

Shareholder democracy and its discontents: outrage, captured boards, and the veil of ignorance

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Abstract

We model the determination of management compensation through the strategic interaction among outside shareholders, managers, and corporate boards. The board sets both regular incentive compensation and discretionary special compensation unrelated to performance. We show that shareholder value maximising compensation plans may feature incentive compensation that is not monotone in performance and discretionary payments unrelated to performance. Manager oriented boards may transfer wealth to managers using compensation plans that feature a higher pay to performance relation and also exploit the discretionary compensation to enrich management. Full delegation of authority to the board, which insulates the board from shareholder outrage, may be optimal even if the likelihood of managerial control is high. However, in some cases, imposing charter restrictions on discretionary compensation is optimal. Shareholder democracy, by exposing board members to outrage costs, creates additional sources of distortion as it both induces management-oriented boards to distort operating policy to mask wealth transfers and shareholder-oriented boards to forego optimal compensation designs to avoid shareholder suspicion.

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1 Introduction

Shareholders must exercise some control over managerial compensation if they are to extract value from their investments. Managers, who are intimately involved with the day-to-day operations of the firm, have much more firm-specific information than shareholders. Moreover, frequently shareholdings are diffuse. Thus shareholders must exercise control while trapped behind a veil of ignorance and handicapped by the attenuated incentives produced by fractional ownership. For this reason, since Berle and Means (1932), the effective exercise of shareholder control has been viewed as problematic. Given diffusion of ownership and ignorance, shareholders must resort to three imperfect tools for exercising control—delegation, charter restrictions, and ex post intervention. Delegation involves handing the duty of managerial supervision over to better informed agents, i.e. a corporate board. Charter restrictions involve prohibiting certain potential corporate actions through specific provisions in the corporate charter. Ex post intervention involves removing or penalising managers or directors after shareholders observe egregious actions. Such intervention is triggered by shareholder outrage generated by board decisions.

Whether these means of control are effective is controversial in both academic and policy circles. This controversy has generated a debate as to whether the stylised facts associated with executive pay fit better an “efficient contracting” view or a “skimming” view of the pay process. Representative of the latter view are Bebchuk and Fried (2003, 2004, 2005), who argue that the pay process for U.S. companies has been captured by company insiders, and features of pay are best understood as a process in which company insiders, with the tacit collusion of boards, set the terms of their own pay, subject to certain external “outrage constraints”. The storm over pay practices in some firms, especially financial firms, in the recent financial crisis has caused many academics and policymakers to renew call for curbs on executive pay.¹ In contrast, Edmans and Gabaix (2009) survey a number of models which demonstrate that these controversial compensation designs are potentially consistent with efficient “arms-length” contracting between managers and a shareholder value maximising boards.

In this paper we consider the problem of controlling opportunism and the relative efficacy of the alternative methods of exercising control discussed above. We assume that shareholders can observe firm performance, investment policy, and the structure of management compensation. However, in contrast to boards, they have less information regarding latent state variables driving performance and the degree to which managers face incentive conflicts. There are two key differences between our approach and the extant literature. First, we consider the *three-way interaction* between managers, boards, and shareholders. In our analysis, each of these agent types has different information, incentives, and interests. While the extant research has developed models of governance when the board is shareholder oriented and when the board is management oriented, our paper is the first to our knowledge in which the orientation of the board is not common knowledge. In fact our analysis revolves around shareholders uncertainty regarding the loyalty of their board. Moreover, because board members are averse to sanction, even shareholder-oriented boards may be unwilling to make value maximising decisions if such decisions are sufficiently suspicious based on the shareholders’ information partition to generate outrage.

In our analysis, shareholders have ultimate control but for reasons of ignorance may gain from delegation to a board. Shareholders have the option of limiting the board’s discretion in offering pay packages through charter provisions, e.g., provisions that limit the level of managerial compensation or ban discretionary bonuses. We term this charter-based control. In addition, shareholders can opt to remove or sanction a board when, conditional on the publicly observable information, the actions of the board increase the probability that the board has been captured beyond a threshold value. We further assume that boards will never risk removal by shareholders. This model formulation captures the notion of “outrage costs” constraining managerial compensation. The lower the outrage threshold, the tighter the constraint from shareholder outrage and thus the more democratic the governance

¹Examples of practices that have been questioned include the indexing and expensing of stock options, directors’ discretion over the vesting of options, high levels of termination fees, M&A fees, etc.

system.

Both charter-based and democratic control are costly. Although limits on discretionary pay and compensation caps can increase firm value when the board is manager-controlled, in our setting “suspicious compensation policies” can maximise shareholder value in some states of the world. Thus, identifying suborned boards through observing compensation policy is problematic. Suspicious compensation policies can be optimal for two reasons. First, high incentive pay may be needed to induce appropriate managerial actions even in marginal states which may be private information to the manager and the board. Banning the high compensation required to induce effort in these states will indeed increase pay to performance sensitivity as such a ban will concentrate high compensation on states where high performance is very likely. Thus, compensation restrictions both increase pay to performance sensitivity and lower shareholder value when the board is shareholder oriented. Second, managers may have private information regarding future firm prospects as well as the private benefits associated with such prospects. For this reason, managers may not reveal adverse information regarding private benefit laden projects without revelation-based incentives. Thus, shareholders, who find the costs of excess compensation less than the cost of malinvestment, have an incentive to pay managers for revelation. Assuming positive systemic risk such, such excess compensation grants are likely in adverse economic states, lowering the pay-performance correlation.

Because board capture is possible, the fact that suspicious policies are sometimes optimal does not mean that shareholders should always delegate authority. Management oriented boards will use delegated authority to pay excess compensation even when it is not required, i.e., when the manager earns no private benefits and economic conditions are not marginal and thus do not justify high incentive compensation. Hence, the firm’s problem, in designing ex ante controls on board compensation policy reduces to trading off the costs of controls, which arise from reducing discretion when the board is shareholder oriented, against the benefits of controls, which arise from reducing discretion when the board is management oriented. Note that in our setting both management-oriented boards and shareholder-oriented boards are made worse off by charter restrictions—shareholder-oriented boards because they know that such restrictions will prevent them from implementing shareholder value maximising policies in some state of nature, management-oriented board because such restrictions prevent them from enriching the manager in other states. Thus, board opposition to charter restrictions is not informative regarding the boards’ loyalty to shareholders.

The alternative to ex ante charter controls we consider is democracy, i.e., allowing boards discretion over compensation policies while empowering less well-informed outside shareholders to sanction boards. We identify this sanctioning with shareholder outrage. Outrage could be expressed for example through a vote to remove directors or through the embarrassment of a compensation plan rejection. We assume that boards are averse to outrage and that such aversion is sufficient to curb compensation policies that will generate the outrage sanction. Thus, the outrage is off the equilibrium path but nevertheless constrains the board. We impose a perfection requirement on the set of equilibria considered that ensures that our equilibria can be approached by a series of games where the outrage point of shareholders is stochastic. Thus, we can view our results as reflecting a world where there is vanishingly small change of shareholder intervention against the board given equilibrium board behaviour. This framework fits the stylised fact that outrage costs do constrain boards but that actual shareholder outrage sanctioning board members is very rare.

In this setting, democracy can be more costly than either delegation or charter control. The reason is that shareholders’ posterior assessment of board corruption are endogenous, affected not only by compensation policy but also by its correlation with other observable firm decisions. Thus, under democracy, corrupt, management-oriented boards have an additional motivation to distort firm policy decisions: to disguise wealth transfers to managers. These manipulations may cost shareholders much more than the simple wealth transfers from excess compensation.

An analogy might clarify our argument. Consider a country that is considering how to control military spend-

ing. There is a chance that the executive is “military biased” and simply wants to funnel money to generals. At the same time, legitimate reasons exist for surges in military spending, i.e. dangerous enemies. If the executive is military biased, but subject to democratic control by a poorly informed electorate, the executive has an incentive to make policy decisions that simulate military threats and thus provoke unnecessary wars in order to justify increased military spending. Absent democratic control, the biased executive would enrich the military more direct and less costly wealth transfers, i.e., raise salaries, buy gold-plated weapons systems, and build nice officers’ clubs

Thus, if all variables observed by outside shareholders are contractible, ex post control through democracy is inferior to ex ante control through charter. Charter control can produce the same of level management compensation—based on the tradeoff between the gains from giving honest boards discretion, and the costs of granting that same discretion to corrupt boards—as ex post control without providing corrupted boards with an incentive to distort operating policy. However, when contracting is incomplete, and thus charters cannot be written that restrict compensation only for some public information state, democracy may be preferable to charter control. Under democracy, shareholder posteriors regarding board conduct will reflect all public information, including unverifiable information. In some cases such information will be fairly informative regarding the reasonableness of a given compensation decision. Manager controlled boards, realising that shareholder outrage will be very high if excess compensation is paid under some (non-contractible) public information signals, may refrain from offering such compensation. Whether the losses from distortion are larger than the gains from building state information into the evaluation of the board’s actions depends on how well the shareholders’ public information regarding overall economic climate correlates with the specific prospects of the firm’s investment projects, i.e. the systemic risk of corporate investment policies.

