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 maximizing compensation plans may feature incentive compensation that is not monotone in expected 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. Our results have implications for several recent debates: the effect of shareholder power in shaping corporate governance, compensation-related shareholder activism, and pay transparency.

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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, shareholders are typically 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, but using charter provisions to insulate the board from shareholder sanctions (except for the most egregious actions). Charter restrictions involve prohibiting certain potential corporate actions through specific provisions in the corporate charter. Ex post intervention involves constraining the actions of the board through the threat of shareholder sanctions if actions that are sufficiently "suspicious" are observed. Such a governance system presupposes low cost of activism and a charter that makes sanctions possible.

Whether these means of control are effective is controversial in both academic and policy circles. Bebchuk (2005) argues that the traditional, director-centered form of governance needs to be replaced by one in which shareholders have the power to amend governance arrangements. In particular, he argues that not only should shareholders have the power to initiate and adopt "rules-of-the game" decisions (such as change a company's charter or state of incorporation [1]), but also the power to selectively intervene in "specific business decisions of substantial importance". These proposals, however, have been challenged by other legal scholars (Romano (2001), Stout and Anabtawi (2004),Bainbridge (2006), Lipton and Savitt (2007), Mirvis, Rowe and Savitt (2007), Anabtawi and Stout (2008)), who point out many problems, including issues of fiduciary responsibility in a shareholder-centric world, shareholder heterogeneity, activist agendas pursued by special interest groups, and information asymmetry between the shareholders and the board.

One area in which greater shareholder activism is already evident is the pay-setting process for corporate executives. The issue of top management pay was brought sharply into focus in the aftermath of the accounting scandals during 2000-2002 and the revelations of options backdating. Gillan and Starks (2007) and Ertimur, Ferri and Muslu (2010) document heightened shareholder activism, via shareholder proposals and "vote-no" campaigns, targeting various aspects of the pay process. The storm over executive pay further intensified after the financial

[1] Under the Delaware code, only the board can initiate charter amendments and bring these to a shareholder vote. Shareholders also lack the power to change the state of incorporation.

crisis: the recently enacted Dodd-Frank act in the U.S. gives shareholders in public companies "say-in pay", that is, the right to cast non-binding votes each year on executive pay packages.[2]

In this paper we consider the relative efficacy of the alternative methods of exercising control discussed above for the problem of controlling managerial opportunism. 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. 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 maximizing decisions if such decisions, based on the shareholders' information partition, are sufficiently suspicious to generate outrage.

In our analysis, shareholders have ultimate control but for reasons of ignorance may gain from delegation to a board. Shareholders also 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 awards. We term the above two types of ex ante control *charter-based control*.[3] In addition, shareholders can opt to remove or sanction a board through selective intervention - for example, when, conditional on the publicly observable information, the actions of the board imply that the probability that the board has been captured is above a threshold value. We call this type of ex post control *shareholder democracy*. We further assume that boards are extremely sanction averse and will never risk sanction by shareholders [4]. This model formulation captures the notion of "outrage costs" constrain-

[2]There is debate about whether the stylized 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 ". 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 shareholder value maximising boards.

[3]As Bebchuk (2005) notes, at present U.S. shareholders have limited power to implement charter amendments. One of his proposals calls for greater shareholder power to implement charter amendments and initiate changes to the state of incorporation.

[4]Thus, in our model, the threat of sanctions remains an off-the-equilibrium-path consequence and boards are not sanctioned in equilibrium. There is growing evidence, however, that compensation related activist agendas can impose costs on the board. For example, Ertimur et al. (2010) note that compensation-related "vote-no" campaigns (organized attempts by shareholders to convince other shareholders to withhold their votes from the election of all or some board members) are increasingly becoming more common and acquiring more "teeth": "

ing managerial compensation. The lower the outrage threshold, the tighter the constraint from shareholder outrage and thus the more democratic the governance system.

Both control by means of charter restrictions and democratic intervention (akin to Bebchuk's (2005) notion of selective intervention on specific business decisions of substantial importance) have costs relative to full delegation. 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 maximize shareholder value in some states of the world. Thus, identifying suborned boards through observing compensation policy is problematic. We consider two types of pay: regular incentive pay that is contractually determined and explicitly disclosed, and *discretionary pay* representing awards made largely at the discretion of the board.[5] In our setting, managers may have private information regarding investment projects as well as private benefits associated with such projects. 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 - this is the form that discretionary compensation takes in our setting.[6]

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 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. Interestingly, we find that full delegation is favored by shareholders over charter restrictions precisely when managers are more likely to derive private benefits from the firm's growth. Moreover, 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 prevent them from implementing shareholder shareholder value maximizing policies in some state of nature, and management-oriented boards 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.

$\cdots$ a large number of votes withheld communicates widespread dissatisfaction with the incumbent board and may act as a catalyst for change."

[5]In December 2006, the SEC announced new rules for the disclosure of the determinants of CEO awards. De Angelis and Grinstein (2010) find that (excluding base salary) the mean and median fraction of total awards that are discretionary (i.e. not based on explicit performance measures) are 48 and 47 percent, respectively.

[6]See Levitt and Snyder (1997), Almazan and Suarez (2003), and especially Inderst and Mueller (2009) and Eisfeldt and Rampini (2008), for other papers that stress the information revelation role of pay.

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 or a low-cost "vote-no" campaign. 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, one can view our results as reflecting a world where there is vanishingly small chance of shareholder intervention against the board given equilibrium board behavior.

In this setting, democracy can be more costly than either delegation faire 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 spending. 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 through more direct and less costly wealth transfers, i.e., raise salaries, buy gold-plated weapons systems, and build nice officers' clubs.

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) point out that many companies use subjective criteria for some of their bonus payments. They argue "$\cdots$ boards favoring 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. Ertimur et al. (2010) document that vote-no campaigns lead to the reduction of "excess CEO pay", and shareholder proposals requiring

shareholder approval of specific compensation items (e.g. golden parachutes) and those addressing how pay is set (e.g. the use of performance-based vesting conditions) receive the most support from shareholders, especially in firms with "excess pay". These results have been interpreted as evidence of shareholder sophistication and the efficacy of "low-cost" activism. Our analysis suggests a more cautious interpretation of these results. Discretionary pay awards to elicit managers' private information will appear as "excessive" since these are not related to specific performance benchmarks; yet, discretionary pay can be valuable for investment efficiency. Moreover, we show that given a positive correlation between a firm's economic state and the expected net present value of projects and the use of discretionary pay, pay-performance sensitivity will be the lowest for shareholder- oriented boards and the highest for management-oriented boards. Thus, it is difficult to draw inferences about the efficacy of shareholder activism from the targeting of discretionary pay.

Similarly, recent "say-on-pay" legislation in the U.S. is another example of policy aimed at selective intervention. 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, our analysis is *normative* in nature: the focus of 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, two recent papers are most relevant. Fisman, Khurana and Rhodes-Kropf (2007) present a model in which shareholders can misattribute poor performance to the CEO rather than to circumstances beyond the CEO's control. The board faces costs of shareholder disapproval, and may be forced to fire the CEO even when the CEO is of above avergae ability. In this environment, entrenchment has an inherent trade-off since it can lead to better firing decisions. Our analysis differs from Fisman et al. (2007) in that we do not assume shareholder irrationality - in Fisman et al. the board maximizes shareholder value but shareholders nonetheless intervene. In Song and Thakor (2006), 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 are that (a) in our analysis the loyalty – not the talent – of the board is the source of uncertainty, (b) shareholder inferences in our analysis can generate an active shareholder response, and not simply a change in beliefs, and (c) corporate governance is the focus of our analysis while Song and Thakor mainly consider investment distortion. Cohn and Rajan (2010) analyze a model in which the manager can refuse to implement the recommendation of an informed activist out of reputational concern. A shareholder value-maximizing board can intervene to mitigate this agency conflict. The optimal intervention policy of the board (i.e. whether to remain active or passive) depends on the extent of the agency conflict and the strength of external governance. 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) when shareholders are impatient (but rational, since beliefs are correct in equilibrium). An important difference of our model with Stein's is that while he addresses the issue of distortion from the first-best, we consider the distortions induced by shareholder democracy relative to alternative means of governance.[7]

This paper is organized as follows. Section 2 develops our basic model of managerial opportunism in the presence of both shareholder and management oriented boards, and considers both the welfare effects and the effects on shareholder value of restrictions on board compensation policy. Section 3 develops the model of shareholder outrage and corporate democracy. Finally, section 4 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 (henceforth, 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 ex ante probability

[7] Other papers that stress an agent's incentive to influence ability perceptions through action choices are Stein (1989), Holmstrom (1999), Prendergast and Stole (1996), Prendergast (1999), and Milbourn, Shockley, and Thakor (2001)). Information exchange between the board and managers is also modelled in Adams and Ferreira (2007, 2009), who 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.

distribution for the states. The ex ante probability of the Good, Medium and Bad states are $\mu/2$, $1/2$, $(1-\mu)/2$, respectively, where $\mu \in [0,1]$.

