

# Evidentiary Standards and Information Acquisition in Public Law

---

Matthew C. Stephenson, *Harvard Law School*

This article considers the type of evidence that an overseer (e.g., a court) should require before allowing a government agent to take some proposed action. The court can increase agency research incentives by prohibiting actions unless the agent produces supporting evidence, and/or by permitting action even when the agent uncovers adverse evidence. The court thus faces a trade-off between an evidentiary standard's *ex post* effects on the agent's policy decision and its *ex ante* effects on the agent's incentive to do research. An extension allows the court to make research effort a precondition for action, regardless of the evidence produced. (*JEL* K23, K32, K41)

Political and legal systems often divide decision-making responsibility between a primary agent, vested with the power to initiate action, and an independent overseer that reviews the evidence proffered by the primary agent in support of its proposal. For example, a regulatory agency might be charged with deciding whether to ban a potentially dangerous product, but a court may assess whether such a ban is supported by sufficient evidence. One of the most salient questions raised by this common form of institutional design concerns the type and amount of evidence that a rational overseer should demand as a condition of approving a proposed

---

I am grateful to Daryl Levinson, John Manning, Eric Posner, Steve Shavell, Ken Shepsle, Kathy Spier, and Kathy Zeiler for helpful comments on earlier drafts.

Send correspondence to: Matthew C. Stephenson, Harvard Law School, Griswold 509, Cambridge, MA 02138, USA; E-mail: [mstephen@law.harvard.edu](mailto:mstephen@law.harvard.edu).

American Law and Economics Review  
doi:10.1093/aler/ahn011

Advance Access publication August 19, 2008

© The Author 2008. Published by Oxford University Press on behalf of the American Law and Economics Association. All rights reserved. For permissions, please e-mail: [journals.permissions@oxfordjournals.org](mailto:journals.permissions@oxfordjournals.org).

action.<sup>1</sup> This article's central claim is that an overseer confronts a trade-off between the *ex post* effects of the evidentiary standard on the policy decision and the *ex ante* effects that the standard may have on the primary agent's incentive to gather information. This second effect may induce a rational overseer to commit itself to an evidentiary standard that is *ex post* suboptimal from the overseer's perspective. Taking this informational effect into account may upset intuitive or conventional views regarding the appropriate evidentiary standard. In particular, the analysis generates four notable results:

First, an overseer may sometimes demand *more* evidence than the overseer actually needs to be convinced that a proposal is a good idea on the merits. Thus, a court that believes—absent any additional information on costs or benefits—that a proposed safety regulation is a good idea might still demand stronger proof from the agency, even though in some instances this will compel the court to vacate a regulation that the court believes is probably beneficial. The court in such cases adopts an evidentiary standard that is “too strong” because the expected gains, in terms of increased agency research, outweigh the expected costs associated with too many *ex post* rejections of good regulations.

Second, an overseer might sometimes want to commit itself to uphold policy proposals accompanied by sufficiently definitive evidence, even if the overseer views the *content* of this evidence as reducing rather than enhancing the attractiveness of the proposal. That is, a court might demand that an agency considering a product ban produce a rigorous assessment of the economic cost per statistical life saved, but would uphold regulations accompanied by such assessments even when those assessments indicate to the court that the regulation is not cost-justified. The explanation is that if the court were to consider the evidence on the merits, the agency would not have an incentive to gather the information, or indeed to act at all. The court's expected gains from encouraging agency research and allowing agency action may outweigh the expected costs associated with too many *ex post* approvals of bad regulations.

---

1. A more fundamental question, which this article does not address, concerns when and why independent oversight is desirable in the first place. Perhaps the most plausible justification is that independent review may help redress agency problems that affect the primary decision-maker.

Third, the preceding two results depend on the assumption that the overseer can observe the product of research effort (i.e., the evidence) more easily or cheaply than it can observe the research effort itself. If, however, the overseer can condition approval of a policy proposal on the level of research effort, there is less need to use the substantive evidentiary standard to incentivize information-gathering. So, for example, if a court can impose various forms of procedural oversight that ensure the responsible agency has invested effort in learning the true costs and benefits of its proposed safety regulation, the court is freer to base its final decision on its assessment of the regulation's net benefits in light of the evidence that the agency acquired (or failed to acquire).

Fourth, notwithstanding the fact that viable procedural oversight mechanisms reduce an overseer's need to use the substantive evidentiary standard to incentivize information acquisition, an overseer may sometimes prefer to couple procedural oversight with a substantive standard other than the *ex post* optimal standard. In other situations, a rational overseer might prefer to dispense with procedural oversight, even when it is available, and instead simply impose the *ex post* optimal substantive evidentiary standard. These results arise because coupling procedural oversight with a substantive standard that is too strong may deter the agency from taking action altogether.

After a brief review of some of the relevant literature, this article develops these arguments in the context of a simple but flexible formal model, and then considers some applications of the model's main results.

## 1. The Extant Literature

Typically, the literature on optimal evidentiary standards focuses on minimizing the sum of decision costs and *ex post* error costs (Posner 1973; Rubinfeld and Sappington 1987; Kaplow and Shavell 1994), efficiently extracting information from better-informed parties (Milgrom and Roberts 1986; Shin 1998; Hay and Spier 1997; Hay 1997), and, to a somewhat lesser extent, influencing parties' primary conduct incentives (Kaplow and Shavell 1994, 1996; Sanchirico 2001a,b, 2006; Stephenson 2006). Much of this literature assumes, however, that the parties' informational endowments are exogenous. This assumption, while often a useful simplification, may obscure the degree to which the evidentiary standard applied by an

independent overseer, such as a court, may influence the *production or acquisition* of relevant information. In the context of judicial oversight of an administrative agency, for example, the standard of review applied by the court may affect the amount of information the agency acquires before deciding whether to regulate.<sup>2</sup>

That said, several important contributions have focused specifically on how evidentiary standards might affect information-gathering incentives. Administrative law scholars, for example, have suggested that judicial scrutiny of agency evidence may induce agencies to gather more information (Pederson 1975; Seidenfeld 2002), while evidence law scholars have explained certain rules of evidence as devices to encourage parties to seek out the best available information (Nance 1988; Friedman 1992). Economic analyses of private law—particularly contracts and products liability—have considered how information disclosure requirements influence a seller’s decision to acquire information about product characteristics (Kronman 1978; Shavell 1994; Polinsky and Shavell 2006).<sup>3</sup> In the regulation literature, Li (2001) shows that it is sometimes optimal for licensing agencies, such as the Food and Drug Administration, to adopt a standard of evidentiary certainty that is excessively stringent *ex post*, because this helps redress the collective action problem that impedes the acquisition of useful information. In another contribution to the regulation literature, Pfaff and Sanchirico (2000) show how firms may conduct too few “environmental audits” when regulators, such as the Environmental Protection Agency, can use the information uncovered by an audit as the evidentiary basis for an enforcement action.

The core insight of these contributions is that an evidentiary standard that is *ex post* optimal may turn out to be suboptimal when the impact on *ex ante* information-acquisition incentives is taken into account. This article builds on that core insight, examining a particular class of evidentiary rules—those

---

2. This point is closely related to the political economy literature on how an agent’s expertise may vary with the scope of its delegated authority (Aghion and Tirole 1997; Bendor and Meiwowitz 2004); the degree to which its decision may be modified by an overseer (Gilligan and Krehbiel 1987, 1990; Prendergast 1993, 2003); whether the decision process employs partisan advocates (Dewatripont and Tirole 1999); and the decision costs that the agent must bear to change policy (Stephenson 2007).

3. A closely related literature considers how liability rules (e.g., strict liability vs. negligence, criminal liability) may affect incentives to acquire information about risk or wrongdoing (Shavell 1992; Arlen 1994).

that require an agent, such as a regulatory bureaucracy, to produce and/or disclose a particular sort of decision-relevant evidence—and considering the potential trade-off between the effect of these evidentiary rules on *ex post* policy decisions and their effect on *ex ante* research decisions. This trade-off may lead a rational overseer, such as a court, to prefer an evidentiary standard that permits policy decisions that seem unjustified on the basis of the available evidence, or one that forbids policy decisions that the overseer would otherwise accept.

## 2. The Basic Model

Consider a simple policymaking game with two strategic players—a proposer (the “agency” (A)) and an overseer (the “court” (C))—who are jointly responsible for deciding whether to take some action,  $\alpha \in \{0, 1\}$ , where  $\alpha = 1$  denotes the decision to adopt a new policy (e.g., to ban a potentially dangerous product) and  $\alpha = 0$  denotes the decision to retain the status quo. If the agency proposes the new policy and the court approves it, the new policy is enacted. If the agency fails to propose, or the court fails to approve, the status quo remains in effect. Thus, each decision-maker has a de facto veto over the new policy, though the agency must always make its decision first.<sup>4</sup>

The net benefits of the proposed regulation, both to the agency and to the court, depend on initially unknown and difficult-to-ascertain facts about regulatory costs and benefits. The model captures this in simplified form by assuming that the payoff of the regulation to both the agency and the court is affected by the “state of the world,”  $\omega \in \{\omega_X, \omega_Y, \omega_Z\}$ . In state  $\omega_X$ , the agency and the court both prefer the new regulation to the status quo.<sup>5</sup> Formally,  $E(U_A|\omega_X) > 0$  and  $E(U_C|\omega_X) > 0$ . In state  $\omega_Y$ , the agency prefers the new regulation, but the court prefers the status

---

4. The enforceability of the court’s veto is simply assumed for purposes of this article. (For a formal analysis demonstrating how this decision-making structure can be enforced by rational voters, see Stephenson (2004).) For simplicity, I also omit the possibility that the court might compel an agency to regulate. While there are some real-world cases where courts can force an agency to act, in general this is unusual and costly.

5. For both the agency and the court, the payoff from the status quo is normalized to 0. I make the arbitrary tie-breaking assumption that, when a player’s expected utility from regulation is 0, that player would prefer to maintain the status quo.

quo. Formally,  $E(U_A|\omega_Y) > 0$  but  $E(U_C|\omega_Y) \leq 0$ . Finally, in state  $\omega_Z$  the agency prefers the status quo ( $E(U_A|\omega_Z) \leq 0$ ). Suppose, for example, that the only decision-relevant information on the proposed product ban, for both the agency and the court, is the economic cost per statistical life saved. The agency and the court, however, differ over the value of a statistical life: the agency values each life at \$2 million, while the court values each life at \$1 million. If the true cost-per-life is less than \$1 million, then the state is  $\omega_X$ , because both the agency and the court would prefer to adopt the regulation under these circumstances. In contrast, if the cost-per-life is greater than \$2 million, the state is  $\omega_Z$ , because in this case the agency would prefer the status quo. Finally, if the cost-per-life is between \$1 million and \$2 million, the state is  $\omega_Y$ , because the agency, but not the court, would view the regulation as worthwhile.

