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(Citation)

CDAMS(「市場化社会の法動態学」研究センター) ディスカッションペーパー, 06/15E

(Issue Date)

2006-10

(Resource Type)

technical report

(Version)

Version of Record

(URL)

<https://hdl.handle.net/20.500.14094/80100067>



Corporate Culture versus Preventive Activity ^{*}

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January, 2007

Abstract

The US Sentencing Commission (USSC) guidelines provide incentives for organizations or corporations to establish internal mechanisms and good organizational or corporate cultures. This paper illustrates how this type of sanctioning can be supported as a socially optimal policy. Further, it shows that such sanctioning promotes a good corporate culture that results, ex post, in a suboptimal level of preventive activity by employees in a good corporate culture or in too much preventive activity in a bad corporate culture when workers are judgment-proof. The sanctions to induce, ex post, first-best level of preventive activity cannot lead to the types of sanction that mitigate fines when a good culture is achieved. Ultimately, there is a trade-off between ex ante efforts in a good corporate culture and ex post preventive activity.

^{*}The author would like to thank Kyota Eguchi, Yasuhiro Ikeda, Hideki Sato for their valuable comments and suggestions.

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1 Introduction

Over the last few decades, many corporate scandals have surfaced in the United States and other countries. Examples include those surrounding Enron and WorldCom in the United States. In responses to these scandals, some policies have been designed; the organizational guidelines by the US Sentencing Commission (USSC) are among them. The USSC organizational guidelines are intended to encourage organizations—including corporations, labor unions, pension funds and the like—to develop ethically sound organizational cultures, i.e., cultures that discourage criminal acts. The USSC guidelines give an organization the incentive to promote ethical organizational cultures by mitigating the potential fines if the organization can demonstrate that it has put in place an effective compliance program.

The USSC guidelines are designed to restrict judicial discretion by judges in order to reduce disparity among offenders who—to begin with—have similar characteristics in the first place.¹ Some scholars analyze the restrictions of judicial discretion in terms of the sentencing guidelines; see Reinganum (2000) for a theoretical analysis and Taha (2000) for an empirical one. In addition, the USSC provides the guidelines for organizations in chapter 8.² Under the USSC organizational guidelines, incentives are offered for organizations to prevent misconducts: if an organization incorporates an effective compliance program, the potential fine range will be mitigated. Organizations are expected to develop institutional cultures that discourage misconducts by way of an effective compliance program; the USSC organizational guidelines encourage organizations to develop such cultures.

There are some internal and external measures in place against workplace misconducts. One such internal measure is a preventive measure that focuses on wage schemes and compensation (Arlen 1994; Arlen and Kraakman 1997; Polinsky and Shavell 1993; Shavell 1997). Arlen (1994)

¹US Sentencing Commission (2006, chapter one)

²See US Sentencing Commission (2004) and Desio (2004). See also Bear and Maldonado-Bear (2002).

studies firms' efforts in detecting employee misconduct under strict liability and shows that there is a trade-off in sanctions between inducing efficient level of activity and inducing efficient detection efforts. In addition, another measure adopted by firms to promote ethical conduct is developing workplace environments or corporate cultures that prevent misconduct or promote preventive activity;³ this is one of the goals set forth in the USSC guidelines. To enhance such ethically sound corporate cultures, firms must make an effort to put in place compliance programs.

Workers employed in a firm are affected not only in term of compensation but also by the corporate culture itself. In this paper, we shall refer to the physical or moral environment of the workplace as the “corporate culture,” and it can be interpreted as a set of social norms within the firm that combat misconduct. Given a wage scheme, within a more ethically sound culture, workers easily choose higher levels of preventive activity over lower ones. For the sake of simplicity, we will classify cultures into two categories; “good” and “bad”. For the firm, since a good corporate culture can lead workers to choose to participate in a higher level of preventive activity (given a particular compensation), there is an incentive to make an effort or investment in attaining a good corporate culture.

There are external measures and actions used by the government or state to combat misconduct. Vicarious liability is one measure; fines are another. Vicarious liability is used to compensate victims and prevent a firm from participating in corporate misconduct or insufficiently preventing it. Fines are intended to prompt firms to embrace corporate cultures that encourage a sufficient level of preventive activity; the USSC guidelines are made with this in mind.

The present paper studies the effects of both vicarious liability and fines on investments

³Bear and Maldonado-Bear (2002) argue that the USSC guidelines both increase and decrease penalties in order to induce firms to adopt ethical corporate culture. Another view of corporate culture—that of Rob and Zemsky (2002)—analyzes corporate culture as social capital that fosters cooperation in the workplace.

made by the firm to attain a good corporate culture, and the preventive activity undertaken by workers. Fines imposed based on the USSC guidelines to encourage compliance programs are examined. Surely such fines facilitate good corporate cultures by inducing an organization to promote preventive activity among workers; nonetheless, a “perverse effect” can arise. We show that for firms with judgment-proof workers, the USSC guidelines type of sanction—in which a firm with a good corporate culture is exempt from fines—can be consistent with social welfare maximization policies. The USSC guidelines type of sanction can distort preventive activity, in firms with judgment-proof workers; on the other hand, sanctions that induce first-best preventive activity have larger variations in terms of preventive activity than those with a US guidelines sentencing type of sanction. There is a trade-off between ex ante investment (to achieve a good corporate culture) and ex post preventive activity.

As in Polinsky and Shavell (1993), Pitchford (1995) and Shavell (1997), this paper holds that a worker engages in misconduct or chooses to undertake an insufficient level of preventive activity because of the “judgment-proof” problem. Since workers have insufficient assets or because negative incentives are legally prohibited, the firm cannot provide them with sufficient incentives.

