assumption S2 *A Board that is more independent is less willing to accept a reduction in its reputation for an increase in the manager's welfare. Equivalently, v_w/v_μ is strictly decreasing in θ.*

For certain results, it is necessary to replace Assumption S1 with the following:

Assumption S3 *A Board that is more independent is more willing to accept a reduction in its reputation for an increase in the investor's welfare. Equivalently, v_π/v_μ, is strictly increasing in θ.*

Assumptions S2 and S3 imply Assumption S1 since $v_w/v_\pi = v_w/v_\mu \cdot v_\mu/v_\pi$. Assumption S3

[8] Although there are only two types of boards, I assume that v changes smoothly as θ increases from $\underline{\theta}$ to $\bar{\theta}$.

states that a management-oriented board is more willing than an investor-oriented board to take actions that destroy firm value, but for whatever reason enhance the board's reputation. This assumption is less intuitive than the preceding two assumptions and plays a more technical role in the analysis by ruling out "money burning," in which a investor-oriented board signals its independence by taking such value-destroying actions. In section 7, I reintroduce the possibility of such perverse signalling and discuss when such behavior may arise and how it may manifest itself.

Lemma 1 in the Appendix outlines certain key implications of Assumptions S1-S3. Completing the description of the model is the following outline of the game's timing: first, the board chooses a compensation contract; after observing the compensation contract, the manager chooses an effort level and the investor updated her beliefs about the board's type; finally, profits are realized and the parties receive their respective payoffs.

3 The Board's Compensation Policy

As discussed in Section 2.1, the manager's utility does not exhibit wealth effects. It follows that given a compensation contract, (α, β), the manager's choice of effort, $e(\alpha)$, depends only on the level of incentives, and the certainty equivalent of this contract is $w(\alpha, \beta, e(\alpha)) = \beta + w(\alpha, 0, e(\alpha))$. It follows that the total surplus (in certainty equivalent terms) generated by (α, β) is $s(\alpha, e(\alpha)) \equiv \pi(\alpha, \beta, e(\alpha)) + w(\alpha, \beta, e(\alpha))$, where $s(\alpha, e(\alpha))$ is independent of β. Let α^* be the level of incentives that maximizes $s(\alpha, e(\alpha))$. I assume that $e(\alpha)$ and α^* are-well defined and that α^* is unique. For example, in the case that $r(e) = e+\epsilon$, $\epsilon \sim N(0, \sigma^2)$, g is smooth, and there is an interior solution, a computation establishes that $w(\alpha, \beta, e) = \beta + \alpha e - g(e) - (1/2)\rho\alpha^2\sigma^2$ and $\alpha^* = [1 + \rho\sigma^2 g'']^{-1}$.

Let $s^* \equiv s(\alpha^*, e(\alpha^*))$ be the maximum surplus and let $\pi(\alpha, \beta) \equiv \pi(\alpha, \beta, e(\alpha))$ and $w(\alpha, \beta) \equiv w(\alpha, \beta, e(\alpha))$ be the respective payoffs of the investor and manager given a contract (α, β). First, consider the behavior of the board when there are no reputational concerns, i.e., when μ is fixed. Let $(\alpha(\theta), \beta(\theta))$ be the compensation contract chosen by a board of type θ.[9]

Lemma 2 *If the board has no reputational concerns, then the board chooses the efficient level of incentives regardless of the board's type ($\alpha(\theta) = \alpha^*$). In addition, $\beta(\theta)$ is unique and a management-oriented board offers a larger base wage than an independent board ($\beta(\bar{\theta}) \leq \beta(\underline{\theta})$).*

Proof. That $\alpha(\theta) = \alpha^*$ follows immediately from the fact that the optimal strategy is for the board to maximize the total surplus and reallocate it using the base wage $\beta(\theta)$. The

[9]The separability of v implies that $(\alpha(\theta), \beta(\theta))$ is independent of the fixed level of μ.

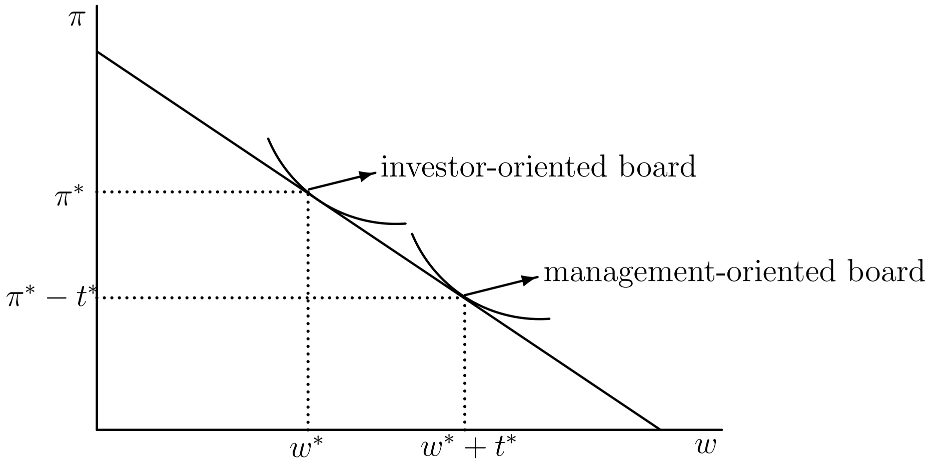

Figure 1: Equilibrium Without Reputational Concerns

board chooses $\beta(\theta)$ to maximize $\phi(s^* - w(\alpha^*, \beta), w(\alpha^*, \beta), \theta)$ subject to $w(\alpha^*, \beta) \geq \underline{w}$. The strict quasiconcavity of ϕ implies that $\beta(\theta)$ is unique. Lemma 1 implies that for $w' > w$ if $\phi(s^* - w', w', \bar{\theta}) \geq \phi(s^* - w, w, \bar{\theta})$ then $\phi(s^* - w', w', \underline{\theta}) > \phi(s^* - w, w, \underline{\theta})$, implying that $\beta(\bar{\theta}) \leq \beta(\underline{\theta})$ *Q.E.D.*

Lemma 2 simply states that in the absence of reputational concerns, both a management-oriented board and an independent board choose a compensation policy that maximizes the total value of the firm, but that a management-oriented board rewards the manager with a larger share of surplus (see Figure 1). Denote by β^* and $\beta^* + t^*$ the base wage offered by an independent and management-oriented board, respectively, when there are no reputational concerns. The expected payoff of the investor and manager given (α^*, β^*) is $\pi^* \equiv \pi(\alpha^*, \beta^*)$ and $w^* \equiv w(\alpha^*, \beta^*) = s^* - \pi^*$.

In the presence of reputational concerns, the board must also take into account what the choice of compensation policy signals to investors. Let $\mu(\alpha, \beta)$ denote the investor's updated belief about the board's type after observing the board's choice of contract. In any sequential equilibrium, $(\alpha(\theta), \beta(\theta), \mu(\alpha, \beta))$, the board's strategy $(\alpha(\theta), \beta(\theta))$ (or possibly a mixture over a finite number of such contracts) must maximize the board's payoff $v(\pi(\alpha, \beta), w(\alpha, \beta), \mu(\alpha, \beta), \theta)$ and the investor's beliefs must satisfy Bayes rule wherever possible.[10] In addition, I limit the analysis to equilibria which satisfy the D1 criterion (Banks and Sobel (1987) and Cho and Kreps (1987)). Intuitively, the D1 criterion ensures that the investor's beliefs off the equilibrium path are "reasonable" and reflect that certain types of boards are more likely than others to choose certain off the equilibrium path actions. Given a contract off the equilibrium path, $(\hat{\alpha}, \hat{\beta})$, the

[10]At this stage, I do not explicitly model the investor's response; for the purposes of the equilibrium analysis, assume that the investor's best "response", $a(\alpha, \beta)$, is simply to choose her posterior $\mu(\alpha, \beta)$. Intuitively, the investor (or for that matter, third parties) takes some action based on her assessment of the board's type, and I am assuming that the board prefers the action associated with higher types.

D1 criterion requires that if a board of type θ_1 strictly prefers to deviate to $(\hat{\alpha}, \hat{\beta})$ whenever a type θ_2 weakly prefers such a deviation, then the investor must believe that any deviation to $(\hat{\alpha}, \hat{\beta})$ is by a type θ_1 board. I provide a more formal definition of the D1 criterion in the Appendix.