The agency and the court do not know the true state *ex ante*. They do, however, know the *ex ante* probabilities of each state. The probability that  $\omega = \omega_X$  is denoted  $p_X$ , the probability that  $\omega = \omega_Y$  is  $p_Y$ , and the probability that  $\omega = \omega_Z$  is  $p_Z = 1 - p_X - p_Y$ . In the context of the above example,  $p_X$  is the probability that the proposed ban will cost less than \$1 million per life saved,  $p_Y$  is the probability that the ban will cost between \$1 and \$2 million per life saved, and  $p_Z$  is the probability that the ban will cost more than \$2 million per life saved.

As an additional notational simplification, define  $X_A = p_X E(U_A|\omega_X)$ ,  $Y_A = p_Y E(U_A|\omega_Y)$ , and  $Z_A = (1 - p_X - p_Y)E(U_A|\omega_Z)$ ; define  $X_C$ ,  $Y_C$ , and  $Z_C$  in equivalent fashion. Furthermore, define the agency's expected payoff from the regulation *ex ante*, when  $\omega$  is unknown, as  $\mu_A = X_A + Y_A + Z_A$ . Similarly, the court's *ex ante* expected payoff from regulation is  $\mu_C = X_C + Y_C + Z_C$ . Thus, if the agency learns no additional information about the likely impact of the proposed regulation, the agency would prefer to regulate if  $\mu_A > 0$ , but would prefer to retain the status quo if  $\mu_A \leq 0$ . Most of the analysis will focus on cases in which the agency initially believes the regulation is desirable ( $\mu_A > 0$ ), because the range of choices and trade-offs is richer and more interesting in this case. The discussion will, however, note how the results change when  $\mu_A \leq 0$ .

Before the agency decides whether to propose regulation, it may try to acquire additional information about the regulation's likely effects. For example, the agency might conduct studies or hold hearings to learn more about the benefits of a proposed product ban (e.g., the number of deaths

and injuries the ban will prevent), the costs the ban would impose (e.g., the economic burden on producers and consumers), and other relevant effects (e.g., the distributional implications of this regulation for different interest groups and geographic regions). Furthermore, the agency can improve its chances of obtaining useful information by investing resources in data gathering, analysis, consultations, or other investigative activities. I will refer to such activities collectively as “research.”

Formally, the agency chooses a level of research effort  $\rho = \{L, H\}$ , where  $\rho = L$  denotes “low” research effort and  $\rho = H$  denotes “high” research effort. The cost to the agency of high research effort is a constant  $k > 0$ ; the cost of low research effort is normalized to 0. After selecting its effort level, the agency observes the fruits of its research. In the real world, the information produced by research will be quite complex. The model abstracts away from this complexity and assumes that the agency’s research provides the agency either with “hard” evidence or “inconclusive” evidence. Formally, the agency receives a signal  $\sigma = \{\emptyset, \omega\}$ . With probability  $\pi_\rho$ , the agency observes  $\sigma = \omega$  (the agency’s research produces “hard” evidence that reveals the true state of the world). With probability  $1 - \pi_\rho$ , the agency receives signal  $\sigma = \emptyset$  (the agency’s research produces “inconclusive” evidence that does not improve the agency’s assessment of the regulation’s likely impact).<sup>6</sup> The agency’s likelihood of acquiring hard evidence is greater if the agency chooses high research effort (that is,  $1 \geq \pi_H > \pi_L \geq 0$ ). The parameters  $k$ ,  $\pi_H$ , and  $\pi_L$  are common knowledge.

In contrast to the agency, the court cannot observe the true state ( $\omega$ ) directly. Furthermore, in the basic model the court cannot observe the agency’s research effort ( $\rho$ ). The court can, however, demand that the agency truthfully disclose the results of its research ( $\sigma$ ). The model further assumes that at the beginning of the game the court can credibly commit to a substantive “evidentiary standard,” which specifies the probability that the court will uphold or reject a proposed regulation conditional on the value of  $\sigma$ . The primary question to be analyzed in the next section concerns the court’s optimal evidentiary standard.

---

6. The assumption of a binary choice between low and high effort is an unrealistic but convenient simplification, as is the assumption that the agency either learns the true state with certainty or else learns nothing. These simplifications are common in the political economy literature on bureaucratic information-gathering (Aghion and Tirole 1997; Dewatripont and Tirole 1999; Prendergast 2003).

We can now summarize the order of play as follows:

- Step 0: Nature chooses the true state,  $\omega$ , from set  $\{\omega_X, \omega_Y, \omega_Z\}$ , where  $p_i$  is the probability that  $\omega = \omega_i$ .
- Step 1: The court announces an evidentiary standard that specifies the probability that the court will uphold or reject regulation conditional on  $\sigma$ ;
- Step 2: The agency chooses a research effort level,  $\rho = \{L, H\}$ . If the agency chooses  $\rho = H$ , it incurs utility cost  $k > 0$ .
- Step 3: The agency observes signal  $\sigma = \{\emptyset, \omega\}$ , where the probability that  $\sigma = \omega$  is  $\pi_\rho$ .
- Step 4: The agency decides whether to propose regulation. If the agency decides not to propose regulation, the final action is  $\alpha = 0$  and the game ends. If the agency proposes regulation, the game proceeds to Step 5.
- Step 5: The court observes  $\sigma$  and applies the evidentiary standard it announced at Step 1. If the court upholds the regulation, the final outcome is  $\alpha = 1$ ; if the court rejects the regulation, the final outcome is  $\alpha = 0$ .

Before proceeding, it is important to highlight five potentially problematic modeling assumptions, to explain their significance, and to provide some justification for them.

First, the assumption that the agency but not the court may acquire additional information derives from the view that agencies typically have better fact-finding capabilities than judicial or other overseers (Landis 1936; Spence and Cross 2000). Many institutional devices may mitigate this problem, however. For example, courts can rely on litigants or outside experts to provide information (Epstein and O'Halloran 1995; Dewatripont and Tirole 1999). Nonetheless, it seems reasonable to suppose that courts cannot overcome their informational disadvantages completely. The model captures this in simplified form by assuming that courts cannot do any independent fact-finding.

Second, the assumption that the court can condition its approval of a proposed regulation on the agency's evidence ( $\sigma$ ) implies that the court can verify whether the agency has truthfully disclosed its information. In some contexts, however, courts may lack the expertise to verify, or even to understand, the evidence an agency presents (Shapiro 1988). This observation motivates recent research that explores the implications of bureaucratic

oversight when overseers cannot evaluate agencies' evidentiary submissions on the merits (Stephenson 2006). That research, however, may understate the degree to which courts can assess the evidence presented to them. This article complements the existing literature by focusing on cases where courts can verify the information that agencies provide.<sup>7</sup>

Third, the basic model assumes that the court cannot observe agency research effort ( $\rho$ ) directly (cf. Pfaff and Sanchirico 2000). This assumption is plausible if the activities that might generate additional evidence are more difficult for a court to verify than the evidence itself. For instance, a court may be able to observe the results of a cost–benefit study more easily than the court can evaluate whether the study was done well—whether, for example, there were other analytic techniques or data sources that the agency could have used. In other cases, however, courts may be able to assess agency research effort more directly. This possibility is taken up in Part 4, which considers a variant on the basic model in which the court can condition regulatory approval on agency research effort.

Fourth, the analysis assumes that the court's choices are limited to accepting or rejecting the proposed regulation; the court cannot offer the agency side-payments or impose penalties other than outright rejection (cf. Bueno de Mesquita and Stephenson 2007; Alonso and Matouschek 2007). This constraint is an important distinction between the public law setting considered in this article and many private law settings analyzed in other work (e.g. Shavell 1994; Polinsky and Shavell 2006). Although one might analogize this article's analysis to a private contractual setting by characterizing the agency as a seller who offers a “product” (the regulation) to a consumer (the court), the analogy is potentially misleading. In the model presented in this article, there is no adjustable market price for the regulation, nor can the agency and the court bargain to redistribute the surplus from the transaction. Rather, the agency makes the court a take-it-or-leave-it offer. This approach

---

7. The assumption that the court can verify  $\sigma$  also omits the possibility that the agency might fabricate evidence. Costless fabrication would, of course, be equivalent to nonverifiability. Some recent work analyzes situations in which a litigant's cost of producing evidence depends on whether the evidence is true or false, even though the overseer cannot directly verify whether the proffered evidence is accurate (Sanchirico 2001b, 2004; Johnston 2002; Stephenson 2006). For reasons of simplicity and tractability, this article does not consider that possibility.

is a more substantively accurate characterization of many important public law settings.<sup>8</sup>

Finally, the analysis depends on the assumption that the court can credibly commit to an evidentiary standard at Step 1. This precommitment assumption is problematic. If the court's expected utility from approving regulation at Step 5 is higher than its expected utility from the status quo, why would the court be willing to strike down the regulation even if that is the action specified by the evidentiary standard? Likewise, if the court's expected utility from regulation is negative at Step 5, why would the court ever be willing to uphold the regulation? Without minimizing these difficulties, there are a few ways the precommitment assumption can be justified. First, unmodeled institutional mechanisms—such as external monitoring or repeat play and reputation—might make *ex ante* commitments to an evidentiary standard credible (cf. Diermeier 1995). Second, one might think of the choice of evidentiary standard as being made not by the court itself, but by some higher-order institutional designer that selects a court that will behave *ex post* in accordance with the designer's preferred evidentiary standard (cf. Rogoff 1985; Spulber and Besanko 1992). Third, analysis of the credible commitment case provides a useful baseline for considering the implications of relaxing the precommitment assumption.