This framework produces a number of implications that are relevant for empirical research and for understanding the interactions among managers, boards, and shareholders.

- When the board is shareholder oriented, increasing constraints on compensation through charter restrictions on discretionary pay lowers firm value while increasing the pay-performance sensitivity and lowering expected managerial compensation.
- When the board is management oriented, constraints on compensation improve firm value only if the likelihood that investment projects are associated with managerial private benefits is sufficiently small, and such restrictions increase pay- performance sensitivity.
- Pay-performance sensitivity can be higher in a management-oriented board than a shareholder-oriented board, both when there are constitutional restrictions on discretionary compensation and when there is full delegation to the board.
- Both shareholder and management-oriented boards will oppose charter restrictions on compensation policy.
- Shareholder democracy more be more efficient in firms whose investment prospects carry a great deal of systemic risk.

Our analysis is particularly relevant in the context of recent policy debates that have suggested various curbs on executive compensation and shareholder voice in the pay process. For example, Bebchuk and Fried (2005) argue that many companies use subjective criteria for some of their bonus payments. They argue “..boards favouring their top executives can use the discretion provided by these plans to ensure that executives are well paid even when their performance is substandard”. In our analysis, while a management-oriented board can misuse discretionary pay, nonetheless, it is an important tool in the hands of a shareholder- oriented board for extracting information from the manager. Similarly, recent “say-on-pay” legislation in the U.S. aims to give shareholders in public

companies the right to cast a non-binding vote each year approving or disapproving executive pay packages. Our analysis suggests that greater involvement of shareholders in the pay process, whether in the form of restricting the board's discretion or making it easier to sanction boards for pay practices that shareholders disapprove may have significant costs both in terms of social welfare and firm value.

Our analysis differs from most of the existing literature on governance and pay in three important respects. First, while the literature mostly tries to understand the pay-setting process through either the lens of an "efficient contracting" view or a "skimming" view, our analysis allows boards, who set executive pay, to be either shareholder oriented or management oriented, but does not assume complete convergence of objectives since the board is sanction-averse. Second, the focus of our analysis is very much on the relative efficacy of alternative governance mechanisms within which boards can operate and set pay. Third, some of our results, and especially our analysis of the effects of shareholder democracy, derive from the three-way interaction between managers, boards, and shareholders. In this latter respect, a recent paper Song and Thakor (2006) is most relevant. In this paper, board type is heterogeneous and the board has career concerns (as does the CEO). An untalented board mimics to some degree the project accept/reject decision of a talented board to influence the posterior assessment of shareholders (or the CEO), and thereby distorts investment. The CEO also has career concern and chooses the precision of the private information that is disclosed to the board. The key differences between our paper and Song and Thakor is that (a) in our analysis the loyalty not the talent of the board is the locus of uncertainty, (b) shareholder inferences in our analysis can generate an active shareholder response not simply a change in beliefs, and (c) corporate governance is the key decision variable in our analysis while Song and Thakor focus only on investment distortion. Adams and Ferreira (2007, 2009) examine the manager's incentive to share information with a board and how this incentive is affected by the conflict between the board's advisory and monitoring roles. They find that a manager-friendly board can encourage more information sharing and can be optimal. Our analysis of the implications of shareholder democracy has also connections with Stein's work suggesting that the potential of a takeover threat can cause a shareholder oriented management to be myopic (Stein, 1988), or that a manager's concern with stock price can cause distortionary earnings manipulation even though the market is not fooled in equilibrium (Stein, 1989).²

This paper is organised as follows. Section 2, develops our basic model of managerial opportunism in the presence of both shareholder and management oriented boards. Section 3 considers both the welfare effects and the effects on shareholder value of restrictions on board compensation policy. Section 4 develops the model of shareholder outrage and corporate democracy. Section 5 provides some concluding remarks.

2 The Basic Model

2.1 Model Primitives and Information Structure

We assume that the firm's manager exerts costly effort to produce an output. Output can be either high (x_2) or low (x_1), where $x_2 > x_1$. Managerial effort can be either high ($E = e > 0$), or low ($E = 0$). The cost of high effort is $e > 0$.

The information structure is as follows. At time $t = 0$, prior to the choice of effort, the firm is in one of three possible states of nature, which we call Good, Medium, and Bad, respectively. This state of nature (which we call the state of the firm) is private information to the manager and the firm's board, but is not observed by shareholders, who only know the probability distribution of the states. The ex-ante probability of the Good, Medium and Bad states are $\mu/2$, $1/2$, $(1 - \mu)/2$, respectively, where $\mu \in [0, 1]$.

²Other papers that stress an agent's incentive to influence ability perceptions through action choices are Holmstrom (1999), Prendergast and Stole (1996), Prendergast (1999), and Milbourn, Shockley, and Thakor (2001).

We assume that in the Good state (henceforth, G state), the probability of high output x_2 if high effort is chosen is 1. In the Medium state (henceforth, M state), the probability of high output x_2 is $1/2$ if high effort is chosen. In both these states, the probability of high output if low effort is chosen is ε and that of low output is $1 - \varepsilon$. In our subsequent analysis, we assume ε to be arbitrarily small so that we can essentially assume that it is zero. Finally, in the Bad state (henceforth, B state), output is x_1 with probability $1 - \varepsilon$ and x_2 with probability ε irrespective of effort. Output is realized at time $t = 1$. We assume that the realized output is verifiable.

The firm also has an investment project at time $t = 1$. The investment requires I and the NPV can be either $+n$ or $-n$. In the G state, the probability of a positive NPV project is $\theta > 0.5$, in the B state, the probability of a *negative* NPV project is also θ , while in the M state, the probability is 0.5 for either type of project. The manager privately observes the NPV of investment (the state of the project). The board and shareholders only know the probability distribution of the project NPV.

Finally, we assume that in each of the states G, M or B, there is a probability $\beta > 0$ that irrespective of the project NPV, acceptance of the project gives the manager a private benefit of $bI = B > 0$. The board and the manager both observe whether or not the project will generate private benefit to the manager (we call this state the state of the manager); however, shareholders do not.

2.2 Compensation Structure

At time $t = 0$, after observing the state of the firm, the board chooses an incentive compensation structure to induce managerial effort. The manager's pay is set by the board.

To see how contractual pay is set, consider state G. Without loss of generality, we can set pay if low output is realized equal to zero. Let g denote pay if high output is realized. To induce high effort, g has to satisfy $g(1 - \varepsilon) - e \geq 0$. Similarly, let m denote pay if high output is realized in the M state. To induce high effort, we require $(1/2 - \varepsilon)m - e \geq 0$. Finally, for the B state, since the probability distribution of output does not depend on effort, pay is set equal to zero irrespective of output.

Pay can also have a discretionary component. Discretionary pay is set at time $t = 1$ by the board after observing the state of the manager. We discuss discretionary pay below.

2.3 The Board and Governance Structure

There are two types of boards - those that maximize shareholder value and those that are controlled by managers and maximize the manager's payoff. We call these two types of boards *shareholder-oriented board* (SB) and *management-oriented board* (MB) respectively. Boards also experience a penalty in the event of dismissal; however, we will assume that this penalty is high enough that in equilibrium, the probability of dismissal will be zero. The state of the board (i.e., board type) is observed by the board and the manager, but not by shareholders, who only have a (prior) probability distribution on the board type.

In this section, we consider and contrast the implications for firm value and social welfare of two types of governance regimes: *full delegation* (FD) and *charter restriction* (CR). Under full delegation, the shareholders delegate to the board the task of setting pay and determining investment policy. In the charter restriction regime, the shareholders may restrict the actions of the board ex ante through charter amendments. We focus on one particular type of constitutional restriction, namely, the power to set discretionary pay. In the next section, we introduce *shareholder democracy* (SD) and study its consequences.

We assume that shareholder outrage costs are high enough that board dismissal occurs only for actions that reveal the board type to be management oriented with probability one. This restriction is removed in the next section where we study how SD affects corporate policy.

