Granting Discretion to Collusive Agencies
The Role of the "Standing" Doctrine

Markus Lehmann*
Max-Planck Project Group "Law and Common Goods"
Poppelsdorfer Allee 45
D-53115 Bonn
Lehmann@mpp-rdg.mpg.de

November 10, 1999

Abstract

To regulate environmental externalities, a welfare-maximizing, uninformed legislature can either use an incentive-compatible mechanism or delegate decision-making power to an administrator with superior knowledge, who, however, has an incentive to collude with regulatees. Within the latter solution, lawmakers can additionally give a watchdog organization a more or less restriced opportunity to let the administrator's decision-making be scrutinized by a court; it then has "standing" to sue the agency. It is shown that this institutional solution may yield higher expected welfare than the incentive scheme. When the legislators decide to grant agency discretion, they will always combine it with a substantial legal standing for the watchdog. Counter-intuively, a commitment of the court to a simple decision-making rule will, in general, improve welfare, when compared with a court which is allowed to decide in accordance to updated beliefs. Also, impeding the watchdog's access to the legal system may increase the probability of trials in equilibrium.

JEL classification: D62, D72, K4.

1 Introduction

The paper addresses the problem how an incompletely informed policy-maker should regulate economic projects which generate non-taxable environmental externalities. Recommendations by the economic profession and regulatory practice are quite divergent in this respect. The regulatory solution strongly

*For invaluable comments, I am indebted to Helmut Bester, Roman Inderst, Kai Konrad, Kay Mitusch and other participants of the microeconomic workshop at Free University Berlin, as well as to Christoph Engel, Max-Planck Project Group "Law of Common Goods". Remaining errors and shortcomings are my own.

advocated by economic theory is that the policy-maker should use an incentive-compatible direct mechanism (see Baron 1985, Laffont 1994, Lewis 1996). In reality, however, the regulation of such economic projects is usually undertaken by a set of interacting institutions. First, legislators, who formulate environmental policy, delegate decision-making power to administrative agencies, which then enjoy leeway how to implement the policy. Secondly, "third parties" (beyond agencies and regulatees) may have more or less restrictive opportunities to file suit against the agency's regulation, i.e., to bring in the courts which scrutinize the agency's decision. When being granted such an opportunity, these parties, in the legal jargon, have "standing". Countries differ significantly in respect to the extent standing is granted. For instance, standing is given in Germany only to individuals whose formal rights are violated (under the so-called *Individualrechtsschutzlehre*), which implies that standing for environmental organizations, the so-called *Verbandsklagerecht*, is handled very restrictively. In contrast, the standing doctrine is less restrictive in the United States under the so-called "injury-in-fact test"; as a consequence, environmental groups are entitled to sue on behalf of their members who allegedly suffer from an injury-in-fact[1]. The merits of lowering or raising standing barriers for organized environmental actors were, resp., are under vivid debate in both countries[2].

The following analysis provides a welfare comparison of these alternative regulatory regimes. It presents a model where investors hold private information relevant for first-best efficient regulation. Welfare-maximizing and uninformed legislators have to choose between two regulatory solutions:

- They can either grant discretion in regulation to an administrator, who has superior information, but an incentive to collude with the investors. To mitigate this incentive, the legislature may supplement discretion with standing for an environmental group, which can then act as a watchdog of the agency's decision-making. The group is initially uninformed, but can engage in research activities to overcome its information deficit and build a case on found evidence. The research results (the evidence itself and its quality) are verifiable, but will reveal the private information only imperfectly. Courts have to apply a simple legal decision-making rule: they must decide in accordance with the presented evidence when its quality exceeds a threshold set by the legislature. This threshold represents the strength of the legal standing granted to the environmental group.

- Alternatively, lawmakers may decide not to grant discretion in the first place and instead use an incentive scheme by offering to the investor type-specific regulation combined with a system of contingent transfers.

[1] See, e.g., Greve (1989) or Rose-Ackerman (1995) for an analysis of German and US-American standing doctrines from a legal perspective.

[2] Bizer/Ormond/Riedel (1990) summarize the development of the German discussion, whose beginnings go back to the early 1970's. In the United States, the debate resumed in the 1990's after the Supreme Court tightened standing requirements; see Rodgers (1994): 105ff., for a summary.

Under the former solution, regulatory costs result in form of court and research expenses. Besides these costs, which do not emerge under the incentive scheme, legal power for environmental organizations may also imply efficiency losses via overregulation. First, to avoid to be taken to court, agencies under pressure from environmental groups may prefer to issue regulation that is initially overly strict. Secondly, the court, when brought in, may wrongfully overturn correct regulation. Within the following model, such legal errors will be one major source of efficiency losses stemming from legal standing.

Several results will be derived. First, under the plausible assumption that some investor types will cancel their project when prescribed standards are too strict, the comparison of the two regimes reveals that, for some type distributions, the institutional solution may perform better than the incentive scheme. Thus, the comparison provides a rationale from a welfare viewpoint for the real-world importance of the institutional solution. When legislators optimally decide to grant agency discretion, they will always combine it with a substantial legal standing for the environmental group. The policy conclusion of the paper is that lowering standing barriers may have beneficial welfare effects. Secondly, by analyzing the behavior of a Bayesian court, a rationale for the court's commitment to the simple decision-making rule used in the model will be given. Generally, an institutional regulatory regime where the court is allowed to update its beliefs and decide accordingly will perform worse. Thirdly, it will be shown that extending standing may actually lead to a decline in legal battles, which contrasts with concerns sometimes raised in the legal discussion, that a more liberal standing for environmental groups will increase the courts' caseload.

Literature In the field of political economy, oversight models relying on additional information by watchdogs or "whistle blowers" were presented by several authors (Banks/Weingast 1992, Laffont/Tirole 1993: chap. 15, Lupia/ McCubbins 1994, Epstein/O'Halloran 1995)[3]. Except for Laffont/Tirole (1993), these authors present models of congressional oversight of administrative decision-making: watchdogs who report directly to the legislature, and where courts do not play a role. Furthermore, and in contrast with the present paper, all these contributions treat agency discretion exogenously and, hence, do not investigate whether it is efficient in the first place to give collusive administrators leeway in decision-making.

In Boyer/Laffont (1999), the choice whether to delegate regulatory power is endogenous, but made at the constitutional level. It is a (welfare-maximizing) constitutional assembly which may grant discretion to a legislative body with

[3] The seminal contribution that spurred this literature is McCubbins/Noll/Weingast (1987). The setting presented here also relates to the principal-agent literature analyzing the principal's problem in general three-tier hierarchies: the principal, to control the agent, may introduce another agent as a supervisor (Varian 1990), who, however, may have incentives to collude (Tirole 1986, Khalil/Lawarrée 1995). In Kofman/Lawarée (1993), a supervisor's report can be double-checked by hiring another supervisor, who is more expensive and has poorer access to information, but will never collude. In the present model, the role of this second supervisor is taken by the environmental group and the court.

respect to the use of specific regulatory instruments (an incentive mechanism or uniform regulation). Within the legislature, better informed politicians have incentives to depart from efficiency, in order to serve the private agenda of the constituency holding the majority in the legislature. In this model, neither the legal system nor potential watchdog organizations play a role.

In the following analysis, the timing of the subgame assuming agency discretion is inspired by Laffont/Tirole (1993). In their model, however, the quality of the watchdog's research result is perfect (that is, when undertaking research, the group would always find verifiable, precise information on the investor's type), whereas the following analysis models the verifiable research results as signals of imperfect quality regarding the true state of the world. Such an approach is frequently used in the literature[4]; however, the model used here differs in that is assumes that the quality of the information gathered is learned only after spending funds on research. This allows us to model the required minimum quality of evidence as a continuous policy variable and to analyze the efficiency implications of parametric variations of this standard of evidence.