### 3. Substantive Evidentiary Standards

The court's evidentiary standard specifies the probability that the court will uphold the regulation given the agency's evidence ( $\sigma$ ). For simplicity, we can restrict attention to pure strategies in which, for each possible  $\sigma$ , the court either upholds or rejects the regulation with certainty. Because there are four possible values of  $\sigma$  ( $\omega_X, \omega_Y, \omega_Z, \emptyset$ ), there are  $2^4 = 16$  possible pure-strategy evidentiary standards. However, in equilibrium the agency would never propose regulation if  $\sigma = \omega_Z$ , so we can treat as equivalent any two standards that differ only in whether the court would uphold regulation

---

8. Some political economists, however, have suggested that certain institutional arrangements might allow more refined incentive schemes, similar to graduated pricing mechanisms, between public agencies and their principals (Baron 2000; Prendergast 2003; Gailmard 2006). In settings where overseers can offer agencies more finely calibrated incentive schemes, the model developed in this article may be less directly applicable.

if  $\sigma = \omega_Z$ . Furthermore, in equilibrium the court never rejects regulation when  $\sigma = \omega_X$ .<sup>9</sup> Therefore, we can restrict attention to four possible ideal-type evidentiary standards that the court might adopt at Step 1, each of which specifies one of two actions (uphold, reject) for each of two possible evidentiary states ( $\omega_Y, \emptyset$ ). In other words, the court's choice of evidentiary standard can be characterized in terms of the answers to two questions: First, will the court uphold regulation if the agency has only inconclusive evidence ( $\sigma = \emptyset$ )? Second, will the court uphold regulation even if the agency has hard evidence that the regulation is bad for the court ( $\sigma = \omega_Y$ )? These four evidentiary standards can be described as follows:

First, the court might refuse to uphold regulation unless the agency has hard evidence that the expected value of the regulation for the court is positive ( $\sigma = \omega_X$ ). If the agency's evidence is inconclusive ( $\sigma = \emptyset$ ) or unfavorable from the court's perspective ( $\sigma = \omega_Y$ ), the court would not approve the regulation.<sup>10</sup> This evidentiary standard, which I will refer to as a convincing evidence (CE) standard, is probably the most intuitive approach that the court could adopt. It imposes on the agency both a *burden of production* (the agency must present hard evidence) and a *burden of persuasion* (this evidence must convince the court that regulation is a good idea).<sup>11</sup>

Second, the court might decline to impose any substantive evidentiary requirements on the agency. Because this approach is functionally equivalent to eliminating evidentiary review, I call it the no review (NR) standard. In formal terms, regulation will be enacted under the NR standard when the agency has hard evidence that the regulation has positive expected utility for

---

9. The reason for this, as will become clearer in the subsequent analysis, is that committing to reject regulation if  $\sigma = \omega_X$  hurts the court both *ex post*, by requiring rejection of a regulation the court views as desirable, and *ex ante*, by reducing the agency's incentive to invest in research.

10. I presume throughout that the agency would not propose a regulation that the court would not approve. Relaxing this assumption would not affect the analysis in any important way.

11. In legal discourse, *convincing evidence* is sometimes used as a term of art to denote a particular degree of certainty, typically greater than "more likely than not" but short of "beyond a reasonable doubt." This article does not use the term in that sense. Rather, the type or quality of evidence that a court would view as sufficient, given the court's view of the relative costs of Type I and Type II errors, is built into the probability that  $\omega = \omega_X$ . Presumably, this probability would be larger under a "more likely than not" standard and smaller under a "beyond a reasonable doubt" standard.

the agency ( $\sigma \in \{\omega_X, \omega_Y\}$ ), or when the agency is uninformed ( $\sigma = \emptyset$ ).<sup>12</sup> The agency will refrain from regulating under the NR standard only when the agency has hard evidence that regulation is against the agency's interests ( $\sigma = \omega_Z$ ).<sup>13</sup>

The third ideal-type evidentiary standard is mandatory disclosure (MD). Under this standard, the court upholds regulation if the agency has hard evidence that the regulation is good for the court ( $\sigma = \omega_X$ ), or if the agency's evidence is inconclusive ( $\sigma = \emptyset$ ).<sup>14</sup> The agency will not enact regulation if hard evidence indicates the regulation is bad for the agency ( $\sigma = \omega_Z$ ) or for the court ( $\sigma = \omega_Y$ ). I refer to this standard as *mandatory disclosure* because the agency, although not obligated to obtain hard evidence in order to regulate, must disclose any evidence that it does uncover. The MD standard may also apply to cases in which the court carefully scrutinizes the available evidence but defers to the agency's judgment if the agency and the court both realize that they are in the realm of speculation, as when the issue is one 'on the frontiers of scientific knowledge' (e.g., *Environmental Defense Fund v. EPA*, 598 F.2d 62 (D.C. Cir. 1978)).

Under the fourth evidentiary standard, which I will refer to as *substantial evidence* (SE), the court refuses to uphold regulation unless the agency has hard evidence, but the court does not consider the content of that evidence. That is, the court upholds regulatory proposals accompanied by hard evidence even if that evidence makes the regulation look undesirable to the court. One can think of this standard as imposing on the agency a "burden of production" but *not* a "burden of persuasion." In formal terms, the agency will enact regulation under the SE standard if  $\sigma \in \{\omega_X, \omega_Y\}$  but not if  $\sigma = \emptyset$ .<sup>15</sup> The SE standard is probably the least intuitive of the four

---

12. This latter result depends on the assumption that  $\mu_A > 0$ .

13. The NR standard need not imply a literal absence of review. It could also apply when the court is maximally deferential, or when the court is simply incapable of determining whether the agency actually has hard evidence.

14. This latter result, again, depends on the assumption that  $\mu_A > 0$ .

15. As with *convincing evidence*, the use of the term *substantial evidence* requires some qualification in light of how this phrase is used in legal discourse. In administrative law, substantial evidence is a term of art used to describe the amount of evidence that an agency must present in support of factual findings in formal adjudications or (under some statutes) legislative rules. This article's use of the term substantial evidence is connected with this legal usage, in that the legal substantial evidence standard is sometimes interpreted as requiring an agency to provide strong evidence rather than mere speculation

	<i>Court upholds if evidence is inconclusive (<math>\sigma = \emptyset</math>)</i>	<i>Court rejects if evidence is inconclusive (<math>\sigma = \emptyset</math>)</i>
<i>Court up holds if evidence is hard but adverse (<math>\sigma = \omega_Y</math>)</i>	No review (NR)	Substantial evidence (SE)
<i>Court rejects if evidence is hard but adverse (<math>\sigma = \omega_Y</math>)</i>	Mandatory disclosure (MD)	Convincing evidence (CE)

**Figure 1.** Ideal-type evidentiary standards.

ideal-type evidentiary standards, because under this standard the court prohibits regulation when the evidence regarding the regulation's effects is inconclusive, but the court allows regulation when there is hard evidence that the regulation is a bad idea from the court's perspective.

Figure 1 depicts these four ideal-type standards and the relationship between them.

Before proceeding, it is worth noting what happens if one abandons the assumption that the agency is predisposed toward regulation *ex ante* ( $\mu_A > 0$ ). Under the alternative assumption that the agency is skeptical of regulation *ex ante* ( $\mu_A \leq 0$ ), two of the four evidentiary standards—SE and MD—are functionally identical to two of the other standards—NR and CE, respectively. If  $\mu_A \leq 0$ , then under both the SE and NR standards the agency enacts regulation if and only if hard evidence shows the expected utility of regulation for the agency is positive ( $\sigma \in \{\omega_X, \omega_Y\}$ ). Similarly, if  $\mu_A \leq 0$ , then under both the CE and MD standards the agency will enact regulation if and only if hard evidence shows the regulation has positive expected utility for both the agency and the court ( $\sigma = \omega_X$ ). Although the remainder of the analysis continues to assume that  $\mu_A > 0$ , one can modify the results to apply to cases where  $\mu_A \leq 0$  simply by dropping the SE and MD standards from consideration.

---

or conjecture, but not that this evidence actually establish that the agency made the correct decision. That said, this article's use of the term substantial evidence differs in important respects from the conventional legal usage. Courts sometimes reject agency decisions under the legal substantial evidence standard because the court concludes that the weight of the evidence disfavors the agency's decision. That behavior corresponds more to the CE standard than the substantial evidence standard. Also, the SE standard analyzed in this article might apply in contexts where the relevant legal test would be something other than substantial evidence.

### 3.1. The Optimal Evidentiary Standard with Exogenous Research

The first question to address is what the court's optimal evidentiary standard would be if the standard does not affect agency research.<sup>16</sup> The answer to this question is given by the following lemma.

*Lemma 1.* *If the evidentiary standard does not affect agency research effort ( $\rho$ ), then the court prefers the MD standard if  $\mu_C > 0$ , and the court prefers the CE standard if  $\mu_C \leq 0$ .*<sup>17</sup>

The intuition for this result is straightforward. If the evidentiary standard does not affect the probability that the agency will acquire hard evidence, the court's only concern is with maximizing its expected utility conditional on whatever evidence the agency has at Step 5. In this situation, the court will always prefer CE to SE: both require the agency to have hard evidence, but the SE standard allows the agency to regulate even when that evidence indicates the regulation is bad for the court. For essentially the same reason, the court always prefers MD to NR, as the only difference between them is whether the agency can regulate when it has hard evidence that the regulation is good for the agency but bad for the court. Therefore, the court's most-preferred evidentiary standard will be either CE or MD. The court's preference between these two depends on whether the court would favor regulation even in the absence of hard evidence. If the court thinks that regulation has a positive expected value *ex ante*, the court prefers MD. On the other hand, if the court views regulation as a bad idea *ex ante*, then the court is better off imposing CE.

### 3.2. The Evidentiary Standard's Effect on Agency Research

Because information-gathering is costly, and because the value to the agency of investing in this costly activity depends in part on how the outcome

---

16. To be clear, while the article refers throughout to the optimal evidentiary standard, the focus is on optimality from the court's perspective, not social optimality. The court's utility function does not incorporate the agency's utility, nor does the court internalize any of the agency's research costs. Even if the court did care about the opportunity costs of diverting agency resources to research, these costs are likely to be much lower for the court than they are for the agency. Rather than including a discounted cost term for agency effort in the court's utility function, the model makes the simplifying assumption that agency effort costs do not enter into the court's utility function at all.

17. All proofs are in the Appendix.

is likely to affect its subsequent freedom of action, the court's choice of evidentiary standard may affect the agency's research effort. To capture this formally, let us first define the agency's expected benefit at Step 2 from acquiring hard evidence as  $B_I$ , where  $I \in \{CE, SE, NR, MD\}$  denotes the evidentiary standard. The relative magnitudes of each  $B_I$  are given by the following lemma.

*Lemma 2. Of the four ideal-type evidentiary standards, the agency's research incentive is strongest under SE and weakest under MD ( $B_{SE} \geq \max\{B_{CE}, B_{NR}\} \geq \min\{B_{CE}, B_{NR}\} \geq B_{MD}$ ). If  $\mu_A > Y_A$ , the agency's research incentive is stronger under CE than under NR ( $B_{CE} > B_{NR}$ ); if  $\mu_A < Y_A$ , then the agency's research incentive is stronger under NR than CE ( $B_{NR} > B_{CE}$ ); and if  $\mu_A = Y_A$ , agency research incentives under NR and CE are equal ( $B_{NR} = B_{CE}$ ).*

The key to this result is the fact that the evidentiary standard affects the value of research to the agency in two distinct ways. First, if the standard forbids regulation unless the agency has hard evidence—as is the case for the CE and SE standards—then the agency's expected value of high research effort is greater, all else equal. In the absence of such a requirement, an agency with inconclusive evidence would still be assured a positive expected payoff from regulation ( $\mu_A > 0$ ). But if the court demands hard evidence as a prerequisite for upholding regulation, then an agency with inconclusive evidence will receive its status quo payoff (0). A requirement that the agency possess hard evidence thus increases the relative value of research to the agency. Furthermore, the higher the agency's *ex ante* expected value of regulation ( $\mu_A$ ), the more a judicial demand for hard evidence increases the agency's incentive to invest in research.