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 0 and that of low output is 1. Finally, in the Bad state (henceforth, B state), output is x_1 with probability 1 and x_2 with probability 0 irrespective of effort. Output is realized at time $t = 1$. We assume that the realized output is verifiable. [8]

The firm also has an investment project at time $t = 1$. The investment requires I and the net present value (henceforth, 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 $P > 0$. 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.

To see how contractual pay is set by a board acting in shareholder interest, first consider state G. Without loss of generality, we can set pay for low output to zero because payments conditioned on lower output reduce managerial effort incentives and thus raise compensation costs. Let g denote pay if high output is realized. To induce high effort, g has to satisfy $g - e \geq 0$. Similarly, let m denote pay if high output is realized in the M state. To induce high effort, we require $(1/2)m - e \geq 0$. 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.

[8] We assume that the manager has a strictly increasing preferences over promised compensation even though in state B the manager is unable to generate cash flow x_2 and thus will not capture any reward for increased compensation conditioned on x_2. In an earlier draft we rationalized this preference by assuming a small probability of the high x_2 cash flow occuring in every state of the firm. Under this assumption all the results in the paper can be established for $\varepsilon \approx 0$, however the introduction of the ε term greatly reduces the transparency of our our results.

2.2.1 Discretionary Pay

In general, CEO compensation contracts are not observable: firms only disclose ex post details of the awards without disclosing how these are determined. In 2006, the SEC issued new disclosure guidelines on CEO compensation that now require firms to report the performance measures used to determine CEO compensation, the performance targets, and performance horizons. De Angelis and Grinstein (2010) analyze the data for S&P 500 firms for the year 2007 and conclude that mean proportion of discretionary compensation to total compensation (excluding base salary) is as high as 48 percent. A major part of grants of stock options and bonus payments are discretionary. [9]

In this paper, we argue that discretionary pay is needed to elicit the manager's private information about the firm's future prospects, such as the NPV of investment projects, when these projects could generate private benefits to managers. To see how a board interested in maximizing shareholder payoff could use discretionary compensation to elicit the manager's private information about the project NPV, suppose that the board observes that the state of the manager is one in which there are private benefits. The board offers the manager the following "menu": If the manager reports that the project has positive NPV, then he receives 0 and the project is accepted; if the manager reports that the project has negative NPV, then he receives P and the project is not taken. This revelation mechanism will induce the manager to reveal the project NPV truthfully. In effect, this "direct mechanism" can be implemented by the following "indirect" one. The manager is offered the following contract: accept a payment of P and reject the project, or accept the project and receive 0. Under this contract, the manager accepts P and rejects the project if it has negative NPV, and accepts the project and receives 0 if it has positive NPV.[10] We will assume that offering the discretionary pay to elicit project information is better for the shareholders than accepting or rejecting the project without discretionary pay. It is straightforward to verify that in state G, since the project will be accepted if no discretionary pay is offered to elicit project information, $n > P$ is sufficient for discretionary pay to be used. In state B, the project will be rejected if no discretionary pay is used. Thus, using discretionary pay is better for shareholders provided

$$\theta n - (1-\theta)P > 0 \tag{1}$$

For the rest of the paper, we assume that condition (1) holds. Note that if the state of the manager is such that there are no private benefits, then no discretionary pay is required to

[9] Some other aspects of pay not disclosed in compensation tables such as severance pay are also largely determined at the discretion of a company's board. While recent literature suggests that benchmarking pay to that of compensation peers is quite widespread, the choice of the peer group itself is largely at the discretion of the board.

[10] We assume the manager has limited liability, and cannot be made to pay P to accept the project.

induce the manager to reveal project NPV.[11]

Several other papers have also suggested that managerial payments can be thought of as information revelation mechanisms. Levitt and Snyder (1997) show that to encourage agents to come forward with early warnings, contracts must be designed that reward revelation of bad news. Eisfeldt and Rampini (2008) argue that "Substantial bonuses must be paid to unproductive managers to incentivize them to reveal that capital should be reallocated away from them." They suggest that there is ample evidence that managers get paid bonuses prior to downsizing or their firms getting acquired. As an example of bonuses paid to agents as a reward for actions that are against their self interest, Eisfeldt and Rampini (2008) quote Harford (2003), who reports that Bank of America directors received a cash bonus of $300,000 when Bank of America merged into Nationsbank. The cash bonus was explained as follows: "the purpose also was to thank people who had, after all, voted themselves out of a job by approving the merger."

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 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 the two types of charter-based governance regimes: *full delegation (FD)* and *charter restriction (CR)*. In the CR 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, limits on the power to set discretionary pay. Specifically, we analyze the consequences of a charter restriction that bans discretionary pay.

Under full delegation, the shareholders delegate to the board the task of setting pay and determining investment policy, and intervention can only be triggered by the most egregious types of actions. Without some such constraint on board action, the MB board will divert to the maximum possible extent. Therefore, we assume that the board is insulated in all situations except those that reveal the board type to be management oriented with probability one.[12]

[11] While we model it as an information revelation mechanism, more generally, discretionary pay can be thought of as any payment or reward to self-interested managers for eschewing actions that are in their private interest but not in the interest of shareholders. If a fraction of the projects generate private benefits (as we assume in our model), then our perspective on discretionary pay is broadly consistent with De Angelis and Grinstein's (2010) finding that more investment-intensive firms (i.e. firms with more projects) use more discretionary pay.

[12] This is equivalent to assuming that charter provisions insulating the board are set at a level that make share-

Notice that an SB board will set pay conditional on high output being realized at either $g = e$ (in the G state) or $m = 2e$ (in the M state) or zero (in the B state). We will assume that the board – whether shareholder or manager oriented – is restricted to offering one of these three levels of compensation. [13] Further, since the shareholders do not observe the state, and there is a positive probability of an SB board setting pay at the level m, the MB board can set pay at the level m without risking dismissal.

Note also that, as discussed above, in an FD regime, discretionary pay D under an SB board will either be $D = 0$ or $D = P$. An MB board can therefore set D at either level without being revealed to be management oriented. However, an SB board will never set pay $D = P$ *and* accept the project. Thus, if an MB sets $D = P$, it must reject the project.

2.4 Governance Regimes, Firm Value and Welfare

2.4.1 Firm Value

We contrast firm value under FD and CR, where in the CR 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 SB, firm value is lower under a CR regime than under an FD regime.*

Proof. Suppose first that the state is one in which the investment project will result in private benefit for the manager. An SB board can always induce the manager to reveal the state and invest in positive NPV projects and stop negative NPV projects in the FD regime by using discretionary compensation. In contrast, in the CR regime, since $\theta > 0.5$, the optimal action from shareholder point of view for the SB board is to allow investment if it observes that the state is G and stop investment is 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, in both the CR and FD regimes.

holder action "sufficiently costly" (in the sense that such actions occur only for posterior probability assessments that the board is of type MB that are close to 1).

[13] Out-of-equilibrium beliefs that associate any other level of pay with an MB board provide identical results. Note that the shareholder board will never pay more than the minimum necessary to induce effort, and thus never deviate from these three pay levels.

Thus, an SB board creates greater value under the FD regime than under the CR regime, provided

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

The expression on the left hand side denotes firm value conditional on the project generating private benefit when the board is SB and the governance regime is FD. The expression on the right hand side denotes firm value conditional on the project generating private benefit when the board is SB and the governance regime is CR. We have assumed that in the CR regime, since investment has ex ante negative (positive) NPV in state B (G), investment is never (always) allowed in that state if the project generates private benefit.

The inequality in (2) can be rewritten as

$$(\frac{3}{4}-\frac{\theta}{2})n>P(\frac{1}{4}+\frac{\theta}{2}+\frac{\mu}{2}-\theta\mu). \tag{3}$$

It is easy to check that the condition holds given (1). □

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

1. *If*
$$\beta<\frac{\mu}{2}\theta+\frac{1-\mu}{2}(1-\theta)+\frac{1}{4}$$
firm value is higher under a CR regime than under an FD regime.

2. *Firm value is higher under an FD regime than under a CR regime for β sufficiently close to 1.*

Proof. Suppose the state is such that there are no private benefits from investment. Since simultaneous project acceptance and discretionary pay reveals the board type to be MB, in the FD regime, the optimal policy for the MB board is to offer P-discretionary pay and not invest. In contrast, in the CR regime, discretionary pay must be necessarily 0. Thus, the MB board in this case can implement the first-best investment policy. Next suppose that investment is associated with private benefits. Here, discretionary pay allows first-best investment in the FD

regime, but in the CR regime, investment is undertaken irrespective of NPV. Finally, notice that the MB board always sets contractual pay at the level m for high output.