Since a shareholder-oriented board will set pay conditional on high output being realised at either $g = e^3$ (in the G state) or $m = 2e$ (in the M state) or zero (in the B state), any other level of pay will reveal the board to be a management-oriented board with probability one. Further, since the shareholders do not observe the state, and there is a positive probability of a shareholder-oriented board setting pay at the level m , the management-oriented board can set pay at the level m without risking dismissal.

Finally, it will be evident that in a full delegation regime, discretionary pay D under a shareholder-oriented board will either be $D = 0$ or $D = bI = B$. A management-oriented board can therefore set D at either level without being revealed to be management oriented. However, as will be clear below, a shareholder-oriented board will never set $D = B$ and accept the project. Thus, if a management-oriented sets $D = B$, it must reject the project.

2.4 Governance Regimes, Firm Value and Welfare

2.4.1 Firm Value

We contrast firm value under full delegation and charter restriction, where in the charter restriction regime, the corporate charter is changed so as to disallow any discretionary pay. The following Proposition states the basic comparison:

Proposition 1. *If the board is shareholder oriented, firm value is lower under a charter restriction regime than under a full delegation regime for n sufficiently large of B sufficiently small.*

Proof: Suppose first that the state is one in which the investment project will result in private benefit for the manager. From the Revelation Principle, WLOG we can assume that if the shareholder-oriented board is allowed to offer discretionary pay, then it can offer the manager a pay of $D = B$ if he reports that the project has negative NPV, and zero otherwise. It is clear that this will induce truthful reporting, since if the NPV is negative and the manager lies, he can at best get B . On the other hand, if the NPV is positive, the board will allow the project, so there is no incentive to get B by lying.

Hence, provided $B < n$, a shareholder-oriented board can always induce the manager to invest in positive NPV projects and stop negative NPV projects in the full delegation regime. In contrast, in the charter restriction regime, since $\theta > 0.5$, the optimal action from shareholder point of view for the shareholder-oriented board is to allow investment if it observes that the state is G and stop investment if the state is B (in the M state, a coin toss can decide the outcome).

Next, suppose that the state is such that the project generates no private benefit. Then discretionary pay is not needed, and the investment project is taken if and only if the NPV is positive for both the charter restriction and full delegation regimes.

Thus, a shareholder-oriented board creates greater value under the full delegation regime than under the charter restriction regime, provided

$$\begin{aligned}
 & (1/2)((1/2)(x_2 - m) + (1/2)x_1 + \frac{n - B}{2}) + \frac{1 - \mu}{2}(x_1 + (1 - \theta)n - \theta B) \\
 & + \frac{\mu}{2}(\theta n - (1 - \theta)B + x_2 - g) > (1/2)((1/2)(x_2 - m) + (1/2)x_1) \\
 & \qquad \qquad \qquad + \frac{1 - \mu}{2}(x_1) + \frac{\mu}{2}(\theta n - (1 - \theta)n + x_2 - g)
 \end{aligned} \tag{1}$$

³Here, we consider ε to be essentially zero.

where the expression on the left hand side denotes firm value conditional on the project generating private benefit when the board is shareholder oriented and the governance regime is full delegation. The expression on the right hand side denotes firm value conditional on the project generating private benefit when the board is shareholder oriented and the governance regime is charter restriction. We have assumed that in the charter restriction regime, since investment has ex ante negative NPV in state B, no investment is allowed in that state if the project generates private benefit.

The inequality in (1) can be rewritten as

$$\left(\frac{3}{4} - \frac{\theta}{2}\right)n > B\left(\frac{1}{4} + \frac{\theta}{2} + \frac{\mu}{2} - \theta\mu\right). \quad (2)$$

Since $\theta < 1$, the condition holds for n sufficiently large.

Proposition 2. *Suppose the board is management oriented.*

• If

$$\beta < \frac{\mu}{2}\theta + \frac{1-\mu}{2}(1-\theta) + \frac{1}{4}$$

firm value is higher under a charter restriction regime than under a full delegation regime.

• If

$$\beta > \frac{\mu}{2}\theta + \frac{1-\mu}{2}(1-\theta) + \frac{1}{4}$$

firm value is

- *Higher under an full delegation regime than a charter restriction regime for n sufficiently large or B sufficiently small.*
- *Higher under an full delegation regime than under a charter restriction regime for β sufficiently close to 1, provided $n > B$.*

Proof: Suppose the state is such that there is no private benefit from investment. Since simultaneous project acceptance and discretionary pay reveals the board type to be management oriented, in the full delegation regime, the optimal policy for the management-oriented board is to set $D = B$ and not invest. In contrast, in the charter restriction regime, discretionary pay must be necessarily $D = 0$. Thus, the management-oriented board in this case can implement the first-best investment policy. Next suppose that investment is associated with private benefit. Here, discretionary pay allows first-best investment in the full delegation regime, but in the charter restriction regime, investment is undertaken irrespective of NPV. Finally, notice that the management-oriented board always sets contractual pay at the level m when high output is realised.

The above considerations imply that firm value under a management-oriented board when the governance regime is full delegation is

$$\begin{aligned} V_{FD}^{MB} = & (1-\beta) \left(\frac{\mu}{2}(x_2 - m - B) + \frac{1-\mu}{2}(x_1 - B) + \frac{1}{2}((1/2)(x_2 - m) + (1/2)x_1 - B) \right) \\ & + \beta \left(\frac{\mu}{2}(\theta n - (1-\theta)B + x_2 - m) + \frac{1-\mu}{2}(x_1 + (1-\theta)n - \theta B) \right. \\ & \left. + \frac{1}{2}((1/2)(x_2 - m) + (1/2)x_1 + \frac{n-B}{2}) \right) \end{aligned}$$

Similarly, firm value under a management-oriented board when the governance regime is charter restriction is

$$V_{CR}^{MB} = (1-\beta) \left(\frac{\mu}{2}(x_2 - m + \theta n) + \frac{1-\mu}{2}(x_1 + (1-\theta)n) + \frac{1}{2}((1/2)(x_2 - m) + (1/2)x_1 + \frac{n}{2}) \right) \\ + \beta \left(\frac{\mu}{2}(\theta n - (1-\theta)n + x_2 - m) + \frac{1-\mu}{2}(x_1 + (1-\theta)n - \theta n) \right) \\ + \frac{1}{2}((1/2)(x_2 - m) + (1/2)x_1)$$

After some manipulation, we get

$$V_{FD}^{MB} - V_{CR}^{MB} \geq 0 \\ \Leftrightarrow n \left(\beta - \left(\frac{\mu}{2}\theta + \frac{1-\mu}{2}(1-\theta) + \frac{1}{4} \right) \right) \geq B \left((1-\beta) + \beta \left(\frac{\mu}{2}(1-\theta) + \frac{1-\mu}{2}\theta + \frac{1}{4} \right) \right).$$

Hence, the results easily follow. \square

Proposition 1 shows that for a shareholder-oriented board, full delegation is value-increasing as long as the project NPV is sufficiently higher than the manager's private benefit from the project. In contrast, Proposition 2 shows that for a management-oriented board, constitutional restrictions can be value-increasing if opportunities for managerial private benefit consumption are sufficiently limited (low β). This is essentially because under full delegation, in states in which private benefits do not exist, the management-oriented board has no incentive to take the project and instead provides discretionary pay (which precludes the project).

Proposition 3. *For any governance regime, firm value is higher if the board is shareholder oriented rather than management oriented.*

Proof: The proof is straightforward and is omitted.

2.4.2 Social Welfare

The social welfare consequences of different types of governance regimes depends on the extent to which investment decisions are distorted from the first best. When private benefits exist, investment has added social value since the manager gains from the private benefit. The following proposition summarizes the social welfare implications of shareholder oriented and management-oriented boards:

Proposition 4. • *With a shareholder-oriented board, social welfare is higher under full delegation than under a charter restriction regime.*

- *For a management-oriented board, social welfare is higher in a charter restriction regime than in a full delegation regime if $\beta < \frac{\mu}{2}\theta + \frac{1-\mu}{2}(1-\theta) + \frac{1}{4}$. If $\beta > \frac{\mu}{2}\theta + \frac{1-\mu}{2}(1-\theta) + \frac{1}{4}$, social welfare is higher in a full delegation regimes if n is sufficiently high, B is sufficiently small, or if $n > B$ and β is sufficiently close to 1.*
- *Social welfare is higher for with a shareholder-oriented board than a management-oriented board if the governance regime is full delegation.*
- *Social welfare is higher for a shareholder-oriented board than a management-oriented board in a charter restriction regime provided $(2\theta - 1)n > B$.*

Proof: The proof is similar to those for Propositions 1 and 2 and is omitted.