Using this criterion, the following lemma establishes that if an equilibrium involves pooling at a contract (i.e., more than one type of board chooses to offer the contract), then this contract gives the manager his reservation wage.[11]

Lemma 3 *Suppose that v satisfies Assumptions S1 and S2. If an equilibrium satisfies the D1 criterion and involves pooling at a contract, (α, β), then $w(\alpha, \beta) = \underline{w}$. In addition, if v satisfies Assumption S3, then $\pi(\alpha, \beta) = s^* - \underline{w}$.*

Proof. See the Appendix.

In any separating equilibrium, it is optimal for a management-oriented board to choose the compensation contract, $(\alpha^*, \beta^* + t^*)$, that it would choose if there were no reputational concerns. The payoff to the board in these circumstances is $v(s^* - w^* - t^*, w^* + t^*, 0, \underline{\theta})$. Let $\tilde{w}$ be the value of w *less* than $w^* + t^*$ that solves the equation, $v(s^* - w^* - t^*, w^* + t^*, 0, \underline{\theta}) = v(s^* - \tilde{w}, \tilde{w}, 1, \underline{\theta})$; note that the strict quasiconcavity of ϕ and the fact that v is increasing in μ implies that if such a value of w exists, it is unique; if no such value of w exists, then set $w = \underline{w}$). $\tilde{w}$ is the level of wages that makes a management-oriented board indifferent between (1) being perceived as management-oriented and offering its preferred contract, $(\alpha^*, \beta^* + t^*)$ and (2) a contract that gives the manager a lower level of wages, but at which the board is perceived as independent.

Proposition 1 *Suppose that v satisfies Assumptions S1 and S2. If $\tilde{w} > \underline{w}$, then there exists a unique separating equilibrium that satisfies the D1 criterion, in which both types of boards choose a level of incentives, α^*. Management-oriented boards set the base wage at $\beta(\underline{\theta}) = \beta^* + t^*$ and the independent board sets the base wage at $\beta(\bar{\theta}) = \beta^* - \max\{w^* - \tilde{w}, 0\}$.*

Proof. See the Appendix.

Note that $w(\alpha^*, \tilde{\beta}) = \min\{w^*, \tilde{w}\}$ and $\pi(\alpha^*, \tilde{\beta}) = s^* - \min\{w^*, \tilde{w}\}$. Proposition 1 establishes that, if possible, an independent board signals its type simply by lowering the manager's base wage, leaving the pay-for-performance sensitivity unchanged (see Figure 2). While the

[11] More formally, there is *pooling* at an action if at least two types of board take the action with positive probability. An equilibrium is said to be *separating* if the actions of the board fully reveal its type to the investor.

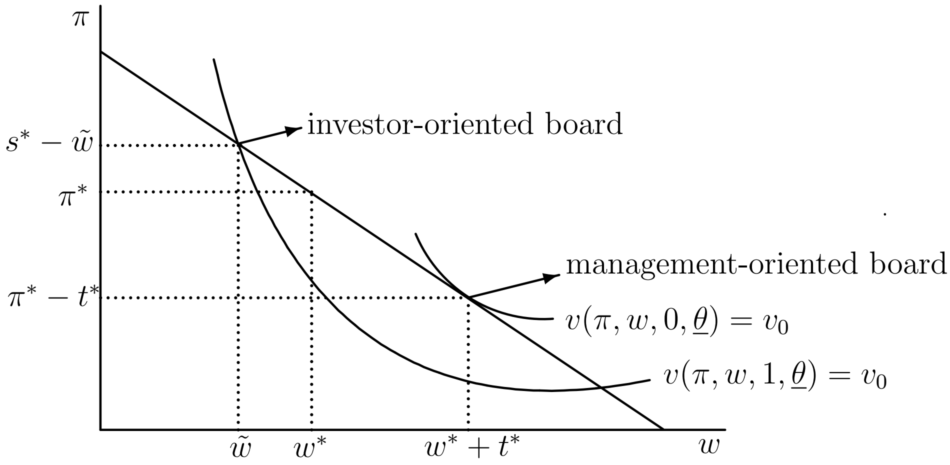

Figure 2: Signaling by Lowering the Base Wage

proposition completely characterizes the equilibrium when $\tilde{w} > \underline{w}$, it remains to analyze the case that $\tilde{w} \leq \underline{w}$. Let $\beta^{**} = \beta^* - (w^* - \underline{w})$, and note that $w(\alpha^*, \beta^{**}) = \underline{w}$.[12]

Proposition 2 *Suppose that v satisfies Assumptions S2 and S3 and that $\tilde{w} \leq \underline{w}$. There is a unique equilibrium satisfying the D1 criterion in which both types of boards chooses the efficient level of incentives, α^*. A independent board offers the manager a base wage β^{**} so that in expectation the manager receives exactly the reservation wage. A management-oriented board offers the manager $\beta^* + t^*$ with some probability and β^{**} otherwise.*

Proof. See the Appendix.

Propositions 1 and 2 establish one of the key implications of the paper, namely that the reputation concerns place an important constraint on the level of executive compensation. Regardless of the particular equilibrium, both types of boards choose a level of pay that is weakly lower relative to the case in which investor perception is not a concern. Another important implication of the propositions is that, absent some other friction, boards design efficient compensation schemes, regardless of the extent of managerial power. Any rent extraction takes place through the base wage. This result follows from the assumption that the true level of pay is well disclosed. As a first approximation, such an assumption is arguably realistic, particularly in the U.S. where there are comprehensive disclosure requirements. For example, given that boards must disclose the grant value of options (which, if anything, *overstate* their actual value to the executive), it is not clear there is any benefit from substituting from cash to options for the sake of inflating pay. Nonetheless, in subsequent section, I consider various sources of inefficiency in the design of compensation contracts.

[12]The next two propositions are an implication of the results derived Cho and Sobel (1990) for a broad class of signaling games. For the sake of completeness, I nonetheless sketch the proof of the next proposition in the Appendix.

4 Imperfect Disclosure and Camouflage

As discussed above, one of the important assumptions in the preceding section is that the investor can accurately infer the firm's expected profits and the manager's level of pay from the board's choice of a compensation contract, (α, β) (i.e., executive compensation is clearly disclosed to investors). Suppose now that for any choice of (α, β), the board can transfer an additional rent y to the manager at a cost $z(y) > y$ to the investor, where is z differentiable. This specification is a way of capturing that the board may be able to pay managers in ways that are poorly disclosed and that such transfers, as a consequence of their hidden nature, are likely to take an inefficient form.

For example, the rents could be in the form of perks that investors cannot observe and which provide less value to the manager than they cost to provide. More generally, the rents could represent any form of pay, such as options, that (1) the manager values less highly than a risk-neutral investor and (2) investors do not account for fully as a consequence of reporting requirements. Of course, certain forms of pay, including options, also have incentive effects; however, I abstract from this consideration and assume that the hidden pay does effect the manager's effort decision. Another potential source of hidden rents is related party transactions that benefit the manager in ways the investor cannot observe and may not be efficient.

Let $y(\pi, w, \theta)$ maximize $\phi(\pi - z(y), w + y, \theta)$. To ensure that $y(\pi, w, \theta)$ is unique, I henceforth assume that z is convex. A result analogous to Lemma 2 is the following:

Lemma 4 *A management-oriented board allows the manager to extract greater rents than an independent board or equivalently, $y(\pi, w, \underline{\theta}) \geq y(\pi, w, \bar{\theta})$. Moreover, when there are no reputational concerns, neither type of board uses the rent-extraction technology.*

Define $\bar{\phi}(\pi, w, \theta) \equiv \phi(\pi - z(y(\pi, w, \theta)), w + y(\pi, w, \theta), \theta)$ and $\bar{v}(\pi, w, \mu, \theta) \equiv v(\tilde{\bar{\phi}}(\pi, w, \theta), \mu, \theta)$. It is easy to show that if v satisfies Assumption S1, then $\bar{v}$ does as well. Assumption S2 and S3, however, are not necessarily preserved when v is transformed. Intuitively, given that v satisfies one of these properties, $\bar{v}$ satisfies the corresponding property as long as rent-extraction is sufficiently costly and therefore limited in degree. To facilitate the analysis, I assume that $\bar{v}$ indeed satisfies Assumption S2 and analyze the impact of unobservable rent-extraction on the equilibria derived in Section 2. This assumption implies that the "disclosed" level of pay, $w(\alpha, \beta)$, still has some signaling value. Note that this assumption is trivially satisfied if an independent board places no weight on management's interests.

Suppose both types of boards offer the same contract, but choose a different levels of hidden rent-extraction. In this scenario, the investor's beliefs about the type of the board depend not only on the observed contract, but also on realized revenues, since the distribution of revenues varies with the level of rent-extraction (i.e., beliefs have the form $\mu(\alpha, \beta, r)$. This fact has the potential to significantly complicate the analysis of equilibria involving pooling. I proceed by limiting the analysis to separating equilibria. When there is separation, the investor's equilibrium beliefs depend only on the observed contract.