Second, if the standard bars the agency from regulating if hard evidence reveals that the regulation is bad for the court—as is the case for the CE and MD standards—then the agency's expected value of high research effort is lower, all else equal. The reason is that these evidentiary standards penalize the agency for discovering the truth, if the truth turns out to be that regulation is good for the agency but bad for the court.<sup>18</sup>

---

18. In formal terms, such evidentiary standards reduce the expected value to the agency of acquiring hard evidence by  $Y_A$ , which is the product of (1) the probability that the agency but not the court would benefit from regulation ( $p_Y$ ), and (2) the expected

For these reasons, the SE standard creates the strongest research incentives. This standard both requires the agency to uncover hard evidence before it can regulate, and allows the agency to regulate if the agency discovers hard evidence that the court views as adverse. Agency research incentives are weakest under the MD standard, which does not penalize the agency for failing to acquire hard evidence, but does prevent the agency from acting if the agency obtains hard evidence that the court views as adverse.

Assessing the relative strength of the agency's research incentives under CE and NR is more complicated because the two effects described above cut in opposite directions. Under the NR standard, the agency is not penalized if it uncovers hard evidence that the court would view as adverse, but the agency is also not penalized if its evidence is inconclusive. By contrast, the CE standard penalizes an agency that fails to unearth hard evidence, but it also prevents the agency from acting on the basis of hard evidence that court views as adverse. If the agency's *ex ante* expected utility from regulation ( $\mu_A$ ) is greater than its expected utility gain from permission to regulate when regulation is bad for the court ( $Y_A$ ), then the agency will invest more in research under CE than under NR; the opposite is true if  $\mu_A$  is smaller than  $Y_A$ . That latter result suggests that an agency will sometimes invest more in research if the court abstains from oversight than if the court demands that the agency present convincing evidence in support of its regulation.

### 3.3. The Optimal Evidentiary Standard with Endogenous Research

A court that can commit to an evidentiary standard confronts a trade-off. On one hand, it would like to implement the most desirable policy, given whatever evidence is available at Step 5. Lemma 1 shows that by this criterion the court's best evidentiary standard is either CE or MD, depending on whether the court views regulation as desirable *ex ante*. The least desirable standard, according to this criterion, is either SE or NR. On the other hand, as Lemma 2 shows, the court's choice of evidentiary standard may affect the agency's research effort. In particular, the agency's research incentives are strongest under SE and weakest under MD. What, then, is

---

utility of the agency of regulation in such a state ( $E(U_A|\omega_Y)$ ). The greater the value of  $Y_A$ , the greater the decrease in the agency's research incentive if the court adopts an evidentiary standard that prevents the agency from regulating if the agency acquires hard evidence that the regulation is bad for the court.

the court's optimal evidentiary standard when its choice affects both the agency's research effort and the ultimate regulatory decision?

In answering this question, it is helpful to consider separately the cases where the court is *ex ante* skeptical of regulation ( $\mu_C \leq 0$ ) and where it is *ex ante* sympathetic to regulation ( $\mu_C > 0$ ).<sup>19</sup> Consider first the former case. Lemma 1 establishes that a skeptical court would prefer CE if the evidentiary standard does not affect the agency's research effort. When that assumption is relaxed pursuant to Lemma 2, this result changes in accordance with the following proposition.

*Proposition 1. If the court is ex ante skeptical of regulation ( $\mu_C \leq 0$ ), then the court's optimal evidentiary standard is:*

- (a) SE if  $B_{SE} > k > B_{CE}$  and  $(\pi_H - \pi_L)X_C > -\pi_H Y_C$ ;
- (b) CE otherwise.

According to Proposition 1, the court may prefer SE to CE, even though committing to the SE standard may require the court to uphold agency action that is bad for the court according to the evidence available at the time of review. The reason is that the agency may invest more in research under the SE standard than it would under the CE standard (i.e.,  $B_{SE} > k > B_{CE}$ ), precisely because the agency knows that it can do more with the evidence it discovers under the former standard than under the latter. This additional research investment benefits the court if it turns out that the regulation is good for both the agency and the court (i.e.,  $\omega = \omega_X$ ), because the greater research investment increases the probability that the agency will discover this happy truth (from  $\pi_L$  to  $\pi_H$ ). But, if the regulation is good for the agency but bad for the court (i.e.,  $\omega = \omega_Y$ ), the application of SE rather than CE raises the probability that the agency will enact regulation (from zero to  $\pi_H$ ). Thus, when the court is skeptical of regulation, it might prefer to commit itself to approve all agency actions that are supported by hard evidence—even when the evidence is adverse—if (a) such an approach sufficiently increases

---

19. In the real world, a single court will review a great variety of regulatory proposals in the same general category, and it is likely to be sympathetic to some and skeptical of others. If the court cannot commit to apply different standards depending on its view of the likely merits of a particular case, its optimal standard will depend on the relative proportion of cases in which it would be sympathetic or skeptical, as well as the expected magnitudes of different error costs.

the agency's research incentives, and (b) the expected benefits associated with greater agency research outweigh the costs of allowing the agency to regulate in the face of adverse evidence.

What about those cases where the court is *ex ante* sympathetic to regulation ( $\mu_C > 0$ )? Here, a similar logic applies—the court must consider the trade-off between enforcing its *ex post* policy preferences and encouraging *ex ante* agency investment in expertise—but the result is somewhat more complex. The specific results are summarized in the following proposition.

*Proposition 2. If the court is ex ante sympathetic to regulation ( $\mu_C > 0$ ), then the court's optimal evidentiary standard is:*

- (a) *SE* if  $B_{SE} > k > \max\{B_{CE}, B_{NR}\}$  and  $(\pi_H - \pi_L)X_C > (1 - \pi_L)\mu_C - \pi_H Y_C$ ,
- (b) *CE* if  $B_{CE} > k > B_{NR}$  and  $(\pi_H - \pi_L)X_C > (1 - \pi_L)\mu_C$ ,
- (c) *CE* if  $\min\{B_{CE}, B_{NR}\} > k > B_{MD}$  and  $(\pi_H - \pi_L)X_C > (1 - \pi_L)\mu_C$  and  $\pi_H Y_C + (1 - \pi_H)\mu_C < 0$ ,
- (d) *NR* if  $B_{NR} > k > B_{CE}$  and  $(\pi_H - \pi_L)X_C > (\pi_H - \pi_L)\mu_C - \pi_H Y_C$ ,
- (e) *NR* if  $\min\{B_{CE}, B_{NR}\} > k > B_{MD}$  and  $(\pi_H - \pi_L)X_C > (\pi_H - \pi_L)\mu_C - \pi_H Y_C$  and  $\pi_H Y_C + (1 - \pi_H)\mu_C > 0$ ,
- (f) *MD* otherwise.

Recall that Lemma 1 provides a baseline prediction that when agency research is unaffected by the evidentiary standard and the court is *ex ante* sympathetic to regulation ( $\mu_C > 0$ ), the court prefers MD. Proposition 2 shows how that prediction may change when agency research is endogenous.

Consider first Proposition 2(a). This condition is similar to the condition described in Proposition 1(a): the agency will not choose high research effort unless the court commits to the SE standard. Consequently, the court may prefer this standard if the benefits associated with greater agency research effort are sufficiently high.

The logic behind subparts (b) and (d) is similar, except that in these cases the court can induce high research effort with evidentiary standards other than SE. Under the conditions specified in Proposition 2(b), the court can induce high research effort with either SE or CE; the court prefers the latter because of its desirable *ex post* effects. Hence, the court compares the expected utility of a world in which the agency chooses high research effort

under CE to a world in which the agency chooses low research effort under MD. The former is preferable if the benefits of additional information are sufficiently high. Similarly, under the conditions described in Proposition 2(d) the court can induce high research effort with either SE or NR; between the two, the court prefers the latter because it has fewer *ex post* costs. Furthermore, the court prefers NR to MD if the expected benefits associated with increasing agency research outweigh the expected costs of allowing the agency to regulate when hard evidence indicates that regulation is bad for the court.

The situations described in Proposition 2(c) and (e) are more complicated. In these cases, the agency will choose high research effort under the SE, CE, or NR standards. The SE standard is dominated by both CE and NR. The court's preference between the latter two standards depends on the expected costs associated with allowing the agency to regulate when it has hard evidence that regulation is bad for the court ( $\pi_H Y_C$ ) and the expected costs of barring the agency from regulating when its evidence is inconclusive ( $(1 - \pi_H)\mu_C$ ). When the former is greater, the court compares CE with high agency research effort to MD with low agency research effort. Otherwise, the court compares NR with high research effort to MD with low research effort.

#### 4. Incorporating Procedural Oversight

The analysis in Part 3 assumed that the court can observe the evidence the agency obtains ( $\sigma$ ) but cannot observe the agency's research effort ( $\rho$ ). In some cases, however, courts may be able to observe research effort directly, or may be able to enforce procedural requirements that ensure the agency exerts a high level of research effort. If so, the court might be able to commit to rejecting any agency regulation that is not preceded by high research effort. We can refer to this strategy as "procedural oversight" to connote the court's insistence that the agency employ costly procedures (e.g., formal hearings, comment periods, preparation of impact statements) that increase the agency's probability of learning valuable information. With procedural oversight, the agency can only regulate if it chooses  $\rho = H$ ; if the agency chooses  $\rho = L$ , the agency and the court receive their status quo payoffs of 0. The availability of procedural oversight raises two questions. First, how does

procedural oversight alter the agency's research incentives under each of the four substantive evidentiary standards, in both relative and absolute terms? Second, how does the court's optimal strategy change when procedural oversight is available?

#### 4.1. Agency Research with Substantive and Procedural Oversight

To assess how the relationship between the substantive evidentiary standard and the agency's research incentives changes when the court employs procedural oversight, we can compare the agency's incentive to invest in high research effort under each of the four substantive evidentiary standards when low research effort guarantees the agency a status quo payoff of 0. Denote the agency's expected benefit at Step 2 of engaging in costly research, when the court imposes procedural oversight, as  $B'_I$ ,  $I \in \{CE, SE, NR, MD\}$ . The following lemma characterizes the relative strength of agency research incentives under each of the substantive evidentiary standards when the court also uses procedural oversight.