2.4.3 Pay-Performance Sensitivity

How pay responds to performance, i.e., pay-performance sensitivity, is a commonly used metric in governance studies. The presumption is that pay will be tied more closely to performance when boards are more independent. It is therefore of interest to see how pay responds to performance in the charter restriction and full delegation regimes when board type varies.

We examine pay-cash flow sensitivity. This is defined as

$$\sigma = \frac{E[\text{Pay} | x_2] - E[\text{Pay} | x_1]}{x_2 - x_1}.$$

Proposition 5. $\sigma_{CR}^{MB} > \sigma_{CR}^{SB} > \sigma_{FD}^{SB}$ and $\sigma_{CR}^{MB} > \sigma_{FD}^{MB} > \sigma_{FD}^{SB}$. Pay-cash flow sensitivity is the lowest for a shareholder-oriented board in a full delegation regime. It is the highest for a management-oriented board in the CR regime.

Proof: (i) Consider first a shareholder-oriented board. We have

$$\begin{aligned} \mathbb{P}[M|x_2] &= \frac{\mathbb{P}[x_2|M]\mathbb{P}[M]}{\mathbb{P}[x_2]} = \frac{1/4}{\mathbb{P}[x_2]}, \\ \mathbb{P}[G|x_2] &= \frac{\mathbb{P}[x_2|G]\mathbb{P}[G]}{\mathbb{P}[x_2]} = \frac{(\mu/2)}{\mathbb{P}[x_2]}, \\ \mathbb{P}[B|x_2] &= 0, \end{aligned}$$

and $\mathbb{P}[x_2] = (1/4) + (\mu/2)$.

We first derive the pay-cashflow sensitivity for the shareholder-oriented board under the full delegation governance regime.

$$E[\text{Pay}|x_2] = \frac{(1/4)}{\mathbb{P}[x_2]}(m + (1/2)\beta B) + \frac{(\mu/2)}{\mathbb{P}[x_2]}(g + (1 - \theta)\beta B).$$

Simplifying, we have

$$E[\text{Pay}|x_2] = \frac{1/2}{(1/2) + \mu} m + \frac{\mu}{(1/2) + \mu} g + \frac{\beta B(\frac{1}{4} + \mu(1 - \theta))}{(1/2) + \mu}.$$

Exactly similarly, we have

$$\begin{aligned} \mathbb{P}[M|x_1] &= \frac{\mathbb{P}[x_1|M]\mathbb{P}[M]}{\mathbb{P}[x_1]} = \frac{(1/4)}{\mathbb{P}[x_1]}, \\ \mathbb{P}[G|x_1] &= 0, \\ \mathbb{P}[B|x_1] &= \frac{\mathbb{P}[x_1|B]\mathbb{P}[B]}{\mathbb{P}[x_1]} = \frac{(1 - \mu)/2}{\mathbb{P}[x_1]}, \end{aligned}$$

and $\mathbb{P}[x_1] = (1/4) + (1 - \mu)/2$. Hence,

$$E[\text{Pay} | x_1] = \frac{(1/4)}{\mathbb{P}[x_1]}((1/2)\beta B) + \frac{(1 - \mu)/2}{\mathbb{P}[x_1]}(\theta\beta B).$$

Simplifying, we have

$$E[\text{Pay} | x_1] = \frac{\beta B(\frac{1}{4} + \theta(1 - \mu))}{1/2 + 1 - \mu}.$$

Pay-performance sensitivity is given by

$$\sigma = \frac{E[\text{Pay} | x_2] - E[\text{Pay} | x_1]}{x_2 - x_1}.$$

For the shareholder-oriented board under the full delegation regime, the above calculations show that

$$\sigma_{FD}^{SB} = \frac{(1/2)}{(1/2) + \mu} \frac{m}{x_2 - x_1} + \frac{\mu}{(1/2) + \mu} \frac{g}{x_2 - x_1} \quad (3)$$

$$+ \frac{\beta B}{x_2 - x_1} \left(\frac{1}{2} - \theta \right) \frac{\mu/2 + (1 - \mu)/2 + 2\mu(1 - \mu)}{((1/2) + \mu)((1/2) + 1 - \mu)}. \quad (4)$$

It follows also that for a shareholder-oriented board in a charter restriction regime, since there is no discretionary pay, the pay-performance sensitivity is obtained by setting $B = 0$ in the above expression, i.e.,

$$\sigma_{CR}^{SB} = \frac{(1/2)}{(1/2) + \mu} \frac{m}{x_2 - x_1} + \frac{\mu}{(1/2) + \mu} \frac{g}{x_2 - x_1}.$$

Since $\theta > 1/2$, it follows that $\sigma_{CR}^{SB} > \sigma_{FD}^{SB}$.

(ii) Consider next a management-oriented board. In a charter restriction regime, there is no discretionary pay. However, contractual pay conditional on high output is m irrespective of whether the state is G or M. Thus, the pay-performance sensitivity is

$$\sigma_{CR}^{MB} = \frac{m}{x_2 - x_1}.$$

Thus, $\sigma_{CR}^{MB} > \sigma_{CR}^{SB}$.

Consider now the full delegation regime. Discretionary pay is used and investment is not made when there are no private benefits. When private benefits exist, managers receive discretionary pay whenever investment is not undertaken. Thus

$$E[\text{Pay} | x_2] = \frac{(1/4)}{\mathbb{P}[x_2]} (m + ((1 - \beta + (1/2)\beta)B)) + \frac{(\mu/2)}{\mathbb{P}[x_2]} (m + ((1 - \beta) + (1 - \theta)\beta)B).$$

Similarly,

$$E[\text{Pay} | x_1] = \frac{(1/4)}{\mathbb{P}[x_1]} (1 - \beta + (1/2)\beta)B + \frac{(1 - \mu)/2}{\mathbb{P}[x_1]} ((1 - \beta) + \theta\beta)B.$$

It is easily checked that

$$\sigma_{FD}^{MB} = \frac{m}{x_2 - x_1} + \frac{\beta B}{x_2 - x_1} \left(\frac{1}{2} - \theta \right) \frac{\mu/2 + (1 - \mu)/2 + 2\mu(1 - \mu)}{((1/2) + \mu)((1/2) + 1 - \mu)}.$$

Thus, $\sigma_{CR}^{MB} > \sigma_{FD}^{MB} > \sigma_{FD}^{SB}$. \square

Proposition 5 therefore shows that there need not be any monotonic relationship between pay-performance sensitivity and firm value. From Proposition 1, firm value is highest (for sufficiently large n) for a firm with a shareholder-oriented board in a full delegation regime. However, Proposition 5 shows that pay-performance sensitivity is the lowest for such a firm. From Pay-performance sensitivity is the highest for a firm with a management-oriented board under charter restriction on discretionary pay; yet, firm value is the lowest for such a firm when $\beta > \frac{\mu}{2}\theta + \frac{1-\mu}{2}(1-\theta) + \frac{1}{4}$ and n is sufficiently large.

3 Model of Corporate Democracy

In this section we formalize the “outrage constraint” on corporate opportunism. Many corporate finance papers have argued informally that the compensation policies of management-oriented boards are constrained by shareholder outrage. The central idea is that the board limits compensation because it realizes that some compensation packages will trigger outrage. This outrage must impose costs on the board, otherwise it would not act as a constraint on the board’s compensation policies. Moreover, since actual examples of shareholder outrage imposing costs on board members are rare, the costs must be sufficiently large so that the board’s optimal policy is to avoid outrage with near certainty. For outrage to act as a constraint in this fashion, it must be the case that (a) board members must be highly averse to outrage and (b) board members can form highly accurate conjectures regarding which compensation policies are likely to trigger outrage. If (a) is not satisfied, then board members would violate outrage limits with a fair degree of regularity. If (b) were not satisfied, and the outrage penalty was fairly stochastic, then the marginal increase in risk of outrage would be small for small increases in compensation and again the equilibrium would call for outrage being observed fairly often in equilibrium.

Thus, we will develop a model where the outrage threshold is “nearly” non-stochastic. Informally speaking we imagine the outrage trigger to be a constant that is perturbed by an infinitesimal noise term which has a very broad support. The noise term will be introduced later as a perfection requirement imposed in our definition of a democratic equilibrium. The next question we need to address is what exactly determines the trigger point for outrage. We take the perspective that shareholder outrage is triggered by suspicion that the board is violating its duty of loyalty to shareholders, i.e., suspicion that the board is management oriented. We assume shareholder suspicions are formed rationally, i.e., through the calculus of probabilities. Note that although shareholders are rational in our model, they are not strategic. Shareholders do not factor in the consequences of their outrage and then decide whether to become outraged. Outrage is determined by the equilibrium actions of the board through Bayes rule. Thus, changing the equilibrium actions of the agents will change the shareholder beliefs. For exactly the same set of parameter values actions that trigger outrage in one equilibrium may not trigger outrage in another equilibrium. Thus, outrage constraints will determine which actions are feasible in equilibrium. Also because some compensation packages may be off the equilibrium path, shareholder outrage is not always uniquely determined by Bayes rule. Thus, as is very common in games of incomplete information, we will need to impose some restrictions on off-the-equilibrium-path beliefs.

