The Effects of Litigation Risk on Board Oversight and CEO Incentive Pay*

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January 2009

*I thank Andres Almazan, Bernard Black, Bill Kinney, Christian Laux, Brian Mittendorf, Paul Newman, and participants at the Accounting and Finance Mini-Conference at the University of Texas for their helpful comments.

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Abstract: Various commentators have praised the WorldCom and Enron settlements for holding outside directors personally liable, arguing that heightened director liability will induce greater board oversight. This paper shows that the connection between director liability and board behavior is more subtle, because directors have multiple means to respond to an increase in liability exposure: They can increase oversight to prevent accounting manipulation and/or reduce performance-based CEO pay to mitigate the CEO's ex ante incentive to engage in manipulation. These two decisions are interrelated, implying that the effects of director liability on board oversight and CEO incentive pay are ambiguous. In particular, the model predicts that, for firms in which board oversight is difficult and costly (e.g., large firms with complex business operations), a stricter legal environment for directors leads to a lower level of board oversight, lower CEO incentive pay, and lower shareholder value.

Keywords: Corporate Governance, Director Liability, Board Oversight, CEO Incentive Pay, Earnings Management

1 Introduction

In recent years, especially after the scandals involving Enron and WorldCom, personal liability has become an increasing concern for outside directors of public companies in the U.S. Traditionally, the out-of-pocket liability risk for outside directors has been small due to D&O insurance and indemnification (Black et al. (2006a, 2006b)). The Enron and WorldCom settlements however changed the rules of the game because the lead plaintiffs insisted on personal payments by the outside directors as a condition of settlement, and there is concern that future plaintiffs will follow their example (Bebchuk et al. (2006)). The Sarbanes-Oxley Act of 2002 (SOX) adds to these concerns because it imposes additional duties on directors and increases the SEC's power to seek civil penalties and to bar individuals from serving as officers or directors.[1] Apart from potential financial penalties, litigation entails other costs for directors such as loss of reputation and the emotional burden, time, and aggravation associated with being a defendant in a lawsuit.[2] If the current regulatory climate and public pressure for scrutiny has created a heightened risk of legal action against directors, the question is how will this shift in the legal environment affect board behavior and corporate governance?

[1] See, e.g., Morrison and Foerster (2003). See also Sale (2006), who argues that recent SEC statements indicate that the SEC intends to increase enforcement efforts against negligent outside directors.

[2] In a symposium on director liability, Bebchuk et al. (2006) note that "Most (directors)..., frankly, don't want to have their name in the caption of the lawsuit. They don't want to have to establish that they didn't do anything wrong. They don't want to have to be deposed and spend their time dealing with the litigation. Life is too short. People are busy; they have other things to do." See also Srinivasan (2005) for the consequences of financial reporting failures on outside directors' reputation costs.

To study this question, I consider a firm where the board of directors is responsible for two tasks: setting the level of performance-based pay for the CEO and overseeing the firm's financial reporting process. These two tasks are interrelated because providing the CEO with strong incentives to engage in productive activities simultaneously encourages the CEO to manipulate the firm's accounting numbers (such as the earnings report) on which his compensation is based (Feltham and Xie (1994)). Earnings manipulation creates a risk for the CEO and the board of directors because it potentially triggers litigation against both parties.

There are two ways for the board of directors to reduce its litigation exposure: It can devote greater effort to overseeing the financial reporting process, which helps to prevent earnings manipulation, or it can decrease the link between CEO pay and performance, which reduces the CEO's ex ante incentive to engage in manipulation. The model shows that the board will generally underexploit the first risk avoidance strategy and overexploit the second. That is, both the level of oversight and the level of CEO incentive pay are lower than the levels desired by shareholders. While the underprovision of board oversight is due to a standard moral hazard problem, the underprovision of CEO incentives is due to the directors' exposure to litigation. Since the board owns only a relatively small fraction of the firm's shares, directors tend to care more about their personal cost of litigation than about shareholder value, rendering them unwilling to provide the CEO with strong incentives.

Various commentators have praised the WorldCom and Enron settlements for making directors personally liable, arguing that heightened accountability will induce directors to do a better job of monitoring financial reporting (e.g., Morgenson (2005) and Francis (2005)). However, the connection between director liability and board oversight is more subtle than conventional views suggest. This arises because the

board's optimal decisions regarding monitoring and CEO incentive pay are not independent from each other. Keeping all else equal, an increase in director liability not only induces the board to be a more vigilant overseer but also makes it optimal for the board to reduce the link between CEO pay and performance. By doing so, the board weakens the CEO's incentive to engage in manipulation and hence the potential for subsequent litigation. This reduction in CEO incentive pay, in turn, affects the board's optimal choice of oversight. Intuitively, if the CEO has weaker incentives to manipulate, there is less need for monitoring. This indirect effect on monitoring can be strong enough to overcome the direct effect, resulting in a decline in oversight. Hence, increasing the threat of director liability does not necessarily result in greater oversight, as usually argued, but can actually lead to a reduction in board oversight.

The connection between director liability and the level of CEO incentive pay is also ambiguous in equilibrium. While stricter liability directly induces the board to cut back on CEO incentive pay, there is an additional indirect effect that works in the opposite direction. This indirect effect arises because, keeping all else equal, an increase in director liability induces the board to be a more vigilant overseer. Greater oversight effort, in turn, reduces the probability of litigation and hence increases the board's willingness to provide strong incentives to the CEO. Depending on which effect is more powerful, the pay-performance sensitivity of CEO compensation can increase or decrease with a change in director liability.

The model generates a number of new empirical implications. In particular, the model predicts that in firms in which the marginal cost of monitoring is relatively high (e.g., large firms with complex business operations), a shift to a more severe legal environment for directors is associated with a reduction in the equilibrium levels of oversight, pay-performance sensitivity, and shareholder value. The opposite predic-

tion holds for firms in which the marginal cost of monitoring is relatively low. These results imply that any attempts to increase board oversight and shareholder value by strengthening the threat of director liability will only work in firms where the level of monitoring is already high, but will be counterproductive in firms where oversight is already a concern. The reason for this result is that in firms in which oversight is difficult and costly, the board tends to (directly) respond to an increase in legal liability mainly by lowering the level of CEO incentive pay rather than spending more time on oversight. Although this kind of risk avoidance is beneficial for directors, it involves a substantial cost to shareholders because it leaves the CEO with insufficient effort incentives.