The above considerations imply that firm value under an MB board when the governance regime is FD is

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

Similarly, firm value under an MB board when the governance regime is CR is

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

After some manipulation, we get

$$\begin{aligned} & V_{FD}^{MB}-V_{CR}^{MB} \gtreqless 0 \\ \Leftrightarrow\ & n\left(\beta-(\frac{\mu}{2}\theta+\frac{1-\mu}{2}(1-\theta)+\frac{1}{4})\right) \gtreqless P\left((1-\beta)+\beta(\frac{\mu}{2}(1-\theta)+\frac{1-\mu}{2}\theta+\frac{1}{4}\right). \end{aligned}$$

Hence, the results easily follow. □

Proposition 1 shows that for an SB board, FD creates more shareholder value than CR. In contrast, Proposition 2 shows that for an MB board, constitutional restrictions can be value-increasing if opportunities for managerial private benefit consumption are sufficiently *limited* (low β). In other words, greater discretion to the board in setting pay is likely to be more effective precisely when the scope for managerial private benefits are high. This somewhat counter-intuitive conclusion results because under FD, in states in which private benefits do not exist, the MB 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 SB rather than MB.*

Proof. The proof is straightforward and is along the following lines. Under the FD regime, the MB board offers discretionary pay when there are no managerial private benefits, and even a positive NPV project is rejected. In contrast, an SB board will offer no discretionary pay, and the project will be accepted if and only if it generates positive NPV. Under the CR regime, the MB board always accepts the project when there are managerial private benefits; however, the SB board can stop the project altogether when the state is B and the expected NPV is negative. Thus, in these states, an MB board causes more investment distortion. In all other states, the SB and MB boards follow the same policies in both governance regimes. □

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 SB and MB boards:

Proposition 4. *Social welfare is*

1. *Higher under FD than under a CR regime if the board is SB.*
2. (a) *Higher in a CR regime than in an FD regime if* $\beta < \frac{\mu}{2}\theta + \frac{1-\mu}{2}(1-\theta) + \frac{1}{4}$ *and the board is MB.*
   (b) *Higher in an FD regime than a CR regime for* β *sufficiently close to 1 and the board is MB.*
3. *Higher for an SB board than an MB board if the governance regime is FD.*
4. *Higher for an SB board than an MB board in a CR regime provided* $(2\theta - 1)n > P$.

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

The result that for θ close to $1/2$ (i.e., when there is little systematic risk), social welfare can be higher under an MB board than an SB board under a constitutional restriction on discretionary pay may be counter-intuitive. The reason is as follows. When there are no managerial private benefits, under both regimes, the efficient investment is implemented. However, when managerial private benefits are present, the SB board stops investment altogether in the bad state, which is bad for social welfare because it deprives the manager of private benefit, but not very costly for shareholders if θ is close to $1/2$.

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 CR and FD 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. *$\sigma^{MB}_{CR} > \sigma^{SB}_{CR} > \sigma^{SB}_{FD}$ and $\sigma^{MB}_{CR} > \sigma^{MB}_{FD} > \sigma^{SB}_{FD}$. Pay-cash flow sensitivity is the lowest for an SB board in an FD regime. It is the highest for an MB board in the CR regime.*

Proof. Please see the Appendix. □

Proposition 5 shows that there need not be any monotonic relationship between pay-performance sensitivity and firm value. From Proposition 1, firm value is highest for a firm with an SB board in an FD regime. However, Proposition 5 shows that pay-performance sensitivity is the lowest for such a firm. This is because the shareholder board under FD offers discretionary pay, which is more likely to be accepted (since the project NPV is more likely to be negative) in the bad state of the economy than in the good. Therefore, higher discretionary pay is more likely to be associated with low output than high.

On the other hand, pay-performance sensitivity is the highest for a firm with an MB board under a constitutional restriction on discretionary pay; yet, firm value is the lowest for such a firm when β is sufficiently high. The pay-performance sensitivity is the highest for such a firm for two reasons. First, there is no use of discretionary pay (which "dampens" the pay-performance sensitivity when used to elicit manager's private information). Second, incentive pay does not decrease in the good state of the economy, since the management board offers the highest possible pay that avoids detection.

A fundamental insight from this section of the paper is that it is very difficult for shareholders to infer whether boards are acting in shareholders' interest from observing performance and compensation data in a world where boards have access to hidden information about both firm prospects and managerial incentives. First, higher "excess pay" – which is pay not explained by observable controls and thus likely to heavily involve components of subjective or discretionary pay – is not informative about board orientation, since both types of boards would prefer to use it, albeit for different reasons. This is important to realize since in recent work, shareholder activism directed as firms with excess pay and the support for such activism from shareholders has been interpreted as evidence of shareholder sophistication and the efficacy of pay-related

activism (see Ertimur et al. (2010)). Second, our analysis suggests that targeting firms in which discretionary pay is used *and* the potential for managerial private benefits are high may be especially harmful, since these are the firms where, even if the board is manager oriented, restrictions in pay will lead to the most severe distortions in investment policy. Third, and related, the analysis suggest that board opposition to charter restrictions on pay does not convey any information about board orientation, since both types of boards prefer delegation to restriction. Finally, we find that pay-performance sensitivity – a widely used metric for incentive alignment in empirical research – could be inversely related to firm value when discretionary pay is used, and could be higher for MB boards than for shareholder boards.

In the next section, we formalize the notion of ex post control through shareholder democracy, and examine its efficacy relative to the ex ante charter-based control mechanisms discussed in above.

3 Model of Corporate Democracy

In order to develop our results we are required to formally define the "outrage constraint" on corporate opportunism discussed earlier. Many corporate finance papers have argued informally that the compensation policies of MB 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.

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 MB. Shareholder *suspicion* in our model is the shareholders' posterior probability assessment that the board is MB. Suspicion is rationally generated through the calculus of probabilities using Bayes Rule. We assume that there is an "outrage trigger" – a cutoff value $\bar{\delta}$ of the posterior – such that suspicion levels in excess of the outrage trigger (i.e., a posterior assessment in excess of $\bar{\delta}$) generate *outrage*. Outrage leads to costly sanctions on the board. We assume that boards are extremely sanction averse and are constrained to *outrage feasible policies*, that is, policies that do not generate outrage.

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.

Since suspicion is determined by the equilibrium actions of the board through Bayes Rule, changing the equilibrium actions of the agents will change the beliefs. Thus, for exactly the same set of parameter values, actions that trigger outrage in one equilibrium may not trigger

outrage in another equilibrium. Suspicion has a self-fulfilling property: if a compensation is assumed to be suspicious, it will be blocked by the outrage constraint. Once blocked by outrage, the policy will not be observed, and thus any beliefs about the policy will be consistent with 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 which we discuss below.

Note also 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. However, in the context of our model, where the only unobserved attribute of directors is their orientation, and shareholder orientation increases firm value, it is not hard to rationalize sanctioning directors based on suspicion. For example, consider a a stationary infinite date model where our model is repeated ad infinitum. Suppose shareholders own the firm for one period and then sell out at the end of the period, i.e., after one play of our game has been completed. Suppose sanction occurs at the end of the period and are costly to shareholders but results in drawing a new board from a pool of potential directors. Then the only variable under the shareholders' control affecting the exit value of the their shares is the posterior probability that the board is MB. When this crosses a threshold, it will be optimal for the shareholders to sanction the board and draw from the pool. If board membership entails sufficiently large private benefits, board members will attempt to avoid this sanction.[14]

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 Environment

- *State of the governance*: $\gamma \in \Gamma \equiv \{\text{SB}, \text{MB}\}$. The board can either be an SB board, or an MB board.

[14] With long-term share ownership, the problem becomes considerably more complex, e.g., shareholders may use history dependent strategies to sanction boards. While interesting, such considerations are beyond the scope of this paper. Other rationales of outrage relying on non-monetary incentives are also reasonable. There is a large literature in evolutionary biology and experimental economics documenting "altruistic punishment," i.e., the willingness of group members to bear costs in order to punish actions which lower the group's overall welfare or fitness. (See, for example, Fehr and Gachter (2002) and Kappeler and vanSchaik (2006)). A board betraying the interests of shareholders and its legal duty of loyalty would seem to be an ideal target for such altruistic punishment.

- *Realized cashflow:* $x \in X \equiv \{x_1, x_2\}$

- *State of firm*: $\phi \in \Phi \equiv \{G, M, B\}$. If the manager does not exert effort, then in all states the probability that the cashflow equals x_1 is 1 and the probability that the cash flow equals x_2 is 0. 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 and the probability that the cash flow equals x_2 is 0.

- *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 $n > 0$. The probability that the state is $+n$ is $\theta \geq 1/2$ for $\phi = G$, $1/2$ for $\phi = M$, and $1 - \theta$ for $\phi = B$.

- *State of the manager:* $\pi \in \Pi = \{\mathbf{P}, \neg\mathbf{P}\}$. In state $\mathbf{P}$ the manager earns a private benefit of P if the project is accepted and in $\neg\mathbf{P}$ the manager does not earn any private benefit.

3.1.2 Timing and Information Endowments

- *At date 0*, the board observes the state of the board and the state of the firm. The board at this point chooses an incentive compensation for the manager, w from a set W. Its information set when it makes this decision is $\mathscr{H}_0^{\text{Brd.}} = \Gamma \times \Phi$.

- The manager observes the state of the board, the state of the firm and the incentive compensation set by the board, and then makes an effort decision by choosing $E \in \{e, 0\}$. Thus, the set of histories at manager's date 0 decision point when he makes the effort decision is $\mathscr{H}_0^{\text{Mgr.}} = \Gamma \times \Phi \times W$.