The paper is organized as follows. Part 2 describes the general setting, the actors and the timing of the game. Part 3 addresses regulation without agency discretion, by deriving the set of (possibly constrained-) efficient incentive schemes for specific type distributions. Part 4 analyses the institutional solution. It derives equilibria contingent on the exogenous standard of evidence required to overturn the agency's decision. Part 5 compares the two regulatory regimes and thus derives the optimal choice of the legislature with respect to the regulatory regime. Part 6 discusses the role of the legal decision-making rule. Part 7 concentrates on the issue whether an extension of standing necessarily raises the number of filed suits. Part 8 concludes.

2 The Model

The model presents a three-tier governance structure (legislature, a regulating agency, a court). Investors and an environmental group are also involved. All actors are assumed to be risk-neutral.

Technology Consider a set of N indivisible private projects which are identical insofar as they yield profit Π_0 for the investor and consumer surplus Cs for society; moreover, each project generates monetary environmental damage D_0. By assumption, it is not possible to define a formal tax base in regard to the underlying technical externality. This assumption is realistic for some areas of environmental policy, e.g., for nature conservation issues.

In order to focus on the different legal situation prevailing in Germany and the United States, assume also that D_0 represents environmental damages which are not protected by individual rights. For instance, D_0 may represent the utility loss of those persons who use the pertinent geographical area for recreational

[4] E.g., by Kofman/Lawarée (1993), Khalil/Lawarée (1995), Froeb/Kobayashi (1996), Che/Earnhart (1997), Lewis/Poitevin (1997).

purposes, but who are not neighbors of the project. In consequence, these victims of externality would not have standing under the German principle of individual rights' protection, while they would have standing under the more liberal standard applied in the United States, which means that an environmental group may sue on their behalf.

Because of the harmful effects on the environment, investors must apply for a permit from a regulatory agency before realizing the project. The permit may possibly have conditions attached to its issue. The following analysis will analyze the procedure for issuing a permit for a specific project. The individual investor's spending on protective activities S reduces environmental damage. The spending level related with a specific damage level is given by the decreasing, strictly convex function $S = S(D)$, where $S(D_0) = 0$. Note that $S(D)$ maps monetary environmental damage into (monetary) spending on avoidance. By not explicitly considering physical variables generating physical environmental harm, this formulation reflects the assumption that a formal tax base is impossible to define. The amount of damage reduction per monetary unit spent depends on the abatement opportunities the investor has at hand. Assume that the projects differ in the effectiveness of abatement opportunities, $S(.) \in \{S_l(.), S_h(.)\}$, where l and h stands for low/high marginal abatement costs:

$$|S_l'(D)| < |S_h'(D)|\,. \tag{1}$$

for every D. For every damage level D, $S_l(D) < S_h(D)$: $S_l(D)$ represents a set of more effective abatement opportunities. $S_i(.)$, $i \in \{l, h\}$, is privately known by investors and not verifiable. When the game starts, other actors know only the potential types and q, which is the fraction of investors having less effective avoidance opportunities $S_h(.)$; hence, q is the uninformed actors' prior belief that the investor applying for a permit is of type $S_h(.)$. Such an investor will also be called the "high" type. Consider figure 1 for a graphical illustration.

Denote efficient levels of environmental damages by D_l^*, D_h^* and $\Delta D = D_l^* - D_h^*$. In the case of agency discretion, D_l^*, D_h^* will be the possible environmental standards the implementing agency can choose to prescribe. Assume an interior solution exists for both types: $D_i^* \notin \{0, D_0\}$. Denote social benefits of the project under marginally efficient regulation by

$$V_i^* = Cs + \Pi_0 - S_i(D_i^*) - D_i^*, i \in \{l, h\}.$$

Conditions for the efficient spending levels are

$$S_i'(D_i^*) = -1, \tag{2}$$

$$V_i^* > 0. \tag{3}$$

Condition (3) is met by assumption. Because of (1), $D_l^* < D_h^*$. Denote $S_i^* = S_i(D_i^*)$. Assume that $S_l^* > S_h^*$: because her technology is more effective, a low-type investor, when optimally regulated, has to spend more. Furthermore,

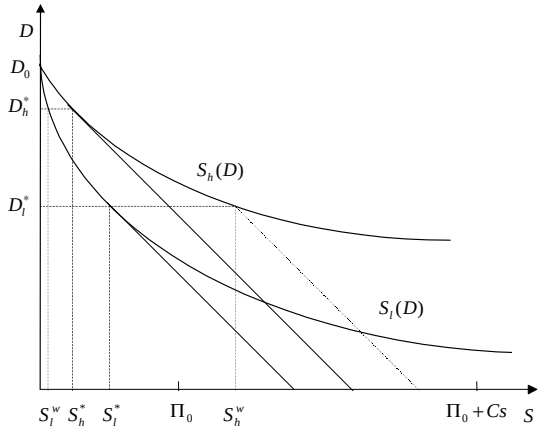

Figure 1: Type-specific efficient regulation

denote $V_0 = Cs + \Pi_0 - D_0$. Assume both project types to be privately profitable, when regulated correctly:

$$\Pi_0 - S_i^* > 0.$$

The Legislature Lawmakers are welfare-maximizing, but have limited knowledge. They only know the potential investor types and q. In designing environmental law, they face a trade-off: by granting discretion to the regulating agency, they may profit from the agency's superior knowledge, but simultaneously risk collusion. Therefore, they may either empower environmental organizations to let agency decisions be scrutinized by a court, or decide to not grant discretion in the first place. In the former case, the empowerment will lead to additional costs for research and an eventual use of the legal system as well as possible overregulation. In the latter case, regulatory costs are zero, but the legislature also fails to gain from the agency's superior information.

When legislators decide to grant discretion, they will prescribe type-specific regulation over D_l^*, D_h^*, and grant the agency discretion to decide which standard to apply in issuing the permit for a specific project. This setting thus depicts a stylized regime of differentiated standards. They may additionally empower the environmental organization by fixing a parameter $\overline{\theta}^*$, which will be explained in detail below, when considering the court's ruling.

When lawmakers decide to not grant discretion, they will design an incentive scheme by offering, in addition to prescribing a specific standard, type-specific

- negative or positive - transfers such that investors choose to reveal their type. As all projects are eventually submitted for permission, lawmakers will have to take the budget balance into account, which amounts to balancing expected subsidy expenditures with expected tax revenues. This incentive scheme will be described in detail in part 3.

The Agency Information on the investor type applying for a permit is observable for the agency. However, the information is not verifiable: it cannot credibly be communicated to the court. Therefore, a court cannot subpoena the agency or the investor to present information on the true type. This formulation depicts the observation, often made in environmental economics, that technical avoidance opportunities and, hence, avoidance costs, are intrinsic information belonging to the firm's management. Regulating agencies may have the opportunity to overcome this problem at least to a certain extent, due to the collaborative, intimate relationship with the investor that evolves during the permitting procedure; for other parties, however, this problem may remain a serious one.