I also discuss the equilibrium effects of a change in the CEO's personal liability for manipulation and show that a *decline* in CEO liability has effects on board behavior very similar to those of an increase in director liability. This arises because the board's decisions regarding the levels of monitoring and CEO incentive pay are mainly driven by its concern for litigation, and this concern is stronger if the legal penalties for the directors are higher and/or the legal penalties for the CEO are lower.

Studies that examine the effects of changes in director liability on the directors' incentive to be attentive monitors are mainly informal (e.g., Black et al. (2004, 2006b)). The current paper extends this research by providing a model that analyzes the board's equilibrium level of oversight in a setting where the board has multiple ways to respond to a change in liability exposure.

Formal studies on boards of directors focus mainly on the effects of board characteristics, such as board independence, on corporate decisions, such as CEO turnover, project choice, and CEO incentive pay (Hermalin and Weisbach (1998), Almazan and Suarez (2003), Hermalin (2005), Adams and Ferreira (2007)). My paper contributes

to this literature by studying the effects of a change in director liability on the board's incentive to oversee financial reporting and its willingness to offer the CEO powerful incentive schemes.

The paper is also related to the literature on earnings management (Fischer and Verrecchia (2000), Ewert and Wagenhofer (2005), Goldman and Slezak (2006)). Goldman and Slezak (2006) study a setting where linking CEO pay to performance creates incentives for earnings manipulation and examine how a change in the CEO's penalties for fraudulent behavior affects the optimal incentive contract. In contrast, the focus of the current paper is on the board's role as an overseer and the equilibrium effects of a change in director liability on corporate governance.

The paper proceeds as follows. Section 2 outlines the model. Section 3 derives the board's optimal decisions regarding CEO incentive pay and board oversight. In Section 4 and 5, I examine the effects of a change in the directors' and the CEO's legal environment on board behavior and shareholder value. Section 6 discusses potential effects of regulatory changes, and Section 7 concludes. I provide all proofs in the Appendix.

2 The Model

The setting contains three risk-neutral players: shareholders, the board of directors, and the CEO. In the beginning of the game, shareholders hire a CEO to run the firm and employ a board of directors to oversee financial reporting and set CEO compensation.

The CEO is qualified to deliver productive effort, denoted $a_1 \in \Re^+$, that affects the value of the firm. In particular, the firm's terminal cash flow is given by $V = va_1 + \eta$,

where η is distributed over $\Re^+$, with mean μ.

Following Feltham and Xie (1994), I assume that the realization of V is not observed until the contract with the CEO is terminated.[3] The CEO's pay is therefore linked to an interim earnings report, denoted R. If the CEO does not engage in manipulation, the earnings report is a perfect signal of final cash flows, $R = V$. I consider a simple pay scheme for the CEO that is linear in the earnings report, $w_C + bR$, where w_C is a fixed salary and b is the pay-performance sensitivity of the CEO's compensation scheme. Further, I assume that payments to the CEO must be non-negative, i.e., $w_C \geq 0$, $b \geq 0$.

The CEO is able to engage in earnings management activities that artificially inflate the earnings report. The earnings management activity is binary and denoted by $a_2 \in \{0, 1\}$, where $a_2 = 1$ denotes the case when the CEO engages in manipulation.

The board of directors is responsible for overseeing the financial reporting process to prevent earnings manipulation. The board is able to counteract manipulation attempts, for example, by preparing for meetings with management, asking probing questions, and engaging in vigorous debate. The level of board oversight is denoted by $e \in [0, 1]$ and determines the probability with which the board successfully prevents manipulation. Put differently, given the board's monitoring choice, e, any manipulation attempt by the CEO is unsuccessful with probability e and successful with probability $(1 - e)$.

The realization of the earnings report depends on the terminal cash flow V, the CEO's manipulation choice, and the board's monitoring effort and is given by $R = V + m(1 - e)a_2$. The factor $m > 0$ represents the impact of successful manipulation

[3] See also Fischer and Verrecchia (2000) and Ewert and Wagenhofer (2005) for similar assumptions.

on the earnings report. In order to guarantee a concave optimization problem and to focus on interior solutions for b ($0 < b < 1$), I assume that manipulation has a relatively low impact on the report relative to productive effort, i.e., m is relatively small compared to v. All activities, a_1, a_2, and e, are unobservable.

If the CEO successfully manipulates the earnings report, which occurs with probability $(1 - e)a_2$, directors and the CEO face a positive risk of litigation. In this case, the expected legal penalties imposed on the CEO and the board are denoted by $L_C = \theta P_C$ and $L_B = \theta P_B$, respectively. The parameter $\theta \in [0, 1]$ represents the CEO's ability to manipulate the accounting system without attracting attention from potential plaintiffs. The higher his ability (i.e., the lower θ), the lower is the likelihood that manipulation triggers litigation. I assume that θ is the CEO's private information, and it is commonly known that θ is uniformly distributed over the interval $[0, 1]$. As shown below, this assumption implies that the CEO will find it optimal to engage in manipulation if and only if the realization of θ is below a certain threshold, denoted θ_T. Hence, the threshold θ_T can be interpreted as the a priori probability that the CEO attempts to manipulate the performance measure. The parameters P_C and P_B are the legal penalties imposed upon the CEO and the directors in case of litigation and represent the strictness of the legal environment for both parties.

The shareholders' goal is to maximize the value of the firm, which equals cash flows net of compensation for the CEO and the board,

$$V^{net} = V - (w_C + bR) - w_B. \tag{1}$$

The term in brackets in equation (1) is the pay to the CEO, and w_B is a fixed payment to the board of directors.

The goal of the CEO is to maximize his compensation minus the cost of effort and

litigation,

$$U_C = (w_C + bR) - 0.5ca_1^2 - (1-e)a_2 L_C, \tag{2}$$

where $0.5ca_1^2$ is the personal cost of productive effort. The CEO's reservation utility is normalized to zero. Since payments to the CEO must be non-negative (and since effort and litigation cost can be avoided by choosing $a_1 = a_2 = 0$), the CEO's participation constraint is always slack and can be ignored.