3.1 Information structure

In order to compute equilibria, we need to formalize the structure of our model somewhat by providing an explicit description of the information sets and actions available to the parties in the game. Some of these assumptions have been stated earlier more informally, but in order to help the reader keep track of all the steps in our model, which of necessity is a bit complex because of the number of strategic agents and choices, we will, at the risk of repetition, provide a complete definition below.

3.1.1 Information endowment

- *State of the governance:* $\gamma \in \Gamma \equiv \text{SB, MB}$. The board can either be a shareholder-oriented board, or a management-oriented board.
- *State of firm:* $\phi \in \Phi \equiv \{G, M, B\}$. The states of the firm are observed by the manager and the board but not by the shareholders. If the manager does not exert effort, then in all states the probability that the cashflow equals x_1 is $1 - \varepsilon$ and the probability that the cash flow equals x_2 is ε . If the manager exerts effort then in

state M the probability of the cash flow being x_2 is $1/2$ and the probability that the cash flow equal x_1 is also $1/2$. In state G the cashflow equals x_2 with probability 1. In state B , the cash flow distribution is not affected by effort, i.e., the probability that the cashflow equals x_1 is $1 - \varepsilon$ and the probability that the cash flow equals x_2 is ε .

- *State of the project:* $\psi \in \Psi \equiv \{+n, -n\}$. In state $-n$, the NPV of the investment project is $-n$; in state $+n$ the NPV of the project is n , where $n > 0$.
- *State of the manager:* $\pi \in \Pi = \{P, \neg P\}$. In state P the manager earns a private benefit of B if the project is accepted and in $\neg P$ the manager does not earn any private benefit.
- *Compensation:* If the state of the firm is G , the the shareholder value maximizing level of incentive payment, which we call “ g - compensation” is

$$g \equiv \frac{e}{1 - \varepsilon}.$$

In state M , the shareholder value maximizing level of incentive payment, which we call “ m - compensation” is

$$m \equiv \frac{e}{\frac{1}{2} - \varepsilon}.$$

In state, B , he shareholder value maximizing level of incentive payment, which we call “ b - compensation” is 0. We assume that boards are restricted to offering one of these three levels of compensation. At the cost of additional notation we could drop this restriction without changing our results given very reasonable off-equilibrium belief restrictions. Thus the set of possible compensation policies is $w \in W \equiv \{g, m, 0\}$.

- *Realized cashflow:* $x \in X \equiv x_1, x_2$
- *Discretionary pay.* We restrict attention to discretionary payments contingent on project rejection at a level that is shareholder value maximizing in some state. Thus, the board can follow one of three polices: offer discretionary pay of B or offer discretionary pay of 0 or not offer discretionary pay at all, and simply dictate the investment decision. We represent dictating policy by \mathbf{D} . *The manager when offered the discretionary pay can either accept the project (and thus reject the pay) or reject the project (and accept the pay).* We represent project acceptance and rejection by A and R respectively. Thus the discretionary pay-cum- project acceptance decision is represented by an ordered pair (c, j) where $c \in C = \{0, B, \mathbf{D}\}$ and $j \in J = \{A, R\}$.

3.1.2 Timing

- *At date 0*, the firm and the manager observe the state of the firm and the state of the board. At this point managerial incentive compensation is fixed.
- *At date 1*, the cash flow, either x_1 , or x_2 is realized; the firm and the manager then learn the state of the manager, and the manager learns the state of the project. At this point, the firm’s policy on discretionary pay is set and the firm makes its investment decision.

3.1.3 Information endowments

The manager will make a decision on effort at date 0. The manager at date 0 is endowed with information on the state of the firm and the state of the board. Thus set of set of histories at manager’s date 0 decision point, the point at which the manager makes the effort decision is $\mathcal{H}_0^{\text{Mgr.}} = \Gamma \times \Phi$. At date 1, the manager also makes an accept reject decision on the project if the board offers discretionary compensation, i.e., $c \neq \mathbf{D}$. At this point, the manager

has observed the state of the board, the state of the firm, the realized cash flow, the state of the project, the state of the manager, and the board's decision to offer incentive compensation, thus the set of histories at which the manager makes his date 1 project accept/reject decision is $\mathcal{H}_1^{\text{Mgr.}} = \Gamma \times \Phi \times \Pi \times \Psi \times W \times X \times C \setminus \{\mathbf{D}\}$.

The board makes its date 0 decision with the same information set as the manager, i.e., $\mathcal{H}_0^{\text{Brd.}} = \Gamma \times \Phi$, at date 1 the board makes the decision of whether to offer incentive compensation, its information set is identical to the manager's with the exception that the board lacks the managers information regarding the state of the project and the board does not observe managerial effort, i.e., $\mathcal{H}_1^{\text{Brd.}} = \Gamma \times \Phi \times W \times X$.

Shareholders only do not observe the state of the firm, the board or the manager, or whether discretionary compensation was offered. They do observe the realized cash flow, whether discretionary compensation was actually paid out, and whether the project was accepted. Using this information they form their posterior regarding the state of the board. Thus, shareholders observe X, W and a partition of C . Under this partition of C accepting the project after a (spurned) offer of discretionary compensation cannot be distinguished from accepting the project without an offer of discretionary compensation. Thus, the shareholders observe the following partition of C : $\{\mathbf{A}, \mathbf{R}^+, \mathbf{R}^-\}$. \mathbf{A} represents $\{(B,A), (0,A), (\mathbf{D},A)\}$. Under (B,A) discretionary compensation of B was offered by the board but the manager decided to accept the project and thus spurned discretionary compensation. Under $(0,A)$ discretionary compensation of 0 was offered by the board and the manager accepted the project, while under (\mathbf{D},A) the board dictated project acceptance. In all these cases the manager does not receive a discretionary payment and the project is accepted. \mathbf{R}^+ represents (B,R) , the case were discretionary compensation of B was offered and the project was rejected. In this case the project is rejected and the manager receives discretionary compensation. \mathbf{R}^- represents $\{(0,R), (\mathbf{D},R)\}$. In these cases, the project is rejected and the manager does not receive discretionary compensation. The shareholder information set at time 1 is denoted by $\mathcal{H}_1^{\text{Sh.}}$.

3.1.4 Payoffs

The board's payoff is determined by either the payoff to the firm or the payoff to the manager depending on whether the board is shareholder or management oriented. The manager's payoff is given by

$$u_{\text{Mgr.}} = wI_{x=x_2} - e + \begin{cases} B & \text{if } \pi = P \text{ and } (c, j) \neq (0, R) \text{ or } (\mathbf{D}, R), \pi = \neg P \text{ and } c = B \\ 0 & \text{otherwise} \end{cases} \quad (5)$$

The shareholders' payoff is given by,

$$u_{\text{Sh.}} = x - wI_{x=x_2} - cI_{j=R} + \psi I_{j=A} \quad (6)$$

For each history $h \in \mathcal{H}_1^{\text{Sh.}}$ shareholders form a posterior assessment, $\hat{\delta}$ that the board is a management-oriented board. This posterior estimate is

$$\mathbb{P}[\gamma = \text{MB} | \mathcal{H}_1^{\text{Sh.}}] \quad (7)$$

This posterior is a random variable that is constant over all states in the same history. This posterior is our measure of shareholder outrage. We will also use the posterior odds of a management orientation as a measure of outrage. The posterior odds are given by

$$\frac{\mathbb{P}[\gamma = \text{MB} | \mathcal{H}_1^{\text{Sh.}}]}{\mathbb{P}[\gamma = \text{SB} | \mathcal{H}_1^{\text{Sh.}}]} \quad (8)$$

The odds ratio is of course monotonic in posterior but frequently has simpler algebraic representation.