When the agency is not granted discretion, it will just have to apply the mechanism and offer type-specific agreements with additional transfers[5]. When it possesses discretion, the agency, in principle, is free to decide which standard to apply. Then, the bureaucrat may offer to regulate according to the standard preferred by the investor, in exchange for a side-payment P. This payment may clearly represent a personal bribe for the administrator. However, another reading of P is possible when the agency, while formally required to consider overall welfare, has geographically biased preferences. The size of jurisdictions usually diverges from the geographical scope of environmental externalities, which leads to benefit spillovers of externality regulation. A bureaucrat biased in favor of the community or region where the project will be sited may be ready to implement a more lenient regulation in exchange for additional spending of the investor on community purposes. When the bulk of environmental externalities is borne by community outsiders, benefit spillovers from regulating these externalities are substantial. In consequence, the agency may be ready to trade additional community income P for inefficient high ex-community damages.

Using the superscript w for wrong regulation and $i, j \in \{l, h\}, i \neq j$, the respective spending levels are given by

$$S_i^w = S_i(D_j^*).$$

Observations

1. $S_l^w < S_l^*$ and $S_h^w > S_h^*$, because $D_l^* < D_h^*$ and $S_i(.)$ is decreasing in D.
2. $S_l^* - S_l^w < \Delta D < |S_h^* - S_h^w|$ for $S(D)$ being strictly convex.

[5] In the model, there is actually no function left for an agency with no discretionary power. In reality, the introduction of specialized bodies may save administrative costs of implementing non-discretionary instruments, an issue not considered here.

Consider figure 1 for a graphical representation of these observations. Denote by V_i^w the gain for society from execution of the project under wrong regulation:

$$V_i^w = Cs + \Pi_0 - S_i^w - D_j^*,$$

where $i, j \in \{l, h\}, i \neq j$. When incorrect regulation amounts to overregulation, environmental policy may even be prohibitive in the sense that investors shrink back from pursuing the project when being prescribed environmental standards that are too strict. It is indeed an often-raised concern that environmental regulation may negatively affect investment incentives. To reflect this concern, the following assumption is made:

Assumption When regulated to the stricter environmental standard D_l^*, the project with high marginal abatement costs is socially, but not privately profitable:

$$V_h^w > 0,$$

$$\Pi_0 - S_h^w < 0. \tag{4}$$

Again, refer to figure 1 for an illustration.

In the present setting, budget considerations enter the agency's decision making process in regulation via possible legal costs. The bureaucrat may prefer regulation cheaper for public funds, meaning that he has an incentive to avoid legal battles insofar as related costs C^a have to borne by his office. Utility of the agency is given by:

$$A(C^a, P),$$

where, denoting the transfer level in the bargaining equilibrium by P^B and the amount of costs of trial by C^c,

$$C^a = \begin{cases} C^c \text{ if } V_i \text{ is enforced by the court,} \\ 0 \text{ else;} \end{cases}$$

and

$$P = \begin{cases} P^B \text{ if } V_i \text{ is based on collusion and not overruled,} \\ 0 \text{ else.} \end{cases}$$

Throughout the paper, application of the British cost recovery rule is assumed: the agency bears all costs of trial if the intended regulation is overturned by the court. As transfers are assumed to take place at the end of the game, the colluding agency either gets the transfer or has to bear the legal costs. Normalize agency's utility to zero under correct regulation, and $A(C^c) < 0 < A(P^B)$. Denote by b the probability that the bureaucrat agrees on a bribe for wrong regulation. Allow for mixed strategies: $b \in [0, 1]$.

The Investor It is only in the case of agency discretion that the investor faces a relevant decision-problem: she then has to decide whether to pay a side-payment or not. She maximizes net private profit of the project. Because of $S_l^w < S_l^*$ and $S_h^w > S_h^*$ (see observation 1), it is only the low-type investor who has an incentive to pay for more lenient regulation.

Side-Payments Incentives to arrange a side-payment will also depend on the environmental group's decision whether to investigate, and, eventually, whether to file suit. When such incentives exist, the payment level agreed upon, by assumption, will be the result of a simple bargaining procedure, where the agency offers a side-contract and the investor can simply accept or reject it. Thus, the agency is assumed to have all the bargaining power and to reap the gains from trade. This assumption is made for presentational convenience. The results are not substantially altered when bargaining gives rise to other divisions of the gains from trade (e.g., within Nash bargaining).

The Environmental Group The public will be given notice of the intended regulation, which may possibly be the result of an informal agreement between the investor and the agency described above. This amounts to the agency announcing that the investor is of a specific type. Denote this announced type by $S_i^a, i \in \{l, h\}$ Remember that it is the low investor type who may be interested in being regulated according to the more lenient standard D_h^*, in exchange for a side payment. Therefore, when the agency announces S_h^a, the group may suspect that the investor is not accurately regulated, and can then decide to engage in research, at cost C^r, to detect the true investor type. The group is interested to minimize environmental damages; therefore, when the agency announces S_l^a and thus intends to regulate according to the stricter standard D_l^*, the group does not have an incentive to undertake research.

Let $k \in [0, 1]$ be the probability that the group engages in research after an announcement S_h^a. Note that the group does not have to find evidence on actual collusion, but on the actual technical avoidance opportunities. Research is modeled in the following way: the group must randomly choose a specific type of evidence or "test" out of a set of evidence types or "tests" of differing quality. The chosen evidence or "test", in turn, gives a specific result. Thus, as a research result, the group receives

- a signal $s \in \{S_l, S_h)$ indicating whether the investor is of the high or the low type, and
- a parameter θ representing the quality of the signal, i.e., the correlation of the signal found with the actual type: after research, $\theta = prob[s = S_i \,|S = S_i\,], i \in \{l, h\}$.

The parameter θ is distributed on the interval $[0.5, 1]$ with distribution $F(\theta)$ and strictly positive density $f(\theta)$, which is common knowledge. When $\theta = 0.5$, the type of evidence would be uninformative; when $\theta = 1$, the signal would be

perfectly informative. Both the signal s and θ are verifiable: once learned by the environmental group, they can credibly be communicated within a trial.

In the literature, it is usually assumed that quality of the research result is known before undertaking the research. Here, in assuming that θ is learned only during the investigation, a situation is depicted where the group does not know beforehand which type of evidence will be found. For instance, in the perception of the court, experts' opinions on technical abatement opportunities at a facility, may be more reliable when their expertise is based on additional technical blueprints. However, it will not be known whether these blueprints are publicly available or not without expending funds on research.

When the group, upon announcement of a type S_h^a, receives a signal $s = S_l$, the evidence speaks for incorrect regulation. The group's only decision is then whether or not to file suit: a non-collaborative relationship between the agency and the environmental organization is assumed. Specifically, the group cannot communicate the result of the research before a trial. If this were the case, the group, by presenting the gathered evidence, could possibly convince the agency to reverse the intended regulation and to avoid a costly trial. Hence, possibly emerging incentives to bargain "in the shadow of the law" are excluded from the analysis, to focus on the impact of a stronger legal standing within the legal system.

The Court The judge has to base her decision on verifiable information. First, given that discretion is limited, she will (and has to) overrule any regulation not consistent with the underlying standard[6], i.e., leading to damage levels different from D_l^*, D_h^*. Second, upon action taken by the environmental group against intended regulation, i.e., the agency's announcement S_h^a, implying regulation over D_h^*, the court will overrule the agency if and only if the group presents a signal $s = S_l$, and the quality of the signal θ is equal or higher than a threshold level $\bar{\theta}$, which is the standard of evidence set by legislators.

By assumption, the court must apply the British cost recovery rule: legal costs are borne by the loser of the case. No further sanction is imposed by the court. Remember that the evidence may only indicate a wrong investor type, but not the actual side-payment arrangement (the agency may thus always argue that it misperceived the actual type).