Following Hermalin and Weisbach (1998), I assume that the preferences of individual directors can be aggregated so that directors act as if they were a single player. The utility of the board is an increasing function of firm value and can be stated as

$$U_B = \beta V^{net} + w_B - (1-e)a_2 L_B - 0.5ke^2, \tag{3}$$

where $0.5ke^2$ is the personal cost of monitoring, with k sufficiently high to induce interior solutions ($e < 1$). The weight β placed on firm value is exogenously given and depends on the board's long-term stake in the firm. In order to make sure that directors are willing to serve on the board, they must obtain a retainer, w_B, that compensates them for the equilibrium costs of monitoring and litigation; that is, $w_B = (1-e)a_2 L_B + 0.5ke^2$.[4]

The timing of events is as follows:

Stage 1: Directors obtain a salary, w_B, for their services on the board.

Stage 2: The board sets the parameters of the pay scheme for the CEO (w_C, b).

[4]Note that I have implicitly assumed here that directors are holding a share of β in the firm independent of whether or not they serve on the board. However, if the board's preference for firm value stems from private benefits of control that are only available to board members, then directors are willing to sit on the board for $w_B = -\beta V^{net} + (1-e)a_2 L_B + 0.5ke^2$. Using this participation constraint instead would not change the qualitative results of the paper.

Stage 3: The CEO privately learns the realization of θ and makes his effort and manipulation choices. At the same time, the board chooses the monitoring intensity, e.

Stage 4: The CEO is compensated based on the realization of the earnings report, R.

Stage 5: If the report is manipulated, the CEO and directors face litigation costs of L_C and L_B, respectively.

3 Results

I start the analysis by determining the CEO's and the board's unobservable action choices in stage 3, contingent on the pay-performance sensitivity, b. The CEO's optimal strategy is to engage in a manipulation attempt, $a_2 = 1$, whenever the increase in CEO compensation associated with manipulation exceeds the CEO's expected cost of litigation, $b\,(1-e)\,m > (1-e)\theta P_C$.[5] Since the expected litigation cost depends

[5]Note that the CEO's manipulation choice is not affected by the equilibrium level of monitoring. This follows because the board does not explicitly punish the CEO for any manipulation attempt. Intuitively, by asking the right questions at the right time the board is able to prevent potential manipulation but cannot observe and verify whether or not the CEO has indeed attempted to manipulate. However, if one assumes that the board is able to observe and punish manipulation attempts, the CEO's choice of θ_T would be a decreasing function of the equilibrium level of oversight. In this case, since the board's equilibrium choice of e increases with b, the board would find it optimal to indirectly commit to a higher equilibrium level of oversight by choosing a higher pay-performance sensitivity (see Laux and Laux (2009) for a paper that studies this indirect commitment effect). The introduction of this indirect commitment effect would substantially complicate the analysis of the current model without adding any new insights regarding the effects of legal liability on board behavior.

on the realization of θ, there exists a threshold, denoted θ_T, such that the CEO engages in manipulation if and only if θ is smaller than θ_T. Hence, θ_T represents the a priori probability that the CEO will attempt to manipulate the performance measure. Given this manipulation strategy, the CEO's expected ex ante utility can be written as

$$E\left[U_C\right] = w_C + b\left(va_1 + \int_0^{\theta_T} m(1-e)d\theta + \mu\right) - 0.5ca_1^2 - \int_0^{\theta_T}(1-e)\theta P_C d\theta.$$

The first-order conditions for the optimal choices of a_1 and θ_T are

$$a_1 = b \cdot v/c, \tag{4}$$

$$\theta_T = b \cdot m/P_C. \tag{5}$$

A higher pay-performance sensitivity, b, not only induces the CEO to work harder on the productive task but also increases his incentive to manipulate the earnings report. Hence, the higher b, the higher is the probability that the CEO engages in a manipulation attempt. In addition, if the CEO's legal penalty for manipulation, P_C, increases, the CEO's incentive to manipulate declines. I assume that the parameter m is sufficiently small and/or the penalty P_C sufficiently large to ensure an interior solution ($\theta_T < 1$).

At the same time, the board of directors chooses the monitoring intensity that maximizes its expected utility:

$$\max_e E[U_B] = \beta\left(va_1 + \mu - b\left(va_1 + \int_0^{\theta_T} m(1-e)d\theta + \mu\right) - w_C - w_B\right)$$
$$+w_B - \int_0^{\theta_T}(1-e)\theta P_B d\theta - 0.5ke^2.$$

The first-order condition for an optimal choice of e is given by

$$e = 1/k \cdot \left(\beta bm\theta_T + 0.5\theta_T^2 P_B\right). \tag{6}$$

A higher level of board oversight reduces the CEO's ability to artificially inflate his compensation, and hence has a positive effect on firm value. For this reason, directors have a greater incentive to carefully oversee the financial reporting process if they have a larger ownership in the firm (β is larger). Monitoring not only has a positive effect on firm value but also reduces the potential for subsequent litigation against the board. Thus, keeping all else equal, higher potential director penalties, P_B, increase the board's incentive to engage in oversight.

For any given levels of P_B and b, the level of monitoring desired by shareholders, denoted e^S, is obtained by substituting $\beta = 1$ into (6). Note that e^S increases with P_B because the shareholders have to compensate the board for the expected cost of litigation in stage 1. For $\beta < 1$, shareholders face a standard moral hazard problem in the sense that the board delivers oversight that is lower than the desired level, $e^* < e^S$.

Proposition 1 *For $\beta < 1$, the board underinvests in monitoring from the shareholders' perspective, that is, $e^* < e^S$.*

In stage 2, the board of directors chooses the parameters of the CEO's pay scheme (w_C, b). Since CEO pay is required to be nonnegative, it is optimal to set $w_C = 0$. To find the optimal pay-performance sensitivity the board solves

$$\begin{aligned} &\max_b \beta \left(va_1 + \mu - b \left(va_1 + \int_0^{\theta_T} m(1-e)d\theta + \mu \right) - w_B \right) \\ &+w_B - \int_0^{\theta_T} (1-e)\theta P_B d\theta - 0.5ke^2, \end{aligned} \tag{7}$$

subject to the incentive constraints (4), (5), and (6).