The strategies for boards and managers are probability distributions over the actions they are able to take at their information sets. The board has one action at date 0, compensation determination, and one at date 1,

discretionary compensation. The manager has two actions: effort, at date 0 and, at date 1, if offered discretionary compensation, whether to accept such compensation. At each history of the game at which an agent takes an action, we let $\mathbb{E}_{h,a}^*(\cdot)$ represent the expected payoff conditioned on information set h being reached, the action a being taken at h with actions at all other information sets determined by the equilibrium agent strategies. Next we define the following sets of best responses for the manager and board.

$$BR_g^*[h] = \{a : \mathbb{E}_{h,a}^*[u_g] = \max_{a'} \mathbb{E}_{h,a'}^*[u_g]\}, \quad g = \text{Mgr., Sh.}, \quad (9)$$

$$F^*[h] = \{a : \mathbb{P}_{h,a}^*[\hat{\delta} > \bar{\delta}] = 0\} \quad (10)$$

$$FBR_g^*[h] = \{a \in F^*(h) : \mathbb{E}_{h,a}^*[u_g] = \max_{a'} \mathbb{E}_{h,a'}^*[u_g]\}, \quad g = \text{Mgr., Sh.}, \quad (11)$$

$$MBR_g^*[h] := \{a \in BR^*[h], \mathbb{E}_{h,a}^*[\hat{\delta}] = \min_{a' \in FBR_g^*[h]} \mathbb{E}_{h,a'}^*[\hat{\delta}]\}, \quad g = \text{Mgr., Sh.}. \quad (12)$$

The set $BR_g(h)$ represents the set of best replies at information set h . The best reply will depend on whether one is maximizing shareholder, $g = \text{Sh.}$, or managerial welfare. The set $FBR_g(h)$ represents the set of outrage feasible best replies at information set h . These are the set of actions which have zero probability, under the candidate equilibrium strategy distribution, of leading to shareholder posteriors (that the board is management oriented) exceeding a cutoff level of $\bar{\delta}$. We assume that $\bar{\delta} > \delta_0$, where δ_0 is the prior probability that the board is management oriented. We assume that board policies are constrained by outrage so that boards will only select among outrage feasible policies. The final best reply set, $MBR_g^*[h]$, is the set of minimum suspicion best replies. This set is a subset of the set of feasible best replies (which is never empty if the set of feasible best replies is non-empty) consisting of those best replies which produce the lowest posterior of the board being management oriented. The minimal suspicion condition formalizes our intuitive notion that whether a given compensation policy will generate outrage is ‘‘almost predictable.’’ Consider a sequence of games where the board faces a very large penalty for facing sanction from the board. With probability $1/n$ the cut off posterior which determines the sanction is a uniformly distributed random variable between 0 and 1, and with probability $1 - 1/n$ the cut off posterior is given by \bar{k} . Then the set of MBR are the only best replies that can be approached by a sequence of BRs in perturbed game. Thus the MBR represents the set of actions that might be selected by a board that is ‘‘almost certain’’ that the cutoff level for sanction is a posterior greater than \bar{k} and is very sanction averse.

3.2 Equilibrium

Definition 1. *A democratic equilibrium of the governance game is a triple, consisting of managerial strategy distribution, a shareholder strategy distribution, and a shareholder posterior assessment, that satisfies the following conditions.*

1. *At every history $h \in \mathcal{H}_0^{\text{Mgr.}}$ and every history $h \in \mathcal{H}_1^{\text{Mgr.}}$, all strategies in the support of the manager’s strategy distribution are elements of $BR^*[h]$.*
2. *At every history in $h \in \mathcal{H}_0^{\text{Brd.}}$ and every history $h \in \mathcal{H}_1^{\text{Brd.}}$, when the board is manager oriented, all strategies in the support of the board’s strategy distribution are elements of $MBR_{\text{Mgr.}}^*[h]$ whenever $MBR_{\text{Mgr.}}^*[h]$ is not empty, and elements of $BR_{\text{Mgr.}}^*[h]$ otherwise; when the board is shareholder oriented, all strategies are elements of $MBR_{\text{Sh.}}^*[h]$ whenever $MBR_{\text{Sh.}}^*[h]$ is not empty, and members of $BR_{\text{Sh.}}^*[h]$ otherwise.*
3. *The shareholder’s posterior estimate of board orientation, $\hat{\delta}$ is measurable with respect to the shareholders information set, $\mathcal{H}_1^{\text{Sh.}}$ and is consistent with Bayes rule for all equilibrium path histories, $h \in \mathcal{H}_1^{\text{Sh.}}$.*

-
4. Consider a history, h' in the shareholders' information set not reached given the equilibrium strategy distribution. If there exists an action, a , either an incentive compensation level or discretionary compensation policy that would render the probability of reaching that history positive, and for some history h at which the board can take this action, $E_{h,a}^*[u_{Sh}] > E_h^*[u_{Sh}]$ and for no history at which the board can take the action $E_{h,a}^*[u_{Mgr}] \geq E_h^*[u_{Mgr}]$, then the shareholders' posterior for h' must equal 0.

Our definition reflects our attempt to formalise outrage. Condition (1) ensures that the manager always takes the actions that maximise his welfare. Condition (2) ensures that the board chooses actions that maximise the payoff to either the manager or the shareholders subject to the outrage constraint, and when more than one action is a maximiser, chooses among maximisers that generate the lowest shareholder posterior of the board being management oriented. Condition (3) ensures that shareholder posteriors are consistent with the laws of probability. Condition (4) rules posteriors about off equilibrium actions which are unreasonable, e.g., absent this refinement an equilibrium exists in which the shareholder board always overpays the manager because shareholders believe that any compensation level lower than the highest level signals that the board is manager oriented. Given these beliefs, the managerial board will also (happily) over pay and lower compensation levels will be off the equilibrium path and thus outside of the control of Bayes rule. Condition (4) rules out these equilibria.

Note that we have already determined in the previous section an optimal policy for the manager given any shareholder compensation policy. This policy is not the only optimal policy for the manager. However, it is the optimal policy for the manager which maximizes shareholder welfare. We call the policy, derived in the previous section, the benevolent best reply policy. This policy is summarized below

- Date 0 effort choice: Whenever the firm state is B set effort equal to 0 regardless of compensation. When the firm state is M set effort equal to e if compensation equals m and 0 otherwise; if the state is G set effort equal to e if compensation equals m or g compensation, and set effort to 0 otherwise.
- Date 1 strategy:
 1. If offered the discretionary payment of B , if the project generates private benefits, always accept the project if the project is positive NPV and reject the project (and receive B) if the project is negative NPV. If the project does not generate managerial private benefits, then reject the project and accept the payment.
 2. If offered the discretionary payment of 0, then if the project does not generate private benefits, accept the project if has a positive NPV and reject the project otherwise. If the project generates private benefits, always accept the project.

When discussing equilibria we will refer to the benevolent best reply policy defined above rather than detailing the managers actions fully.

3.3 Democratic distortion

In this subsection, we illustrate the dissipative costs of democratic governance with a simple example and then prove some general results. In our example, the probability that the manager earns private benefits from the project, $\beta = 1/2$, $\mu = 1/2$, and $\delta_0 = 1/2$ and $\varepsilon = 5/38$. The outrage threshold, $\bar{\delta} = 0.81$. The following set of strategies constitutes an equilibrium under shareholder democracy.

- Manager Strategy: Uses the benevolent best response.
- Board Strategy:

– If the board is shareholder oriented:

- * At date 0, set compensation equal to 0 in firm state B , m in firm state M and g in firm state G .
- * At date 1, if the project generates managerial private benefits, then offer discretionary compensation of B , if the project does not generate private benefits, offer discretionary compensation of 0.

– If the board is management oriented

- * At date 0, set compensation to m -compensation in all states of the firm.
- * At date 1, when the project does not generated managerial private benefits, then offer discretionary compensation of B . When the project generates private benefits, do not offer any discretionary compensation and accept the project.

- Shareholders' posterior assessment, $\hat{\delta}$:

Whenever the incentive compensation equals 0, or g , $\hat{\delta} = 0$. If incentive compensation equals m , then $\hat{\delta}$ is given by

$$\hat{\delta}(m, x_1, \mathbf{R}^+) = 0.78 \quad \hat{\delta}(m, x_2, \mathbf{R}^+) = 0.81 \quad (13)$$

$$\hat{\delta}(m, x_1, \mathbf{R}^-) = 0.00 \quad \hat{\delta}(m, x_2, \mathbf{R}^-) = 0.00 \quad (14)$$

$$\hat{\delta}(m, x_1, \mathbf{A}) = 71/109 \approx 0.6514 \quad \hat{\delta}(m, x_2, \mathbf{A}) = 81/119 \approx 0.6807 \quad (15)$$

To verify that these strategies and beliefs constitute an equilibrium, first note that the manger oriented board is generating the highest possible managerial payoff. Incentive compensation is set at its highest level, m , and managers always earn B in addition. When the manager has private benefits, B is earned through private benefits. When the manager does not have private benefits, B is earned through discretionary compensation. Thus, we need only check that the compensation satisfies the outrage constraint and generates minimal suspicion. However, this is clear. First, note that as the posteriors of the shareholder never exceed the outrage constraint for any compensation pattern, the outrage constraint is not violated. Next note that among outrage proof actions that maximize the boards payoff, the board picks the actions which minimize suspicion. For the shareholder-oriented board this is a trivial condition because, for every history there is a unique action which maximizes shareholder value. For the manager-oriented board, again, the actions which maximize the manager's value are unique (offer discretionary pay) when the manager has no private benefits. When the manager has private benefits, the manger's payoff is the same under project acceptance and receipt of the discretionary payment of B . As is clear from the posterior calculations in equations (13)-(15), the posterior assessment of the board is higher for the discretionary payment of B (when the project has negative NPV and the outcome is \mathbf{R}^+) than it is for project acceptance. Because the equilibrium strategy of the board, when the manager has private benefits is to accept the project, the minimal suspicion condition is satisfied as well. It remains to show that the shareholders posteriors are consistent with Bayes rule, but this is a simple algebra exercise and shown in the Appendix.