  We will assume that the set $W \equiv \{g, m, 0\}$, where g, m and 0 are the contractual pay levels received by the manager in states G, M and B, respectively, conditional on high output x_2 being realized. Pay conditional on low output is set equal to 0. These are the minimal pay levels in each state required to induce high effort. Thus, $g = e$ and $m = 2e$.

- *At date 1*, the cash flow, either x_1, or x_2, is realized; the board and the manager then learn the state of the manager, and the manager learns the state of the project. At this point, the board's information set is identical to the manager's with the exception that the board lacks the manager's information regarding the state of the project, i.e., $\mathscr{H}_1^{\text{Brd.}} = \Gamma \times \Phi \times W \times X \times \Pi$. The board then makes an offer of discretionary pay to the manager.

  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 these polices: offer discretionary pay of P (we call this P-discretionary pay) or offer

discretionary pay of 0 (we call this 0-discretionary pay). If positive discretionary pay is offered, it is contingent on project rejection, i.e. the manager must reject the project to receive it. Thus, project acceptance always leads to 0 discretionary pay for the manager, whereas rejection leads to positive discretionary pay of P only if P-discretionary pay is offered. In addition, we allow the board to simply dictate the investment decision. The dictating policy could be associated with an offer of zero or positive (equal to P) discretionary pay: we represent these two policies by $\mathbf{D_0}$ and $\mathbf{D_1}$, respectively. Only project rejection is compatible with the dictating policy of $\mathbf{D_1}$. Thus, the board's offer and the manager's project acceptance/rejection decisions are represented by an ordered pair $(c, j) \in C \times J \equiv Q$, where $c \in C = \{0, P, \mathbf{D_0}, \mathbf{D_1}\}$ and $j \in J = \{A, R\}$.

- The manager makes an accept or reject decision on the project. 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 and its offer of discretionary compensation; thus the set of histories at which the manager makes his date 1 project accept/reject decision is $\mathscr{H}_1^{\text{Mgr.}} = \Gamma \times \Phi \times W \times X \times \Pi \times \Psi \times C \backslash \{\mathbf{D_0}, \mathbf{D_1}\}$.

- Shareholders 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 $\hat{Q}$ of Q . Under this partition of Q, accepting the project after a (spurned) offer of discretionary compensation cannot be distinguished from accepting the project with an offer of 0-discretionary compensation, or a dictating policy of $\mathbf{D_0}$. Thus, the shareholders observe the following partition of Q: $\{\mathbf{A}, \mathbf{R}^+, \mathbf{R}^-\}$. $\mathbf{A}$ represents $\{(P,A), (0,A), (\mathbf{D_0},A)\}$. Under (P,A) discretionary compensation of P 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 $(\mathbf{D_0},A)$ the board dictated project acceptance with zero discretionary pay. In all these cases the manager does not receive a discretionary payment and the project is accepted. $\mathbf{R}^+$ represents (P,R), the case were discretionary compensation of P was offered and accepted (and the project was rejected), and $(\mathbf{D_1},R)$, the case in which positive discretionary pay was offered and the board dictated project rejection. In all these cases the project is rejected and the manager receives discretionary compensation. $\mathbf{R}^-$ represents $\{(0,R), (\mathbf{D_0},R)\}$. 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 $\mathscr{H}_1^{\text{Sh.}} \equiv X \times W \times \hat{Q}$.

3.1.3 Payoffs

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

$$u_{\text{Mgr.}} = w I_{x=x_2} - e + \begin{cases} P & \text{if } \pi = \mathbf{P} \text{ and } (c,j) \neq (0,R) \text{ or } (\mathbf{D_0},R),\ \pi = \neg\mathbf{P} \text{ and } (c,j) = (P,R) \text{ or } (\mathbf{D_1},R) \\ 0 & \text{otherwise} \end{cases} \tag{4}$$

The shareholders' payoff is given by,

$$u_{\text{Sh.}} = x - w I_{x=x_2} - c I_{j=R} + \psi I_{j=A}, \quad c \in C \backslash \{\mathbf{D_0}, \mathbf{D_1}\} \tag{5}$$

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

$$\mathbb{P}[\gamma = \text{MB} | \mathscr{H}_1^{\text{Sh.}}] \tag{6}$$

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

$$\frac{\mathbb{P}[\gamma = \text{MB} | \mathscr{H}_1^{\text{Sh.}}]}{\mathbb{P}[\gamma = \text{SB} | \mathscr{H}_1^{\text{Sh.}}]} \tag{7}$$

The odds ratio is of course monotonic in the posterior but frequently has a 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. One is effort choice at date 0. The other is the project accept/reject decision at date 1. 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.

- Board

  Let

$$\mathrm{BR}_s^*[h] = \{a : \mathbb{E}_{h,a}^*[u_s] = \max_{a'} \mathbb{E}_{h,a'}^*[u_s]\}, \quad s = \text{Mgr.}, \text{Sh.}, \tag{8}$$

$$F^*[h] = \{a : \mathbb{P}_{h,a}^*[\hat{\delta} > \bar{\delta}] = 0\} \tag{9}$$

$$\mathrm{FBR}_s^*[h] = \{a \in F^*(h) : \mathbb{E}_{h,a}^*[u_s] = \max_{a' \in F^*[h]} \mathbb{E}_{h,a'}^*[u_s]\}, \quad s = \text{Mgr.}, \text{Sh.}, \tag{10}$$

$$\mathrm{MBR}_s^*[h] := \{a \in \mathrm{FBR}^*[h] : \mathbb{E}_{h,a}^*[\hat{\delta}] = \min_{a' \in \mathrm{FBR}_s^*[h]} \mathbb{E}_{h,a'}^*[\hat{\delta}]\}, \quad s = \text{Mgr.}, \text{Sh.}. \tag{11}$$

The set $BR_s(h)$ represents the set of best replies at information set h. The best reply will depend on whether one is maximizing shareholder ($s = \text{Sh.}$), or managerial welfare ($s = \text{Mgr.}$). The set $F^*[h]$ is the set of outrage-feasible actions 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 MB) exceeding a cutoff level of $\bar{\delta}$. We assume that board polices are constrained by outrage so that boards will only select among outrage feasible policies. The set $FBR_s^*(h)$ represents the set of outrage feasible best replies at information set h. We assume that $\bar{\delta} > \delta_0$, where δ_0 is the prior probability that the board is MB. The final best reply set, $\mathrm{MBR}_s^*[h]$, is the set of minimum suspicion best replies. This set is a subset of the set of feasible best replies consisting of those best replies which produce the lowest posterior of the board being MB (and is never empty if the set of feasible best replies is non-empty). 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 has a posterior of $\bar{k}$ and is very sanction averse.

- Manager

  The Manager's set of best responses at information set h is defined analogously:

$$\mathrm{BR}_{Mgr.}^*[h] = \{a : \mathbb{E}_{h,a}^*[u_{Mgr.}] = \max_{a'} \mathbb{E}_{h,a'}^*[u_{Mgr.}]\} \tag{12}$$

3.2 Equilibrium

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

1. *At every history $h \in \mathscr{H}_0^{Mrg.}$ and every history $h \in \mathscr{H}_1^{Mrg.}$, all strategies in the support of the manager's strategy distribution are elements of $BR^*_{Mgr.}[h]$.*

2. *At every history in $h \in \mathscr{H}_0^{Brd.}$ and every history $h \in \mathscr{H}_1^{Brd.}$, when the board is manager oriented, all strategies in the support of the board's strategy distribution are elements of $MBR^*_{Mgr.}[h]$ whenever $MBR^*_{Mgr.}[h]$ is not empty; when the board is SB, all strategies are elements of $MBR^*_{Sh.}[h]$ whenever $MBR^*_{Sh.}[h]$ is not empty.*[15]

3. *The shareholders' posterior estimate of board orientation, $\hat{\delta}$ is measurable with respect to the shareholders' information set, $\mathscr{H}_1^{Sh.}$ and is consistent with Bayes rule for all equilibrium path histories, $h \in \mathscr{H}_1^{Sh.}$.*

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 formalize outrage. Condition (1) ensures that the manager always takes the actions that maximize his welfare. Condition (2) ensures that the board chooses actions that maximize the payoff to either the manager or the shareholders subject to the outrage constraint, and when more than one action is a maximizer, chooses among maximizers that generate the lowest shareholder posterior of the board being MB. Condition (3) ensures that shareholder posteriors are consistent with the laws of probability. Condition (4) rules out 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.

[15] $\text{MBR}_s[h]$ could be empty for some off-equilibrium-path histories, e.g., histories that are reached by a board action that violated the outrage constraint.

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 that 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 P, if the project generates private benefits, always accept the project (and spurn P) if the project is positive NPV and reject the project (and receive P) 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, $\beta = 1/2$, $\mu = 1/2$, and $\delta_0 = 1/2$. 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 SB:

        * 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 P-discretionary compensation; if the project does not generate private benefits, offer 0-discretionary compensation.