The first-order condition for an optimal choice of b is given by

$$\beta \left[\frac{v^2}{c}(1-2b) - 2(1-e)m\theta_T - \mu \right] - \left[(1-e)\theta_T P_B \frac{m}{P_C} \right] = 0, \tag{8}$$

where e and θ_T satisfy (6) and (5). The first term in square brackets in (8) captures the effects of an increase in b on firm value. An increase in b induces higher managerial effort but also leaves the CEO with a higher compensation. Note that CEO compensation not only directly increases with b (since w_C stays zero) but also indirectly because the CEO has a stronger incentive to manipulate the report if b is larger. The board weights these effects on firm value with β. The second term in square brackets in (8) is the effect of a change in b on the board's expected cost of litigation.

For any given levels of e and P_B, shareholders' optimal pay-performance sensitivity, denoted b^S, can be found by substituting $\beta = 1$ into (8). The problem here is that for $\beta < 1$ directors are more concerned about their personal cost of litigation than about shareholder value. As a result, in an effort to reduce litigation exposure, the board chooses a pay-performance sensitivity that is too low from the perspective of shareholders, $b^* < b^S$. It is important to note that the conflict of interest regarding the choice of b is not solely a result of $\beta < 1$. Rather, the conflict of interest is created through the imposition of legal sanctions against directors. If directors do not face liability risk, $P_B = 0$, the second term in square brackets disappears, implying that the board finds it optimal to choose $b^* = b^S$, regardless of the level of β.

Proposition 2 *For $\beta < 1$ and $P_B > 0$, the board chooses a pay-performance sensitivity that is too low from the perspective of shareholders, $b^* < b^S$.*

4 The Effects of Director Liability on Board Behavior

The class action lawsuits against Enron and WorldCom substantially increased liability fears among outside directors throughout the U.S. (Bebchuk et al. (2006)). These security lawsuits were unusual because the lead plaintiffs insisted on personal payments by the outside directors. In total, former WorldCom and Enron directors agreed to pay $31 million out of their own pockets to settle the lawsuits. If the current regulatory climate has created a heightened risk of legal sanctions against directors, the question is how will this shift in the legal environment affect the behavior of the board?

The goal of this section is to study the equilibrium effects of an increase in the directors' legal penalties, P_B, on board oversight, CEO incentive pay, and shareholder value. For the analysis it does not matter whether the legal environment has changed for real or only in the perception of directors.

Before analyzing the equilibrium effects of a change in P_B, it is helpful to consider the direct effects associated with an increase in P_B first. There are three direct effects at work. First, keeping the level of CEO incentive pay, b, constant, an increase in director liability, P_B, increases the board's incentive to carefully oversee financial reporting. This effect is beneficial for shareholders and often used as an argument in favor of stiffer sanctions for inattentive directors. Second, keeping the level of board oversight, e, fixed, an increase in P_B induces directors to lower the link between CEO pay and performance, b. A lower pay-performance sensitivity reduces the CEO's incentive to manipulate and hence the risk of litigation. This effect is detrimental to shareholders as it further increases the gap between the board's chosen level of

incentive pay, b^*, and the shareholders' desired level, b^S. Finally, holding e and b fixed, an increase in director liability increases the salary, w_B, directors require in order to be willing to serve on the board.

While these direct effects are intuitively appealing, the equilibrium effects of a change in the directors' legal environment can be quite different. This arises because the board's optimal decisions regarding monitoring and CEO incentive pay are not independent from each other. Consider first the effect of a change in director liability, P_B, on the level of board oversight in equilibrium. Various commentators have called for tougher liability rules for directors in order to increase their attention devoted to monitoring (e.g., Morgenson (2005), Francis (2005)). While it is true that an increase in P_B directly increases the board's incentive to act as a monitor, there is an opposing indirect effect. Keeping the level of monitoring fixed, an increase in P_B makes it optimal for the board to reduce the link between CEO pay and performance. Since the CEO has now weaker incentives to manipulate, there is less need for monitoring. This indirect negative effect on board oversight can be strong enough to overcome the direct effect, resulting in a decline in monitoring. Hence, contrary to what is usually argued, increasing the threat of director liability can actually lead to a lower level of board oversight.

Consider next the equilibrium effects of an increase in director liability, P_B, on the board's choice of the pay-performance sensitivity, b. As outlined above, an increase in P_B induces the board to cut back on CEO incentive pay. In addition to this direct effect, there exists an indirect effect that works in the opposite direction. Keeping b fixed, an increase in director liability induces the board to work harder on its oversight task. This increase in oversight, in turn, reduces the probability of litigation and hence makes the board more willing to provide the CEO with strong incentives. Depending

on whether this indirect positive effect on b is more or less powerful than the direct negative effect, the level of CEO incentive pay increases or decreases with P_B.

The connection between director liability and shareholder value is also ambiguous in equilibrium. A change in P_B affects the board's decisions regarding the level of oversight and the level of CEO incentive pay and thereby influences the value of the firm. In addition to these two effects, higher expected litigation costs increase the retainer, w_B, directors demand in order to be willing to sit on the board. Of course, a larger director compensation, w_B, reduces shareholder value.

A key variable that determines the signs of the links between director liability on the one hand and board oversight, CEO incentive pay, and shareholder value on the other hand is the marginal cost of monitoring, k. Empirical proxies for the difficulty of monitoring are the size of the firm and the complexity of the firm's business operations.

Proposition 3 *There exists three thresholds, denoted k_1, k_2, and k_3, with $k_1 > k_2 > k_3$ such that*

(i) for all $k > k_1$ ($k < k_1$), an increase in director liability, P_B, leads to a lower (higher) level of board oversight, e;

(ii) for all $k > k_2$ ($k < k_2$), an increase in director liability, P_B, induces the board to choose a lower (higher) pay-performance sensitivity, b;

(iii) for all $k > k_2$ ($k < k_3$), an increase in director liability, P_B, reduces (increases) shareholder value, $E[V^{net}]$.

Consider first the case where the board's monitoring task is difficult and costly (i.e., k is large). In this situation, the board mainly relies on the pay-performance sensitivity as a tool to mitigate litigation exposure. That is, the board directly responds

to an increase in legal liability, mainly by reducing the level of CEO incentive pay and not so much by increasing oversight. Since a reduction in CEO incentives reduces the need for oversight, both the equilibrium level of oversight and the equilibrium pay-performance sensitivity decrease when the CEO faces tougher legal penalties. As a result, for high values of k, an increase in director liability leads to lower shareholder value.