The remainder of the article is organized as follows. In section 2, we establish a model that incorporates the standard principal-agent model for environments in the workplace or for corporate cultures and identify the inefficiency of the judgment-proof problem; nonetheless, we show that the appropriate policy can solve the ex post problem. In section 3, we examine investments that encourage good corporate cultures (i.e., those that prevent misconduct) and demonstrate that there is a trade-off between that investment and preventive activity. Section 4 provides brief concluding remarks.

2 The Basic Model

This section formulates a standard principal-agent model of preventive activity that combats misconduct (Polinsky and Shavell 1993; Pitchford 1995; Shavell 1997; Balkenborg 2001) and considers the influence of sanction on the preventive activity. The subsequent section shall examine the effects of sanctions with mitigation on investment in corporate culture and preventive activity. We consider that a firm hires an identical worker with no initial wealth, in order to perform an business which possibly occurs a misconduct. Both the firm and the worker are risk neutral. The worker chooses a level of preventive activity or care $p \in [0, 1)$, but this is observable by neither the firm nor the court. Given preventive care p , misconduct occurs with a probability of $1 - p$.

The worker's cost in selecting preventive care is $c(p, \theta)$, where $c(\cdot, \theta)$ is a strictly increasing and convex function, such that $c(p, \underline{\theta}) > c(p, \bar{\theta})$, $c'(p, \underline{\theta}) > c'(p, \bar{\theta})$ for any p and $c(0, \theta) = c'(0, \theta) = 0$, $\lim_{p \rightarrow 1} c'(p, \theta) = +\infty$ for any $\theta \in \{\underline{\theta}, \bar{\theta}\}$.⁴ Additionally, we assume the following with regard to the cost function: $2c'(p, \theta) + pc'''(p, \theta) > 0$, given θ . This is the condition that is satisfied when the cost incurred to implement care p under the judgment-proof case is strictly increasing.

Given the same level of care, the (marginal) cost of the worker with $\underline{\theta}$ is higher than that of the worker with $\bar{\theta}$. (θ is the state of the firm and can be interpreted as the culture in the workplace or the organization; $\underline{\theta}$ and $\bar{\theta}$ are bad and good corporate cultures, respectively.) This assumption on cost function indicates that under a corporate or organizational culture where workers can scarcely perform misconduct (i.e., a good corporate culture), they bear lower technological or mental costs in preventing misconduct than they do in a workplace where they easily could. For example, under an organization where workers could easily communicate each other or inform

⁴As is customary, we implicitly assume that the cost function includes a fixed cost but that the fixed cost is not sunk. Our average cost function is U-shaped. (See Figure 2.)

their boss in order to combat misconducts or accidents, they would easily prevent from trivial misconducts to significant ones. We will omit θ hereafter if the state is not an important factor and indicate only, for example, $c(p)$ and not $c(p, \theta)$. The state or culture of the firm is observable by both the firm and the USSC.

The corporate culture will be in a good state $\bar{\theta}$ with a probability of $q \in [0, 1)$, for which the firm exerts an effort. The firm's cost function $m(q)$ strictly increases and is convex with $m(0) = m'(0) = 0, \lim_{q \rightarrow 1} m'(q) = +\infty$. The firm that employs a worker yields benefits but might cause an accident or misconduct that brings harm h to anonymous victims inadvertently or as a result of misconduct. Victims are also assumed to be risk-neutral and receive damages d from the firm if an accident or misconduct occurs.

No efforts on the part of either a worker or the firm (p, q) will be spared in terms of misconduct unless liability and/or fines are imposed by the government, since those efforts are unobservable. The firm is assumed to be strictly liable for misconduct caused by a worker. The firm incurs damages d and fines f if misconduct occurs. In this paper, we assume that $d = h$ since damages are not conditioned on state of a firm in reality. The USSC can impose fines contingent on whether $\underline{\theta}$ or $\bar{\theta}$, i.e., $f(\theta)$. Let us denote $f(\underline{\theta}) = \underline{f}$ and $f(\bar{\theta}) = \bar{f}$. Damages are transferred from the firm to victims, and fines are transferred from the the firm to the government. For the firm, both damages and fines serve as sanctions. We focus on incentives within the organization and consider damages and fines as the total sanction s . We denote $(d + \underline{f}, d + \bar{f})$ simply as $(\underline{s}, \bar{s})$.

The time structure of the model is as follows: (1) The USSC sets fines $\{\underline{f}, \bar{f}\}$ given the strict vicarious liability d , i.e., $(\underline{s}, \bar{s})$. (2) A firm decides the level of effort q needed to attain good corporate culture $\bar{\theta}$. (3) The state of the firm or corporate culture is realized and observed by the firm. (4) The firm offers a wage scheme that is accepted by a worker. (5) The worker chooses the level of care or preventive activity p , given the wage scheme. (6) Finally, a misconduct may or may not occur, and the firm must pay damages and fines if there is a misconduct. Figure 1

summarizes this sequence of events.