– If the board is MB

* At date 0, set compensation to m-compensation in all states of the firm.
* At date 1, when the project does not generate managerial private benefits, then offer discretionary compensation of P. 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

$$\hat{\delta}(m, x_1, \mathbf{R}^+) = 4/5 \quad \hat{\delta}(m, x_2, \mathbf{R}^+) = 4/5 \tag{13}$$

$$\hat{\delta}(m, x_1, \mathbf{R}^-) = 0 \quad \hat{\delta}(m, x_2, \mathbf{R}^-) = 0 \tag{14}$$

$$\hat{\delta}(m, x_1, \mathbf{A}) = 2/3 \quad \hat{\delta}(m, x_2, \mathbf{A}) = 2/3 \tag{15}$$

The basic idea of the example is that, given that the MB board offers discretionary pay and the project is rejected when there are no private benefits, the offer of discretionary pay is viewed with suspicion. This causes the manager-oriented board to eschew discretionary pay when the manager has private benefits because the manager can profit equally, in this case, from accepting possibly negative NPV project. Thus when the manager has private benefits the MB board offers zero discretionary pay, and the project is always accepted, leading to inefficiency.

To verify that these strategies and beliefs constitute an equilibrium, first note that the MB board is generating the highest possible managerial payoff. Incentive compensation is set at its highest level, m, and managers always earn P in addition. When the manager has private benefits, P is earned through private benefits. When the manager does not have private benefits, P 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 shareholders' posterior assessments of board type 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 board's payoff, the board picks the actions which minimize suspicion. For the SB board this is a trivial condition because, for every history there is a unique action which maximizes shareholder value. For the MB 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 manager's payoff

is the same under project acceptance (and receipt of no discretionary pay) and project rejection (and receipt of P in the form of the discretionary payment). As is clear from the posterior calculations in equations (13)-(15), the posterior assessment of the board is higher for the discretionary payment of P (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.

Now compare the case analyzed above with the one where there is no outrage constraint. In this latter case, the MB board would be willing to offer discretionary compensation to the manager even when the manager obtains private benefits from the project. The MB board will still pay the manager m-compensation in all states of the firm and would still pay the discretionary compensation of P when the manager obtains 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 MB boards from using positive discretionary compensation to screen projects in the case where such payments are shareholder value maximizing. Hence, a no-outrage solution would produce higher shareholder payoffs than those produced in equilibrium analyzed above. The losses from outrage will be proportional to the likelihood that the board is MB, the likelihood managers earn private benefits, and the losses from not using discretionary compensation versus accepting the project. The gain from discretionary compensation (when the board is MB and the manager has private benefits) is that undertaking negative NPV projects is avoided. The expected value of this gain is given by

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

and the total loss to shareholders from shareholder outrage is

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

This equation implies that outrage reduces both shareholder and social welfare[16] most when private benefits are likely, the board has a high probability of being MB, business conditions are weak, and the variance of project NPV is high.

Note also the use of discretionary pay packages after m-compensation provides no information regarding the orientation of the board in this example (since $\beta = 1/2$).[17] Both the MB

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

[17]In contrast, the level of incentive pay is more informative here, since a payment of g or b-incentive compensation is only associated with an SB board.

board and the SB boards offer discretionary pay with the same probability. The difference between the MB and SB boards is when they offer positive discretionary pay. Manager oriented 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 SB boards.

We now prove a more general result. One can show that, generically, shareholder democracy produces welfare losses to shareholders relative to FD whenever the democratic equilibrium features the SB board implementing the first best shareholder value maximizing policy, and discretionary payment is offered after both cash flows.

Proposition 6. *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 smaller than it is under FD. Conditional on the cash flow equaling x_1, the payoff is strictly smaller under shareholder democracy. Conditional on the cash flow equaling x_2, the payoff under democracy is weakly smaller and is strictly smaller except when the parameters of the model fall in the following non-generic subset:*

$$\left\{(\beta,\theta,\mu)\in(0,1)\times(1/2,1)\times(0,1):\frac{(1-\theta)\mu+\frac{1}{4}}{\mu+\frac{1}{2}}-\left(1-\frac{1}{\beta(\beta+1)}\right)=0\right\}. \tag{18}$$

Proof of Proposition 6. A democratic equilibrium which involves positive discretionary compensation after both cash flows can never produce a strictly higher payoff for the shareholder than under full delegation. This follows because in the full delegation equilibrium the SB maximizes shareholder payoffs and the MB, when it is indifferent amongst policies that maximize manager payoffs, chooses the policy that maximizes shareholder payoffs. Thus, to prove the result we only need to show that for an event that occurs with positive probability, the payoff is higher under FD than it is under democracy. The event we choose is the event that the x_1 cash flow is realized and the board is MB, i.e. the event $\{x = x_1\} \cap \text{MB}$. When the project generates no private benefits, under both a democratic equilibrium and FD, the MB board will always pay the P-discretionary compensation. When the the project generates private benefits, under FD, the management-oriented board will offer the manager the P-revelation contract. This will result in the acceptance of the project when it is positive NPV, and the payment of the bonus P and project rejection otherwise. This is the unique shareholder value maximizing policy and thus the only way the democratic equilibrium can match FD is if, under democracy, the MB board also offers the P- revelation contract. The revelation contract produces both $\mathbf{R}^+$

and $\mathbf{A}$ with positive probability in equilibrium. The manager's payoff is the same from each of these outcomes when there are private benefits. Thus minimal suspicion requires that both of these policies are equally suspicious, i.e. produce the same posterior of the board being MB.[18] The MB board will choose the highest possible incentive compensation for the manager. By assumption the SB board is following the first-best compensation policy and thus is paying m compensation with positive probability. Hence, m compensation does not violate the outrage constraint. As this is the case, the MB board will choose m compensation in all states of the firm. Thus, whenever the MB board is permitting both $\mathbf{R}^+$ and $\mathbf{A}$ to be realized when the project generates private benefits, if minimal suspicion is satisfied, it must be the case that

$$\mathbb{P}[\text{MB}|m,x_1,\mathbf{R}^+] = \mathbb{P}[\text{MB}|m,x_1,\mathbf{A}] \tag{19}$$

This implies by Bayes rule that

$$\frac{\mathbb{P}[\mathbf{R}^+|\text{MB},m,x_1]}{\mathbb{P}[\mathbf{R}^+|\text{SB},m,x_1]} = \frac{\mathbb{P}[\mathbf{A}|\text{MB},m,x_1]}{\mathbb{P}[\mathbf{A}|\text{SB},m,x_1]} \tag{20}$$

Equivalently,

$$\frac{\mathbb{P}[\mathbf{R}^+|\text{MB},m,x_1]}{\mathbb{P}[\mathbf{A}|\text{MB},m,x_1]} = \frac{\mathbb{P}[\mathbf{R}^+|\text{SB},m,x_1]}{\mathbb{P}[\mathbf{A}|\text{SB},m,x_1]} \tag{21}$$

Next note that $\mathbf{A}$, $\mathbf{R}^+$, and $\mathbf{R}^-$ are disjoint events (that are mutually exhaustive). Thus, we can write

$$\mathbb{P}[\mathbf{R}^+|\text{MB},m,x_1,\mathbf{R}^+ \text{ or } \mathbf{A}] + \mathbb{P}[\mathbf{A}|\text{MB},m,x_1,\mathbf{R}^+ \text{ or } \mathbf{A}] = 1 \tag{22}$$

and

$$\mathbb{P}[\mathbf{R}^+|\text{MB},m,x_1,\mathbf{R}^+ \text{ or } \mathbf{A}] = \frac{\mathbb{P}[\mathbf{R}^+|\text{MB},m,x_1]}{\mathbb{P}[\mathbf{R}^+|\text{MB},m,x_1] + \mathbb{P}[\mathbf{A}|\text{MB},m,x_1]}. \tag{23}$$

Similarly,

$$\mathbb{P}[\mathbf{R}^+|\text{SB},m,x_1,\mathbf{R}^+ \text{ or } \mathbf{A}] = \frac{\mathbb{P}[\mathbf{R}^+|\text{SB},m,x_1]}{\mathbb{P}[\mathbf{R}^+|\text{SB},m,x_1] + \mathbb{P}[\mathbf{A}|\text{SB},m,x_1]}. \tag{24}$$

Thus, (21) implies that

$$\mathbb{P}[\mathbf{R}^+|\text{MB},m,x_1,\mathbf{R}^+ \text{ or } \mathbf{A}] = \mathbb{P}[\mathbf{R}^+|\text{SB},m,x_1,\mathbf{R}^+ \text{ or } \mathbf{A}]. \tag{25}$$

For the SB board, which pays m compensation only in state m, from (24), the conditional

[18] Otherwise, if the manager's payoff is higher under $\mathbf{A}$, the MB board will offer 0-discretionary compensation which leads to project acceptance with probability 1; if the manager's payoff is higher under $\mathbf{R}^+$, the MB board will choose the dictating policy $\mathbf{D_1}$.

probability in (25) is given by

$$\mathbb{P}[\mathbf{R}^+|\text{SB},m,x_1,\mathbf{R}^+ \text{ or } \mathbf{A}] = \frac{\frac{1}{2}\beta}{\frac{1}{2}\beta+\frac{1}{2}}. \tag{26}$$