Denote by $p(\bar{\theta})$ the probability, before research, that the signal's quality is higher than the standard of evidence:

$$p(\bar{\theta}) = prob[\theta \geq \bar{\theta}] = 1 - F(\bar{\theta}).$$

Note that $p(1) = 0$. Hence, $\bar{\theta} = 1$ depicts a situation where the court would always dismiss the group's complaint, which amounts to the group not having

[6]The objection may be raised that the court will only intervene when a plaintiff files suit. However, one may imagine that there will always be an obedient citizen suing the agency when observing intended regulation different from D_l^*, D_h^*. Planned regulation that is publicly announced is clearly verifiable; consequently, the citizen has to spend neither research nor court costs.

standing. Decreasing the standard of evidence increases $p(\bar{\theta})$, and $p(0.5) = 1$. Thus, for $\bar{\theta} < 1$, $\bar{\theta}$ depicts the extent of the environmental group's legal standing.

Timing The timing of the game can be summarized as follows:

1. Society learns the possible investor types, q and the distribution of θ.
2. Legislators decide whether or not to grant discretion. If they grant discretion to the agency, they additionally choose a standard of evidence $\bar{\theta}^*$. If they do not grant discretion, they introduce an incentive-compatible mechanism.
3. The investor learns her type and applies for a permit. During the permitting procedure, the agency also learns the actual type. Information on the type is not verifiable.
4. When the agency does not have discretion, the mechanism is implemented, and the game ends. When the agency has discretion, it can offer a side-contract to the investor, which specifies a payment to the agency in exchange for regulation preferred by the investor, provided that the agency decision is not overruled.
5. The agency announces a type S_i^a. Upon learning about the intended regulation, the environmental organization, if it has standing, decides whether to undertake research or not.
6. As research results, the group receives a signal s and quality information θ, which are both verifiable. If the environmental group does not undertake research, or finds a signal $s = S_h$, or $\theta < \bar{\theta}$, or both, the agency's intended regulation will be implemented.
7. When the environmental group takes action and presents an adequate signal, the court overrules the agency, if $\theta \geq \bar{\theta}$.
8. The regulated project will be executed (and a side-payment may be effected), if privately profitable under the implemented regulation.

Consider first the solution where the legislature decides to not grant discretion.

3 The Incentive Scheme

If the legislature directly prescribes type-specific efficient damage levels dependent on the investor's announcement to be of a specific type, the low investor type has an incentive to announce that she is of the high type, as $S_l^w < S_l^*$. The high investor type, in contrast, will always truthfully reveal her information, because $S_h^w > S_l^*$. If regulated in accordance to the optimal high-type standard, the low type would reap an informational rent $S_l^* - S_l^w$.

To mitigate this incentive, the legislator will offer a set of "regulatory contracts" which combine a prescribed standard with contingent negative or positive transfers. To get the project executed, the investor will have to choose a contract. For the welfare comparison of part 5, it is not necessary to fully characterize the set of possible contracts. Instead, this part characterizes the (possibly constrained-) efficient set of contracts for specific type distributions, that is, for specific values of q.

Focus first on schemes generating the first-best outcome, specifically, sets of contracts $\{(\rho^*, D_l^*), (\tau^*, D_h^*)\}$, where ρ^* is a subsidy and τ^* a tax, such that

$$S_l^* - \rho^* \leq S_l^w + \tau^*, \qquad (IC_l)$$

$$S_h^* + \tau^* \leq S_l^w - \rho^*; \qquad (IC_h)$$

$$\Pi_0 - S_l^* + \rho^* \geq 0, \qquad (IR_l)$$

$$\Pi_0 - S_h^* - \tau^* \geq 0; \qquad (IR_h)$$

$$q\tau^* = (1-q)\rho^*. \qquad (BB)$$

Inequations (IC_l) and (IC_h) give the incentive-compatibility constraints of the low and the high type in terms of their respective costs (avoidance costs net of the - positive or negative - transfer). The system of transfers must induce both types to reveal their respective marginal avoidance costs by choosing the right contract for the specific type. It is assumed that investors still choose the right contract when their payoffs are identical.

Inequations (IR_l) and (IR_h) give the participation constraints of the low and the high type. Before executing the project, the investor has to choose one of the regulatory contracts; however, she is free not to pursue the project in the first place. By assumption, investors will still realize the project when their net profit is zero.

Equation (BB) is the balanced budget requirement: For q representing the fraction of high-type investors, expected total subsidies to low-type investors must equal expected total tax revenues from high-type investors. Reformulate (BB) to

$$\rho^* = \frac{q}{1-q}\tau^*, \qquad (BB)$$

whereas constraints (IC_l) and (IC_h) can be rewritten as

$$\rho^* \geq S_l^* - S_l^w - \tau^*, \qquad (IC_l)$$

$$\rho^* \leq S_h^w - S_h^* - \tau^*. \qquad (IC_h)$$

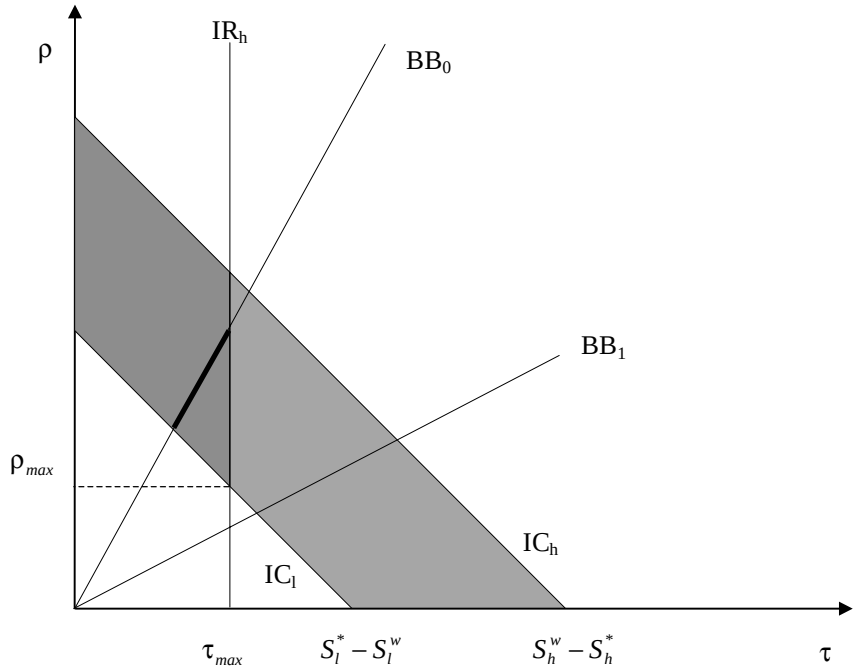

Figure 2: The scope for first-best schemes

As, from observation 2, $S_l^* - S_l^w < |S_h^* - S_l^w|$, constraint (IC_h) will never bind when (IC_l) is fulfilled with equality. Note also that constraint (IR_l) will never bind: as the project - under correct regulation - is privately profitable and $\rho \geq 0$, the low type will always participate. For the high type, however, revealing her information means getting private net profits lowered by the tax amount to be paid. Therefore, (IR_h) may bind. From (IR_h), the maximal tax amount that can be extracted from the high-type investor is given by $\tau_{\max} = \Pi_0 - S_h^*$. A higher tax would lead the investor to not execute the project.