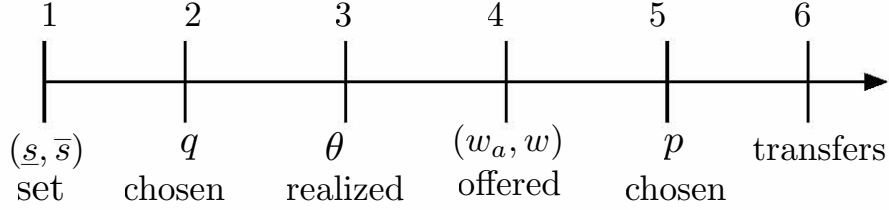


Figure 1: **The sequence of compliance-related events**

The model is solved through backwards induction, in order to ensure subgame perfection. Let us first consider the optimal contract between the firm and worker after θ is realized. In order to examine a worker's preventive activity or care against misconduct and the compensation by the firm, we will employ the standard moral hazard model, as do Pitchford (1995) and Shavell (1997). The firm cannot observe a worker's level of care p but can offer a wage contract depending on whether or not a misconduct has occurred. Following Balkenborg (2001), we denote wages where misconduct occurs as $w_a \geq 0$ and if no misconduct occurs as $w_a + w$.⁵ The reason why w_a is nonnegative is that the worker has no initial asset. $w_a \geq 0$ is the worker's limited liability constraint. w is interpreted as a bonus paid when there is no misconduct. Given the wage scheme and the state of the firm, the worker's optimal level of care p maximizes his expected payoff $U = w_a + pw - c(p, \theta)$ and is determined by the first-order condition

$$c'(p, \theta) = w. \quad (1)$$

We deduce that the marginal cost of care equals the marginal benefit (as a bonus), due to a reduction in the likelihood of a misconduct. This is the worker's incentive compatibility

⁵Balkenborg (2001) shows that under a judgment-proof condition, damages to socially optimal conditions depend on the bargaining powers of the principal and agent; Balkenborg also examines the relationship between Pitchford (1995) and Shavell (1997).

constraint. Let us denote the privately optimal level of care given w and θ as $p^*(w, \theta)$ or simply p^* . The worker will accept the wage scheme if his payoff is greater than the reservation payoff—which is assumed to be zero here—without a loss of generality:

$$U = w_a + pc'(p, \theta) - c(p, \theta) \geq 0 \quad (2)$$

This equation represents the worker's participation constraint.

Given the corporate culture or state θ , the firm chooses a wage contract that minimizes the gross expenditure (excluding $m(q)$) ($E = (1-p)s + w_a + pc'(p)$), subject to the constraints listed above. Following Shavell (1997), we obtain a basic result.

PROPOSITION 1 *Given the state of the firm θ :*

(i) *Suppose that sanction s is smaller than the first threshold s_1 , such that $s_1 = c'(p^t)$, where p^t is given by $c'(p^t) = c(p^t)/p^t$. In this case, the rent the worker receives is zero. The optimal wage contract is $(w_a, w) = (c(p^f) - p^f s, s)$, and the induced level of care is first-best, i.e., $p^* = p^f$, where p^f is given by $c'(p^f) = s$.*

(ii) *Suppose that the sanction is between the first and second thresholds, i.e., $s \in [s_1, s_2]$ such that $s_2 = c'(p^t) + p^t c''(p^t)$. In this case, the rent the worker receives is positive and fixed in s . The optimal wage contract is $(w_a, w) = (0, s_1)$, and the induced level of care is fixed, i.e., $p^* = p^t$, given by $c'(p^t) = c(p^t)/p^t$.*

(iii) *Suppose that the sanction is larger than the second threshold; In this case, the rent the worker receive is positive and increases in s . The optimal wage contract is $(w_a, w) = (0, \hat{w})$, where $\hat{w}$ is $s - p^* c''(p^*)$, and the induced level of care is $p^* = p^j$, where p^j is given by $c'(p^j) + p^j c''(p^j) = s$.*

PROOF: See Appendix.

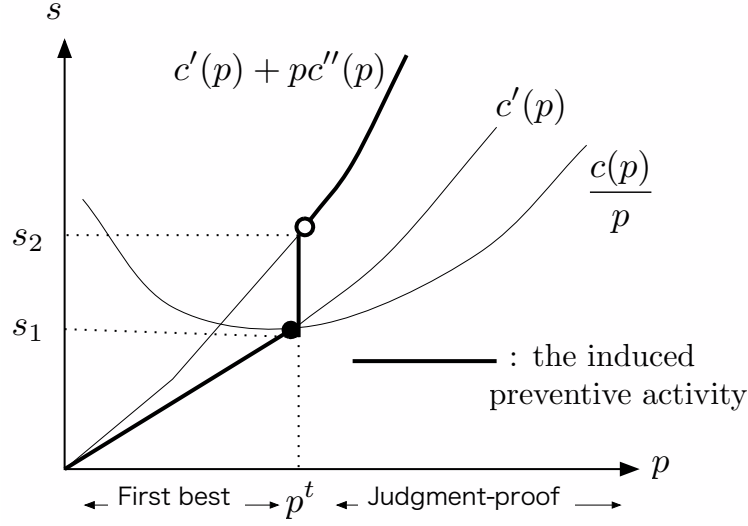


Figure 2: **The result of proposition 1**

This result is attained by Shavell (1997), is illustrated in Figure 2,⁶ and forms the basis of the following analysis. For $p < p^t$ —where p^t is such that $c(p^t)/p^t = c'(p^t)$ —the firm can induce the level of care without paying the rent to the worker; this is the first-best case. On the other hand, for $p > p^t$, the firm must pay the worker rent to induce the level of care, since the limited liability constraint is binding; this is the judgment-proof case.

Now let us consider, ex post, a socially optimal sanction, given θ as the benchmark. We refer to the periods before and after θ is realized as ex post and ex ante, respectively. $\{\underline{s}, \bar{s}\}$ denotes the liability plus fines for the firm that realizes $\underline{\theta}, \bar{\theta}$, respectively, i.e., $\underline{s} = d + \underline{f}$ and $\bar{s} = d + \bar{f}$. We have the ex post, socially optimal sanction s^{*post} , as follows.

PROPOSITION 2 *Given the state of the firm θ :*

(i) *Suppose that the harm that occurs is smaller than the first threshold, i.e., $h \leq s_1$. Then the ex post, socially optimal sanction (damages plus fines) $s^{*post} = d + f$ equals harm h , and the*

⁶See Figure 1 in Shavell (1997).

worker's induced level of care is $p^f(h)$ with $p^f(h, \bar{\theta}) > p^f(h, \underline{\theta})$.