For the manager oriented board which pays m-compensation in all firm states, if it is offering the revelation discretionary P-compensation (as the MB board does under FD) in all states, from (23), the condition probability in (25) is given by

$$\mathbb{P}[\mathbf{R}^+|\text{MB},m,x_1,\mathbf{R}^+ \text{ or } \mathbf{A}] = (1-\beta)+\beta\Big(\mathbb{P}[B|x_1]\,\theta+\mathbb{P}[M|x_1]\,\frac{1}{2}+\mathbb{P}[G|x_1]\,(1-\theta)\Big). \tag{27}$$

(Note that the denominator of the expression in unity because under the MB board under FD, $\mathbf{R}^-$ is never realized). Because $\mathbb{P}[G|x_1]=0$ we can rewrite (27) as

$$\mathbb{P}[\mathbf{R}^+|\text{MB},m,x_1,\mathbf{R}^+ \text{ or } \mathbf{A}] = (1-\beta)+\beta\Big(\mathbb{P}[B|x_1]\,\theta+(1-\mathbb{P}[B|x_1])\,\frac{1}{2}\Big). \tag{28}$$

Because $\theta \geq 1/2$,

$$\mathbb{P}[B|x_1]\,\theta+(1-\mathbb{P}[B|x_1])\,\frac{1}{2} \geq 1/2. \tag{29}$$

Thus,

$$(1-\beta)+\beta\Big(\mathbb{P}[B|x_1]\,\theta+(1-\mathbb{P}[B|x_1])\,\frac{1}{2}\Big) \geq (1-\beta)+\beta\,\frac{1}{2} \tag{30}$$

(28) and (30) imply that

$$\mathbb{P}[\mathbf{R}^+|\text{MB},m,x_1,\mathbf{R}^+ \text{ or } \mathbf{A}] \geq (1-\beta)+\beta\,\frac{1}{2}. \tag{31}$$

Thus, in order for (25) to be satisfied it must be the case, given (26) and (31), that

$$\frac{\frac{1}{2}\beta}{\frac{1}{2}\beta+\frac{1}{2}} \geq (1-\beta)+\beta\,\frac{1}{2}. \tag{32}$$

However (32) cannot be satisfied for any $\beta \in (0,1)$. Thus the result is established.

Now consider $x = x_2$. Using the same logic as above it follows that for the efficient policy to satisfy the minimal suspicion criterion, it must be the case that

$$\mathbb{P}[\mathbf{R}^+|\text{MB},m,x_2,\mathbf{R}^+ \text{ or } \mathbf{A}] = \mathbb{P}[\mathbf{R}^+|\text{SB},m,x_2,\mathbf{R}^+ \text{ or } \mathbf{A}]. \tag{33}$$

Equation (33) can only hold if

$$\frac{\frac{1}{2}\beta}{\frac{1}{2}+\frac{1}{2}\beta}-\left((1-\beta)+\beta\left((1-\theta)\frac{\frac{\mu}{2}}{\frac{1}{4}+\frac{\mu}{2}}+\frac{1}{2}\frac{\frac{1}{4}}{\frac{1}{4}+\frac{\mu}{2}}\right)\right)=0. \tag{34}$$

Equation (34) can only be satisfied if

$$\frac{(1-\theta)\mu+\frac{1}{4}}{\mu+\frac{1}{2}}-\left(1-\frac{1}{\beta(\beta+1)}\right)=0. \tag{35}$$

Because the map defined by the left hand side of (34) is non-singular for all $(\beta,\theta,\mu)\in(0,1)\times(1/2,1)\times(0,1)$ the set

$$\{(\beta,\theta,\mu)\in(0,1)\times(1/2,1)\times(0,1):\frac{(1-\theta)\mu+\frac{1}{4}}{\mu+\frac{1}{2}}-\left(1-\frac{1}{\beta(\beta+1)}\right)=0\} \tag{36}$$

is one dimension less than dimension of the parameter space,

$$\{(\beta,\theta,\mu)\in(0,1)\times(1/2,1)\times(0,1)\} \tag{37}$$

Hence, the set of parameters under which democracy produces the same payoff as FD is non-generic when $x=x_2$.

□

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 CR and democracy, an MB board will undertake the project when the project generates private benefits. The MB 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 MB board uses 0-discretionary pay to extract the manager's project information and accept the project if and only if it has positive NPV. Note that such a policy is clearly feasible under a CR. Under shareholder democracy, however, the minimum suspicion condition may be violated. If there is systematic risk, i.e., $\theta>1/2$, x_2 is positively correlated with the likelihood of a positive NPV. Then, after a realized cash flow of x_2, project prospects are better on average than they are in state M alone. This implies when compensation is set at m, 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 MB. Thus, under democracy MB boards have an incentive to lower suspicion by rejecting the project when it generates no private benefits rather than screen the project.

Proposition 7. *Assume that the project has some systematic risk, i.e., $\theta > 1/2$. Then, in any shareholder democracy equilibrium in which discretionary pay is not offered to the manager after either cash flow, the expected payoff to shareholders is strictly lower than it would be under charter restrictions on discretionary compensation. Conditioned on the cash flow equaling x_2 the payoff is strictly lower. Conditioned on the cash flow equaling x_1, there exist equilibria in which the shareholder democracy payoff equals the CR payoff if and only if the following condition is satisfied:*

$$\left(\theta - \frac{1}{2}\right)\left(\frac{2(1-\mu)}{2(1-\mu)+1}\right) \leq \frac{\beta}{1-\beta}. \tag{38}$$

Proof of Proposition 7. Under charter restrictions the MB board accepts the project when the project generates private benefits and uses 0-revelation compensation when the project does not generate private benefits. Here, given that positive discretionary pay is ruled out under democracy by the outrage constraint (i.e., out-of-equilibrium beliefs are such that the posterior that board type is MB exceeds the outrage threshold when positive discretionary pay is observed), an MB board will always accept the project with 0 discretionary pay when there are private benefits. When there are no private benefits, an MB board that follows the same policy under shareholder democracy as under CR essentially randomizes between acceptance and rejection (the outcome depending on whether project NPV is positive or negative). In order for randomization at cash flow x_i to be possible in equilibrium (i.e., not to violate the minimal suspicion condition), it must be the case that acceptance and rejection generate the same level of suspicion, or posterior probability, that the board is MB, i.e.,

$$\mathbb{P}[\text{MB}|m, x_i, \mathbf{A}] = \mathbb{P}[\text{MB}|m, x_i, \mathbf{R}^-]. \tag{39}$$

(39) implies by Bayes rule that

$$\frac{\mathbb{P}[\mathbf{A}|\text{MB}, m, x_i]}{\mathbb{P}[\mathbf{A}|\text{SB}, m, x_i]} = \frac{\mathbb{P}[\mathbf{R}^-|\text{MB}, m, x_i]}{\mathbb{P}[\mathbf{R}^-|\text{SB}, m, x_i]}. \tag{40}$$

Because

$$\mathbb{P}[\mathbf{A}|\text{MB}, m, x_i] + \mathbb{P}[\mathbf{R}^-|\text{MB}, m, x_i] = 1 \tag{41}$$

(40) implies that

$$\frac{\mathbb{P}[\mathbf{A}|\text{MB}, m, x_i]}{\mathbb{P}[\mathbf{A}|\text{SB}, m, x_i]} = \frac{1 - \mathbb{P}[\mathbf{A}|\text{MB}, m, x_i]}{1 - \mathbb{P}[\mathbf{A}|\text{SB}, m, x_i]}. \tag{42}$$

(42) implies that

$$\mathbb{P}[\mathbf{A}|\text{MB}, m, x_i] = \mathbb{P}[\mathbf{A}|\text{SB}, m, x_i]. \tag{43}$$

For the SB board, which pays m compensation only in state m, the conditional probability

in (43) is given by

$$\mathbb{P}[\mathbf{A}|\text{SB},m,x_i] = \sigma^i_{\text{SB}}\beta + \frac{1}{2}(1-\beta) \tag{44}$$

where σ_{SB} is the probability that, in state M, after paying m-compensation and cash flow x_i being realized, the SB board accepts the project when it generates private benefits. Note that, because the expected NPV of the project is 0, and because the revelation mechanism is ruled out by the outrage constraint, randomization is consistent with shareholder value maximization. If the MB board is following the shareholder value maximizing policy when the project does not have private benefits, and accepting when the project generates private benefits, the corresponding conditional probability for the management-oriented board in (43) is given by

$$\mathbb{P}[\mathbf{A}|\text{MB},m,x_i] = \beta + \mathbb{P}[\text{+NPV}|x_i,m,MB](1-\beta) \tag{45}$$

where,

$$\mathbb{P}[\text{+NPV}|x_i,m,MB] = \begin{cases} (1-\theta)\,\mathbb{P}[\text{B}|x_1,m,MB] + \frac{1}{2}\,(1-\mathbb{P}[\text{B}|x_1,m,MB]) & \text{if } i=1 \\ \theta\,\mathbb{P}[\text{G}|x_2,m,MB] + \frac{1}{2}\,(1-\mathbb{P}[\text{G}|x_2,m,MB]) & \text{if } i=2 \end{cases} \tag{46}$$

Thus, if $\theta > 1/2$

$$\mathbb{P}[\text{+NPV}|x_1,m,MB] < \frac{1}{2} < \mathbb{P}[\text{+NPV}|x_2,m,MB] \tag{47}$$

(45) and (47) imply that if the manager oriented board follows the shareholder maximizing policy when the manager does not have private benefits, as it does under charter restrictions, then

$$\mathbb{P}[\mathbf{A}|\text{MB},m,x_2] > \mathbb{P}[\mathbf{A}|\text{SB},m,x_2] \tag{48}$$

which violates (43). Thus, when $x = x_2$, implementing the shareholder maximizing policy when the project does not have private benefits violates minimal suspicion. Because the MB board constrained from paying positive discretionary compensation follows the same policy under charter restrictions as under democracy when the project generates private benefits, we see that, conditional on $x = x_2$, shareholder payoff is lower when the outrage constraint blocks positive discretionary pay under shareholder democracy, compared to charter constraints that disallow discretionary pay.