Let $\tilde{w}_r$ be defined in the same manner as $\tilde{w}$. Specifically, given the board chooses a level of incentives α^*, $\tilde{w}_r$ is the level of wages below which a management-oriented board prefers to sacrifice its reputation than to offer the manager such a low wage. As a first step to understanding the impact of unobservable rent-extraction, we have the following result:

Lemma 5 *A management-oriented board is willing to pay the manager a lower disclosed wage when the rent-extraction technology is available, i.e.,* $\tilde{w}_r \leq \tilde{w}$.

Proof. Note that $\bar{\phi}(\pi, w, \underline{\theta}) \geq \phi(\pi, w, \underline{\theta})$, which implies that $\bar{v}(s^* - w, w, 1, \underline{\theta}) \geq v(s^* - w, w, 1, \underline{\theta})$. In addition, $v(s^* - w^* - t^*, w^* + t^*, 0, \underline{\theta}) = \bar{v}(s^* - w^* - t^*, w^* + t^*, 0, \underline{\theta})$. It follows that $\tilde{w}_r \leq \tilde{w}$. *Q.E.D.*

Replacing $\tilde{w}_r$ with $\tilde{w}$ and $\bar{v}$ with v (and limiting attention to beliefs of the form $\mu(\alpha, \beta)$), Proposition 1 applies exactly as before. In particular, if $\tilde{w}_r > \underline{w}$, a management-oriented board does not extract any hidden rents, chooses the efficient level of incentives, and offers the manager a base wage $\beta^* + t^*$. An independent board chooses the efficient level of incentives, offers a lower base wage relative to the case without the rent-extraction technology, $\beta^* - \max\{w^* - \tilde{w}_r, 0\}$, but may compensate the manager with unobserved rents. Applying Lemma 5 and Proposition 1, it therefore follows that:

Proposition 3 *If $\bar{v}$ satisfies Assumptions S1 and S2 and $\tilde{w}_r > \underline{w}$, then an independent board offers the manager a lower disclosed wage relative to the case in which it is not possible to extract hidden rents, and a management-oriented board's behavior is unchanged. An independent board, however, extracts hidden rents.*

Proposition 3 implies that that level of undisclosed rents transferred to the manager is potentially *increasing* in the degree of independence (see Figure 3). To understand this surprising result, it is important to recall that an independent board only places greater weight on investor interests relative to a management-oriented board and does not generally have incentives perfectly aligned with the investor. Reputational concerns cause the independent board to lower the manager's disclosed wage below the level the board deems ideal. As a result, the board allows the manager to "claw back" some rents in undisclosed ways.

The general implication of Proposition 3 is that when there are (1) weaknesses in the system of disclosure and (2) concerns about investor perception, mandatory disclosure causes boards to substitute away from well disclosed forms of pay towards poorly disclosed forms of pay.

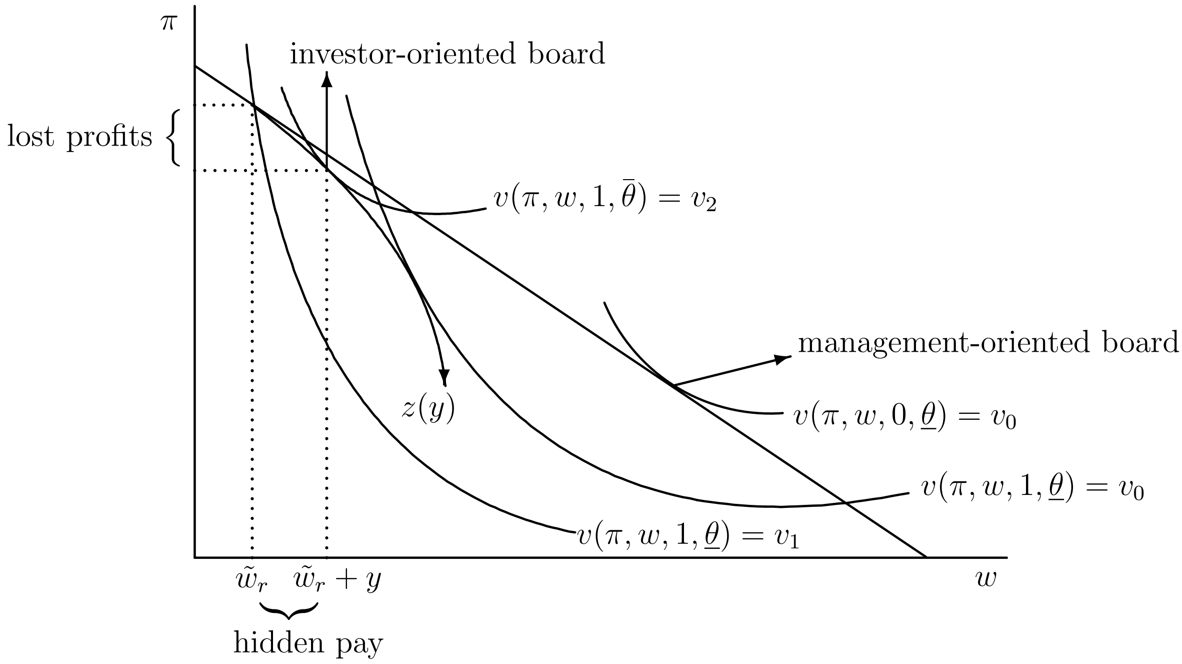

Figure 3: Hidden Rent-Extraction

Such substitution is generally costly. When there are large gaps in the reporting requirements, mandatory disclosure of executive pay may actually become counterproductive. Moreover, there is no clear relationship between a board's type and the extent to which it chooses to exploit these gaps. At one extreme, a controlling and informed principal would both choose an efficient contract and minimize the rents of the manager. At the other extreme, a board that is completely entrenched and unconcerned about it reputation extracts significant rents, but does not necessarily do so in a distortionary and hidden manner. A board that does not favor management to the same degree, but is concerned about it reputation, may actually make greater effort to obscure the true level of compensation of its executives.

5 Outside Options and Excess Pay

A strong assumption in the preceding analysis is that investors are fully informed about the manager's outside option, $\underline{w}$. In practice, investors have incomplete knowledge what constitutes competitive pay and what constitutes excess pay. Moreover, the outside opportunities of executives vary depending on a host of factors that are not completely transparent to investors, including the particular mix of skills valued by the market at any given point of time, the need for talent by comparable firms, the particular connections of an executive, and personal considerations that may make certain executives more mobile than others. As a result of these factors, there is likely to be variability in the outside opportunities for otherwise similar executives. A natural question is how this variability affects the compensation decisions of boards.

To address this question, I assume that the manager has an outside option $\underline{w}$ with probability ν and $\underline{w} + k$ otherwise, where $k > 0$. The actual realization of the outside option is observed only by the board and the manager and is assumed to be independent of the board's type. Recall that $\tilde{w}$ is the lowest (risk-adjusted) wage a management-oriented board is willing to offer its manager to obtain a good reputation. For the analysis to be interesting relative to the baseline case, it must be the case that $\tilde{w} < \underline{w} + k$. If $\underline{w} + k \leq \tilde{w}$, then an investor-oriented board can signal its independence by offering $\tilde{w}$, regardless of the outside option of its executive, and the analysis is unchanged. In what follows, I therefore concentrate on the case in which $\underline{w} < \tilde{w} < \underline{w} + k$. The requirement that $\underline{w} < \tilde{w}$ is simply to reduce the number of different cases and has little substantive bearing on the analysis. I also assume that $\underline{w} + k < w^* + t^*$, where $w^* + t^*$ is the wage a management-oriented board prefers to offers its manager in the absence of reputational considerations.