Lemma 1 *For $\tau_{\max} < \Pi_0 - S_h^*$, there is a threshold $q_{\min}^{is} > 0$ such that for any $q < q_{\min}^{is}$, no feasible set of contracts implementing the first-best allocation under a balanced budget exists.*

Proof. Define by $\rho_{\min}$ the lowest possible subsidy for which the low-type investor is ready to reveal her information, when the high type is subjected to maximum taxation; thus, from (IC_l), $\rho_{\min} = S_l^* - S_l^w - \tau_{\max}$. For $\tau_{\max} < S_l^* - S_l^w$, $\rho_{\min} > 0$: even under maximum taxation, the legislature has to offer a positive subsidy to induce the low type to choose (ρ^*, D_l^*). When the fraction of high types (which are taxed) is low, it may then not be possible to balance

the budget. From (BB),

$$q^{is}_{\min} = \frac{\rho_{\min}}{\rho_{\min} + \tau_{\max}} > 0.$$

In contrast, for $\tau_{\max} \geq S^*_l - S^w_l$, $\rho_{\min} = 0$ and, consequently, $q^{is}_{\min} = 0$. ■

Consider figure 2 for a graphical explanation. The shaded area represents the set of implementable schemes, that is, tax/subsidy-combinations that fulfill the constraints (IC_l) and (IC_h). The darker area gives the set of feasible schemes, where, additionally, (IR_l) is fulfilled. Lines BB_0 and BB_1 are, for given q, the respective locus of tax/subsidy-combinations yielding a balanced budget. BB_1 represents a lower q than BB_0. The bold segment on BB_0 gives the tax/subsidy combinations feasible under the balanced budget requirement. For BB_1, no such tax/subsidy-combination exists.

Remark *Lemma 1 relies on assumption (4):* $\tau_{\max} < S^*_l - S^w_l$ *implies* $\Pi_0 - S^w_h < 0$. *Under wrong regulation, the project of the high-type investor is no longer privately profitable. Because* $S^*_l - S^w_l < |S^*_h - S^w_l|$ *under strict convexity of* $D(S)$ *(observation 2),* $\tau_{\max} = \Pi_0 - S^*_h < S^*_l - S^w_l$ *implies* $\Pi_0 - S^*_h < S^w_h - S^*_h$, *or* $\Pi_0 - S^w_h < 0$.

Focus now on $q < q^{is}_{\min}$. The legislature has two possibilities:

External Funds The legislature may use external finance via general taxation to cover the emerging budget deficit. By assumption, general taxation is distortionary. Denote the expected amount of necessary external funds for regulation of the project by B. The budget restriction (BB) is then

$$B + q\tau_{\max} = (1-q)(S^*_l - S^w_l - \tau_{\max})$$

or

$$B = (1-q)(S^*_l - S^w_l) - (\Pi_0 - S^*_h),$$

which is decreasing in q; hence, for smaller q, the amount necessary to balance the budget and the related excess burden will be higher.

Departure from efficient standards Consider the case where $q \to 0$. It is then (constrained) efficient to put all the regulatory inefficiency on the (relatively rare) high-type investors. Denoting the smallest possible q by $q_{\min} = \frac{1}{N}$, where N is the number of investors,

$$\lim_{N \to \infty} q_{\min} = 0.$$

Hence, $q \to 0$ presupposes that the number of investors is "very large". Therefore, even a small inefficiency per low-type investor will add up, if q is small enough, to a higher amount than the inefficiency from regulation of the (relatively rare) high-type investors.

The legislature may now propose a contract (intended for the high type) to meet a suboptimal standard $\bar{D}_h > D_h^*$, where $S_h(\bar{D}_h) < S_h^*$, and ask for a tax such that (IR_h) is fulfilled with equality. Then, the legislature can mobilize a tax amount higher than $\tau_{\max}$ per high-type investor and still ensure the project is executed. Furthermore, the subsidy to be paid to a low-type investor is also reduced. To see this, reformulate the incentive-compatibility constraint of the low type (IC_l) in terms of net profits:

$$\Pi_0 - S_l(\bar{D}_h) - [\Pi_0 - S_h(\bar{D}_h)] \leq \Pi_0 - S_l^* + \rho,$$

where the bracketed term on the left-hand side is the tax amount to be paid by the investor when alleging she is of the high type. A reformulation of the left-hand side gives

$$S_h(\bar{D}_h) - S_l(\bar{D}_h) \leq \Pi_0 - S_l^* + \rho. \tag{5}$$

Hence, $S_h(\bar{D}_h) - S_l(\bar{D}_h)$ gives the payoff for the low-type investor from misrepresentation of her type. Let $\Delta S(D) = S_h(\bar{D}_h) - S_l(\bar{D}_h)$. Note that $\Delta S(D_0) = 0$. Together with (1), this property implies $\Delta S'(D) < 0$: allowing the investor a higher level of environmental damages when she states to be of the high type reduces the subsidy necessary to induce truth-telling of the low type, as can been seen from (5).

Lemma 2 *For $q \to 0$, (constrained-) efficient regulation of the high investor is given by $\bar{D}_h^*$ implicitly defined by*

$$\Delta S(\bar{D}_h^*) = \Pi_0 - S_l^* - \varepsilon, \tag{6}$$

where ε is "very small".

Proof. Any (finite) tax amount extracted from the (finite and relatively small) amount of high-type investors will be dissipated over the "many" low type investors. Consequently, the possible subsidy per low type investor approaches zero. Because of $\Delta S'(D) < 0$, the legislature will lower the high type regulation to the point where a low type investor tells the truth even when she is given (almost) no subsidy. ■

Consider the benchmark case where $S_l^* = \Pi_0$, which, from (6), implies $\bar{D}_h^* \to D_0$. Then, the legislature's offer approaches the set of contracts $\{(\Pi_0, D_0), (\varepsilon, D_l^*)\}$: either no regulation and a confiscatory tax (for the high-type investors), or type-specific efficient regulation and (almost) no subsidy, (for the low-type investors). This benchmark will be relevant for the welfare comparison undertaken in part 5.

Note finally that, for $q \to 0$, the expected welfare loss from regulation under departure from the efficient standard D_h^* would approach zero, whereas, when implementing the efficient standards and relying on external finance, the related excess burden would monotonically increase for a lower q. Hence, if q is small enough, the legislature will prefer departures from the efficient high-type standard to external finance.

4 Agency Discretion and Legal Standing

4.1 Strategic Decisions

The Environmental Group Consider first the group's decision whether or not to file suit, which presupposes that the agency announced S_h^a and the group did undertake research. As the group learns θ during research, $p(\bar{\theta}) \in \{0, 1\}$ when it has to make this decision. It will take action, if it received a signal $s = S_l$ as its research result, with higher accuracy than the prescribed minimal standard of evidence ($\theta \geq \bar{\theta}$). If at least one condition does not hold, the group will not take action. Consequently, the court, when brought in, will always rule in favor of the environmental organization. The group will never have to bear the legal costs C^c. However, it bears the risk of spending research costs C^r and obtaining either a signal useful in court, but with too low a quality, or a signal $s = S_h$ which, by itself, cannot be used to construct a case.

Analyze now the environmental organization's incentive to undertake research. Remember that the group will always accept an announcement of S_l^a (meaning that the investor will be regulated under the stricter standard promulgated by the law) irrespective of its belief in regard to which type it actually confronts. Upon announcement of S_h^a, a court ruling against planned regulation will occur under one of two alternative constellations: either the agency did accept a bribe and the signal found by the group indicates the true type, or the agency did intend to regulate correctly and the group received a wrong signal. Thus, a signal not indicating the actual type may also be useful for the environmental group. It is this latter possibility that may provoke court errors.