Now consider $x = x_1$. In this case, if $\sigma^1_{\text{SB}} = 1$, then

$$\mathbb{P}[\mathbf{A}|\text{MB},m,x_1] < \mathbb{P}[\mathbf{A}|\text{SB},m,x_1]. \tag{49}$$

Because the conditional probability on the right-hand side of (44) is continuous in σ^1_{SB}, the intermediate value theorem implies that a necessary and sufficient condition for the existence

of ${\sigma^1_{\rm SB}}^* \in [0,1]$ such that

$$\mathbb{P}[\mathbf{A}|\text{MB},m,x_1] = \mathbb{P}[\mathbf{A}|\text{SB},m,x_1] \tag{50}$$

is for $\mathbb{P}[\mathbf{A}|\text{SB},m,x_1]$ to be less than $\mathbb{P}[\mathbf{A}|\text{MB},m,x_1]$ when $\sigma^1_{\rm SB} = 0$. Thus, for shareholder democracy equilibrium in which outrage blocks discretionary compensation to produce an equal payoff to shareholders as CR, it must be the case that

$$\left(\frac{1}{2} - \mathbb{P}[\text{+NPV}|x_1 m, MB]\right)(1-\beta) \leq \beta. \tag{51}$$

Because,

$$\mathbb{P}[\text{+NPV}|x_1,m,MB] = (1-\theta)\frac{2(1-\mu)}{2(1-\mu)+1} + \frac{1}{2}\frac{1}{2(1-\mu)+1} \tag{52}$$

the result follows. □

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, MB boards will either overinvest or invest at the optimal level, while democracy-constrained boards will sometimes overinvest and sometimes underinvest. Thus, despite the fact that managers weakly prefer higher levels of investment and charter restrictions lead to overinvestment, 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.

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. 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 added incentives 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. State-contingent charter rules that are difficult to change can be very costly since the optimality of these rules depend heavily on the underlying firm environment. When the environment changes, the rules are no longer optimal.

In contrast, under democracy, shareholder posteriors regarding board conduct will reflect all public information, including information that cannot be incorporated into the charter. In some cases such information will be fairly informative regarding the reasonableness of a given

compensation decision. Manager controlled boards, realizing that shareholder outrage will be very high if excess compensation is paid under some 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 the overall economic climate correlates with the specific prospects of the firm's investment projects, i.e. the systemic risk of corporate investment policies. This argument results in the following corollary.

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

3.4 Example Where Democracy is Best

Since by assumption, neither a charter restrictions on discretionary pay nor delegation can be made contingent on cash flows, the possibility exists that democracy can produce a higher payoff to shareholders if the restrictions imposed by outrage vary with cash flows. In this case, the losses from democratic distortion of policy may be less than the gains from incorporating state information into the the restrictions on discretionary compensation. Below, we develop a democratic equilibrium which produces higher shareholder welfare than either charter restrictions or FD. In the example, the probability that the manager earns private benefits from the project, $\beta = 5/11$, $\mu = 0$, and $\delta_0 = 1/9$, $n = 1$, $\theta = 5/8$, and $P = 4/7$. The outrage threshold, $\bar{\delta} > 3/11$. The following set of strategies constitutes an equilibrium under shareholder democracy.

- Manager Strategy: Uses the benevolent best response.
- Board Strategy:
  - If the board is SB:
    - 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 realized cash flow is x_2, and the the project generates managerial private benefits, offer discretionary compensation of P. If the realized cash flow is x_1 and project generates managerial private benefits, then if the state is B reject the project, if the state is M accept the project with probability 9/10. If the project does not generate private benefits, offer discretionary compensation of 0.
  - If the board is MB

∗ At date 0, set compensation to m-compensation in all states of the firm.

∗ At date 1, if the project generates private benefits, accept the project and do not offer discretionary compensation. If the project does not generate private benefits and the realized cash flow is x_2, then offer discretionary compensation of P. If the project does not generate private benefits and the realized cash flow is x_1, then offer zero discretionary compensation.

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

$$\hat{\delta}(g \text{ or } b, x_1, \mathbf{R}^+) = 1 \quad \hat{\delta}(g \text{ or } b, x_2, \mathbf{R}^+) = 0 \tag{53}$$

$$\hat{\delta}(g \text{ or } b, x_1, \mathbf{A}) = 0 \quad \hat{\delta}(g \text{ or } b, , x_2, \mathbf{A}) = 0 \tag{54}$$

$$\hat{\delta}(g \text{ or } b, x_1, \mathbf{R}^-) = 0 \quad \hat{\delta}(g \text{ or } b, x_2, \mathbf{R}^-) = 0 \tag{55}$$

$$\hat{\delta}(m, x_1, \mathbf{R}^+) = 1 \quad \hat{\delta}(m, x_2, \mathbf{R}^+) = 3/13 \tag{56}$$

$$\hat{\delta}(m, x_1, \mathbf{A}) = 3/11 \quad \hat{\delta}(m, x_2, \mathbf{A}) = 5/49 \tag{57}$$

$$\hat{\delta}(m, x_1, \mathbf{R}^-) = 3/11 \quad \hat{\delta}(m, x_2, \mathbf{R}^-) = 0 \tag{58}$$

To verify that these strategies and beliefs constitute an equilibrium, first note that outrage blocks positive discretionary compensation if and only if the realized cash flow equals x_1. In this case, investing in the project without revelation of its NPV through discretionary compensation is 0 NPV in state M, and negative NPV in state B. Thus, when the cash flow equals x_1 and outrage blocks positive discretionary compensation, the SB's policy of randomizing in state M and rejecting in state B maximizes shareholder welfare given the outrage constraint. As both accepting and rejecting the project produce the same shareholder welfare in state M, minimal suspicion requires that if both policies are adopted, each generates the same suspicion. An inspection of $\hat{\delta}$ shows this to be the case. When the realized cash flow is x_2, the unique best response for the SB board if there are managerial private benefits is to offer P-discretionary compensation, while if there are no managerial private benefits, the unique best response is to offer 0-discretionary compensation to extract the manager's private information. In both situations, the project is accepted if and only if it has positive NPV, and outrage constraints are not violated.

Now consider the MB board. When the realized cash flow is x_1, outrage blocks P-discretionary compensation. Amongst the outrage feasible policies, acceptance maximizes managerial welfare when the project generates private benefits, while the manager is indifferent between acceptance and rejection when the project does not generate private benefits. Both acceptance and rejection generate the same level of suspicion, and thus when the project does not generate private benefits, the MB board's policy is a minimal suspicion best response. When the realized cash flow is x_2, P- discretionary compensation is not blocked by outrage. When the

project generates private benefits, the manager is indifferent between receiving such compensation and accepting the project. Accepting the project generates less outrage. Thus, the MB board's policy of accepting the project without offering P-discretionary compensation when the project generates private benefits is a minimal suspicion best response. When the project does not generate private benefits, the only policy that maximizes managerial welfare is the payment of discretionary compensation and attendant rejection of the project. This is the policy that is adopted by the MB board and it does not violate the outrage constraint. Thus, the policy is a minimal suspicion best response.

Thus, all the board and manager strategies are best responses given the suspicion levels. It is easy to verify with simple algebra that the levels of suspicion specified in the equilibrium are consistent with Bayes rule wherever it can be applied.

Why does democracy produce higher welfare here than both charter restriction and delegation? Consider first democracy versus CR. When the realized cash flow is x_1, there is no additional distortion due to democracy. However, when the realized cash flow is x_2, democracy allows the use of discretionary pay. This makes it possible for the positive NPV project to be accepted and the negative NPV project to be rejected by the SB board when there are managerial private benefits. This is the benefit of democracy relative to CR. On the other hand, when there are no private benefits, the MB board now under democracy offers discretionary compensation and the project is rejected even when it is positive NPV. This is the cost of democracy relative to CR. Clearly, democracy improves shareholder payoff if the likelihood of managerial private benefits is sufficiently high, i.e. there exists β_{CR} such that democracy is better for $\beta \geq \beta_{CR}$.

Next, consider democracy versus FD. If the cash flow is x_1, and there are managerial private benefits, democracy blocks the use of discretionary pay, which is a cost of democracy relative to FD. On the other hand, when the board is MB and there are no managerial private benefits, FD leads to a distortion since P-discretionary pay is offered and the project rejected. This is prevented under democracy when the cash flow is x_1, and the project is accepted with 0-discretionary pay if and only if it has positive NPV. There is an additional cost of democracy relative to FD when the cash flow is x_2 and there are managerial private benefits, since the MB board to minimize suspicion, accepts the project. Thus, it is clear that democracy will increase the payoff to shareholders relative to FD if the likelihood of managerial private benefits is sufficiently small, i.e. there exists β_{FD} such that democracy is better if $\beta \leq \beta_{FD}$.