(ii) Suppose that the harm is larger than the first threshold, i.e., $h > s_1$. In this case, the ex post, socially optimal sanction s^{*post} exceeds harm h , and the worker's induced level of care is first-best, i.e., $s^{*post} > h$ and $p^* = p^j(s^{*post}) = p^f(h)$.

PROOF: The USSC minimizes social cost $(1 - p)h + c(p^f)$, subject to the worker's induced care $p^*(s)$. Note that $p^*(s) = p^f(s)$ if $s < s_1$; $p^*(s) = p^t$ if $s \in [s_1, s_2]$; and $p^*(s) = p^j(s)$ if $s > s_2$. The first-order condition is $p'(s)h = c'(p)p'(s)$ or $h = c'(p)$, that is, the induced level of care satisfies the first-best level of care, regardless of whether the case is the first-best or judgment-proof.

(i) When $s < s_1$, by proposition 1 (i), $s^{*post} = c'(p^f) = h$ for any θ must be satisfied. The ex post, socially optimal sanction s^{*post} equals harm whenever any θ is realized. Note that $\bar{p}^f(h) > \underline{p}^f(h)$, since $c'(p, \bar{\theta}) < c'(p, \underline{\theta})$ for all p , where $(\bar{p}^f(h), \underline{p}^f(h))$ denotes $(p^f(h, \bar{\theta}), p^f(h, \underline{\theta}))$ given $s = h$, respectively.

(ii) When $s \in [s_1, s_2]$ or $s > s_2$, s^{*post} must satisfy $h = c'(p^j(s^{*post}))$. This leads to $s^{*post} > h$ and $p^j(s^{*post}) = p^f(h)$. Q.E.D.

In the case of the first-best (i), since $d = h$ is set, fines are not required to induce the socially optimal care. On the other hand, in the judgment-proof case (ii), by $d = h$, fines are required to induce the socially optimal care. The fine $f(\theta)$ is determined by $p^j c''(p^j, \theta)$ when $d = h$. If $\underline{p}^j c''(\underline{p}^j, \underline{\theta}) - \bar{p}^j c''(\bar{p}^j, \bar{\theta})$ is positive and $d = h$, then $\underline{f} - \bar{f}$ is positive and the policy that allows palliation is justified. $p c''(p)$ is interpreted as marginal rent, and from the viewpoint of the ex post, social optimum, if the difference in marginal rents for bad and good cultures is positive, the USSC guidelines type of sanction is supported.

After the state of the firm θ is realized, the ex post, socially optimal sanction equals harm if the firm need not pay the rent for the worker, and exceeds harm when the firm needs to pay the

rent. The care chosen by the judgment-proof worker is less than that chosen by the first-best worker, given the same sanction. This is why fines imposed upon firms with judgment-proof workers are larger than those imposed upon the firm without, when d does not depend on θ . Given the ex post, socially optimal sanction, the level of care by the judgment-proof worker and that by the first-best worker are the same, that is, the first-best level of care would be induced. In the judgment-proof case, a sanction larger than the harm induces the first-best level of care and increases the rent the worker receives. A socially optimal sanction, given θ (ex post), has been considered in this section. The following section analyzes an ex ante, socially optimal sanction when an organizational culture θ is decided by the firm's effort q .

3 Corporate Culture and The “Perverse Effect”

Now let us describe the firm's investment decision q to promote a good corporate culture or state $\bar{\theta}$ and the ex ante, socially optimal sanction. Investment q can be interpreted as efforts toward a “compliance program” or measures that combat misconduct. The firm's problem is to minimize

$$qE(\bar{\theta}) + (1 - q)E(\underline{\theta}) + m(q), \quad (3)$$

subject to the worker's induced level of care p , where $E(\theta)$ is gross expenditure (excluding $m(q)$) given θ . The (privately) optimal investment q^* is determined by the first-order condition

$$E(\underline{\theta}) - E(\bar{\theta}) = m'(q^*), \quad (4)$$

which implies that the marginal profit (reduction) equals the marginal cost of the investment (also known as a “compliance program effort”). This is the incentive compatibility constraint on

q . We can observe that the investment q increases with an increase in the ex post expenditure $E(\underline{\theta})$ or a decrease in $E(\bar{\theta})$. Note that $E(\theta)$ is $(1-p)s + c(p, \theta)$ when the firm employs the first-best worker, and is $(1-p)s + pc'(p, \theta)$ when the firm employs the judgment-proof worker.

Given the above analysis, let us next consider the (ex ante) socially optimal sanction $(\underline{s}^*, \bar{s}^*)$ or $(d + \underline{f}, d + \bar{f})$. The USSC minimizes (ex ante) social cost SC

$$q[1-p]h + c(p, \bar{\theta}) + (1-q)[(1-p)h + c(p, \underline{\theta})] + m(q), \quad (5)$$

subject to the incentive compatibility constraints on p and q . We solve the above problem and derive the following.