For relatively small values of k, the above results are reversed. If monitoring is easy and effective, the board will mainly respond to an increase in liability by working harder on the oversight task. Better oversight, in turn, makes it optimal for the board to provide the CEO with strong incentives. Hence, both the equilibrium level of oversight and the equilibrium pay-performance sensitivity increase when directors face tougher legal penalties. While these two effects are beneficial for shareholders, there is an additional negative effect associated with an increase in P_B: Keeping e and b fixed, a higher P_B requires offering the board a greater retainer, w_B. However, given the level of oversight is relatively high (due to a low marginal cost k), this last effect is small. As a result, for low values of k, an increase in director liability increases shareholder value.

The analysis indicates that a shift to a tougher legal environment for directors improves corporate governance only in those firms where the level of board oversight is already high (i.e., where k is low). In firms where board oversight is an issue (due to high values of k), increasing the threat of litigation does not improve corporate governance; in fact, it aggravates the problems and leads to lower equilibrium levels of oversight, CEO incentive pay, and shareholder value. To sum up: exactly in those firms where directors struggle with their oversight task, a move to a stricter legal environment for directors is counterproductive to corporate governance.

5 The Effects of CEO Liability on Board Behavior

The analysis so far has shown that imposing greater penalties on inattentive directors does not necessarily lead to more desirable board behavior. The reason is that the board can respond to increased liability not only by working harder on the monitoring task but also by reducing CEO incentive pay.

The situation is different with respect to the CEO: If the CEO's potential penalties for manipulation, P_C, increase, his only direct response will be to engage in less earnings manipulation; that is, he will choose a lower manipulation threshold θ_T. This observation does not imply that an increase in P_C is always desirable to shareholders. Greater penalties for the CEO not only have an effect on the CEO's behavior but also on the board's behavior.

The goal of this section is to study the equilibrium effects of an increase in CEO penalties, P_C, on the levels of board oversight, CEO incentive pay, and firm value. As in the previous section, it is helpful to consider the direct effects associated with an increase in P_C first. There are three direct effects at work:

First, holding the pay-performance sensitivity, b, constant, an increase in CEO liability reduces the board's incentive to exercise oversight. This arises because if P_C increases, the CEO will have a lower incentive to manipulate the earnings report, which, in turn, reduces the need for monitoring.

Second, keeping the monitoring effort, e, constant, an increase in CEO penalties makes it optimal for the board to enhance the link between CEO pay and performance. There are two reasons for this result: Given that the CEO's incentive to manipulate declines with P_C, the compensation scheme that maximizes shareholder value involves a higher pay-performance sensitivity to induce greater managerial ef-

fort. Since the board cares about shareholder value, it will increase b if P_C increases. In addition, if the CEO's incentive to manipulate declines due to a higher penalty P_C, the board's trade-off between maximizing shareholder value and minimizing its personal cost of litigation is shifted in favor of the former, which further increases the board's willingness to provide strong incentives to the CEO.

The third direct effect is that, holding e and b fixed, an increase in P_C reduces the probability of litigation and hence reduces the retainer, w_B, directors require in order to be willing to serve on the board. A similar effect does not occur with respect to the CEO's salary because the CEO is able to earns rents; that is, his participation constraint is not binding.

As in the previous section, the board's optimal decisions regarding monitoring and CEO incentive pay are interrelated, implying that the effects of an increase in P_C on the equilibrium levels of e, b, and $E[V^{net}]$ are ambiguous. A key variable that determines the signs of these relations is again the marginal cost of monitoring, k.

Proposition 4 *There exists a threshold, denoted k_4, with $k_4 < k_2$, such that*

(i) for all $k > k_1$ ($k < k_1$), an increase in CEO liability, P_C, leads to a higher (lower) level of board oversight, e;

(ii) for all $k > k_2$ ($k < k_2$), an increase in CEO liability, P_C, induces the board to choose a higher (lower) pay-performance sensitivity, b;

(iii) for all $k > k_2$ ($k < k_4$), an increase in CEO liability, P_C, increases (reduces) shareholder value, $E[V^{net}]$.

If monitoring is costly and difficult (k is high), the equilibrium level of oversight is relatively small, and the board mainly relies on the pay-performance sensitivity as a tool to control litigation risk. In this case, the board's main direct response to

an increase in CEO penalties (which reduces incentives to manipulate) is to increase the pay-performance sensitivity of the CEO's pay scheme in order to increase effort incentives. The use of a more powerful incentive scheme, in turn, increases the need for board oversight. Hence, for high values of k, both the equilibrium level of CEO incentive pay and the equilibrium level of oversight increase when the CEO faces tougher penalties. Since both effects are beneficial to shareholders, an increase in CEO liability is associated with an increase in shareholder value.

If monitoring is easy and effective, i.e., k is small, the above results are reversed. In this case, the equilibrium level of oversight is relatively large, and the board's main direct response to an increase in P_C is to reduce monitoring. Lower board oversight, in turn, makes it optimal for the board to provide the CEO with a weaker incentive scheme. Hence, for low values of k, both the equilibrium level of oversight and the equilibrium pay-performance sensitivity decrease with CEO penalties. While both effects are detrimental to shareholders, there is a direct positive effect: keeping e and b fixed, higher CEO liability reduces the retainer, w_B, directors demand to be willing to sit on the board. However, given board oversight is high (due to a low marginal cost k), this last effect is relatively small. As a result, for low values of k, imposing greater penalties on the CEO for fraudulent behavior leads to a reduction in shareholder value.

In sum: The model predicts that in firms in which board monitoring is effective (k is low), increasing the CEO's expected penalties for manipulation leads to a reduction in the equilibrium levels of board oversight, the pay-performance sensitivity, and shareholder value.

6 Regulatory Changes

The analysis in the previous two sections has shown that an increase in director liability has effects on board behavior similar to those resulting from a reduction in CEO liability. This follows because the board's decisions regarding monitoring and CEO incentive pay are mainly driven by its concern for litigation. While it is clear that the board's concern for litigation increases if director penalties, P_B, increase, the same is true if CEO penalties, P_C, decrease: A lower penalty P_C increases the CEO's temptation to engage in manipulation and hence makes litigation more likely. The board therefore responds to an increase in P_B similarly to the way it responds to a reduction in P_C.