*Lemma 3. With procedural oversight, agency research incentives are strongest under NR and weakest under CE ( $B'_{NR} \geq \max\{B'_{SE}, B'_{MD}\} \geq \min\{B'_{SE}, B'_{MD}\} \geq B'_{CE}$ ). If  $(\frac{\pi_H}{1-\pi_H})Y_A > \mu_A$ , agency research incentives are stronger under SE than under MD; if  $(\frac{\pi_H}{1-\pi_H})Y_A < \mu_A$ , then agency research incentives are stronger under MD than SE; if  $(\frac{\pi_H}{1-\pi_H})Y_A = \mu_A$ , agency research incentives under SE and MD are equal.*

Lemma 2 established that, in the absence of procedural oversight, the agency's research incentives are strongest under SE and weakest under MD, and the agency's research incentives under CE are stronger than under NR if  $\mu_A > Y_A$  but weaker if  $\mu_A < Y_A$ . Lemma 3 shows how these results change if the court makes high research effort a precondition for judicial approval. When the court does this, agency research incentives are strongest under NR and weakest under CE. Also, the SE standard creates stronger agency research incentives than the MD standard if  $(\frac{\pi_H}{1-\pi_H})Y_A > \mu_A$ , but weaker incentives if  $(\frac{\pi_H}{1-\pi_H})Y_A < \mu_A$ .

The explanation for these results turns on the different effects of evidentiary standards that permit the agency to regulate even when the agency's evidence is inconclusive (NR and MD). Without procedural oversight, these standards *weaken* agency research incentives. The reason is that under NR or MD, in contrast to CE or SE, the agency that fails to acquire hard evidence

still gets an expected payoff of  $\mu_A > 0$  if it proposes regulation. When the court refuses to approve regulation if the agency has not invested in high effort, however, a standard that permits regulation without hard evidence *strengthens* research incentives, because an agency that chooses high research effort is guaranteed an expected payoff of  $\mu_A$  even if the research is unsuccessful. In contrast, if the evidentiary standard does not permit regulation without hard evidence, then the agency knows that if its research is unsuccessful, it will end up with its status quo payoff of 0.

Although the addition of procedural oversight changes the *relative* benefits of research under the four substantive evidentiary standards, procedural oversight increases the expected benefit of research under all four standards. The change in the relative ranking occurs because the magnitude of this increase is greater for some evidentiary standards than for others.<sup>20</sup> The important substantive conclusion is that the effect of the court's evidentiary standard on agency research incentives depends on whether the court can commit to rejecting a proposed regulation if the agency does not invest in high research effort. Procedural oversight not only increases the agency's incentives to do research, but it also changes the relative effects of different substantive evidentiary standards on agency research incentives. An institutional designer interested in influencing agency research effort therefore cannot simply consider procedural and substantive oversight separately or additively.

#### 4.2. The Optimal Evidentiary Standard with Procedural Oversight

The next question concerns the court's optimal evidentiary standard when the court can use procedural oversight. Consider first the case where the court is *ex ante* skeptical of regulation ( $\mu_C \leq 0$ ). For simplicity, assume that if the court is indifferent between imposing procedural oversight and eschewing

---

20. The magnitude of these differences can be calculated simply by taking the difference between  $B'_I$  and  $B_I$  for each  $I$ . Thus, procedural oversight increases the expected benefit of high research effort by  $\pi_L X_A$  under the CE standard; by  $\pi_L (X_A + Y_A)$  under the SE standard; by  $\pi_L X_A + (1 - \pi_L)\mu_A$  under the MD standard; and by  $\pi_L (X_A + Y_A) + (1 - \pi_L)\mu_A$  under the NR standard. The positive effect of procedural oversight on agency research incentives is therefore strongest under NR and weakest (but still positive) under CE. The relative strength of the effect of procedural oversight under SE and MD depends on the values of the other parameters. Specifically, if  $(\frac{\pi_L}{1-\pi_L})\mu_A > Y_A$ , then procedural oversight has a greater positive effect on agency research incentives under SE than under MD, but the opposite is true if  $(\frac{\pi_L}{1-\pi_L})\mu_A < Y_A$ .

procedural oversight, the court will impose procedural oversight.<sup>21</sup> Making use of this assumption and Lemma 3, the court's optimal evidentiary standard is given by the following proposition.

*Proposition 3. If the court is ex ante skeptical of regulation ( $\mu_C \leq 0$ ), and the court can condition regulatory approval on the agency's research effort ( $\rho$ ), then the court's optimal evidentiary standard is:*

- (a) *NR with procedural oversight if  $B'_{NR} > k > \max\{B'_{SE}, B'_{MD}\}$  and  $(\pi_H - \pi_L)X_C > -(\pi_H Y_C + (1 - \pi_H)\mu_C)$ ;*
- (b) *SE with procedural oversight if  $B'_{SE} > k > B'_{MD}$  and  $(\pi_H - \pi_L)X_C > -\pi_H Y_C$ ;*
- (c) *SE with procedural oversight if  $\min\{B'_{SE}, B'_{MD}\} > k > B'_{CE}$  and  $\mu_C < (\frac{\pi_H}{1 - \pi_H})Y_C$  and  $(\pi_H - \pi_L)X_C > -\pi_H Y_C$ ;*
- (d) *MD with procedural oversight if  $B'_{MD} > k > B'_{SE}$  and  $(\pi_H - \pi_L)X_C > -(1 - \pi_H)\mu_C$ ;*
- (e) *MD with procedural oversight if  $\min\{B'_{SE}, B'_{MD}\} > k > B'_{CE}$  and  $\mu_C > (\frac{\pi_H}{1 - \pi_H})Y_C$  and  $(\pi_H - \pi_L)X_C > -(1 - \pi_H)\mu_C$ ;*
- (f) *CE with procedural oversight if  $B'_{CE} > k$ ;*
- (g) *CE without procedural oversight otherwise.*

Consider each of the subparts of Proposition 3 individually. Proposition 3(a) focuses on cases where research costs ( $k$ ) are sufficiently high that even with procedural oversight, the agency will choose high research effort only under the NR standard. The court therefore compares its expected utility under NR with procedural oversight ( $\pi_H(X_C + Y_C) + (1 - \pi_H)\mu_C$ ) to its expected utility under CE (the court's *ex post* optimal standard) without procedural oversight ( $\pi_L X_C$ ), choosing whichever option has greater expected utility.

Proposition 3(b) applies to cases in which the agency will invest in research if the court imposes procedural oversight in conjunction with NR or SE, but not otherwise. The court's payoff is always greater under SE than under NR if the agency's research effort is the same under both, so the

---

21. This assumption is convenient because it eliminates the need to identify separately cases in which the court would be indifferent between imposing procedural oversight and not doing so.

only relevant comparison is between the court's expected utility from high research under SE ( $\pi_H(X_C + Y_C)$ ) and its expected utility from low research under CE ( $\pi_L X_C$ ). The logic behind Proposition 3(d) is similar. In that case, the agency invests in research under NR or MD with procedural oversight. Because the latter standard gives the court a higher expected payoff if agency research effort is constant, the court compares its expected utility under MD with high research ( $\pi_H X_C + (1 - \pi_H)\mu_C$ ) to its expected utility under CE with low research ( $\pi_L X_C$ ).

Subparts (c) and (e) cover cases in which the agency would invest in research under NR, SE, or MD if the court imposes procedural oversight. The NR standard is dominated by the other two, so the court compares its expected utility under three conditions: (1) high agency research under SE ( $\pi_H(X_C + Y_C)$ ); (2) high agency research under MD ( $\pi_H X_C + (1 - \pi_H)\mu_C$ ); and (3) low agency research under CE ( $\pi_L X_C$ ). The first of these three expected utilities is greatest under the conditions specified in Proposition 3(c); the second of these three expected utilities is greatest under the conditions specified in Proposition 3(e).

Proposition 3(f) covers cases in which the agency will choose high effort under CE with procedural oversight. Because CE gives the court the greatest expected *ex post* utility, holding agency research constant, CE with procedural oversight is optimal for the court.

Finally, Proposition 3(g) establishes that under some circumstances the court prefers to abstain from procedural oversight. When the conditions described in subparts (a)–(f) do not apply, procedural oversight would always deter the agency from regulating, guaranteeing that the court will receive its status quo payoff of 0. The court would do better if it allowed the agency to choose low research effort and subjected the agency to the CE standard, as this gives the court a positive expected payoff ( $\pi_L X_C$ ).

A comparison of Proposition 3 with Proposition 1 demonstrates the significance of procedural oversight for the court's optimal strategy. First, as one might expect, the court often prefers to employ procedural oversight. Second, in those cases where the court would prefer *not* to use procedural oversight, the court will choose its *ex post* optimal standard (CE). Third, the procedural oversight option does not mean the court will simply choose the CE standard in all cases. In some situations, the court cannot induce high research effort by coupling the CE standard with procedural oversight because doing so would deter the agency from acting, but the court *can*

induce high research effort by coupling procedural oversight with some other evidentiary standard.

Now, consider the case in which the court can use procedural oversight and is *ex ante* sympathetic to regulation ( $\mu_C > 0$ ). The court's optimal strategy in this case is given by the following proposition.

*Proposition 4.* If the court is *ex ante* sympathetic to regulation ( $\mu_C > 0$ ) and the court can condition regulatory approval on the agency's research effort ( $\rho$ ), then the court's optimal evidentiary standard is:

- (a) NR with procedural oversight if  $B'_{NR} > k > B'_{MD}$  and  $(\pi_H - \pi_L)(X_C - \mu_C) > -\pi_H Y_C$ ;
- (b) MD with procedural oversight if  $B'_{MD} > k$ ;
- (c) MD without procedural oversight otherwise.

Recall from Lemma 1 that if the court is *ex ante* sympathetic to regulation ( $\mu_C > 0$ ) and the substantive standard does not affect agency research, the court prefers MD. Proposition 4 demonstrates how this result changes when the court can employ procedural oversight.

Proposition 4(a) applies to cases in which the agency would choose high research effort under NR with procedural oversight but would choose low research effort under MD. In such cases, the court will compare the expected payoffs under the former  $(\pi_H(X_C + Y_C) + (1 - \pi_H)\mu_C)$  and the latter  $(\pi_L X_C + (1 - \pi_L)\mu_C)$ , making its choice based on which is larger.