LEMMA

Socially optimal sanctions $(\underline{s}^, \bar{s}^*)$ are characterized by the following equation:*

$$\begin{aligned} & [\{(1-p)h + c(\underline{p})\} - \{(1-\bar{p})h + c(\bar{p})\}] + \frac{1}{\partial q(\underline{s}^*, \bar{s}^*)/\partial \underline{s}} (1-q)\underline{p}'(\underline{s}^*)(h - c'(\underline{p})) \\ &= [\{(1-p)h + c(\underline{p})\} - \{(1-\bar{p})h + c(\bar{p})\}] + \frac{1}{\partial q(\underline{s}^*, \bar{s}^*)/\partial \bar{s}} q\bar{p}'(\bar{s}^*)(h - c'(\bar{p})) \\ &= m'(q(\underline{s}^*, \bar{s}^*)). \end{aligned} \quad (6)$$

Note that, given s , $p(s)$ is $p^f(s)$, which is implicitly determined by $c'(p^f) = s$, when the firm employs the first-best worker; $p^j(s)$, which is implicitly determined by $c'(p^j) + p^j c''(p^j) = s$, when the firm employs the judgment-proof worker; or p^t , such that $c'(p^t) = c(p^t)/p^t$ when $s \in [s_1, s_2]$ for each θ .

PROOF: Let us denote incentive compatibility conditions on p and q as $\underline{p} = p(\underline{s})$, $\bar{p} = p(\bar{s})$ and $q(\underline{s}, \bar{s})$, respectively. Note that $\partial q/\partial \underline{s} > 0$, $\partial q/\partial \bar{s} < 0$ by the envelope theorem. Substituting these conditions $p(\underline{s})$, $p(\bar{s})$ and $q(\underline{s}, \bar{s})$ into the social cost function (5), and we minimize the

function on $(\underline{s}, \bar{s})$. We have the following first-order conditions:

$$\frac{\partial q}{\partial \underline{s}} [\{(1 - \underline{p})h + c(\underline{p})\} - \{(1 - \bar{p})h + c(\bar{p})\}] + (1 - q)\underline{p}'(\bar{s}^*)(h - c'(\underline{p})) = m'(q)\frac{\partial q}{\partial \underline{s}} \quad (7)$$

$$\frac{\partial q}{\partial \bar{s}} [\{(1 - \underline{p})h + c(\underline{p})\} - \{(1 - \bar{p})h + c(\bar{p})\}] + q\bar{p}'(\bar{s}^*)(h - c'(\bar{p})) = m'(q)\frac{\partial q}{\partial \bar{s}}. \quad (8)$$

Solving equations (7) and (8), we have the condition (6). Q.E.D.

We shall use this lemma for the following analysis. Condition (6) gives us information on socially optimal sanctions and investment. Using the condition, and let us verify the impact of the USSC guidelines on the level of care by workers and investment by the firm. USSC guidelines allow firms with good corporate cultures to be exempt from fines. The firm must pay the damages equal to the harm incurred, and also could have fines imposed upon them. Now suppose that when the firm can (cannot) achieve the good culture, it must pay the damages that equal harm (plus fines), i.e., $\underline{s} = d + \underline{f}$, $\bar{s} = d = h$. Let us denote the first threshold when a good corporate culture is achieved as $\bar{s}_1$. The following proposition demonstrates the impact of the USSC guidelines type of sanctions on organizational activity.

PROPOSITION 3 *Suppose that sanctions under a good culture are equal to harm.*

(i) *Suppose that within a good culture, harm is smaller than the first threshold, i.e., $h \leq \bar{s}_1$; then, the socially optimal sanction $\underline{s}^*$ is equal to harm h . The induced levels of care are first-best, given harm, i.e., $(\underline{p}^* = \underline{p}^f(h), \bar{p}^* = \bar{p}^*(h))$.*

(ii) *Suppose that harm is larger than the first threshold, i.e., $h > \bar{s}_1$; then, the induced level of care by the worker with $\bar{\theta}$ is smaller than first-best, given harm, i.e., $p^* < p^f(h)$.*

Moreover, if the worker with $\underline{\theta}$ is first-best under $\underline{s} = h$, then the socially optimal sanction $\underline{s}^$ is more than harm ($\underline{s}^* > h$), and the induced level of care is larger than that of the first-best one ($\underline{p}^* > \underline{p}^f(h)$).*

If the worker with $\underline{\theta}$ is judgment-proof or chooses $\underline{p}^t$ under $\underline{s} = h$, then the socially optimal sanction $\underline{s}^$ is more than harm and is more than the sanction that induces the first-best level of care ($\underline{s}^* > h$), and the induced level of care is larger than that of first-best one ($\underline{p}^* > \underline{p}^f(h) > \underline{p}^j(h)$).*

PROOF: See Appendix.

When harm is sufficiently small, by setting a sanction that consists of damages plus fines and equals harm, the first-best levels of care are achieved. Each worker with any θ is not judgment-proof and the firm does not pay the rent. A sanction that equals harm results in the first-best level of care and socially optimal investment; if damages are equal to harm, then fines are not needed in this case.

When harm is sufficiently large and the sanction imposed on a firm with a good corporate culture equals harm, a socially optimal sanction imposed on a firm with a bad corporate culture is larger than harm. In particular, when the firm employs judgment-proof workers, the required magnitude of sanction is larger than that required for first-best workers. In this case, the sanction imposed on the firm with a good culture is smaller than that imposed on a firm with a bad culture, i.e., $\underline{s} > \bar{s}(= h)$.

Proposition 3 (i) demonstrates that unless the firm employs judgment-proof workers, fines relating to corporate culture are not needed; fines should be set to be just equal to harm. In proposition 3 (ii), a socially optimal sanction does not result in the first-best level of care ex post, i.e., ($\underline{p}^* > \underline{p}^f(h), \bar{p}^* < \bar{p}^f(h)$). USSC guidelines type of sanction can induce a super-optimal or suboptimal level of care. This type of sanction can lead to desirable efforts in investment toward good corporate cultures, but also can distort preventive care; the “perverse effect” in Arlen (1994) can also appear in our model. If the restriction that $\bar{s} = h$ is eased, we will have a socially optimal sanction that induces the first-best level of care ex post, even when harm is

sufficiently large.