Regulatory changes designed to prevent future accounting frauds and scandals such as the Sarbanes Oxley Act of 2002 likely increase potential sanctions for both the CEO and directors. My model suggests that such a regulatory move may have little or no impact on the behavior of the board. This follows because the effects associated with increases in P_B and P_C work in opposite directions with respect to the board's choices of e and b, and hence tend to cancel out each other.

7 Conclusion

This paper analyzes the effects of a change in the legal environment on the board of directors' decisions regarding monitoring and CEO incentive pay. Directors face a potential threat of litigation because the CEO has an incentive to manipulate the financial reporting process in order to inflate his compensation. Various commentators have called for greater out-of-pocket penalties for inattentive directors as a means to provide better incentives for vigilant board oversight. The problem, however, is

that boards of directors are usually not only responsible for performing the oversight task but also for designing the incentive pay scheme for the CEO. This provides directors with two means to respond to an increase in personal liability: They can increase the level of oversight to prevent manipulation; or they can reduce the link between CEO pay and performance to weaken the CEO's ex ante incentive to engage in manipulation. While the first response is beneficial to shareholders, the second one is not.

Since the board's decisions regarding monitoring and CEO incentive pay are interrelated, the connections between director liability, incentive pay, and board oversight are ambiguous in equilibrium. In particular, the paper shows that in firms where board oversight is difficult and costly (e.g., large firms with complex business operations), a shift to a tougher legal environment for directors will lead to a reduction in the equilibrium level of board oversight, the equilibrium level of CEO incentive pay, and shareholder value. In these firms, directors directly respond to an increase in personal liability mainly by lowering the level of CEO incentive pay rather than spending more time on oversight. The model suggests that imposing stiffer penalties on directors for oversight failure is counterproductive to corporate governance exactly in those firms where board oversight is already a concern.

Appendix

First and second-order conditions for e and b.

It is without loss of generality to assume that the board chooses e and b simultaneously. Using (4) and (5), the board's optimization problem can be stated as

$$\begin{aligned}\max_{b,e} E\left[U_B\right] &= \beta\left(\frac{v^2}{c}b+\mu\right)-\beta b\left(\frac{v^2}{c}b+(1-e)\frac{m^2}{P_C}b+\mu\right)-\beta w_B+w_B \\ &\quad -0.5(1-e)\left(\frac{m}{P_C}b\right)^2 P_B-0.5ke^2.\end{aligned}$$

The first-order conditions for the optimal levels of e and b, $\frac{\partial E[U_B(b,e)]}{\partial e}=\frac{\partial E[U_B(b,e)]}{\partial b}=0$, are already stated in (6) and (8).

The second-order conditions for a maximum are $\frac{\partial^2 E[U_B(b,e)]}{\partial b^2}<0$, $\frac{\partial^2 E[U_B(b,e)]}{\partial e^2}<0$, and $\frac{\partial^2 E[U_B(b,e)]}{\partial b^2}\frac{\partial^2 E[U_B(b,e)]}{\partial e^2}>\left(\frac{\partial^2 E[U_B(b,e)]}{\partial b\partial e}\right)^2$. While the first two conditions are always satisfied, the last condition can be rewritten as

$$2\beta\frac{v^2}{c}k+\frac{m^2}{P_C}\left(2\beta+\frac{P_B}{P_C}\right)\left((1-e)k-\frac{m^2}{P_C}b^2\left(2\beta+\frac{P_B}{P_C}\right)\right)>0. \tag{9}$$

Condition (9) is satisfied, for example, if managerial effort is relatively productive (v is large). Substituting (6) into (9) yields

$$2\beta\frac{v^2}{c}+\frac{m^2}{P_C}\left(2\beta+\frac{P_B}{P_C}\right)(1-3e)>0. \tag{10}$$

Proof of Propositions 3.

Parts (i) and (ii): Using the first-order conditions (6) and (8), it can be shown that

$$\frac{de}{dP_B}=\frac{b\frac{m^2}{P_C}\frac{db}{dP_B}\left(2\beta+\frac{P_B}{P_C}\right)+0.5\frac{m^2}{P_C^2}b^2}{k} \tag{11}$$

and

$$\frac{db}{dP_B}=\frac{\frac{de}{dP_B}\frac{m^2}{P_C}b\left(2\beta+\frac{P_B}{P_C}\right)-(1-e)\frac{m^2}{P_C^2}b}{2\beta\frac{v^2}{c}+(1-e)\frac{m^2}{P_C}\left(2\beta+\frac{P_B}{P_C}\right)}. \tag{12}$$

Using (6) and (5), the solution to (11) and (12) is given by

$$\frac{de}{dP_B} = \frac{\frac{\theta_T^2}{k}\left(\beta\frac{v^2}{c} - (1-e)\frac{m^2}{P_C}\left(\beta + 0.5\frac{P_B}{P_C}\right)\right)}{2\beta\frac{v^2}{c} + (1-3e)\frac{m^2}{P_C}\left(2\beta + \frac{P_B}{P_C}\right)} \tag{13}$$

and

$$\frac{db}{dP_B} = \frac{\theta_T\frac{m}{P_C}(2e-1)}{2\beta\frac{v^2}{c} + (1-3e)\frac{m^2}{P_C}\left(2\beta + \frac{P_B}{P_C}\right)}. \tag{14}$$

The denominator of (13) and (14) is the second-order condition (10) which is assumed to be positive to ensure a concave optimization problem.

Let $e(k)$ denote the optimal level of e as a function of k and let k_1 be the threshold for which $Q(k) = \beta\frac{v^2}{c} - (1-e(k))\frac{m^2}{P_C}\left(\beta + 0.5\frac{P_B}{P_C}\right) = 0$ is satisfied. Since $e(k)$ decreases with k, condition (13) shows that for $k < k_1$ it holds that $\frac{de}{dP_B} > 0$ and for $k > k_1$ it holds that $\frac{de}{dP_B} < 0$.

Let k_2 be the threshold for which $e(k_2) = 0.5$ is satisfied. Since $e(k)$ is decreasing in k, (14) shows that for $k > k_2$ it holds that $\frac{db}{dP_B} < 0$ and for $k < k_2$ it holds that $\frac{db}{dP_B} > 0$.