Proposition 4(b) applies to cases in which the agency would choose high research effort if the court imposes MD with procedural oversight. In these cases, the court would always choose MD with procedural oversight because doing so both guarantees that the agency will do costly research and also applies the court's optimal evidentiary standard *ex post*.

Finally, Proposition 4(c) states that when the conditions in neither 4(a) nor 4(b) are satisfied, the court prefers MD without procedural oversight. The reason, as with the analogous case covered by Proposition 3(g), is that procedural oversight deters the agency from acting, which would result in the court receiving its status quo payoff of 0. In contrast, MD without procedural oversight ensures the court a positive expected payoff  $(\pi_L X_C + (1 - \pi_L)\mu_C)$ .

In order to see the implications of the procedural oversight option when the court is sympathetic to regulation *ex ante*, compare Proposition 4 with

Proposition 2. The court prefers to use procedural oversight in many cases, and when it would not, the court will choose its *ex post* optimal evidentiary standard (MD). As was true in the case of the skeptical court, the existence of the procedural oversight option does not mean that the court will always choose MD, because the court can sometimes induce high research effort only by combining procedural oversight with a different evidentiary standard (NR).

## 5. Discussion

The preceding analysis demonstrates how the selection of an evidentiary standard, applied *ex post*, can influence an agency's *ex ante* incentives to acquire information, and the consequences of this effect for the design of oversight systems. The analysis highlights several important dimensions of this general problem that are often overlooked.

First, while evidentiary standards are often described in terms of how 'deferential' they are to the primary decision-making agent, it is important to differentiate two kinds of deference. One form of deference consists of allowing an agent to act in the *absence* of hard evidence regarding the effects of its proposal. Another form of deference consists of allowing an agent to act in the *presence* of evidence that the proposal is a bad idea from the overseer's perspective. These two types of deference have different effects on the agent's research effort. Allowing an agent to act in the absence of hard evidence dampens research incentives, while allowing an agent to act in the presence of adverse evidence strengthens research incentives. These two forms of deference also differ in their consequences for the overseer's *ex post* utility. Allowing action in the presence of adverse evidence is by definition an *ex post* cost for the overseer, while the expected utility implications of permitting regulation when the evidence is inconclusive depend on whether the overseer is predisposed to favor or oppose the action.

Second, because the overseer can vary its evidentiary standard on two dimensions—whether to allow regulation when the evidence is inconclusive, and whether to allow regulation when the evidence is adverse—analyses that consider only one of these dimensions are potentially incomplete. It could, for example, be misleading to evaluate a disclosure regime by comparing only the MD standard to the NR standard—that is, by asking only whether

the overseer is better off requiring disclosure—without also considering the possibility that an overseer might prohibit action unless the agent produces hard evidence. Similarly, analyses that implicitly compare CE to NR—that is, those that assume that the only relevant alternatives are no oversight whatsoever or oversight that demands hard evidence that the proposed action benefits the overseer—may miss the possibility that the overseer’s welfare could be improved by either the MD or SE standard.

Third, institutional designers have incentives to develop commitment mechanisms that force overseers to adhere to evidentiary standards established *ex ante*. As noted earlier, one way for an institutional designer to commit to an evidentiary standard might be to select an overseer with particular characteristics. For instance, it may be optimal to have an overseer that is incapable of evaluating the evidence, as this effectively implements an NR standard.<sup>22</sup> Or, if an institutional designer wanted to implement the SE standard, it could select an overseer capable of assessing whether the agency had acquired hard evidence, but incapable of assessing that evidence on the merits. More generally, this suggests that at least in some contexts overseers may be *ignorant by design*.

Fourth, procedural oversight will either enhance agency research incentives or deter the agency from acting altogether. This result is consistent both with the claim that procedural oversight increases agency research and with the hypothesis that procedural oversight may lead to agency “ossification” (McGarity 1992), both are possibilities, depending on the cost of research relative to the expected benefits.<sup>23</sup> Furthermore, the availability of procedural oversight alters the relative strength of research incentives under different evidentiary standards. Thus, we should expect different substantive evidentiary standards in contexts where procedural oversight is possible than in contexts where it is not.

---

22. Of course, if the institutional designer wanted an NR standard, it could eliminate oversight altogether. But if the optimal approach is NR coupled with procedural oversight, as in Propositions 3(a) and 4(a), then the institutional designer might prefer an overseer that can evaluate agency research effort but cannot assess the outcome of that effort.

23. However, this analysis also predicts that the overseer should abandon procedural oversight if the result is ossification.

## 6. Conclusion

This article has considered the effect of different evidentiary standards, applied *ex post* by an independent overseer, on an agency's incentives to invest in gathering decision-relevant information. The substantive evidentiary standard can be characterized, in simplified form, as consisting of two components: First, does the overseer permit the decision-maker to take action in the absence of hard evidence? Second, does the overseer permit the decision-maker to take action if hard evidence indicates the proposal is not in the overseer's interests? Allowing action without hard evidence dampens research incentives; allowing action in the presence of adverse evidence strengthens research incentives. But, deference to the decision-maker in the presence of adverse evidence may require the overseer to approve actions that it views as undesirable, while prohibiting action unsupported by hard evidence may require the overseer to reject proposals it believes are probably desirable. A rational overseer must take these trade-offs into account when selecting an evidentiary standard. Furthermore, the availability of procedural oversight or other similar devices does not eliminate these trade-offs, though it alters the overseer's optimal decision rule.

More generally, this article contributes to a growing body of literature in institutional economics, bureaucratic politics, and public law that emphasizes the importance of examining how institutional and legal rules affect the production and acquisition of decision-relevant information, particularly in environments where information must be gathered by an agent that places a different value on information, or on the costs of acquiring that information, than does its principal.

## Appendix

### Proof of Lemma 1

Denote the expected utilities of each ideal-type evidentiary standard to player  $j = \{A, C\}$ , respectively, as:

- $E(U_j|CE) = \pi_{CE}X_j$ ,
- $E(U_j|SE) = \pi_{SE}(X_j + Y_j)$ ,
- $E(U_j|MD) = \pi_{MD}X_j + (1 - \pi_{MD})\mu_j$ ,
- $E(U_j|NR) = \pi_{NR}(X_j + Y_j) + (1 - \pi_{NR})\mu_j$ ,

where  $\pi_I = \pi_H$  if the agency would choose high research effort ( $\rho = H$ ) under evidentiary standard  $I$ , and  $\pi_I = \pi_L$  if the agency would choose low research effort ( $\rho = L$ ) under evidentiary standard  $I$ .

The proof of the lemma follows straightforwardly from a comparison of the court's expected utility under each of the four standards.

First, the difference between the court's expected utilities under CE and SE is:

$$E(U_C|CE) - E(U_C|SE) = -\pi_I Y_C. \quad (1)$$

Because  $Y_C \leq 0$  by assumption, the court prefers CE to SE.

Second, the difference between the court's expected utilities under MD and NR is:

$$E(U_C|MD) - E(U_C|NR) = -\pi_I Y_C. \quad (2)$$

Again, the fact that  $Y_C \leq 0$  implies that the court prefers MD to NR.

All that remains is to compare the court's expected utilities under CE and MD. This difference is given by

$$E(U_C|CE) - E(U_C|MD) = -(1 - \pi_I)\mu_C. \quad (3)$$

This implies that if  $\mu_C > 0$ , the court prefers MD to CE, while if  $\mu_C < 0$ , the court prefers CE to MD.

This is sufficient to prove the lemma. It is useful, though, to make three related observations:

First, the court's preference as between SE and NR also depends on the sign of  $\mu_C$ . The difference between the court's expected utilities under SE and NR is

$$E(U_C|SE) - E(U_C|NR) = -(1 - \pi_I)\mu_C. \quad (4)$$

This implies that if  $\mu_C < 0$ , the court prefers SE to NR, while if  $\mu_C > 0$ , the court prefers NR to SE.

Second, when  $\mu_C > 0$ , the difference in the court's expected utility from NR and CE is

$$E(U_C|NR) - E(U_C|CE) = \pi_I Y_C + (1 - \pi_I)\mu_C. \quad (5)$$

Thus, when  $\mu_C > 0$ , then the court will prefer NR to CE when  $(\frac{1-\pi_I}{\pi_I})\mu_C > -Y_C$ , which is more likely to hold when  $\pi_I$  is small, when  $\mu_C$  is large, and  $Y_C$  is not too negative.

Third, the difference in the court's expected utilities from MD and SE when  $\mu_C \leq 0$  is:

$$E(U_C|MD) - E(U_C|SE) = (1 - \pi_I)\mu_C - \pi_I Y_C. \tag{6}$$

So, when  $\mu_C \leq 0$ , the court prefers MD to SE when  $(\frac{1-\pi_I}{\pi_I})\mu_C > Y_C$ , which is more likely to hold when  $\pi_I$  is large, when  $\mu_C$  is not too negative, and when  $Y_C$  is very negative.

**Proof of Lemma 2**

The expected benefit to the agency of choosing  $\rho = H$  under each of the four evidentiary standards ( $B_I$ ) is equal to the agency's expected utility under that standard if the agency's probability of observing  $\omega$  is  $\pi_H$ , minus the agency's expected utility under that standard if the agency's probability of observing  $\omega$  is  $\pi_L$ . This value for each of the four evidentiary standards is

$$B_{CE} = (\pi_H - \pi_L)X_A, \tag{7}$$

$$B_{SE} = (\pi_H - \pi_L)(X_A + Y_A), \tag{8}$$

$$B_{MD} = (\pi_H - \pi_L)(X_A - \mu_A), \tag{9}$$

$$B_{NR} = (\pi_H - \pi_L)(X_A + Y_A - \mu_A). \tag{10}$$

Because  $Y_A \geq 0$  (by definition), it follows that  $B_{SE} \geq B_{CE}$  and  $B_{NR} \geq B_{MD}$ .

Because  $\mu_A > 0$  (by assumption), it follows that  $B_{SE} > B_{NR}$  and  $B_{CE} > B_{MD}$ .

By transitivity, it immediately follows that  $B_{SE} > B_{MD}$ .

All that remains is to compare  $B_{CE}$  and  $B_{NR}$ . The difference between these values is  $\mu_A - Y_A$ . If  $\mu_A > Y_A$ , then  $B_{CE} > B_{NR}$ , while if  $\mu_A < Y_A$ , then  $B_{NR} > B_{CE}$ , and if  $\mu_A = Y_A$ , then  $B_{CE} = B_{NR}$ .

### Proof of Proposition 1

If  $k \geq B_{SE}$ , we know from Lemma 2 that the evidentiary standard does not affect  $\rho$ . If  $\mu_C \leq 0$ , we can therefore conclude (from Lemma 1) that the court prefers CE.