PROPOSITION 4 *Suppose that $h > \bar{s}_1$ and set $\bar{s}$ such that $\bar{p}^*(\bar{s}) = \bar{p}^f(h)$, where $\bar{s} > h$. If the worker with $\underline{\theta}$ is first-best under $\underline{s} = h$, then $\underline{s}^*$ equals harm and the first-best level of care is induced. If the worker with $\underline{\theta}$ is judgment-proof or chooses p^t under $\underline{s} = h$, then $\underline{s}^*$ is greater than harm, and the first-best level of care is induced.*

PROOF: By condition (6), $\underline{p}^* = \underline{p}^f$ such that $h - c'(\underline{p}) = 0$ is required. When the worker with $\underline{\theta}$ is first-best under $\underline{s} = h$, setting $\underline{s}^* = h$ leads to $h - c'(\underline{p}^*) = 0$. When the worker is judgment-proof or chooses $\underline{p}^t$ under $\underline{s} = h$, given the conditions, setting $\underline{s}^* > h$ leads to $h - c'(\underline{p}^*) = 0$. Q.E.D.

The relationship between sanctions is as $\underline{s}(= h) < \bar{s}$ when the worker with $\underline{\theta}$ is first-best given s . This is not a USSC guidelines type of sanction (like $\underline{s} > \bar{s}$). When the worker is judgment-proof given s , whether or not $\underline{s}$ is higher than $\bar{s}$ depends on the relation between the cost functions of $\underline{\theta}$ and $\bar{\theta}$.

Now let us denote the levels of care and the socially optimal sanctions in propositions 3 (ii) and 4 as $(\underline{p}^U, \bar{p}^U)$, $(\underline{s}^U, \bar{s}^U)$, $(\underline{p}^F, \bar{p}^F)$ and $(\underline{s}^F, \bar{s}^F)$, respectively. Here, we focus on judgment-proof cases. In proposition 3 (ii), when a good corporate culture $\bar{\theta}$ is achieved, the induced level of care is insufficient. When a bad culture $\underline{\theta}$ is achieved, a super-optimal level of care is induced ex post. On the other hand, in proposition 4, either state attains the first-best level of care. In comparing propositions 3 and 4, however, we observe that a USSC guidelines type of sanction (proposition 3) has a smaller variance on the levels of care, i.e., that is, $\underline{p}^F < \underline{p}^U$, $\bar{p}^U < \bar{p}^F$. Therefore, if a social welfare function is risk-averse, the USSC guidelines type of sanctions might be superior to those that induces the first-best levels of care. This may be one of the reasons why the USSC promotes the good corporate cultures by mitigating fines if firms attain good cultures.

We have attained socially optimal sanctions under judgment-proof conditions, namely, $(\underline{s}^U, \bar{s}^U)$, in proposition 3 (ii) and $(\underline{s}^F, \bar{s}^F)$ in proposition 4. The difference between sanctions under the good and bad corporate cultures in a USSC guidelines type of sanction (in proposition 3) is larger than the one in proposition 4, i.e., $|\underline{s}^U - \bar{s}^U| > |\underline{s}^F - \bar{s}^F|$. Thus, we can obtain the following result from the incentive compatibility constraint on q : $q^U > q^F$, where q^U and q^F denote the induced investment in propositions 3 and 4, respectively. In proposition 4, the levels of care or preventive activity under both good or bad corporate cultures are first-best, but the investment in promoting a good culture is smaller. In proposition 3, the USSC guidelines type of sanctions induces larger investments but do not induce first-best preventive activity. In other words, sanctions that intend to induce the first-best preventive activity might not be able to achieve the good corporate cultures. There is a trade-off between promoting good corporate culture and inducing the first-best preventive activity.

Additionally, the left side of the incentive compatibility condition on q (4) and $(\underline{s}^F, \bar{s}^F)$ lead to

$$\underline{p}(c'(\underline{p}) - \underline{s}^F) + \bar{p}(\bar{s}^F - c'(\bar{s}^F)) + (\underline{s} - \bar{s}).$$

The signs of the first and second terms are negative and positive, respectively. The sign of the third term depends on the cost functions, as described. If the first term dominates the second and third terms, then the government cannot induce positive investments that promote good corporate cultures, i.e., $q^* = 0$; In that case, sanctions that induce the first-best preventive activity lead to zero efforts in encouraging corporate cultures that combat misconduct and result in a smaller level of preventive activity, i.e., $\underline{p}^F$. Therefore, a USSC guidelines type of sanction can be superior to sanctions that merely induce a first-best activity in some circumstances.

Finally, let us consider whether sanctions that do not distinguish between organizational cultures satisfy a social optimum. A combination of sanctions minimizing social cost ex ante

$(\underline{s}^*, \bar{s}^*)$ must satisfy condition (6). By this, we derive

$$\frac{1}{\partial q(\underline{s}^*, \bar{s}^*)/\partial \underline{s}}(1-q)\frac{dp(\underline{s}^*)}{d\underline{s}}(h-c'(\underline{p})) = \frac{1}{\partial q(\underline{s}^*, \bar{s}^*)/\partial \bar{s}}q\frac{d\bar{p}(\bar{s}^*)}{d\bar{s}}(h-c'(\bar{p})). \quad (9)$$

To satisfy this condition, one of the following conditions is required:

$$h - c'(\underline{p}) = 0 \quad \text{and} \quad h - c'(\bar{p}) = 0, \quad (10)$$

$$h - c'(\underline{p}) > 0 \quad \text{and} \quad h - c'(\bar{p}) < 0, \quad (11)$$

$$\text{or } h - c'(\underline{p}) < 0 \quad \text{and} \quad h - c'(\bar{p}) > 0. \quad (12)$$