Before research, the probability of finding a correct signal of sufficiently high quality is defined by

$$\begin{aligned} prob[s = S_l \,|S = S_l\,] &= p(\bar{\theta})E(\theta \,|\theta \geq \bar{\theta}\,) \\ &= \int_{\bar{\theta}}^{1} f(\theta)d\theta \frac{\int_{\bar{\theta}}^{1} \theta f(\theta)d\theta}{\int_{\bar{\theta}}^{1} f(\theta)d\theta} = \int_{\bar{\theta}}^{1} \theta f(\theta)d\theta, \end{aligned} \tag{7}$$

whereas the probability of finding a false signal of sufficiently high quality is given by

$$\begin{aligned} prob[s = S_l \,|S = S_h\,] &= p(\bar{\theta})(1 - E(\theta \,|\theta \geq \bar{\theta}\,)) \\ &= \int_{\bar{\theta}}^{1} f(\theta)d\theta \left(1 - \frac{\int_{\bar{\theta}}^{1} \theta f(\theta)d\theta}{\int_{\bar{\theta}}^{1} f(\theta)d\theta}\right) = \int_{\bar{\theta}}^{1} (1-\theta) f(\theta)d\theta. \end{aligned} \tag{8}$$

When observing S_h^a, the environmental group will update its belief that the investor is of the low type and, hence, that the agency intends wrong regulation, according to Bayes' rule. Remember that, in this case, the possible gain for the group from prevailing in court is given by ΔD. Hence, the condition for the

environmental organization to undertake research is

$$\frac{(1-q)b}{q+(1-q)b}p(\bar{\theta})E(\theta\,|\theta\geq\bar{\theta})\Delta D + \frac{q}{q+(1-q)b}p(\bar{\theta})(1-E(\theta\,|\theta\geq\bar{\theta}))D_h^* > C^r, \tag{9}$$

where the first term of the left-hand side depicts the expected gain from finding correct evidence that the announced type is the wrong one and the second term depicts the expected gain of finding false evidence, suggesting a false announcement by the agency even while it was truthful.

The Agency Consider now possible negotiations over a side-payment between the investor and the agency. When the bureaucrat detects that he has to regulate a low type, he may offer a side-contract to the investor, who, by assumption, can only accept or reject it. The investor will accept any contract where

$$\Pi_0 - S_l^w - P \geq \Pi_0 - S_l^*.$$

Thus, the bureaucrat would ask for $P^B = S_l^* - S_l^w$. He has an incentive to do so, when

$$k[p(\bar{\theta})E(\theta\,|\theta\geq\bar{\theta})A(C^c) + (1-p(\bar{\theta})E(\theta\,|\theta\geq\bar{\theta}))A(P^B)] + (1-k)A(P^B) > 0. \tag{10}$$

The left-hand-side of (10) is the expected payoff from wrong regulation of the low type: The first term in the brackets represents overruling by the court (the group finding a signal indicating the actual type of sufficiently high quality), the second term depicts fruitless research, and the last term gives the payoff when the group does not undertake research. Using (7), a re-arrangement of (10) gives

$$A(P^B) > \frac{-k\int_{\bar{\theta}}^1 \theta f(\theta)d\theta}{1-k\int_{\bar{\theta}}^1 \theta f(\theta)d\theta}A(C^c),$$

which holds for $k = 0$, and for $k = 1$ and high $\bar{\theta}$. Even while the bureaucrat is not personally sanctioned for accepting the payments, legal costs serve as a sanction anticipated by an administrator taking budget considerations into account. Assume this effect deters the agency from accepting the payment for some lower $\bar{\theta} < 1$, given that $k = 1$.

Enforceability of the Side-Contract A side-contract covering a bribery payment cannot legally be enforced. Under the timing of the game presented in part 2, transfers are paid after the agency issues the conditional project permit. When the agency is committed to the regulation that has been issued, it will never be rational for the investor to pay the agreed transfer sum in stage 8. of

the game. Anticipating this, the agency may as well decide not to collude. To rule out this problem, the analysis follows the assumption of self-enforcement or "quasi-enforceability" frequently made in the literature (e.g., by Laffont/Tirole (1993): 478).

Overregulation and Extortion Legal costs to be borne by the agency will also influence its decision how to regulate a high-type investor: the agency may have an incentive to prescribe tighter environmental standards D_l^*, thereby avoiding a costly legal battle. False regulation, by assumption, would lead the high-type investor to not realize the project. As the project is socially profitable, a welfare loss would result.

In reality, this case is less probable, because investors are also entitled to file suit against agencies' regulations. Consequently, a high-type investor may succeed in getting wrong regulation overturned by the court. The model presented here abstracts from this possibility to focus on the impact of standing for outside watchdog organizations[7]. Such overregulation will then occur[8], because

$$k[p(\bar{\theta})(1 - E(\theta \,|\theta \geq \bar{\theta}))A(C^c) < 0. \tag{11}$$

A high-type investor, while not having the possibility, in the model, to sue the agency, may avert overregulation by also offering a payment. Because the threat to overregulate is credible, the agency can extort the high-type investor, that is, exchange correct regulation for a side-payment. Under the inadequately strict regulation, the investor would not execute the project. However, upon receipt of an additional transfer, the agency may prefer to regulate correctly and risk a subsequent overruling by the court. Assume a similar bargaining procedure as in the case of collusion with the low type.

Corollary 3 *Under $\bar{\theta} < 1$ and the emerging incentives for overregulation, extortion of investors can improve welfare.*

Proof. The investor is ready to accept any side-contract where

$$\Pi_0 - S_h^* - P \geq 0.$$

Consequently, the parties will agree on a transfer level $P^{Be} = \Pi_0 - S_h^*$. Then, the agency will realize $A(P^{Be})$, when the environmental group's research activities are not successful, or the group does not undertake research. The administrator will not be ready to make the bargain, if

$$\begin{aligned} k[p(\bar{\theta})(1 - E(\theta \,|\theta \geq \bar{\theta}))A(C^c) + (1 - p(\bar{\theta})(1 - E(\theta \,|\theta \geq \bar{\theta})))A(P^{Be})] \\ +(1-k)A(P^{Be}) < 0. \end{aligned} \tag{12}$$

[7] Neither do investors file suit against other investors' planned regulation. This is plausible, as investors do not necessarily belong to the same branch.

[8] Incentives for overregulation will be weaker when the administrator is intrinsically motivated to follow the legislature's requirements at least to some extent and, hence, derives utility from correct regulation.

which depicts a stricter condition than (11). Consequently, there will be P for which (12) does not hold while (11) still holds. ■

The positive effect on overregulation is maximized under the assumed bargaining procedure, in which the agency reaps the entire surplus. However, the effect will be substantial for every procedure under which the administrator gets at least a positive share. Assume for now that the administrator's incentives under $A(C^c)$ are low-powered such that (12) does not hold under the applied bargaining procedure, and the high type is correctly regulated.

4.2 Equilibria

This paragraph derives and classifies equilibria for given $\bar{\theta}$ by operating with conditions (9) and (10). Denote equilibrium strategies of the agency and the environmental group by b^* and k^*. Figures 3 and 4 present the respective correspondences. Note that in these figures, the abscissa denotes $1-\bar{\theta}$: moving in eastern direction means to lower the standing barrier. In the benchmark case without standing, $\bar{\theta}=1$. Then, according to (9), the environmental group never has an incentive to undertake research: $k^*=0$. The agency will never face the risk of bearing legal costs, and will thus always be ready to apply lenient regulation for a side-payment, according to (10): $b^*=1$.