An investor-oriented board, whose manager has a high outside wage, $\underline{w} + k$, can no longer separate itself from a management-oriented board. The resulting behavior of the investor-oriented board in this scenario is similar to that outlined in Proposition 2: the board offers a contract which gives the manger $\underline{w} + k$ and the manager-oriented board emulates this behavior with some probability (i.e., there is some pooling at $\underline{w} + k$). The behavior of an investor-oriented board, whose manager has a low outside wage, is analogous to Proposition 1: the board completely separates itself by granting its manager a total wage equal to $w^{**} \equiv \min\{w^*, \tilde{w}\}$. This equilibrium is summarized by the following proposition:[13]

Proposition 4 *Suppose that v satisfies Assumptions S2 and S3, $\underline{w} < \tilde{w} < \underline{w} + k$, and $\underline{w} + k < w^* + t^*$. In the unique equilibrium satisfying the D1 criterion: (1) The board chooses the level of incentives, α^*, regardless of its type. (2) An investor-oriented board offers the manager a risk-adjusted wage of $\underline{w} + k$ when his outside option is $\underline{w} + k$ and w^{**} when his outside option is $\underline{w}$. And (3) a management-oriented board offers the manager $w^* + t^*$ with some probability and w^{**} otherwise.*

Relative to the baseline case in which the manager's outside option is always $\underline{w}$, an investor-oriented board must now sometimes offer the wage $\underline{w} + k$ to retain the manager. This change in behavior is purely driven by the tighter constraint the board faces when the managers has a better outside option and would be present in any model of compensation. It is the change in the management-oriented board's behavior that is interesting. This type of board may *lower* the manager's wage relative to the baseline case, as a consequence of the fact that the manager may have a *higher* outside option. That is, the board may now finds it advantageous to offer the manager exactly the high outside wage and justify its decision by pointing to the need

[13] I omit the proof as it is completely analogous to Propositions 1 and 2.

to pay the manager competitively (whether true or not). In this way, the board suffers less reputational harm than when the wage is extremely high and cannot be justified by any metric. Stated differently, the board "takes cover" beneath the fact some executives command high wages. The presence of such cover leads to greater compression in wages than would otherwise be present.

6 The Board's Preferences

In the preceding sections, the board's preferences are assumed to be a function, $v(\pi, w, \mu, \theta)$, with certain properties. In this section, I provide a simple model of how such preferences may arise as a consequence of the interaction between insiders and outsiders on the board. In particular, there are two members of the board: an outside director and the manager, who serves as the inside director. I assume that certain decisions, such as the manager's compensation, are at the sole discretion of the outside director. Although the outside director must formally be independent, there is uncertainty about the director's true degree of independence. A director is independent if she has no significant ties with the manager or firm, as the manager can leverage such ties to obtain more favorable decisions. For example, directors who have lucrative consulting contracts or who otherwise engage in related party transactions with the firm have a greater incentive to please the firm's management. Whether a director is independent is also a function of how susceptible the director is to influence, which can either be implicit, as in the case of management persuasion, or explicit, as when executives make donations to a director's preferred charity.

To capture the possibility of this type of influence, I assume that the manager is able to induce the outside director to increase his compensation by providing the director with a private benefit of $b(w, \theta)$, where b is increasing the manager's wage (i.e., the certainty equivalent of the compensation package) and where θ is the outside director's level of independence.[14] As θ increases, the outside director is more independent, and the manager has fewer levers to exert influence; formally, $\frac{\partial b}{\partial w \partial \theta} < 0$. An alternative and particularly stark way of interpreting $b(w, \theta)$ is as the maximum side payment the outside director is able to extract from the manager when the level of compensation is w (where it is more difficult make such side payments when there are fewer ties between the parties). An illustrative example is the following: suppose that the manager can transfer b in private benefits to the outside director at personal cost $b\theta$ (transfers are costlier as directors become more independent). In addition, suppose that when

[14] I assume either that the cost of these private benefits is either borne by the manager or is immaterial to the performance of the firm. For example, funds donated to a charity in which the director takes special interest may have already earmarked for donation and thus impose no additional cost to investors.

the outside director pays a salary w, the director and manager bargain over how much of the "excess," $w - \underline{w}$, the manager must transfer to the director. Nash bargaining yields a transfer $b(w, \theta) = \arg\max_{b \leq w - \underline{w}} b \cdot (w - \underline{w} - b\theta)$. A calculation establishes that $b(w, \theta) = (w - \underline{w})/2\theta$, and clearly $\frac{\partial b}{\partial w \partial \theta} < 0$.

In addition to private benefits $b(w, \theta)$, I assume that the director receives a share τ of the firm's profits, where $0 \leq \tau \leq 1$. Although the determinants of director compensation are an important and interesting question, I take τ as given for the purposes of this analysis. The final source of incentives arises from the director's concern about her reputation. As I discuss briefly in Section 2.1, there are several reasons for directors to be concerned about investor perception about their independence. If investors believe that the board favors management when critical decisions arise, such as a possible merger, investors will discount the firm's value. Such a response may hurt the board financially, make the firm a takeover candidate, and also reduce the likelihood directors are reelected to the board. Finally, the perception that a director is not responsive to investor interests may reduce the director's opportunities to sit on other boards. Regarding this last point, it can be argued that directors that are perceived as too independent by managers are less likely to receive additional board seats. However, such a consideration is implicitly embedded in the reward for being management friendly, $b(w, \theta)$.

To capture these various reputation effects, I assume that the outside director receives a payoff, $r(\mu, \theta)$, when r is increasing in the director's reputation μ. The payoff may also vary with θ, since (1) the value of having tenure on the board and the likelihood of retaining the position will generally depend on a director's degree of independence and the resulting relationship with management. A director that neither has the support of investors or management is extremely vulnerable, whereas a director may be insulated from investor pressure if she is friendly to management and retains their support. For example, suppose that the outside director receives an expected benefit T from remaining on the board. Suppose, moreover, that investors can lobby to remove a director from the board. The intensity of such lobbying will depend on the perception of the director's independence (relative to the average replacement) and will therefore be decreasing in μ. If the probability the director retains her position is $\psi(\mu, \theta)$, then we have that $r(\mu, \theta) = \psi(\mu, \theta)T$. Note that managers will also have concerns about their reputation, but I ignore this consideration in this simple illustration of how the board's preferences may be derived.

Summing these components together, the outside directors chooses a compensation contract to maximize $v(\pi, w, \mu, \theta) = \tau\pi + b(w, \theta) + r(\mu, \theta)$. It is easy to verify that v satisfies Assumption S1. A sufficient condition for v to satisfy Assumption S2 is that $\frac{\partial r}{\partial u \partial \theta} \geq 0$, so that independent directors are more responsive to investor perception. However, if $\frac{\partial r}{\partial u \partial \theta} > 0$, Assumption S3 is *not* satisfied. Certain key results depend only on Assumptions S1 and S2. Nonetheless, in the next section, I explore how certain other implications change when Assumption S3 is not satisfied.

7 Reputation and Inefficient Compensation Design

As discussed in the preceding section, if the investor-oriented board is more sensitive to investor perception, then Assumption S3 may not be satisfied. Rather, v satisfies Assumptions S1, S2, and:

Assumption S4 *An independent board is less willing than a management-oriented board to accept a reduction in its reputation for an increase in the firm's profits. Equivalently, v_π/v_μ, is strictly decreasing in θ.*

Proposition 3 depends on only Assumption S1 and S2 and applies regardless of whether v satisfies Assumption S3 or S4. In particular, the investor-oriented board signals its independence by simply lowering the manager's wage. It is when the board cannot fully signal its independence by lowering the wage that the degree to which the board is sensitive to investor perception becomes critical. When it is not possible to achieve full separation by lowering the wage (i.e., $\tilde{w} \leq \underline{w}$) and if v satisfies Assumption S3, then Proposition 2 implies that an investor-oriented board offers the manager $\underline{w}$ and the management-oriented board with some probability follows follows suit. Intuitively, this is a situation in which the high level of salaries is driven by the market for executive talent, and there is little scope for significantly lowering the wage.

However, if v satisfies Assumption S4 rather than S3, then an independent board will opt to distinguish itself by signaling in other ways. For example, the board may increase the pay-for-performance sensitivity, α, to signal that the firm is well-governed. However, such behavior is distortionary and *lowers* current profits. Assumption S4 implies precisely that the board is willing to make such a tradeoff and forgo profits to establish its reputation. Whether such behavior is good or bad is difficult to interpret since future periods are not explicitly modeled. If the board opts to maintain a good reputation and forgo profits in order to improve the firm's profitability going forward by, for example, increasing its access to finance, then such behavior may very well be in the long-term interest of investors. On the other hand, if the board members are mainly interested in maintaining the private benefits associated with tenure on the board and in increasing their outside opportunities, such "reputation-seeking" behavior is essentially an agency problem.