If  $k \leq B_{CE}$ , the agency will choose  $\rho = H$  under both CE and SE. As between these two, we know from Lemma 2 that the court prefers CE. Furthermore, because the court is (weakly) better off if  $\rho = H$  (holding the substantive review standard constant), we know from Lemma 1 that the court will prefer CE with  $\rho = H$  to NR or MD with  $\rho = L$ .

All that remains is to consider which evidentiary standard the court prefers if  $B_{SE} > k > B_{CE}$ . In this case, CE weakly dominates MD and NR because the agency chooses  $\rho = L$  under any of these three standards. The relevant comparison for the court is between the expected utilities of SE with high research effort ( $\pi_H(X_C + Y_C)$ ) and CE with low research effort ( $\pi_L X_C$ ). The former is greater if  $(\pi_H - \pi_L)X_C > -\pi_H Y_C$ .

### Proof of Proposition 2

First, consider the cases where  $k > B_{SE}$  or  $k < B_{MD}$ . In these cases, we know from Lemma 2 that the evidentiary standard will not affect  $\rho$ . Thus, it follows from Lemma 1 and the assumption that  $\mu_C > 0$  that the court prefers MD.

Next, consider the case where  $B_{SE} > k > \max\{B_{CE}, B_{NR}\}$ . In this case, the agency chooses  $\rho = H$  under SE but not otherwise (Lemma 2). We know from Lemma 1 that if  $\mu_C > 0$  and the evidentiary standard does not affect  $\rho$ , MD weakly dominates NR and CE. Thus, we compare the court's expected utility under SE with high research effort ( $\pi_H(X_C + Y_C)$ ) to the court's expected utility under MD with low research effort ( $\pi_L X_C + (1 - \pi_L)\mu_C$ ). The former is greater if  $(\pi_H - \pi_L)X_C > (1 - \pi_L)\mu_C - \pi_H Y_C$ .

Next, consider the case where  $B_{CE} > k > B_{NR}$ . In this case, the agency chooses  $\rho = H$  under CE or SE, but not NR or MD (Lemma 2). From Lemma 1 and the assumption that  $\mu_C > 0$ , we know that CE weakly dominates SE and that MD weakly dominates NR. So, we compare the court's expected utility under CE with high research effort ( $\pi_H X_C$ ) to the court's expected utility under MD with low research effort ( $\pi_L X_C + (1 - \pi_L)\mu_C$ ). The former is greater if  $(\pi_H - \pi_L)X_C > (1 - \pi_L)\mu_C$ .

Next, consider the case where  $B_{NR} > k > B_{CE}$ . In this case, the agency chooses  $\rho = H$  under NR or SE, but not CE or MD (Lemma 2). From Lemma 1 and the assumption that  $\mu_C > 0$ , we know that NR weakly dominates SE and that MD weakly dominates CE. We therefore compare the court's expected utility under NR with high research effort ( $\pi_H(X_C + Y_C) + (1 - \pi_H)\mu_C$ ) to the court's expected utility under MD with low research effort ( $\pi_L X_C + (1 - \pi_L)\mu_C$ ). The former is greater if  $(\pi_H - \pi_L)X_C > (\pi_H - \pi_L)\mu_C - \pi_H Y_C$ .

Finally, consider the case where  $\min\{B_{CE}, B_{NR}\} > k > B_{MD}$ . In this case, the agency chooses  $\rho = H$  under SE, CE, or NR, but not under MD (Lemma 2). We know from Lemma 1 and the assumption that  $\mu_C > 0$  that SE is weakly dominated by both CE and NR. Furthermore, we know from the proof of Lemma 1 that the court prefers CE to NR if  $\pi_H Y_C + (1 - \pi_H)\mu_C < 0$ . In that case, the relevant comparison for the court is between the expected utility of CE with high research effort ( $\pi_H X_C$ ) and the expected utility of MD with low research effort ( $\pi_L X_C + (1 - \pi_L)\mu_C$ ). The former is greater if  $(\pi_H - \pi_L)X_C > (1 - \pi_L)\mu_C$ . On the other hand, the court prefers NR to CE if  $\pi_H Y_C + (1 - \pi_H)\mu_C > 0$ . In that case, the relevant comparison is between the court's expected utility of NR with high research effort ( $\pi_H(X_C + Y_C) + (1 - \pi_H)\mu_C$ ) and its expected utility of MD with low research effort ( $\pi_L X_C + (1 - \pi_L)\mu_C$ ). The former is greater if  $(\pi_H - \pi_L)X_C > (\pi_H - \pi_L)\mu_C - \pi_H Y_C$ .

**Proof of Lemma 3**

$B'_I$  is the agency's expected utility under substantive standard  $I$  if the agency's probability of observing  $\omega$  is  $\pi_H$ . The value of  $B'_I$  for each of the four substantive evidentiary standards is therefore:

$$B'_{CE} = \pi_H X_A, \tag{11}$$

$$B'_{SE} = \pi_H(X_A + Y_A), \tag{12}$$

$$B'_{MD} = \pi_H X_A + (1 - \pi_H)\mu_A, \tag{13}$$

$$B'_{NR} = \pi_H(X_A + Y_A) + (1 - \pi_H)\mu_A. \tag{14}$$

Because  $Y_A \geq 0$ , it follows that  $B'_{SE} \geq B'_{CE}$  and  $B'_{NR} \geq B'_{MD}$ . Because  $\mu_A > 0$ , it follows that  $B'_{MD} > B'_{CE}$  and  $B'_{NR} > B'_{SE}$ .

The foregoing is sufficient to establish that  $B'_{NR} \geq \max\{B'_{SE}, B'_{MD}\} \geq \min\{B'_{SE}, B'_{MD}\} \geq B'_{CE}$ .

All that remains is to compare  $B'_{SE}$  and  $B'_{MD}$ . Algebraic manipulation yields the result that if  $(\frac{\pi_H}{1-\pi_H})Y_A > \mu_A$ , then  $B'_{SE} > B'_{MD}$ ; if  $(\frac{\pi_H}{1-\pi_H})Y_A < \mu_A$ , then  $B'_{MD} > B'_{SE}$ ; and if  $(\frac{\pi_H}{1-\pi_H})Y_A = \mu_A$ , then  $B'_{SE} = B'_{MD}$ .

### Proof of Proposition 3

Consider first the case where  $B'_{NR} > k > \max\{B'_{SE}, B'_{MD}\}$ . In this case, we know from Lemma 3 that the agency will choose  $\rho = H$  under NR with procedural oversight, but the agency will be deterred from acting under CE, SE, or MD with procedural oversight. Thus, combining procedural oversight with CE, SE, or MD gives the court a payoff of 0. Furthermore, because  $k > B'_{SE} \geq B_{SE}$ , it follows from Lemma 2 that, absent procedural oversight, the agency will choose  $\rho = L$  under any evidentiary standard. From Lemma 1 we know that when  $\mu_C \leq 0$ , the court's most-preferred evidentiary standard without procedural oversight is CE, which gives the court a weakly positive expected payoff. Thus, the relevant comparison for the court is between its expected utility from NR with high research effort  $(\pi_H(X_C + Y_C) + (1 - \pi_H)\mu_C)$  and its expected utility from CE with low research effort  $(\pi_L X_C)$ . The former is greater if  $(\pi_H - \pi_L)X_C > -(\pi_H Y_C + (1 - \pi_H)\mu_C)$ .

Next, consider the case where  $B'_{SE} > k > B'_{MD}$ . In this case, we know from Lemma 3 that the agency will choose  $\rho = H$  under NR or SE with procedural oversight, but the agency will be deterred from acting under CE or MD with procedural oversight. As between NR with high research effort and SE with high research effort, we know from Lemma 1 that the court prefers the latter. Because  $B'_{MD} \geq B_{MD}$  and  $B'_{MD} \geq B'_{CE} \geq B_{CE}$ , it follows that without procedural oversight, the agency will choose  $\rho = L$  under MD or CE. As between these two, Lemma 1 indicates that the court prefers CE and that the court's expected utility from CE with low research effort is weakly positive. Therefore, the relevant comparison in this case is between the court's expected utility under SE with high research effort  $(\pi_H(X_C + Y_C))$  and the court's expected utility under CE with low research effort  $(\pi_L X_C)$ . The former is greater if  $(\pi_H - \pi_L)X_C > -\pi_H Y_C$ . It is also possible in this case that the agency might choose  $\rho = H$  under SE or NR *without* procedural oversight. If so, the decision to impose procedural

oversight under these standards would not affect agency behavior or the court's utility, and the tie-breaking assumption that the court would impose procedural oversight when indifferent comes into play.

Next, consider the case where  $B'_{MD} > k > B'_{SE}$ . In this case, we know from Lemma 3 that the agency will choose  $\rho = H$  under NR or MD with procedural oversight, but the agency will be deterred from acting under CE or MD with procedural oversight. As between NR with high research effort and MD with high research effort, we know from Lemma 1 that the court prefers the latter. Furthermore, because  $k > B'_{SE} \geq B_{SE}$ , it follows from Lemma 2 that, absent procedural oversight, the agency will choose  $\rho = L$  under any evidentiary standard. From Lemma 1 we know that when  $\mu_C \leq 0$ , the court's most preferred evidentiary standard without procedural oversight is CE, which gives the court a weakly positive expected payoff. Thus, the relevant comparison for the court is between its expected utility from MD with high research effort ( $\pi_H X_C + (1 - \pi_H)\mu_C$ ) and its expected utility from CE with low research effort ( $\pi_L X_C$ ). The former is greater if  $(\pi_H - \pi_L)X_C > -(1 - \pi_H)\mu_C$ .

Next, consider the case where  $\min\{B'_{SE}, B'_{MD}\} > k > B'_{CE}$ . In this case, the agency will choose  $\rho = H$  if NR, SE, or MD are coupled with procedural oversight (Lemma 3). Because  $k > B'_{CE} \geq B_{CE}$ , the agency will choose  $\rho = L$  under CE; if the court were to couple CE with procedural oversight, the agency would not act. (The agency might also choose  $\rho = H$  without procedural oversight under SE or NR, but if so then according to the tie-breaking assumption, the court would employ procedural oversight.) NR with high research effort is weakly dominated by SE or MD with high research effort. From the proof of Lemma 1, we know that the court prefers SE with high research effort to MD with high research effort if  $\mu_C < (\frac{\pi_H}{1-\pi_H})Y_C$ . Under that condition, the relevant comparison for the court is between its expected utility under SE with high research effort ( $\pi_H(X_C + Y_C)$ ) and its expected utility under CE with low research effort ( $\pi_L X_C$ ). The former is greater if  $(\pi_H - \pi_L)X_C > -\pi_H Y_C$ . On the other hand, if  $\mu_C > (\frac{\pi_H}{1-\pi_H})Y_C$ , then the relevant comparison is between the court's expected utility under MD with high research effort ( $\pi_H X_C + (1 - \pi_H)\mu_C$ ) to its expected utility under CE with low research effort ( $\pi_L X_C$ ). The former is greater if  $(\pi_H - \pi_L)X_C > -(1 - \pi_H)\mu_C$ .