The model generates different impacts stemming from the legal system:

- The court may overturn wrong regulation by the agency. This is the *correction* function of the court.
- The possibility of research and a subsequent trial may deter the agency from accepting a bribe for false regulation. Call this the *deterrent* function of the legal system.
- The judge may wrongfully overturn correct high-type regulation, thus committing a *legal error*.

Equilibria A: No correction, no deterrence: $b^*=1$, $k^*=0$. In this case, (9) does not hold for $b=1$. In this case, $\bar{\theta}$ is high enough for the benchmark described above to still hold: the group will never investigate, and the agency will always accept the transfer. While third-party standing exists, it has no influence on the parties' decisions. Call standing to be non-substantive in this case.

Consider now a low enough for (9) to hold as an equality, for $b=1$. Then, the environmental organization is indifferent whether or not to conduct investigations, and will thus be ready to randomize. One of two cases will apply:

Case I: $b^*=1$ **and** $k^*\in[0,\bar{k}]$. For $k^*\in(\bar{k},1]$,(10) will not hold. When the research probability is too high, the agency will be deterred from a side-arrangement with the investor. Then, lowering still further leads directly to the class of equilibria C. where both parties randomize over their possible strategies (see below).

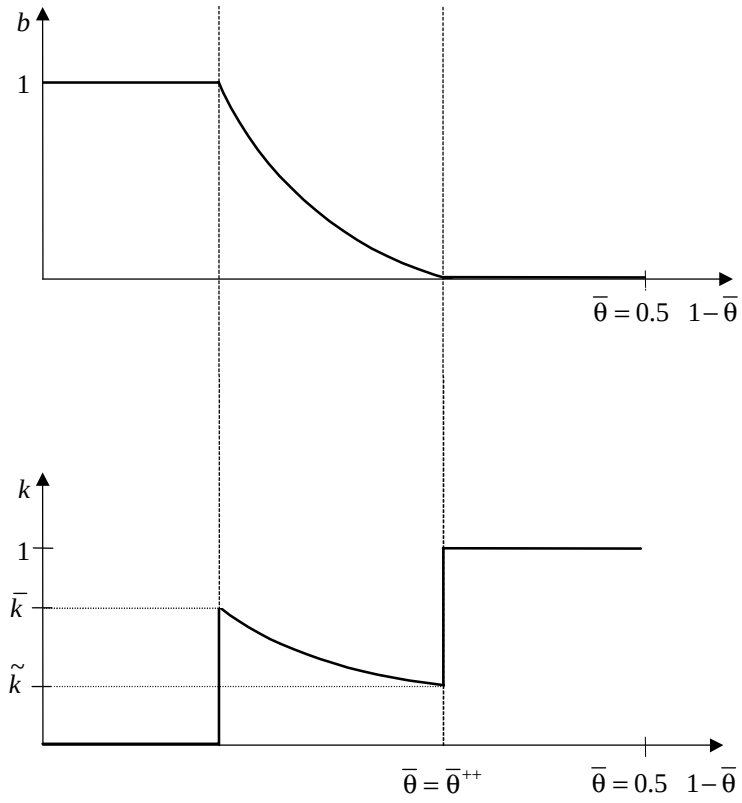

Figure 3: Equilibrium correspondences - case I

Case II: $b^* = 1$ **and** $k^* \in [0, 1]$. Then, (10) also holds for $k = 1$. Further lowering leads to the following class of equilibria:

Equilibria B. Only correction, no deterrence: $b^* = 1$, $k^* = 1$. Within equilibria B, (9) holds for $b = 1$, and (10) holds for $k = 1$. When the environmental group files suit, the court will correct the regulation; however, due to a high standard of evidence, the risk for the agency of being overruled is too low to be deterred from collusion.

Assume now $\bar{\theta}$ to be low enough that, for $k = 1$, (10) holds as an equality. Then, the agency is indifferent as to whether or not to agree on bribery and will therefore be ready to randomize. One of two cases results:

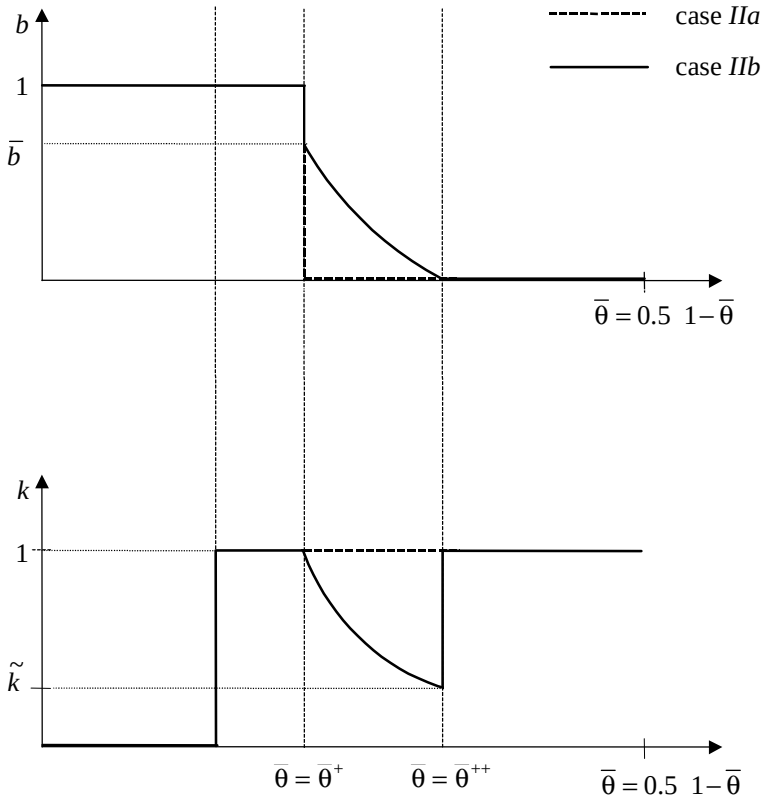

Figure 4: Equilibrium correspondences - case II

Case IIa: $b^* \in [0,1]$**,** $k^* = 1$**.** Here, (9) holds for any b. The group will undertake research even when the probability of the agency accepting a side-payment is zero. Lowering $\bar{\theta}$ still further leads directly to equilibria D. where the group investigates even while the agency does not collude (equilibria D. - see below).

Case IIb: $b^* \in [\bar{b},1]$, $k^* = 1$ Here, (9) does not hold for $b \in [0,\bar{b})$. Where the probability of collusion is too low, the environmental group has no incentive to conduct an investigation. Lowering $\bar{\theta}$ leads to the following equilibria class:

Equilibria C. Correction and deterrence: $b^* \in (0,1)$**,** $k^* \in (0,\bar{k})$ **(case I) or** $b^* \in (0,\bar{b})$**,** $k^* \in [\tilde{k},1)$ **(case IIb).** For $b = 1$, (9) holds. When $\bar{\theta}$ is low enough for (10) not to hold for $k = 1$, the agency will not accept a bribe

when the group always undertakes research. However, (9) may not hold for $b = 0$: When the agency always acts honestly, the environmental group will not investigate. This constellation gives rise to equilibria in mixed strategies, where the parties randomize in choosing their actions. ¿From (10), the equilibrium strategy of the group is given by

$$\begin{aligned} k^*(\bar{\theta}) &= \frac{1}{p(\bar{\theta})E(\theta \left| \theta \geq \bar{\theta} \right.)} \frac{A(P^B)}{A(P^B) - A(C^c)} \\ &= \frac{1}{p(\bar{\theta})E(\theta \left| \theta \geq \bar{\theta} \right.)} K, \end{aligned} \tag{13}$$

where $K \in (0,1)$ represents the propensity of the agency to accept the side-payment: A lower K means that the agency is less inclined to collude, because of a low payment P^B or of high legal costs. Solving (9) for b, the equilibrium strategy of the agency is

$$b^*(\bar{\theta}) = \frac{q}{1-q} \frac{C^r - p(\bar{\theta})(1 - E(\theta \left| \theta \geq \bar{\theta} \right.))D_h^*}{p(\bar{\theta})E(\theta \left| \theta \geq \bar{\theta} \right.)\Delta D - C^r} \tag{14}$$