To formalize the intuition that the board may forgo current profits, let $\tilde{\pi}$ satisfy the equation $v(\tilde{\pi}, \underline{w}, 1, \underline{\theta}) = v(s^* - w^* - t^*, w^* + t^*, 0, \underline{\theta})$; if no such value of π exists, set $\tilde{\pi}$ equal to the minimum expected profit required by investors, $\underline{\pi}$. The management-oriented board is indifferent between a contract that yields a profit $\tilde{\pi}$, a wage $\underline{w}$, and a good reputation and a contract that yields

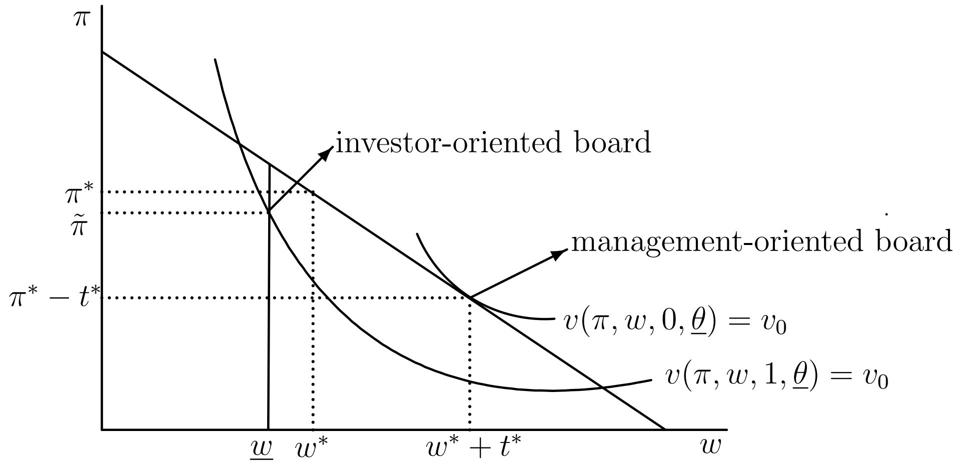

Figure 4: Perverse Signaling

its preferred profit and wage, but a poor reputation. Note that $\tilde{\pi} + \underline{w} \leq s^*$, implying that the former contract does not generally maximize total surplus.[15] I omit the proof of the following proposition as it is completely analogous to the proof of Proposition 2.

Proposition 5 *Suppose that v satisfies Assumptions S2 and S4 and that $\tilde{w} \leq \underline{w}$. In payoff relevant terms, there is a unique equilibrium satisfying the D1 criterion in which the investor and manager receive $\tilde{\pi}$ and $\underline{w}$, respectively, in a firm with an independent board. In a firm with a management-oriented board, the investor and manager receive $s^* - w^* - t^*$ and $w^* + t^*$ if $\tilde{\pi} \geq \underline{\pi}$; if $\tilde{\pi} < \underline{\pi}$, then the investor and manager receive $\tilde{\pi}$ and $\underline{w}$ with some probability and $s^* - w^* - t^*$ and $w^* + t^*$ otherwise.*

See Figure 4 for a graphical representation of this equilibrium. Regardless of whether this behavior is interpreted as positive or negative, this result establishes that comparatively independent board may adopt inefficient pay packages if (1) their is significant investor scrutiny of executive compensation; (2) the board is highly sensitive to this scrutiny; and (3) the level of executive pay is largely determined by competitive forces so that there is little scope for lowering the level of pay. The model is neutral on the exact form of such a distortion in compensation practices, but one possible interpretation is that the distortion will reflect the accepted set of best practices at any given point of time. For example, options for some time were considered a desirable way of aligning the interests of managers with investors, but are now out of favor. The board to signal that it is well-governed may choose less than efficient compensation schemes and follow these fads, increasing and decreasing its use of options when in and out of favor, respectively.

[15]This inequality follows from the fact that $\tilde{w} \leq \underline{w}$, which in turn implies that $v(s^* - \tilde{w}, \tilde{w}, 1, \underline{\theta}) \geq v(s^* - w^* - t^*, w^* + t^*, 0, \underline{\theta})$. In addition, I make the regularity assumption that for any intermediate value of surplus $0 \leq s \leq s^*$ there exist a corresponding level of incentives, α. This assumption is satisfied for most "well-behaved" specifications of r and g.

8 Private Information about Firm Revenues

An assumption maintained throughout the analysis is that the underlying production technology, $r(e, \epsilon)$, is fixed and known by investors. An important consequence of this assumption is that the optimal level of incentives, α^*, is common knowledge. In actuality, investors are likely to have less information than the board about $r(e, \epsilon)$ and thus the optimal level of incentives. I model such a scenario by assuming that with probability ω the firm's production technology is not $r(e, \epsilon)$, but rather $\hat{r}(\epsilon)$, implying that managerial effort is not productive. The level of productivity is independent of the board's type, θ, and is observed only by the board (prior to making to making its compensation decision). It is critical to note that even though managerial effort is not important, it does not follow that the firm is on average less profitable when the underlying technology is $\hat{r}$. For example, the firm may be at a stage where the role of the manager is to carry out an established strategy versus a firm where the quality of managerial decision-making is critical.

To illustrate the forces present in this scenario, I simplify the analysis and assume that the investor-oriented board has interests that are perfectly aligned with an investor concerned only about current profits, i.e., $v(\pi, w, \mu, \bar{\theta}) = \pi$. The investor-oriented board therefore chooses the contract (α^*, β^*) when the manager is productive and $(0, \underline{w})$ otherwise.[16] The problem facing the management-oriented board is whether to preserve its reputation and emulate the investor-oriented board or whether to choose its preferred contract. Suppose that $\tilde{w} > \underline{w}$, so that the management-oriented board is not willing to pay its manager $\underline{w}$ even at the expense of negative investor perception. It follows that this type of board will never offer the contract $(0, \underline{w})$. In addition, when the underlying technology is $r(e, \epsilon)$, the management-oriented board also never offers (α^*, β^*), since the certainty equivalent of this contract is $\underline{w}$, given $r(e, \epsilon)$. Rather, the management-oriented board offers its preferred contract, $(\alpha^*, \beta^* + t^*)$. Note that the certainty equivalent of $(\alpha^*, \beta^* + t^*)$ is $\underline{w} + t^*$.

It remains to analyze which contract the management-oriented board offers when the technology is $\hat{r}(\epsilon)$. Given $\hat{r}(\epsilon)$, the management-oriented board's preferred contract is $(0, \underline{w} + t^*)$. The two relevant contracts are therefore (α^*, β^*) and $(0, \underline{w} + t^*)$. Let $(\hat{\pi}, \hat{w})$ be the investor's expected profit and the manager's certainty equivalent, when the board offers (α^*, β^*) and the technology is $\hat{r}(\epsilon)$.[17] In addition, let $\hat{u}(r)$ be the investor's equilibrium belief about the board's type upon observing the board offer the contract (α^*, β^*), given that (1) a management-oriented board chooses to offer (α^*, β^*) whenever the firm's technology is $\hat{r}(\epsilon)$ and (2) the realization of revenues is r.[18]

[16] In what follows, I assume that $\alpha^* > 0$.

[17] $\hat{\pi} = (1 - \alpha^*)E[\hat{r}(\epsilon)] - \beta^*$ and $u(\hat{w}) = E[u(\beta^* + \alpha^* \hat{r(\epsilon)}, 0)]$

[18] Letting $f(r)$ and $\hat{f}(r)$ denote the distributions of $r(e(\alpha^*), \epsilon)$ and $\hat{r}(\epsilon)$, respectively, $\hat{u} = \frac{q(1-\omega)f(r)}{q(1-\omega)f(r)+(1-q)\omega\hat{f}(r)}$

When the technology is given by $\hat{r}$, the management-oriented board chooses (α^*, β^*) only if $E[v(\hat{\pi}, \hat{w}, \hat{u}(r), \underline{\theta})] \geq v(s^* - w^* - t^*, w^* + t^*, 0, \underline{\theta})$. Based on the preceding analysis, we have the following proposition:

Proposition 6 *Suppose $v(\pi, w, \mu, \bar{\theta}) = \pi$, $\tilde{w} > \underline{w}$, and there are two possible technologies, $r(e, \epsilon)$ and $\hat{r}(\epsilon)$. When the underlying technology is $\hat{r}(\epsilon)$, a management-oriented board chooses the inefficient contract, (α^*, β^*), if and only if $E[v(\hat{\pi}, \hat{w}, \hat{u}(r), \underline{\theta})] \geq v(s^* - w^* - t^*, w^* + t^*, 0, \underline{\theta})$. When the underlying technology is $r(e, \epsilon)$, a management-oriented board always chooses the efficient level of incentives, α^*.*

Proposition 6 illustrates that boards may distort their choice of compensation schemes when there is private information about future revenue. In this case, incentives clearly have no value when the revenue generating technology is $\hat{r}(\epsilon)$. However, the board opts to provide such incentives as they *may* be optimal and therefore offer a way to extract rents without incurring as much reputational harm as a straight forward cash payment. However, it is important to note that in general the board may also choose to extract rents through a contract that pays a higher base wage and an inefficiently *low* level of incentives. Whether the distortion results in incentives that are too strong or too weak depends crucially on the underlying technology and the set of compensation contracts that are justifiable on efficiency grounds. Finally, although it is only the management-oriented board that engages in such behavior in the analysis above, investor-oriented boards will generally also have an incentive to distort their decisions if, for no other reason, than to avoid practices that seem opportunistic. Specifically, if the investor-oriented board has reputational concerns it may opt not to offer the contract (α^*, β^*), although optimal, to avoid negative inferences.