Next, I show that $k_2 < k_1$. The threshold k_1 is determined by $Q(k) = 0$ and the threshold k_2 is determined by $e(k) = 0.5$. Substituting k_2 into $Q(k)$ yields $Q(k_2) = \beta\frac{v^2}{c} - 0.5\frac{m^2}{P_C}\left(\beta + 0.5\frac{P_B}{P_C}\right)$. Given the second-order condition (10), for $k = k_2$ it holds that $2\beta\frac{v^2}{c} - \frac{m^2}{P_C}\left(\beta + 0.5\frac{P_B}{P_C}\right) > 0$, which implies $Q(k_2) > 0$. Since $Q(k_1) = 0$, $Q(k_2) > 0$, and $Q'(k) < 0$, it follows that $k_2 < k_1$.

Part (iii): The shareholders' goal is to maximize their expected payoff,

$$E\left[V^{net}\right] = va_1 + \mu - b\left(va_1 + m(1-e)\theta_T + \mu\right) - w_C - w_B, \tag{15}$$

where a_1, θ_T, e, and b are determined by (4), (5), (6), (8), and where $w_B = 0.5(1-e)\theta_T^2 P_B + 0.5ke^2$.

Using (4), (5), and $w_B = 0.5(1-e)\theta_T^2 P_B + 0.5ke^2$, the first derivative with respect to P_B is given by

$$\begin{aligned}\frac{dE\left[V^{net}\right]}{dP_B} &= \left(\frac{v^2}{c}(1-2b) - 2m(1-e)\theta_T - \mu - (1-e)\theta_T P_B \frac{m}{P_C}\right)\frac{db}{dP_B} \\ &\quad + \left(bm\theta_T + 0.5\theta_T^2 P_B - ke\right)\frac{de}{dP_B} - 0.5(1-e)\theta_T^2.\end{aligned} \tag{16}$$

Substituting (6) and (8) into (16) yields

$$\begin{aligned}\frac{dE\left[V^{net}\right]}{dP_B} &= (1-\beta)\left(\frac{v^2}{c}(1-2b) - 2(1-e)m\theta_T - \mu\right)\frac{db}{dP_B} \\ &\quad + (1-\beta)bm\theta_T\frac{de}{dP_B} - 0.5(1-e)\theta_T^2.\end{aligned} \tag{17}$$

Recall that the shareholders' desired level of monitoring is given by $e^f = \frac{bm\theta_T + 0.5\theta_T^2 P_B}{k}$, which implies that $e^f - e = (1-\beta)\frac{bm\theta_T}{k}$. Using $\frac{de}{dP_B} = \frac{\partial e}{\partial b}\frac{db}{dP_B} + \frac{\partial e}{\partial P_B}$, $\frac{\partial e(b,P_B)}{\partial P_B} = \frac{0.5\theta_T^2}{k}$, and $\frac{\partial e}{\partial b} = \frac{2\beta m\theta_T + \theta_T\frac{m}{P_C}P_B}{k}$, we have

$$\begin{aligned}\frac{dE\left[V^{net}\right]}{dP_B} &= (1-\beta)\left[\frac{v^2}{c}(1-2b) - 2(1-e)m\theta_T - \mu\right]\frac{db}{dP_B} \\ &\quad + \theta_T^2\left[(1-\beta)m\frac{2\beta bm + \theta_T P_B}{k}\frac{db}{dP_B} - 0.5\left(1-e^f\right)\right].\end{aligned} \tag{18}$$

The first term in square brackets in (18) is positive due to condition (8). Hence, a necessary condition for $\frac{dE\left[V^{net}\right]}{dP_B} > 0$ is that $\frac{db}{dP_B} > 0$ holds. Recall that for all $k > k_2$ it holds that $\frac{db}{dP_B} < 0$. Hence, from (18) it follows that for all $k > k_2$, it holds that $\frac{dE\left[V^{net}\right]}{dP_B} < 0$.

Let the second term in square brackets in (18) denote $B(k) = (1-\beta)m\frac{2\beta mb + \theta_T P_B}{k}\frac{db}{dP_B} - 0.5\left(1-e^f\right)$. If $k < k_2$ and $B(k) > 0$, then $\frac{dE\left[V^{net}\right]}{dP_B} > 0$. Note that for $k < k_2$ (which implies $e > 0.5$) it holds that $\frac{dB(k)}{dk} < 0$ due to $\frac{de}{dk} < 0$, $\frac{de^f}{dk} < 0$, $\frac{db}{de} > 0$, $\frac{d\theta_T}{db}\frac{db}{de} > 0$, and (for $k < k_2$) $\frac{d^2 b}{dP_B de} > 0$. A sufficient condition for $\frac{dE\left[V^{net}\right]}{dP_B} > 0$ is that $k < k_3$ where k_3 satisfies $B(k) = 0$. Note that for $k = k_3$ it must hold that $\frac{db}{dP_B} > 0$. Recalling that $\frac{db}{dP_B} > 0$ holds only if $k < k_2$, it follows that $k_3 < k_2$.

Proof of Propositions 4.

Parts (i) and (ii): Using the first-order conditions (6) and (8) it can be shown that

$$\frac{de}{dP_C} = \frac{1}{k}\left(\frac{m^2}{P_C} b \frac{db}{dP_C}\left(2\beta + \frac{P_B}{P_C}\right) - \frac{m^2}{P_C^2} b^2 \left(\beta + \frac{P_B}{P_C}\right)\right) \tag{19}$$

and

$$\frac{db}{dP_C} = \frac{\frac{de}{dP_C}\frac{m^2}{P_C} b \left(2\beta + \frac{P_B}{P_C}\right) + 2(1-e)\frac{m^2}{P_C^2} b \left(\beta + \frac{P_B}{P_C}\right)}{2\beta\frac{v^2}{c} + (1-e)\frac{m^2}{P_C}\left(2\beta + \frac{P_B}{P_C}\right)}. \tag{20}$$

Using (6) and (5), the solution to (19) and (20) is given by

$$\frac{de}{dP_C} = -\frac{2}{k}\theta_T^2 \left(\beta + \frac{P_B}{P_C}\right) \frac{\beta\frac{v^2}{c} - (1-e)\frac{m^2}{P_C}\left(\beta + 0.5\frac{P_B}{P_C}\right)}{2\beta\frac{v^2}{c} + \frac{m^2}{P_C}\left(2\beta + \frac{P_B}{P_C}\right)(1-3e)} \tag{21}$$

and

$$\frac{db}{dP_C} = \frac{2\theta_T \frac{m}{P_C}\left(\beta + \frac{P_B}{P_C}\right)(1-2e)}{2\beta\frac{v^2}{c} + \frac{m^2}{P_C}\left(2\beta + \frac{P_B}{P_C}\right)(1-3e)}. \tag{22}$$

The denominator of (21) and (22) is the second-order condition (10) which is assumed to be positive to ensure a concave optimization problem.