Irrespective of whether the worker with θ is first-best or judgment-proof, condition (10) needs $(\underline{s} = \underline{s}^F, \bar{s} = \bar{s}^F)$. Conditions (11) and (12) need $(\underline{s} < \underline{s}^F, \bar{s} > \bar{s}^F)$ and $(\underline{s} > \underline{s}^F, \bar{s} < \bar{s}^F)$, respectively. Note that $s^F = h$ when a worker is first-best, and $s^F > h$ when a worker is judgment-proof. We can observe that the USSC guidelines type of sanction in proposition 3, i.e., $(\underline{s}^U > \underline{s}^F, \bar{s}^U = h)$ responds to case (12), and that the first-best type of sanction $(\underline{s}^F, \bar{s}^F)$ in proposition 4 responds to case (10). The USSC guidelines type of sanction is one of the social welfare maximizing policies.

Suppose there is a sanction that does not distinguish between organizational cultures, i.e., $\underline{s} = \bar{s} = s$. This type of sanction is considered to be a sanction before the USSC guidelines start. We consider the noteworthy case where workers under either culture are judgment-proof. To achieve a social optimum, the sanction $s(= \underline{s} = \bar{s})$ must satisfy one of conditions (10) to (12), i.e., $s > h$, $\underline{s}^F > s > \bar{s}^F$, or $\bar{s}^F > s > \underline{s}^F$. Although we cannot eliminate the possibility that a sanction that does not distinguish between cultures can achieve a social optimum, we cannot help note that such a possibility is remote. Whether or not the sanction satisfies one of the conditions depends on the shape of the cost function $c(p, \theta)$. The sanction achieves a social optimum if and only if the effect of θ on the cost function accidentally matches one of

the conditions. The possibility that the sanction that does not distinguish between cultures will achieve a social optimum is remote. The USSC guidelines type of sanction can achieve a social optimum with any shape of the cost function, but sanctions that do not distinguish cultures can do so only with particular cost-function shapes. The USSC guidelines potentially have more desirable characteristics.

4 Concluding Remarks

This article has examined the effect of damages and fines (in forms of sanctions) on corporate cultures or environments and the preventive activity of workers through the wage scheme of the firms in question. When harm is not very large and a firm employs first-best workers, damages plus fines that equal harm lead to a socially optimal investment toward attaining a good corporate culture *ex ante* and first-best preventive activity *ex post*. When harm is extremely large and the firm employs judgment-proof workers, if the government employs a USSC guidelines type of sanction, the sanction that intends to promote greater investment results in a super-optimal or suboptimal level of preventive activity on the part of the worker. On the contrary, a sanction that looks to induce the first-best preventive activity prompts a firm to invest little. There is a trade-off in effort between enhancing the corporate culture and inducing preventive activities.

The USSC organizational guidelines are considered a device to encourage organizations, including firms, to put in place an “effective compliance program” or otherwise promote a good corporate culture that combats misconduct. In brief, fines can be mitigated according to the USSC guidelines if an organization has put in place an environment that effectively prevents workers from acting in an illegal manner. In this article, an investment made to promote a good corporate culture can be interpreted as an effort on the part of a firm to put in place a compliance program. We demonstrate that a USSC guidelines type of sanction can be consistent with

one of the social welfare maximization policies and can achieve larger investments and smaller variations in preventive activity when harm is large. The USSC organizational guidelines type of sanction strikes a desirable balance in terms of efforts toward establishing corporate culture and promoting preventive activity.

Appendix

PROOF OF PROPOSITION 1: (i) we first show that $w_a > 0$. Let w be such that $w = c'(p)$ is fixed and the firm can increase its profit by setting a new $w'_a < w_a$. This continues until the participation constraint is binding or until $w_a \geq 0$ is binding. When $s < s_1$ by the worker participation constraint, there exists $w_a > 0$. Since the worker participation constraint is binding and $w_a > 0$, the firm's problem is:

$$\min_{w,p} \pi = (1-p)s + c(p), \quad (13)$$

subject to the incentive compatibility constraint. The first-order condition on p and the incentive compatibility constraint lead to $w = c'(p) = s$. Additionally by $U = 0$, we deduce that $w_a = c(p) - ps$.

(ii) From the above proof in (i), when $s > s_1$, the participation constraint is not binding. Thus, we get $w_a = 0$. Next we claim that the firm chooses $w = s_1$. The firm's new problem is

$$\min_w (1 - p(w))s + p(w)w, \quad (14)$$

where $p(w)$ is implicitly defined by $w = c'(p)$. The derivative of (14) with respect to w is

$$p'(w)(s - w) - p. \quad (15)$$

If s is sufficiently close to s_1 , (15) is negative for $w \in [s_1, s]$. Thus, the firm chooses $w = s_1$ as the corner solution. Given $w = s_1$, the worker chooses p^t such that $s_1 = c'(p^t)$. It is clear that the rent is fixed in s since the firm chooses s_1 for such s . On the contrary, if s is sufficiently large, (15) is positive when evaluated at $w = s_1$. This indicates that for such a larger s the firm chooses w^* which is larger than s_1 . $w^* > s_1$ chosen by the firm satisfies that (15) equals zero. Therefore, there exists $s_2 > s_1$.

(iii) If $s > s_2$, then by the proof of (ii), $w_a = 0$. The firm's new problem is

$$\min_{w,p} (1-p)s + pc'(p), \quad (16)$$

subject to the incentive compatibility constraint. The first-order condition on p and the incentive compatibility constraint result in $c'(p) + pc''(p) = s$ and $\hat{w} = s - pc''(p)$. Since $p^j > p^t$, the relevant threshold s_2 is determined by $s_2 = c'(p^t) + p^t c''(p^t)$. Finally, we show the relation between the rent and the sanction. The rent the worker receives increases in s , because of the incentive compatibility condition (1); of this, the derivative of U with respect to p is positive. Q.E.D.