Next, consider the case where  $B'_{CE} > k$ . In this case, the agency will choose  $\rho = H$  under CE with procedural oversight (Lemma 3). (The agency

might also choose  $\rho = H$  under CE without procedural oversight if  $B_{CE} > k$ , but in this case the tie-breaking assumption means the court would impose procedural oversight.) We know from Lemma 1 that CE with high research effort is preferred by the court to any other evidentiary standard when  $\mu_C \leq 0$ .

Finally, consider the case where  $k > B_{NR}$ . In this case, the agency always chooses  $\rho = L$ , and imposition of procedural oversight will only deter the agency from acting at all (Lemma 3). Therefore, we know from Lemma 1 that the court's optimal choice in this case is to impose CE without procedural oversight.

#### **Proof of Proposition 4**

Consider first the case where  $B'_{NR} > k > B'_{MD}$ . In this case, the agency will choose  $\rho = H$  under NR with procedural oversight, but procedural oversight will deter the agency from acting under MD or CE (because  $k > B'_{MD} > B'_{CE}$ ) (Lemma 3). The agency might also choose  $\rho = H$  under SE (with or without procedural oversight), but we know from Lemma 1 that NR with high research effort weakly dominates SE with high research effort when  $\mu_C > 0$ . (The agency might also choose  $\rho = H$  under NR without procedural oversight, but in this case the tie-breaking assumption implies that the court would employ procedural oversight.) From Lemma 1, we know that if the agency chooses  $\rho = L$ , the court's most-preferred evidentiary standard is MD if  $\mu_C > 0$ . Hence, the relevant comparison for the court is between its expected utility under NR with high research effort  $(\pi_H(X_C + Y_C) + (1 - \pi_H)\mu_C)$  and its expected utility from MD with low research effort  $(\pi_L X_C + (1 - \pi_L)\mu_C)$ . The former is greater if  $(\pi_H - \pi_L)(X_C - \mu_C) > -\pi_H Y_C$ .

Next, consider the case where  $B'_{MD} > k$ . In this case, the court can induce the agency to choose  $\rho = H$  by coupling MD with procedural oversight (Lemma 3). From Lemma 1 and that, holding the substantive evidentiary standard constant, the court is weakly better off when  $\rho = H$ , it follows that if  $B'_{MD} > k$ , MD with procedural oversight is the court's optimal evidentiary standard. (If  $B_{MD} > k$ , the court is indifferent between MD with procedural oversight and MD without procedural oversight, as both induce high agency research effort. Under the tie-breaking assumption employed here, the court in this case would impose procedural oversight.)

Finally, consider the case where  $k > B'_{NR}$ . In this case, we know from Lemma 3 that the agency always chooses  $\rho = L$ , and if the court were to impose procedural oversight, the agency would not act at all. Therefore, in this case the court would dispense with procedural oversight and adopt whatever substantive evidentiary standard gives the court the greatest expected utility when  $\mu_C > 0$  and  $\rho = L$ . From Lemma 1, we know that this is MD.

## References

- Aghion, Philippe, and Jean Tirole. 1997. "Formal and Real Authority in Organizations," 105(1) *Journal of Political Economy* 1–29.
- Alonso, Ricardo, and Niko Matouschek. Forthcoming. "Optimal Delegation," *Review of Economic Studies*.
- Arlen, Jennifer. 1994. "The Potentially Perverse Effects of Corporate Criminal Liability," 23 *Journal of Legal Studies* 833–67.
- Baron, David P. 2000. "Legislative Organization with Informational Committees," 44(3) *American Journal of Political Science* 485–505.
- Bendor, Jonathan, and Adam Meirowitz. 2004. "Spatial Models of Delegation," 98(2) *American Political Science Review* 293–310.
- Bueno de Mesquita, Ethan, and Matthew C. Stephenson. 2007. "Regulatory Quality under Imperfect Oversight," 101(3) *American Political Science Review* 605–20.
- Dewatripont, Mathias, and Jean Tirole. 1999. "Advocates," 107(1) *Journal of Political Economy* 1–39.
- Diermeier, Daniel. 1995. "Commitment, Deference, and Legislative Institutions," 82(2) *American Political Science Review* 344–55.
- Epstein, David, and Sharyn O'Halloran. 1995. "A Theory of Strategic Oversight: Congress, Lobbyists, and the Bureaucracy," 11(2) *Journal of Law, Economics, and Organization* 227–55.
- Friedman, Richard D. 1992. "Toward a Partial Economic, Game Theoretic Analysis of Hearsay," 76 *Minnesota Law Review* 723–96.
- Gailmard, Sean. 2006. "Discretion Rather than Rules: Choice of Instruments to Constrain Bureaucratic Policy-Making." Unpublished manuscript, Northwestern University.
- Gilligan, Thomas W., and Keith Krehbiel. 1987. "Collective Decision-Making and Standing Committees: An Informational Rationale for Restrictive Amendment Procedures," 3 *Journal of Law, Economics, and Organization* 287–335.
- Gilligan, Thomas W., and Keith Krehbiel. 1990. "Organization of Informative Committees by a Rational Legislature," 34 *American Journal of Political Science* 531–64.
- Hayes, Bruce L. 1997. "Allocating the Burden of Proof," 72 *Indiana Law Journal* 651–79.

- Hay, Bruce L., and Kathryn E. Spier. 1997. "Burdens of Proof in Civil Litigation: An Economic Perspective," 26 *Journal of Legal Studies* 413–31.
- Johnston, Jason Scott. 2002. "A Game Theoretic Analysis of Alternative Institutions for Regulatory Cost-Benefit Analysis," 150(5) *University of Pennsylvania Law Review* 1343–1428.
- Kaplow, Louis, and Steven Shavell. 1994. "Accuracy in the Determination of Liability," 31(1) *Journal of Law and Economics* 1–15.
- Kaplow, Louis, and Steven Shavell. 1996. "Accuracy in the Assessment of Damages," 39(1) *Journal of Law and Economics* 191–209.
- Kronman, Anthony T. 1978. "Mistake, Disclosure, Information, and the Law of Contracts," 7(1) *Journal of Legal Studies* 1–34.
- Landis, James M. 1936. *The Administrative Process*. New Haven, CT: Yale University Press.
- Li, Hao. 2001. "A Theory of Conservatism," 109(3) *Journal of Political Economy* 617–36.
- McGarity, Thomas O. 1992. "Some Thoughts on 'Deossifying' the Rulemaking Process," 41 *Duke Law Journal* 1385.
- Milgrom, Paul, and John Roberts. 1986. "Relying on the Information of Interested Parties," 17(1) *RAND Journal of Economics* 18–32.
- Nance, Dale A. 1988. "The Best Evidence Principle," 73 *Iowa Law Review* 227–97.
- Pederson, William F. 1975. "Formal Records and Informal Rulemaking," 85(1) *Yale Law Journal* 38–88.
- Pfaff, Alexander S. P., and Chris William Sanchirico. 2000. "Environmental Self-Auditing: Setting the Proper Incentives for Discovery and Correction of Environmental Harm," 16(1) *Journal of Law, Economics, and Organization* 189–208.
- Polinsky, A. Mitchell, and Steven M. Shavell. 2006. "Mandatory versus Voluntary Disclosure of Product Risks," NBER Working Paper No. W12776.
- Posner, Richard A. 1973. "An Economic Approach to Legal Procedure and Judicial Administration," 2(2) *Journal of Legal Studies* 399–458.
- Prendergast, Canice. 1993. "A Theory of 'Yes Men'," 83(4) *American Economic Review* 757–70.
- Prendergast, Canice. 2003. "The Limits of Bureaucratic Efficiency," 111(5) *Journal of Political Economy* 929–58.
- Rogoff, Kenneth. 1985. "The Optimal Degree of Commitment to an Intermediate Monetary Target," 100(4) *Quarterly Journal of Economics* 1169–89.
- Rubinfeld, Daniel L., and David E. M. Sappington. 1987. "Efficient Awards and Standards of Proof in Judicial Proceedings," 18 *RAND Journal of Economics* 308–15.
- Sanchirico, Chris. 2001a. "Character Evidence and the Object of Trial," 101 *Columbia Law Review* 1227–1311.

- Sanchirico, Chris. 2001b. "Relying on the Information of Interested—and Potentially Dishonest—Parties," 3 *American Law and Economics Review* 320–57.
- Sanchirico, Chris. 2004. "Evidence Tampering," 53 *Duke Law Journal* 1215–1336.
- Sanchirico, Chris. 2006. "A Primary Activity Approach to Proof Burdens," University of Pennsylvania Institute for Law and Economics, Research Paper No. 06-03.
- Seidenfeld, Mark. 2002. "Cognitive Loafing, Social Conformity, and Judicial Review of Agency Rulemaking," 87 *Cornell Law Review* 486–548.
- Shapiro, Martin. 1988. *Who Guards the Guardians?: Judicial Control of Administration*. Athens, GA: University of Georgia Press.
- Shavell, Steven M. 1992. "Liability and the Incentive to Obtain Information about Risk," 21(2) *Journal of Legal Studies* 259–70.
- Shavell, Steven M. 1994. "Acquisition and Disclosure of Information Prior to Sale," 25(1) *RAND Journal of Economics* 20–36.
- Shin, Hyun Song. 1998. "Adversarial and Inquisitorial Procedures in Arbitration," 29(2) *RAND Journal of Economics* 378–405.
- Spence, David B., and Frank Cross. 2000. "A Public Choice Case for the Administrative State," 89 *Georgetown Law Journal* 97–142.
- Spulber, Daniel F., and David Besanko. 1992. "Delegation, Commitment, and the Regulatory Mandate," 8(1) *Journal of Law, Economics, and Organization* 126–54.
- Stephenson, Matthew C. 2004. "Court of Public Opinion: Government Accountability and Judicial Independence," 20(2) *Journal of Law, Economics, and Organization* 379–99.
- Stephenson, Matthew C. 2006. "A Costly Signaling Theory of 'Hard Look' Judicial Review," 58 *Administrative Law Review* 753–813.
- Stephenson, Matthew C. 2007. "Bureaucratic Oversight and Endogenous Agency Expertise," 23 *Journal of Law, Economics, and Organization* 469–98.