Whether or not democracy can dominate both CR and FD thus depends on whether $\beta_{CR} < \beta_{FD}$. Our example provides a set of parameter values for which this is the case. Figure 1 shows that the interval $[\beta_{CR}, \beta_{FD}]$, ceteris paribus, becomes smaller as μ increases, and eventually vanishes.

To understand why higher μ erodes the advantage of democracy, note that the benefit of democracy relative to CR is lower the higher is the likelihood of a positive NPV project con-

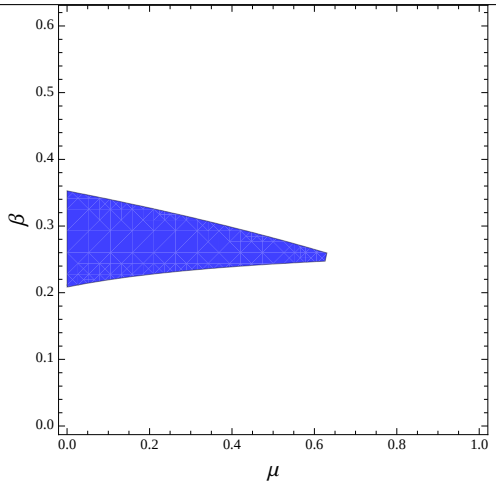

Figure 1: Region in which a democratic equilibrium produces higher shareholder welfare than charter restrictions or FD. In the figure, β and μ are varied while the other parameters of the model are set as follows: $\delta = 0.05$, $\theta = 0.63$, $n = 1$ and $P = 4/7$.

ditional on x_2. This is because (a) under CR when there are managerial benefits, the project is always accepted, whereas under democracy, the SB board uses P-discretionary pay, and (b) under democracy, the project is always rejected when the board is MB and there are no managerial private benefits. Thus, the advantage of democracy is less if θ is higher or if μ is higher (conditional on x_2, a higher μ shifts the weight from state M – where θ is essentially $1/2$ – to state G, where θ exceeds $1/2$). Therefore, as μ increases, democracy can remain as good as CR only if the cut-off value β_{CR} increases, i.e., $\beta_{CR}(\mu)$ is increasing in μ. Consider now democracy versus FD. If there are managerial private benefits, the advantage of democracy over FD in cash flow state x_1 is lower if θ is lower or μ is higher. However, the opposite is the case if there are no managerial private benefits. If β_{FD} is sufficiently high, the former effect dominates at $\beta = \beta_{FD}$. In addition, a higher μ makes x_2 more likely and further disadvantages democracy relative to FD, since under democracy when cash flow is x_2 and there are managerial private benefits, the project is always accepted. As a result, democracy remains as good as FD only if the cut-off value β_{FD} decreases as μ increases, i.e., $\beta_{FD}(\mu)$ decreases in μ. Since $\beta_{CR}(\mu)$ increases and $\beta_{FD}(\mu)$ decreases in μ, the feasible region shrinks as μ increases, and eventually disappears in our example.

4 Conclusion

In this paper, we consider the efficacy of alternative governance regimes in shaping compensation policy in an environment in which shareholders are unsure of the loyalty of their boards. The conventional board-centric governance style that characterizes US corporations and dele-

gates discretion to the board can be shareholder wealth maximizing in a wide range of circumstances and under relatively mild constraints on the actions of the board. Shareholder voice in the form of charter amendments that prohibit certain types of discretionary compensation can sometimes be optimal. Interestingly, such restrictions will be preferred to delegation precisely when the scope for managerial private benefits from investment is low. Shareholder democracy, i.e. shareholder outrage that leaves boards vulnerable to sanctions for compensation or investment policies that cause suspicion, can distort investment and decrease shareholder wealth even when shareholders' inferences about board type are rationally formed. The distortions occur both because shareholder-oriented boards cannot use compensation policies that are optimal but are deemed suspicious because manager-oriented boards can misuse these, and also because manager-oriented boards have an incentive to mask suspicious compensation policy by distorting operating policy.

One advantage of shareholder democracy over delegation or charter amendments is that, under democracy, more state-information can be built into shareholder responses to management policy. As a result, especially when the firm's economic prospects are poor, we do find situations in which shareholder democracy can increase shareholder payoff. However, the conditions for this to happen appear to be fairly tight, and the advantage of shareholder democracy diminishes rapidly as the firm's economic prospects improve.

Several directions for extending the analysis are promising. One direction is to consider the effect of our assumption that the board knows whether management 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 manager-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 manager-oriented boards, and indirectly the constraints on shareholder-oriented boards through its effect of changed manager-oriented board behavior on shareholder posteriors and thus outrage.

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Appendix

Proof of Proposition 5

Proof. (i) Consider first an SB 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 SB board under the FD governance regime.

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

Simplifying, we have

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

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,

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

Simplifying, we have

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

Pay-performance sensitivity is given by

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

For the SB board under the FD regime, the above calculations show that

$$\sigma_{FD}^{SB} = \frac{(1/2)}{(1/2)+\mu}\frac{m}{x_2-x_1}+\frac{\mu}{(1/2)+\mu}\frac{g}{x_2-x_1} \tag{59}$$

$$+\frac{\beta P}{x_2-x_1}(\frac{1}{2}-\theta)\frac{\mu/2+(1-\mu)/2+2\mu(1-\mu)}{((1/2)+\mu)((1/2)+1-\mu)}. \tag{60}$$

It follows also that for an SB board in a CR regime, since there is no discretionary pay, the pay-performance sensitivity is obtained by setting $P=0$ 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 an MB board. In a CR 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 FD 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

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

Similarly,

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

It is easily checked that

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

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

Posterior Odds for Example 1.

The parameter assumptions are: $\mu = 0.5$, $\beta = 0.5$. We have:

$$\begin{aligned}
\widehat{\delta}(m,x_1,R^+) &= \frac{\mathbb{P}.[m,x_1|MB]\mathbb{P}.[R^+|m,x_1,MB]\mathbb{P}.[MB]}{\mathbb{P}.[m,x_1|MB]\mathbb{P}.[R^+|m,x_1,MB]\mathbb{P}.[MB]+\mathbb{P}.[m,x_1|SB]\mathbb{P}.[R^+|m,x_1,SB]\mathbb{P}.[SB]} \\
&= \frac{(\frac{1-\mu}{2}+\frac{1}{4})(1-\beta)(1/2)}{(\frac{1-\mu}{2}+\frac{1}{4})(1-\beta)(1/2)+(1/4)(\beta/2)(1/2)} = 4/5
\end{aligned}$$

Similarly,

$$\begin{aligned}
\widehat{\delta}(m,x_2,R^+) &= \frac{\mathbb{P}.[m,x_2|MB]\mathbb{P}.[R^+|m,x_2,MB]\mathbb{P}.[MB]}{\mathbb{P}.[m,x_2|MB]\mathbb{P}.[R^+|m,x_2,MB]\mathbb{P}.[MB]+\mathbb{P}.[m,x_2|SB]\mathbb{P}.[R^+|m,x_2,SB]\mathbb{P}.[SB]} \\
&= \frac{(\frac{1}{4}+\frac{\mu}{2})(1-\beta)(1/2)}{(\frac{1}{4}+\frac{\mu}{2})(1-\beta)(1/2)+(1/4)(\beta/2)(1/2)} = 4/5
\end{aligned}$$

Also,

$$\begin{aligned}
\widehat{\delta}(m,x_1,A) &= \frac{\mathbb{P}[m,x_1|MB].\mathbb{P}[A|m,x_1,MB].\mathbb{P}[MB]}{\mathbb{P}[m,x_1|MB].\mathbb{P}[A|m,x_1,MB].\mathbb{P}[MB]+\mathbb{P}[m,x_1|SB].\mathbb{P}[A|m,x_1,SB].\mathbb{P}[SB]} \\
&= \frac{(\frac{1-\mu}{2}+\frac{1}{4})\beta(1/2)}{(\frac{1-\mu}{2}+\frac{1}{4})\beta(1/2)+(1/4)(1/2)(1/2)} = 2/3
\end{aligned}$$

Similarly

$$\begin{aligned}
\widehat{\delta}(m,x_2,A) &= \frac{\mathbb{P}[m,x_2|MB].\mathbb{P}[A|m,x_2,MB].\mathbb{P}[MB]}{\mathbb{P}[m,x_2|MB].\mathbb{P}[A|m,x_2,MB].\mathbb{P}[MB]+\mathbb{P}[m,x_2|SB].\mathbb{P}[A|m,x_2,SB].\mathbb{P}[SB]} \\
&= \frac{(\frac{1}{4}+\frac{\mu}{2})\beta(1/2)}{(\frac{1}{4}+\frac{\mu}{2})\beta(1/2)+(1/4)(1/2)(1/2)} = 2/3
\end{aligned}$$