Note that for these parameter values, no equilibrium can exist where shareholder-oriented boards follow the first best policy and manger oriented boards offer discretionary compensation when the manager has private benefits. The reason is simply that, when the manger does not have private benefits (and thus, from a shareholder perspective, the payment the discretionary of B is unnecessary) the manger has a strict preference for the payment of B . The manager with private benefits is indifferent between receiving B and accepting the project. Thus, in any equilibrium in which there is some probability the manager board will offer discretionary compensation of B to the manager with private benefits, the manager oriented board must be offering discretionary compensation of B

to the manager without private benefits with probability 1. However, such a policy would imply that discretionary pay is accepted with a higher frequency than it is in the equilibrium above. If this occurred, the shareholders posterior assessment would increase beyond the outrage threshold.⁴

Now consider the case where there is no outrage constraint. In this case, the manager board would be willing to offer discretionary compensation to the manger even when the manger generated private benefits from the project. The manager-oriented board will still pay the manager m -compensation in all states of the firm and would still pay the discretionary compensation of B when the manager when the manager generates no private benefits. The policy of the shareholder board would be exactly the same as it is with the outrage constraint. Thus, the effect of the outrage constraint is to block manager-oriented boards from using positive discretionary compensation to screen projects in the case where such payments are shareholder value maximising. Hence, a no-outrage solution will produce higher shareholder payoffs than those produced in equilibrium analysed above. The losses from outrage will be proportional to the likelihood that the board is management oriented, the likelihood managers earn private benefits, and the losses from not using discretionary compensation versus accepting the project. The gain from discretionary compensation is that undertaking negative NPV projects is avoided. The expected value of this gain is given by

$$\frac{1}{2}\theta(1-\mu)(n-B) + \frac{1}{2}(1-\theta)\mu(n-B) + \frac{n-B}{4} = \frac{1}{4}(n-B)(\theta(2-4\mu) + 2\mu + 1) \quad (16)$$

we see that the this gain is decreasing in business conditions, μ and in the variance of project NPV, which is proportional to n . Thus the total loss to shareholders from shareholder outrage is given by

$$\beta \delta_0 \left(\frac{1}{4}(n-B)(\theta(2-4\mu) + 2\mu + 1) \right) \quad (17)$$

This equation implies that outrage reduces both shareholder and social welfare⁵ most when private benefits are likely, the board has a high probability of being management oriented, and business conditions are weak, the project NPV is high, and the state of the project covaries more with business conditions.

Note also the use of discretionary pay packages provides no information regarding the orientation of the board in this example (since $\beta = 1/2$). Both the manager-oriented board and the shareholder-oriented board offer discretionary pay with the same probability. The difference between the manager and shareholder-oriented boards is when they offer positive discretionary pay. Managerial boards offer it only when it is unnecessary and shareholder-oriented boards offer it only when it is necessary. This result casts some doubt on the efficacy of attempting to measure board capture simply by the observing discretionary pay policy. A more sensible line of investigation might be to measure the effects of incentive pay on firm performance, which will differ between manager and shareholder oriented boards. One can show that generically shareholder democracy produces welfare losses to shareholders relative to full delegation whenever the democratic equilibrium features the shareholder-oriented board implementing the first best shareholder value maximizing policy.

Proposition 6. *For a generic set of parameter values of the model, in any shareholder democracy equilibrium in which discretionary pay is offered to the manager after both cash flows, and the shareholder board follows the first-best compensation policy, the payoff to shareholders is strictly lower than it is under full delegation.*

⁴Note that $\hat{\delta}(m, x_2, \mathbf{R}^+) = 0.81 = \bar{\delta}$ in the example when the MB board offers no discretionary pay when the manager has private benefit. If discretionary pay is offered, the outcome of \mathbf{R}^+ would result whenever the manager has private benefit and the project has negative NPV under the manager's optimal strategy. This makes the offer of discretionary pay more suspicious and the outrage constraint is violated. The Appendix shows the calculation of the posterior when the MB board offers discretionary pay in the state in which the manager has private benefit.

⁵The social welfare gain from stopping a negative NPV project by offering discretionary pay when there are managerial private benefits is also $n - B$.

Proof. Since the shareholder-oriented board is, by assumption following the first best policy in the democracy equilibrium and the shareholder-oriented board always follows the first best policy under full delegation, differences in payoffs must arise because of differences in behaviour of the management-oriented board. Since under full delegation, the shareholder board offers discretionary compensation, and offering discretionary compensation maximizes shareholder payoffs, the payoff conditioned on a management-oriented board in the democratic equilibrium can only equal the payoff under delegation if the management-oriented board also offers discretionary compensation when the manager has private benefits.

If the MB board offers discretionary compensation when the manager has private benefit, two outcomes are possible: (a) if the project has negative NPV, the manager accepts the discretionary compensation and the project is rejected, so that shareholders observe \mathbf{R}^+ , (b) if the project has positive NPV, the manager rejects the discretionary compensation and the project is accepted, so that shareholders observe \mathbf{A} . Recall that the MB board always pays incentive compensation m . Thus, for any realization of output x , the posterior probability that the manager is MB if shareholders observe \mathbf{R}^+ or \mathbf{A} are as follows:

$$\widehat{\delta}(m, x, \mathbf{R}^+) = \frac{\mathbb{P}[m, x | MB] \cdot \mathbb{P}[\mathbf{R}^+ | m, x, MB] \cdot \mathbb{P}[MB]}{\mathbb{P}[m, x | MB] \cdot \mathbb{P}[\mathbf{R}^+ | m, x, MB] \cdot \mathbb{P}[MB] + \mathbb{P}[m, x | SB] \cdot \mathbb{P}[\mathbf{R}^+ | m, x, SB] \cdot \mathbb{P}[SB]}$$

so that the odds ratio is

$$\frac{\mathbb{P}[m, x | MB] \cdot \mathbb{P}[\mathbf{R}^+ | m, x, MB]}{\mathbb{P}[m, x | SB] \cdot \mathbb{P}[\mathbf{R}^+ | m, x, SB]} = \frac{\mathbb{P}[x](1 - \beta + \beta \mathbb{P}[-NPV|x])}{\beta \mathbb{P}[-NPV|M] \mathbb{P}[x|M] \mathbb{P}(M)} = \frac{\mathbb{P}[x](1 - \beta + \beta \mathbb{P}[-NPV|x])}{\beta \frac{1}{8}}.$$

and

$$\widehat{\delta}(m, x, \mathbf{A}) = \frac{\mathbb{P}[m, x | MB] \cdot \mathbb{P}[\mathbf{A} | m, x, MB] \cdot \mathbb{P}[MB]}{\mathbb{P}[m, x | MB] \cdot \mathbb{P}[\mathbf{A} | m, x, MB] \cdot \mathbb{P}[MB] + \mathbb{P}[m, x | SB] \cdot \mathbb{P}[\mathbf{A} | m, x, SB] \cdot \mathbb{P}[SB]}$$

so that the corresponding odds ratio is

$$\frac{\mathbb{P}[m, x | MB] \cdot \mathbb{P}[\mathbf{A} | m, x, MB]}{\mathbb{P}[m, x | SB] \cdot \mathbb{P}[\mathbf{A} | m, x, SB]} = \frac{\mathbb{P}[x](\beta \mathbb{P}[+NPV|x])}{\mathbb{P}[+NPV|M] \mathbb{P}[x|M] \mathbb{P}(M)} = \frac{\mathbb{P}[x](\beta \mathbb{P}[+NPV|x])}{\frac{1}{8}}.$$