PROOF OF PROPOSITION 3:

(i) The worker with $\bar{\theta}$ chooses $\bar{p}^* = \bar{p}^f$, and $h - c'(\bar{p}^f) = 0$. By condition (6), $\underline{p}^*$ such that $h - c'(\underline{p}^*) = 0$ must be induced, i.e., $\underline{p}^* = \underline{p}^f(h)$.

We first show that either worker with $\underline{\theta}$ or $\bar{\theta}$ is first-best when $[\underline{s}, \bar{s}] \in [0, \bar{s}_1]^2$, where $\bar{s}_1 = c(\bar{p}^t, \bar{\theta})/\bar{p}^t = c'(\bar{p}^t, \bar{\theta})$, and next demonstrate $\underline{s}^* = h$. Since $c(p, \bar{\theta}) < c(p, \underline{\theta}) \forall p$ and $\frac{dc(p)/p}{dp} = (c'(p)p - c(p))/p^2 = 0$, we acquire that $c(\bar{p}^t, \bar{\theta})/\bar{p}^t < c(\underline{p}^t, \underline{\theta})/\underline{p}^t$. Note that $c(p^t, \theta)/p^t = c'(p^t, \theta)$; hence, given the same level of sanction, if the worker with $\bar{\theta}$ is first-best, then the worker with $\underline{\theta}$ is also first-best. When $s < \bar{s}_1$ is set, the workers with $\underline{\theta}$ and $\bar{\theta}$ chooses $(\underline{p}^f(s), \bar{p}^f(s))$, respectively. The firm's gross cost E equals $(1 - p^f)s + c(p^f) \forall \theta$, since the firm need not pay the rent; therefore, given the above conditions, $\underline{p}^* = \underline{p}^f(h)$ such that $h - c'(\underline{p}^*) = 0$ is induced if $\underline{s}^* = h$.

(ii) Given $\bar{s} = h$, the worker with $\bar{\theta}$ is judgment-proof under $\bar{s} = h$ and chooses $p^j(h)$, $h - c'(\bar{p}^j) > 0$. This requires $\underline{p}$ such that $h - c'(\underline{p}) < 0$ by condition (6), that is, $\underline{s}^*$ such that $\underline{p}^*(\underline{s}^*) > p^f(h)$ is required. Since $c(\bar{p}^t, \bar{\theta})/\bar{p}^t < c(\underline{p}^t, \underline{\theta})/\underline{p}^t$, given $\underline{s}$, the worker can be either first-best or be judgment-proof. The USSC guidelines must induce either first-best or judgment-proof workers to choose $p^* > p^f(h)$. Here, denote the sanction that induces $p^f(h)$ as s^f . When the worker is first-best under $\underline{s} = h$, $\underline{s}^*(> s^f = h)$ is required. When the worker is judgment-proof or chooses $\underline{p}^t$ under $\underline{s} = h$, $\underline{s}^*(> s^f > h)$ is required. Q.E.D.

References

- [1] Arlen, Jennifer H. 1994. The Potentially Perverse Effects of Corporate Criminal Liability. *Journal of Legal Studies* 23: 833–863.
- [2] Arlen, Jennifer H. and Reinier Kraakman. 1997. Controlling Corporate Misconduct: An Analysis of Corporate Liability Regimes. *New York University Law Review* 72: 687–779.
- [3] Balkenborg, Dieter. 2001. How Liable Should a Lender Be? The Case of Judgment-Proof Firms and Environmental Risk: Comment. *American Economic Review* 91 no. 3: 731–738.
- [4] Bear, Larry A. and Rita Maldonado-Bear. 2002. The Securities Industry and the Law. *Journal of Banking and Finance* 26: 1867–1888.
- [5] Desio Paula. 2004. An Overview of the Organizational Guidelines. US Sentencing Commission, Washington, DC. Available from <http://www.ussc.gov/corp/ORVERVIEW.pdf>.
- [6] Pitchford, Rohan. 1995. How Liable Should a Lender Be? The Case of Judgment-Proof Firms and Environmental Risk. *American Economic Review* 85 no. 5: 1171–1186.

- [7] Polinsky, A. Mitchell and Steven Shavell. 1993. Should Employees Be Subject to Fines and Imprisonment Given the Existence of Corporate Liability? *International Review of Law and Economics* 13: 239–257.
- [8] Reinganum, Jennifer F. 2000. Sentencing Guidelines, Judicial Discretion, and Plea Bargaining. *Rand Journal of Economics* 31 no.1: 62–81.
- [9] Rob, Rafael and Peter Zemsky. 2002. Social Capital, Corporate Culture, and Incentive Intensity. *Rand Journal of Economics* 33 no. 2: 243–257.
- [10] Shavell, Steven. 1997. The Optimal Level of Corporate Liability Given the Limited Ability of Corporations to Penalize Their Employees. *International Review of Law and Economics* 17: 203–213.
- [11] Taha, Ahmed E. 2000. The Equilibrium Effect of Legal Rule Changes: Are The Federal Sentencing Guidelines Being Circumvented? *International Review of Law and Economics* 21: 251–269.
- [12] United States Sentencing Commission. 2004. Chapter Eight—Sentencing of Organizations—Federal Sentencing Guidelines Manual and Appendices (2005). The Commission, Washington, DC. Available from <http://www.ussc.gov/2005guid/tabconchap8.htm>.
- [13] United States Sentencing Commission. 2006. 2005 Annual Report. The Commission, Washington, D.C.