9 Conclusion

In this paper, I explore how managerial influence and concerns about investor perception affect compensation decisions. As is intuitive, the greater the influence of managers, the higher level of pay. When disclosure requirements are strong and pay packages are clearly reported to investors, the presence of reputational concerns places a constraint on the amount of rent-extraction and results in a lower level of pay than would prevail otherwise. In addition, boards opt to provide the efficient level of incentives regardless of the level of pay.

Inefficient pay practices arise when there are gaps in the reporting requirements. In particular, to maintain their reputation while simultaneously transferring rents to managers, boards substitute well disclosed forms of pay for less transparent forms of pay, such as perks. Such a substitution is likely to result in compensation schemes that transfer value to managers in a wasteful manner. Therefore, an implication of the analysis is that when there are large gaps in the reporting requirements, mandatory disclosure of executive may actually become counterproductive.

Although the total level of pay is always increasing with managerial power, the extent to which boards engage in this type of inefficient substitution does not necessarily correlate with their degree of independence. It is the difference between the disclosed level of pay and the board's preferred level of pay for its manager that motivates boards to transfer rents in hidden ways; and this difference is potentially larger for boards that are comparatively independent and highly sensitive to investor perception.

Distortion in the design of compensation contracts also may arise when the market for executive talent is highly competitive and there is limited scope for boards to respond to investor pressure by lowering the level of pay. In this case, the boards most concerned about their reputation may signal that they are well-governed in costly ways. For example, boards may adopt compensation contracts with excessively high pay-for-performance sensitivities if such behavior is associated with good governance. Such signaling may actually be desirable from an investor perspective if establishing that the board is independent improves the prospects of the firm (for example, by lowering the cost of capital). However, if directors are largely motivated by other considerations, including retaining the private benefits of board tenure or obtaining other board seats, then this behavior is unlikely to benefit investors. In such situations, the board's career concerns are actually a liability for investors.

When there is variation in the outside opportunities of executives and if investors are imperfectly informed about these sources of variation, boards can exploit this uncertainty by arguing that their executives command high wages in the market. In this manner, boards suffers less reputational harm than when there is less ambiguity about the appropriate level of wages. Interestingly, introducing such ambiguity in the model may actually lower average wage of managers. The reason is that a board, which in the initial equilibrium opts to pay a high wage and suffer the reputational consequences, may find the wage-reputation tradeoff more favorable when there is uncertainty. Specifically, such a board may find it optimal to lower the wage of its manager just enough to bring his or her compensation in line with those executives that truly command a relatively high wage. In this manner, ambiguity about market may lead to greater compression in wages across managers. The extensive use of peer groups to justify levels of compensations provides anecdotal evidence of this type of behavior.

Just as boards may exploit uncertainty about market wages, they may exploit there superior knowledge of the firm's future revenues and profitability to extract rents. As discussed in the introduction, Yermack (1997) finds that boards may time option grants to benefit from good news about the firm's prospects. More generally, boards have an incentive to adopt contracts that are justifiable to investors, but may not be appropriate. For example, certain boards may provide excessively strong incentives if doing so yields rents, while other board may inappropriately avoid using incentives precisely to disassociate themselves from such rent-seeking behavior. In both cases, inefficiencies arise.

Taken together, the analysis suggests that the relationship between managerial power, reputational concerns, and the design of compensation contracts is extremely subtle. It is commonly argued that poorly governed firms pay their executives excessively and do not tie pay sufficiently to performance. The relationship between the quality of governance and the level pay is borne out in the theory. However, the theoretical (and, for that matter, the empirical) basis for statements on the inadequate relationship between pay and performance is less clear. Although distortions in the composition of pay are present in the theory, there is no systematic underprovision of incentives among poorly governed firms. Indeed, under certain conditions, comparatively independent boards choose a more distorted level of incentives. Of course, other factors not modeled here could be present. For example, it is possible that the decoupling of pay from performance reflects the inability of certain boards to commit to punish poor performance. Incorporating such considerations into the analysis is a challenge for future research.

10 The Appendix

In this section, I provide a formal definition of the D1 criterion and proof certain key results. Given an equilibrium, $(\alpha(\theta), \beta(\theta), \mu(\alpha, \beta))$, denote the board's equilibrium payoff by $v(\theta)$; i.e., $v(\theta) \equiv v(\pi(\alpha(\theta), \beta(\theta)), w(\alpha(\theta), \beta(\theta)), \mu(\alpha(\theta), \beta(\theta)), \theta)$. In addition, define

$$D(\hat{\alpha}, \hat{\beta}, \theta) \equiv \{\mu : v(\pi(\hat{\alpha}, \hat{\beta}), w(\hat{\alpha}, \hat{\beta}), \mu, \theta) > v(\theta)\}$$
$$\hat{D}(\hat{\alpha}, \hat{\beta}, \theta) \equiv \{\mu : v(\pi(\hat{\alpha}, \hat{\beta}), w(\hat{\alpha}, \hat{\beta}), \mu, \theta) = v(\theta)\}$$

A formal statement of the D1 criterion in this setting is as follows:

Definition 1 *An equilibrium,* $(\alpha(\theta), \beta(\theta), \mu(\alpha, \beta))$*, satisfies the D1 criterion if when the board chooses a deviation,* $(\hat{\alpha}, \hat{\beta})$*, such that* $D(\hat{\alpha}, \hat{\beta}, \theta_2) \cup \hat{D}(\hat{\alpha}, \hat{\beta}, \theta_2) \subset D(\hat{\alpha}, \hat{\beta}, \theta_1)$*, the investor believes that the board's type is* θ_1*.*

Assumption S1-S4 each imply that v satisfies the strict Spence-Mirrlees condition with respect to some pair of variables.[19] A well-known fact that is that if a function satisfies the strict Spence-Mirrlees condition it also satisfies the strict single crossing property (See Milgrom

[19]A continuously differentiable function $u(x, y, t)$ with $u_y \neq 0$ satisfies the strict Spence-Mirrlees condition if $u_x/|u_y|$ is strictly increasing in t.

and Shannon (1994) and Edlin and Shannon (1998)).[20] The next lemma summarizes the single crossing conditions that are particularly useful for the analysis that follows:

Lemma 1 *Fix $z = (\pi, w, \mu)$ and $z' = (\pi', w', \mu')$.*

1. *If v satisfies both Assumptions S1 and S2, $w' > w$, $\pi' \leq \pi$, and $\mu' \leq \mu$, then $v(z', \bar{\theta}) \geq v(z, \bar{\theta})$ implies that $v(z', \underline{\theta}) > v(z, \underline{\theta})$.*

2. *If v satisfies Assumptions S2 and S3, $w' \geq w$, and $\pi' \leq (\geq)\pi$, where one of the inequalities is strict, then $v(z', \bar{\theta}) \geq v(z, \bar{\theta})$ implies that $v(z', \underline{\theta}) > v(z, \underline{\theta})$.*

Proof. Lemma 1 is almost an immediate extension of Milgrom and Shannon's results, but for the sake of completeness, I provide a sketch of the proof. Suppose that both Assumptions S1 and S2 hold and that $\pi' \leq \pi$ and $\mu' \leq \mu$. In addition, assume that $v(z', \bar{\theta}) \geq v(z, \bar{\theta})$ and $v(z', \underline{\theta}) \leq v(z, \underline{\theta})$. The continuity of v in θ implies that there exist θ_0 such that $\underline{\theta} \leq \theta_0 \leq \bar{\theta}$ and $v(z', \theta_0) = v(z, \theta_0)$. The properties of v ensure that the board's indifference curves are smooth and path-connected; that is, there exists a path $a(s) = (\pi(s), w(s), \mu(s))$ such that $a(0) = z$, $a(1) = z'$, and $\pi'(s) \leq 0$, $w'(s) < 0$, and $\mu'(s) \geq 0$. By construction, $\frac{dv}{ds}|_{\theta=\theta_0} = 0$. Differentiating in s and applying Assumptions S1 and S2 implies that $\frac{dv}{ds}|_{\theta<\theta_0} > 0$ and $\frac{dv}{ds}|_{\theta>\theta_0} < 0$. It follows that if $\theta_0 < \bar{\theta}$, then $v(z', \bar{\theta}) < v(z, \bar{\theta})$; and if $\theta_0 = \bar{\theta}$, then $v(z', \underline{\theta}) > v(z, \underline{\theta})$, which in either case contradicts the initial hypothesis. Statement 2 of Lemma 1 can be proved in an analogous way. *Q.E.D.*

Proof of Lemma 3.