In order for the management-oriented board to both pay discretionary compensation of B with positive probability and accept the project with positive probability, minimal suspicion implies that these two odds ratios must be the same, i.e.,

$$\frac{\mathbb{P}[x](1 - \beta + \beta \mathbb{P}[-NPV|x])}{\beta \frac{1}{8}} = \frac{\mathbb{P}[x](\beta \mathbb{P}[+NPV|x])}{\frac{1}{8}} \quad (18)$$

which requires

$$\beta \mathbb{P}[+NPV|x_1] = \mathbb{P}[-NPV|x_1] + \frac{1 - \beta}{\beta} \quad (19)$$

and

$$\beta \mathbb{P}[+NPV|x_2] = \mathbb{P}[-NPV|x_2] + \frac{1 - \beta}{\beta} \quad (20)$$

The set of parameter values that satisfy *both* equations (19) and (20) is a set of measure 0. Thus, generically shareholder welfare is lower than it is under full delegation. \square

Democracy can produce outrage constraints that block the payment of positive discretionary compensation (in the sense that the posterior that the board type is MB when positive discretionary compensation is paid exceeds the outrage threshold). In this case, the welfare of shareholders is lower than it would be if the same block on discretionary compensation were imposed by charter restrictions. In fact, the policy distortion induced by democracy is even stronger in this case. If discretionary compensation is blocked either by outrage or by charter

restrictions, then, when the manager earns private benefits, he has a strict preference for undertaking the project. Thus, under both charter restriction and democracy, a manager-oriented board will undertake the project when the project generates private benefits. The management-oriented board will also always pay the highest possible level of compensation, m -compensation, which is used by the shareholder board only in state M . Suppose that when the high cash flow of x_2 is realized and when there are no managerial private benefits, the management-oriented board uses the lack of managerial private benefits to extract the manager's project information and accept the project if and only if the project has positive NPV. Note that such a policy is clearly feasible under a charter restriction. Under shareholder democracy, however, the minimum suspicion condition may be violated. If there is systematic risk, i.e., x_2 is positively correlated with the likelihood of project success, then after a realized cash flow of x_2 , project prospects are better on average than they are in state M alone. This implies that the manager board would accept the project with a much higher likelihood than the shareholder board. Thus, project acceptance leads to more shareholder suspicion (a higher posterior) that the board is management oriented. Thus, under democracy management-oriented boards have an incentive to lower suspicion by rejecting the project when it generates no private benefits rather than screen the project. This policy of blanket rejection is less efficient than the policy of screening.

Proposition 7. *Suppose that the project has some systematic risk, i.e., $\theta > 0.5$, and that ε is sufficiently small. In any shareholder democracy equilibrium in which discretionary pay is not offered to the manager after either cash flow and the shareholder board follows the first-best incentive compensation policy, the payoff to shareholders is strictly lower than it would be under charter restrictions.*

Proof. We aim to show that at x_2 as $\varepsilon \rightarrow 0$ acceptance will always generate a higher posterior and thus be inconsistent with minimum suspicion criterion. To show this note first that more likely the SB is to accept the project after m compensation and x_2 , the lower the posterior odds ratio conditional on acceptance that the board is MB. Suppose after x_2 the SB offers 0 discretionary pay when the manager has private benefits in state M (which leads to project acceptance) and screens without positive discretionary compensation when the manager does not have private benefits (i.e., it offers 0 discretionary pay and the manager plays the benevolent strategy), and the MB in all states of the firm after x_2 offers 0 discretionary pay when the manager has private benefits (leading to project acceptance) and screens without positive discretionary pay when the manager does not have private benefits. Then the odds ratio for management orientation when $\varepsilon = 0$ corresponding to $(m, x_2, \mathbf{A}) \in \mathcal{H}_1^{\text{Sh}}$ is

$$\frac{4 \left(\frac{1}{4} \left(\frac{1-\beta}{2} + \beta \right) + \frac{1}{2} (\beta + (1-\beta)\theta) \mu \right)}{\frac{1-\beta}{2} + \beta} \quad (21)$$

The odds ratio, at $\varepsilon = 0$ corresponding to $(m, x_2, \mathbf{R}^-) \in \mathcal{H}_1^{\text{Sh}}$ is

$$\frac{8 \left(\frac{1}{2} (1-\theta) \mu (1-\beta) + \frac{1-\beta}{8} \right)}{1-\beta} \quad (22)$$

The difference between the acceptance odds ratio and the rejection odds ratio is

$$\frac{4(2\theta - 1)\mu}{1 + \beta} \quad (23)$$

This difference is positive when there is some systematic risk, i.e., $\theta > 1/2$. By continuity, for ε sufficiently small, the difference is still positive. Thus, the posterior odds are always higher for project acceptance than project

rejection after m compensation and x_2 . Minimal suspicion then implies that the management-oriented board will always reject the project when the manager has no private benefits. As this policy produces lower shareholder payoffs than the charter restriction policy, the result is established. \square

It is interesting to note restrictions on discretionary pay engendered by democratic outrage will lead to lower levels of investment than under charter restrictions. Under charter restrictions, management-oriented boards will either overinvest or invest at the optimal level, while democracy-constrained boards will sometimes overinvest and sometimes under invest. Thus, despite the fact that managers weakly prefer higher levels of investment and charter restrictions lead to over investment, democracy which leads to lower levels of investment than charter restrictions, is less efficient. Thus, the value of control mechanisms to shareholders need not be judged by the degree to which they constrain manager preferred policies. e.g. even if takeovers generate private benefits and a given control system lowers the probability of a takeover, it need not be more efficient than another control system that produces more takeover. Another point worthy of note, is that Proposition 6 and 7 show that democracy cannot increase efficiency relative to delegation and charter restrictions if democracy enforces the same discretionary pay policies as delegation and charter restrictions. However, because shareholder outrage need not be related to verifiable and contractible variables, outrage can be depend on the state information revealed by non-contractible levels of firm cash flow x_1 and x_2 . If shareholder value can be increased by state dependent restrictions on discretionary compensation, then democracy may add value despite the fact that in both the state in which discretion is restricted and the state in which it is not restricted, democracy will lead generally to less efficient outcomes. This result is recorded in the following corollary.

Corollary 1. *A necessary but not sufficient condition for the democratic equilibrium to produce higher shareholder welfare than both charter restrictions full delegation is that the policy of restricting discretionary compensation after one cash flow but not the other produces a higher shareholder welfare than both full delegation and charter restrictions.*

4 Conclusion

In this paper, we have considered the effect of shareholder outrage on board compensation policy when shareholders are unsure both of the the board's loyalty and whether management has conflicted interests. Our analysis has focused on discretionary compensation. We have shown that such compensation is efficient in some states when the board is loyal but that such compensation will be used by management-oriented boards in different sates of nature to enrich managers and distort investment. Shareholder suspicion and outrage can increase distortion further by encouraging manager-oriented boards to not only distort to enrich managers but also to to mask their disloyalty. The current analysis is incomplete in that we have not fully considered the effect of our outrage on incentive compensation. In results not yet presented, we can show that when systematic project risk is low and the likelihood that the managers incentives are conflicted is high, the primary focus of shareholder outrage will be on incentive compensation rather than discretionary compensation. Increased outrage will in this case, lower social welfare by pushing managerial compensation below effort-assuring levels in some states of nature but may increase shareholder wealth if the likelihood of disloyalty is sufficiently high. If outrage does restrict compensation, it will increase the correlation between pay and performance even in cases where outrage lowers shareholder wealth. Thus, a high degree board sensitivity to outrage combined with a strong pay-to-performance relation can actually be signs of suboptimal governance.

As well as completely developing the insights of the current model, several directions for extending the analysis are promising. One direction is to consider the effect of our assumption that the board knows whether manage-

ment has conflicted incentives with regard to investment policy. This assumption models a rather intimate relation between managements and boards. Much of the distortion created by shareholder outrage results from the board catering to the manager's investment preferences. A less well informed management-oriented board would have less ability to distort policy to simultaneously protect its reputation and deliver private benefits to the manager. This could increase the correlation between management and shareholder-oriented board actions and thus reduce outrage and hence the effect of the outrage constraint on shareholder-oriented boards. That is, shareholders, in equilibrium, may grant more poorly informed boards more slack when second guessing their decisions. Thus, in some cases, ignorance of manager's private benefit structure, might be bliss, or at least generate more efficient investment policies. We also assume that shareholders can observe all compensation payments made by the board. This rules out hidden or stealth compensation packages or compensation through perks. If compensation is masked, it will effect directly the incentives of management boards, and indirectly the constraints on shareholder-oriented boards through it effect of changed management oriented board behaviour on shareholder posteriors and thus outrage.

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