Recall that k_1 is the threshold for which $Q(k) = \beta\frac{v^2}{c} - (1-e(k))\frac{m^2}{P_C}\left(\beta + 0.5\frac{P_B}{P_C}\right) = 0$ is satisfied. Since $e(k)$ is decreasing in k, condition (21) shows that for $k < k_1$ it holds that $\frac{de}{dP_C} < 0$ and for $k > k_1$ it holds that $\frac{de}{dP_C} > 0$.

Recall that k_2 is the threshold for which $e(k_2) = 0.5$ is satisfied. Since $e(k)$ decreases with k, (22) shows that for $k > k_2$ it holds that $\frac{db}{dP_C} > 0$ and for $k < k_2$ it holds that $\frac{db}{dP_C} < 0$.

Part (iii): The shareholders' goal is to maximize their expected payoff

$$E\left[V^{net}\right] = va_1 + \mu - b\left(va_1 + m(1-e)\theta_T + \mu\right) - w_C - w_B, \tag{23}$$

where a_1, θ_T, e, and b are determined by (4), (5), (6), (8), and where $w_B = 0.5(1-e)\theta_T^2 P_B + 0.5ke^2$.

Using (4), (5), and $w_B = 0.5(1-e)\theta_T^2 P_B + 0.5ke^2$, we have

$$E\left[V^{net}\right] = \left[\frac{v^2}{c}b + \mu\right] - b\left[\frac{v^2}{c}b + m(1-e)\frac{m}{P_C}b + \mu\right] - w_C - 0.5(1-e)\left(\frac{m}{P_C}b\right)^2 P_B - 0.5ke^2. \tag{24}$$

The first derivative with respect to P_C is given by

$$\begin{aligned}\frac{dE\left[V^{net}\right]}{dP_C} &= \left[\frac{v^2}{c}(1-2b) - 2(1-e)\frac{m^2}{P_C}b - \mu - (1-e)\frac{m^2}{P_C}b\frac{P_B}{P_C}\right]\frac{db}{dP_C} \\ &\quad + \left(\frac{m^2}{P_C}b^2 + 0.5\theta_T^2 P_B - ke\right)\frac{de}{dP_C} + (1-e)\theta_T^2\left(\frac{P_B}{P_C} + 1\right).\end{aligned} \tag{25}$$

Substituting (6) and (8) into (25) yields

$$\begin{aligned}\frac{dE\left[V^{net}\right]}{dP_C} &= \left[\frac{v^2}{c}(1-2b) - 2(1-e)m\theta_T - \mu\right](1-\beta)\frac{db}{dP_C} \\ &\quad + mb\theta_T(1-\beta)\frac{de}{dP_C} + (1-e)\theta_T^2\left(\frac{P_B}{P_C} + 1\right).\end{aligned} \tag{26}$$

Recall that the shareholders' desired level of monitoring is given by $e^f = \frac{bm\theta_T + 0.5\theta_T^2 P_B}{k}$, which implies that $(e^f - e) = (1-\beta)\frac{bm\theta_T}{k}$. Using $\frac{de}{dP_C} = \frac{\partial e}{\partial b}\frac{db}{dP_C} + \frac{\partial e}{\partial P_C}$, $\frac{\partial e(b,P_C)}{\partial P_C} = -\frac{\beta bm\frac{m}{P_C^2}b + \left(\frac{m}{P_C}b\right)\frac{m}{P_C^2}bP_B}{k}$, and $\frac{\partial e}{\partial b} = \frac{2\beta m\theta_T + \theta_T\frac{m}{P_C}P_B}{k}$ we have

$$\begin{aligned}\frac{dE\left[V^{net}\right]}{dP_C} &= (1-\beta)\left[\frac{v^2}{c}(1-2b) - 2(1-e)m\theta_T - \mu\right]\frac{db}{dP_C} \\ &\quad + (1-\beta)bm\theta_T\frac{2\beta m\theta_T + \theta_T\frac{m}{P_C}P_B}{k}\frac{db}{dP_C} \\ &\quad + \theta_T^2\left[(1-e)\left(1 + \frac{P_B}{P_C}\right) - (e^f - e)\left(\beta + \frac{P_B}{P_C}\right)\right].\end{aligned} \tag{27}$$

The first term in square brackets in (27) is positive due to condition (8). The second term in square brackets in (27) is also positive, since $e < e^f$ and $\beta < 1$. Hence, for $\frac{db}{dP_C} > 0$ it holds that $\frac{dE\left[V^{net}\right]}{dP_C} > 0$. Recall that $\frac{db}{dP_C} > 0$ holds if $k > k_2$. Hence, condition (27) shows that for all $k > k_2$, it holds that $\frac{dE\left[V^{net}\right]}{dP_C} > 0$.

Let $Z(k) \equiv (1-\beta)bm\frac{2\beta m + \frac{m}{P_C}P_B}{k}\frac{db}{dP_C} + \left[(1-e)\left(1 + \frac{P_B}{P_C}\right) - (e^f - e)\left(\beta + \frac{P_B}{P_C}\right)\right]$. If $k < k_2$ and $Z(k) < 0$, then $\frac{dE\left[V^{net}\right]}{dP_C} < 0$. For $k < k_2$ (which implies $e > 0.5$) it

holds that $\frac{dZ(k)}{dk} > 0$ due to $\frac{de}{dk} < 0$, $\frac{d(e^f - e)}{dk} < 0$, $\frac{db}{de} > 0$, $\frac{d\theta_T}{db}\frac{db}{de} > 0$, and (for $k < k_2$) $\frac{d^2b}{dP_C de} < 0$. Hence, it holds that $Z(k) < 0$ for all $k < k_4$, where k_4 satisfies $Z(k) = 0$. Note that for $k = k_4$ it must hold that $\frac{db}{dP_C} < 0$. Recalling that $\frac{db}{dP_C} < 0$ holds only if $k < k_2$, it follows that $k_4 < k_2$. Thus, for all $k < k_4$ it holds that $\frac{dE[V^{net}]}{dP_C} < 0$.

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