Suppose that both types of boards take (α, β) with positive probability and $w(\alpha, \beta) > \underline{w}$. Since v is strictly increasing in μ and $\mu(\alpha, \beta) < 1$, $v(\pi(\alpha, \beta), w(\alpha, \beta), 1, \bar{\theta}) - v(\bar{\theta}) > 0$. Using the continuity of v and the fact that for any level of total surplus there is a corresponding level of incentives, choose $\epsilon > 0$ and a compensation contract off the equilibrium path, $(\hat{\alpha}, \hat{\beta})$, such that $\pi(\hat{\alpha}, \hat{\beta}) = \pi(\alpha, \beta)$ and $w(\hat{\alpha}, \hat{\beta}) = w(\alpha, \beta) - \epsilon$ and $v(\pi(\alpha, \beta), w(\alpha, \beta) - \epsilon, 1, \bar{\theta}) - v(\bar{\theta}) > 0$. Let $\gamma(\epsilon, \theta)$ denote the level of μ at which $v(\theta) = v(\pi(\alpha, \beta), w(\alpha, \beta) - \epsilon, \mu, \theta)$ (that $\gamma(\epsilon, \bar{\theta})$ exists follows from the continuity of v; if for $\theta = \underline{\theta}$, no such value of μ exists, then set $\gamma(\epsilon, \underline{\theta}) = +\infty$). Lemma 1 implies that $\gamma(\epsilon, \bar{\theta}) < \gamma(\epsilon, \underline{\theta})$. Therefore $D(\hat{\alpha}, \hat{\beta}, \underline{\theta}) \cup \hat{D}(\hat{\alpha}, \hat{\beta}, \underline{\theta}) \subset D(\hat{\alpha}, \hat{\beta}, \bar{\theta})$ and the D1 criterion requires that $\mu(\hat{\alpha}, \hat{\beta}) = 1$. However, given this belief, $(\hat{\alpha}, \hat{\beta})$ is a profitable deviation for an independent board. It follows that if there is pooling at (α, β), then $w(\alpha, \beta) = \underline{w}$.

[20] For the purposes of this setting, a function $u(x, y, t)$ with $u_y > 0$ satisfies the strict single crossing property if for $x' > x$, any arbitrary values of y and y', and $t' > t$, $u(x', y', t) \geq u(x', y', t)$ implies that $u(x', y', t') > u(x, y, t')$.

Suppose that, in addition, v satisfies Assumption S3 and there is pooling at (α, β), with $w(\alpha, \beta) = \underline{w}$ and $\pi(\alpha, \beta) < s^* - \underline{w}$. Lemma 1 implies that if for any level of μ, a management-oriented board weakly prefers to deviate to a contract, $(\hat{\alpha}, \hat{\beta})$, at which $w(\hat{\alpha}, \hat{\beta}) = \underline{w}$ and $\pi(\hat{\alpha}, \hat{\beta}) = s^* - \underline{w}$, then an independent board strictly prefers such a deviation. This fact implies that $D(\hat{\alpha}, \hat{\beta}, \underline{\theta}) \cup \hat{D}(\hat{\alpha}, \hat{\beta}, \underline{\theta}) \subset D(\hat{\alpha}, \hat{\beta}, \bar{\theta})$. Therefore, it must be the case that $\pi(\alpha, \beta) = s^* - \underline{w}$. *Q.E.D.*

Proof of Proposition 1.

Suppose that v satisfies Assumptions S1 and S2, $\tilde{w} > \underline{w}$, and that there exists an equilibrium that satisfies the D1 criterion. From Lemma 3, if there is pooling at a contract, (α, β), then $w(\alpha, \beta) = \underline{w}$. The fact that $\tilde{w} > \underline{w}$ implies that any such contract is strictly dominated for a management-oriented board. Therefore, the equilibrium must be fully separating and $\alpha(\underline{\theta}) = \alpha^*$ and $\beta(\underline{\theta}) = \beta^* + t^*$. Suppose that an independent board chooses a contract (α, β). Since the equilibrium is separating the payoff to the board is $v(\pi(\alpha, \beta), w(\alpha, \beta), 1, \bar{\theta})$. To see that an independent board must choose the compensation contract $(\alpha^*, \tilde{\beta})$, where $\tilde{\beta} = \beta^* - \max\{w^* - \tilde{w}, 0\}$, assume that $(\alpha, \beta) \neq (\alpha^*, \tilde{\beta})$. The first step is show that

$$v(\pi(\alpha, \beta), w(\alpha, \beta), 1, \bar{\theta}) < v(\pi(\alpha^*, \tilde{\beta}), w(\alpha^*, \tilde{\beta}), 1, \bar{\theta}) \tag{1}$$

If $w^* \leq \tilde{w}$ it is clear that condition (1) holds since holding beliefs fixed (α^*, β^*) is the optimal choice of an independent board. Suppose therefore that $w^* > \tilde{w}$. If $w(\alpha, \beta) \leq \tilde{w} < w^*$, then again condition (1) holds by the strict quasiconcavity of ϕ. Assume therefore that $w(\alpha, \beta) > \tilde{w} = w(\alpha^*, \tilde{\beta})$. Lemma 1 implies that if an independent board weakly prefers (α, β) to $(\alpha^*, \tilde{\beta})$, then a management-oriented board strictly prefers $(\alpha^*, \tilde{\beta})$. However, using the definition of $\tilde{w}$, the equilibrium payoff of a management oriented board at $(\alpha^*, \beta^* + t^*)$ equals $v(\pi(\alpha^*, \tilde{\beta}), w(\alpha^*, \tilde{\beta}), 1, \underline{\theta})$. This implies that $(\alpha^*, \tilde{\beta})$ is an optimal deviation for a management-oriented board, which is a contradiction. Therefore it has been established that condition (1) must hold, which implies that $D(\alpha^*, \tilde{\beta}, \underline{\theta}) \cup \hat{D}(\alpha^*, \tilde{\beta}, \underline{\theta}) \subsetneqq \{1\} \subset D(\alpha^*, \tilde{\beta}, \bar{\theta})$. The D1 criterion requires that $\mu(\alpha^*, \tilde{\beta}) = 1$, implying that an independent board strictly prefers to deviate to $(\alpha^*, \tilde{\beta})$ from its equilibrium action, (α, β). It must be the case therefore that $(\alpha, \beta) = (\alpha^*, \tilde{\beta})$.

It has been established that if an equilibrium satisfying the D1 criterion exists, then $\alpha(\theta) = \alpha^*$, $\beta(\underline{\theta}) = \beta^* + t^*$, and $\beta(\bar{\theta}) = \beta^* - \max\{w^* - \tilde{w}, 0\}$. It remains to show that there exist beliefs, $\mu(\alpha, \beta)$, such that $(\alpha(\theta), \beta(\theta), \mu(\alpha, \beta))$ is an equilibrium and actually satisfies the D1 criterion. Let $\mu(\alpha, \beta) = 1$ if $w(\alpha, \beta) \leq \tilde{w}$ and let $\mu(\alpha, \beta) = 0$ otherwise. Note that the beliefs satisfy Bayes rule wherever possible and that the action of a management-oriented board maximizes its payoff. If $w^* \leq \tilde{w}$, an independent board receives the maximum feasible payoff in equilibrium. Suppose that $w^* > \tilde{w}$, then if an independent board were to deviate its optimal choice would be (α^*, β^*).

Note that $v(s^*-w^*,w^*,0,\underline{\theta}) < v(s^*-w^*-t^*,w^*+t^*,0,\underline{\theta}) = v(s^*-\tilde{w},\tilde{w},1,\underline{\theta})$. Lemma 1 implies that $v(s^*-w^*,w^*,0,\bar{\theta})) < v(s^*-\tilde{w},\tilde{w},1,\bar{\theta}))$. Therefore, $(\alpha(\theta),\beta(\theta),\mu(\alpha,\beta))$ is an equilibrium. Consider a deviation $(\hat{\alpha},\hat{\beta})$. If $w(\hat{\alpha},\hat{\beta}) \leq \tilde{w}$, then $D(\hat{\alpha},\hat{\beta},\underline{\theta}) \cup \hat{D}(\hat{\alpha},\hat{\beta},\underline{\theta}) = \emptyset$ and $\mu(\hat{\alpha},\hat{\beta}) = 1$ as required by the D1 criterion. Suppose $w(\hat{\alpha},\hat{\beta}) > \tilde{w}$. Note that $\pi(\hat{\alpha},\hat{\beta}) < \pi(\alpha^*,\beta(\bar{\theta})) \leq s^*-\tilde{w}$. Lemma 1 implies that if $v(\pi(\hat{\alpha},\hat{\beta}),w(\hat{\alpha},\hat{\beta}),\mu,\bar{\theta}) > v(\bar{\theta}) \geq v(s^*-\tilde{w},\tilde{w},1,\bar{\theta})$, then $v(\pi(\hat{\alpha},\hat{\beta}),w(\hat{\alpha},\hat{\beta}),\mu,\underline{\theta}) \geq v(s^*-\tilde{w},\tilde{w},1,\underline{\theta}) = v(\underline{\theta})$. It follows that $D(\hat{\alpha},\hat{\beta},\bar{\theta}) \cup \hat{D}(\hat{\alpha},\hat{\beta},\bar{\theta}) \subset D(\hat{\alpha},\hat{\beta},\underline{\theta})$, and $\mu(\hat{\alpha},\hat{\beta}) = 0$ as required by the D1 criterion, completing the proof. *Q.E.D.*

Proof of Proposition 2.

Suppose that v satisfies Assumptions S2 and S3 and that an independent board offers a contract (α,β) in equilibrium, where $(\alpha,\beta) \neq (\alpha^*,\beta^{**})$. Lemma 3 implies there cannot be pooling at (α,β), from which it follows that $\mu(\alpha,\beta) = 1$. Therefore, the contract (α,β) must be weakly dominated for a management-oriented board. Suppose the equilibrium is fully separating. The fact that $\tilde{w} \leq \underline{w}$ implies that to sustain the separation an independent board must significantly distort its action from (α^*,β^*). A management-oriented board in equilibrium must therefore be exactly indifferent between (α^*,β^*+t^*) and (α,β), i.e., $v(s^*-w^*-t^*,w^*+t^*,0,\underline{\theta}) = v(\pi(\alpha,\beta),w(\alpha,\beta),1,\underline{\theta})$, otherwise an independent board always has a value increasing deviation. Since $\tilde{w} \leq \underline{w}$, $v(s^*-\underline{w},\underline{w},1,\underline{\theta}) \geq v(s^*-w^*-t^*,w^*+t^*,0,\underline{\theta})$. Lemma 1 implies that $v(s^*-\underline{w},\underline{w},1,\bar{\theta}) > v(\pi(\alpha,\beta),w(\alpha,\beta),1,\bar{\theta})$. In fact, for any level of μ, if a management-oriented board is willing to deviate to (α^*,β^{**}), an independent board is willing to deviate as well. Therefore $\mu(\alpha^*,\beta^{**}) = 1$ and (α^*,β^{**}) is an optimal deviation, which is a contradiction. Suppose now that the equilibrium involves pooling. Lemma 3 implies that the pooling can only be at (α^*,β^{**}). Once again, it follows that if a management oriented board prefers (α^*,β^{**}) to (α,β) that an independent strictly prefers (α^*,β^{**}), which again is a contradiction. It has thus been established that $(\alpha,\beta) = (\alpha^*,\beta^{**})$. It immediately follows that a management-oriented board chooses a mixture of (α^*,β^{**}) and (α^*,β^*+t^*).

Let $\alpha(\theta) = \alpha^*$, $\beta(\bar{\theta}) = \beta^{**}$, and μ^* be the value of μ satisfying the equation $v(s^*-\underline{w},\underline{w},\mu^*,\underline{\theta}) = v(s^*-w^*-t^*,w^*+t^*,0,\underline{\theta})$; if no such value of μ exist, set $\mu^* = q$. Let $\beta(\bar{\theta}) = \beta^{**}$ with probability λ and β^*+t^* with probability $1-\lambda$, where $\mu^* = q/(q+(1-q)\lambda)$. Finally, let $\mu(\alpha,\beta) = \mu^*$ at (α^*,β^{**}) and 0 otherwise. $(\alpha(\theta),\beta(\theta),\mu(\alpha,\beta))$ is clearly an equilibrium. It remains to show that this equilibrium satisfies the D1 criterion. Given a deviation $(\hat{\alpha},\hat{\beta})$ and a belief μ, if an independent board prefers to deviate, then a management-oriented board strictly prefers to deviate. Therefore, the beliefs satisfy the D1 criterion. *Q.E.D.*

References

Banks, J. S. and J. Sobel (1987). Equilibrium selection in signaling games. *Econometrica 55*(3), 647–61.

Bebchuk, L. A. and J. M. Fried (2003). Executive compensation as an agency problem. *Journal of Economic Perspectives 17*(3), 71–92.

Bebchuk, L. A., J. M. Fried, and D. I. Walker (2002). Managerial power and rent extraction in the design of executive compensation. *University of Chicago Law Review 69*(3), 751–846.

Bertrand, M. and S. Mullainathan (2001). Are CEOs rewarded for luck? The ones without principals are. *Quarterly Journal of Economics 116*(3), 901–32.

Borokhovich, K. A. and R. Brunarski, Kelly R. adn Parrino (1997). CEO contracting and antitakeover amendments. *Journal of Finance 52*(4), 1495–1517.

Cho, I.-K. and D. M. Kreps (1987). Signalling games and stable equilibria. *Quarterly Journal of Economics 102*(2), 179–222.

Coate, S. and S. Morris (1995). On the forms of transfers to special interests. *Journal of Political Economy 105*(6), 1210–34.

Core, J. E., R. W. Holthausen, and D. F. Larcker (1999). Corporate governance, chief executive officer compensation, and firm performance. *Journal of Financial Economics 51*(3), 371–406.

Crystal, G. (1991). *In Search of Excess: The Overcompensation of American Executives*. New York: W.W. Norton Co.

Dyck, A. and L. Zingales (2002). The corporate governance role of the media. NBER Working Paper, No. 9309.

Edlin, A. S. and C. Shannon (1998). Strict single crossing and the strict Spence-Mirrlees condition: A comment on monotone comparative statics. *Econometrica 66*(6), 1417–25.

Ely, J. C. and J. Välimäki (2003). Bad reputation. *Quarterly Journal of Economics 118*(3), 785–814.

Fisman, R., R. Khurana, and M. Rhodes-Kropf (2004). Governance and CEO turnover: Do something or do the right thing? Working Paper.

Garvey, G. T. and T. T. Milbourn (2004). Asymmetric benchmarking in compensation: Executives are rewarded for good luck but not penalized for bad. *Journal of Financial Economics*, Forthcoming.

Hall, B. J. and K. J. Murphy (2002). Stock options for undiversified executives. *Journal of Accounting and Economics 33*(1), 3–42.

Hartzell, J. C. and L. T. Starks (2003). Institutional investors and executive compensation. *Journal of Finance 58*(6), 2351–74.

Hermalin, B. E. and M. S. Weisbach (2003). Board of directors as an endogenously determined institution: A survey of the economic literature. *FRBNY Economic Policy Review 9*(1), 7–26.

Holmstrom, B. and J. Ricart i Costa (1986). Managerial incentives and capital management. *Quarterly Journal of Economics 101*, 835–60.

Jensen, M. C. and E. F. Fama (1983). Separation of ownership and control. *Journal of Law and Economics 26*(2), 301–25.

Jensen, M. C. and K. J. Murphy (1990). Performance pay and top-management incentives. *Journal of Political Economy 98*(2), 225–264.

Johnson, M. F., S. Porter, and M. B. Shackell (1997). Stakeholder pressure and the structure of executive compensation. Working Paper.

Louis, H., J. R. Roe, and D. Robinson (2004). Managers' and investors' responses to media exposure of board ineffectiveness. Working Paper, Pennsylvania State University.

Milgrom, P. and C. Shannon (1994). Monotone comparative statics. *Econometrica 62*(1), 157–80.

Scharfstein, D. and J. Stein (1990). Herd behavior and investment. *American Economic Review 80*, 465–79.

Scharfstein, D. and J. Stein (2000). The dark side of internal capital markets: Divisional rent-seeking and inefficient investment. *Journal of Finance 55*(6), 2537–64.

Yermack, D. (1997). Good timing: CEO stock option awards and company news announcements. *Journal of Finance 52*(2), 449–76.

Yermack, D. (2004). Renumeration, retention, and reputation incentives for outside directors. *Journal of Finance 59*(5), 2281–2308.