To double-check the sign of (14), note that $C^r - p(\bar{\theta})(1 - E(\theta \left| \theta \geq \bar{\theta} \right.))D_h^* > 0$, or the group will also investigate when the agency always regulates correctly (this will be the case under equilibria D). Furthermore, $\bar{\theta}$ is low enough for the group undertaking research when $b = 1$. Hence, from (9),

$$(1-q)p(\bar{\theta})E(\theta \left| \theta \geq \bar{\theta} \right.)\Delta D + qp(\bar{\theta})(1 - E(\theta \left| \theta \geq \bar{\theta} \right.))D_h^* - C^r > 0.$$

These properties imply $p(\bar{\theta})E(\theta \left| \theta \geq \bar{\theta} \right.)\Delta D - C^r > 0$. Standing has two impacts here: the court will correct regulation ($k^* > 0$); anticipating this, the agency is deterred from collusion to a certain extent ($b^* < 1$). Using (7) and (8), derive (13) and (14) with respect to $\bar{\theta}$:

$$\frac{dk^*(\bar{\theta})}{d\bar{\theta}} = \frac{\bar{\theta}f(\bar{\theta})}{\left(\int_{\bar{\theta}}^1 \theta f(\theta) d\theta\right)^2} K > 0$$

and

$$\begin{aligned} \frac{db^*(\bar{\theta})}{d\bar{\theta}} = \frac{q}{1-q} & \frac{(1-\bar{\theta})f(\bar{\theta})D_h^* \left(\int_{\bar{\theta}}^1 \theta f(\theta) d\theta \Delta D - C^r\right)}{\left(\int_{\bar{\theta}}^1 \theta f(\theta) d\theta \Delta D - C^r\right)^2} \\ & + \frac{q}{1-q} \frac{\bar{\theta}f(\bar{\theta})\Delta D \left(C^r - \int_{\bar{\theta}}^1 (1-\theta) f(\theta) d\theta D_h^*\right)}{\left(\int_{\bar{\theta}}^1 \theta f(\theta) d\theta \Delta D - C^r\right)^2} > 0. \end{aligned}$$

Decreasing $\bar{\theta}$ decreases the equilibrium probabilities of undertaking research and of accepting the side-payment. Lowering standing barriers has a deterrent

effect on collusion. Thus, the group can reduce its research activity in order to maintain the agency's indifference in regard to acceptance or non-acceptance of the side-payment. Conversely, a stronger standing for the environmental group increases the odds of prevailing in court. The agency is forced to reduce its collusion probability in order to maintain the group's indifference towards conducting or not conducting an investigation.

Note that k^* never becomes zero for $b^* > 0$. This is so, because a decreasing $\bar{\theta}$ will eventually lead the group to always undertake research ($k = 1$) even when the agency does not collude.

Assume now to be low enough for (9) to hold as an equality for $b = 0$; thus, the group will still be ready to randomize. Equilibrium strategies are $b^* = 0$ and $k^* \in (\tilde{k}, 1]$, where $\tilde{k}$ is the equilibrium strategy of the group in the mixed equilibrium where $b^* = \varepsilon$, ε being "very small". Lowering $\bar{\theta}$ leads to the following equilibria:

Equilibria D. No correction, only deterrence: $b^* = 0, k^* = 1$. Here, (9) holds for $b = 0$, and (10) does not hold for $k = 1$. The group always investigates, and the agency never colludes. In this case, the judge will never overturn wrong regulation: The environmental organization, in undertaking research, only relies on possible court errors.

The welfare impact of the deterrence effect will be analyzed in more detail in the next part. Consider now parametric variations of research and legal costs. The set of equilibria existing for $\bar{\theta} \in [0.5, 1]$ is restricted for some values of research and legal costs C^r and C^c. To see this, study the cases where research or legal costs are either zero or "very high".

Research costs. Setting $C^r = 0$ implies that the group will undertake research for any $\bar{\theta} < 1$. Depending on (10), the agency will agree on the side-payment or not. Possible equilibria are given by B (case IIa) and D. "Very high" research costs may imply that the group will never undertake research or, for $b = 1$, only at a low level of $\bar{\theta}$.

Legal costs. Assume that research costs are not prohibitive, in the sense that $k^* = 1$ for some $\bar{\theta}$. Setting $C^c = 0$ means that the agency will never be deterred from accepting the side-payment. Depending on (9) being fulfilled, the environmental group will decide whether or not to conduct an investigation or not. Possible equilibria are given by class A (case II) and B. High C^c imply that deterrence is strong: for given k, the agency is deterred for high $\bar{\theta}$. Equilibria C and D will exist for higher $\bar{\theta}$. Moreover, for high legal costs, the agency may be inclined to overregulation by prescribing the high type to apply the strict standard D_h^*, as described above.

In the following analysis, equilibria A and D exist on the assumptions made before: there are $\bar{\theta}$ for which

- standing is non-substantive: the environmental group never undertakes research and the agency always colludes (equilibrium class A), and for which
- the environmental group always investigates even while the agency never colludes (equilibrium class D).

Generally speaking, legal and research costs are assumed to be substantial, but not prohibitive. The above discussion of possible equilibria allows to state the following lemma useful for the welfare analysis.

Lemma 4 *Assume that there $\bar{\theta}$ are for which $b^* = 1$, $k^* = 0$ (equilibrium class A) and for which $b^* = 0$, $k^* = 1$ (class D). Then, there must also be $\bar{\theta}$ for which either $b^* = 1$, $k^* = 1$ (class B) or $b^* \in (0,1)$, $k^* \in (0,\bar{k})$, viz., $b^* \in (0,\bar{b})$, $k^* \in (0,1)$ (class C), or both.*

Proof. Suppose that equilibrium classes B and C do not exist. Then, there will be a $\bar{\theta}$ for which the transition between the equilibrium classes A and D takes place. For this $\bar{\theta}$, (9) must hold as an equation for $b^* \in [0,1]$ and (10) must hold as an equation for $k^* \in [0,1]$; hence, $b^* \in [0,1]$, $k^* \in [0,1]$ give the possible equilibria under this $\bar{\theta}$. This implies that $k^* = 0, b^* = 0$ should also be a possible equilibrium. However, the existence of such an equilibrium contradicts (10): when the environmental group never investigates, the agency will always collude. ■

5 The Choice of the Legislature

5.1 Expected Welfare Assuming Agency Discretion

Legislators must decide whether or not to grant discretion to the regulatory agency. When deciding in favor of discretion, they must additionally choose an optimal standard of evidence $\bar{\theta}^*$. Let $W(\bar{\theta})$ be the expected welfare for the legislature of granting discretionary power to the agency and combining it with a specific standard of evidence:

$$\begin{aligned} W(\bar{\theta}) \quad = \quad & q[k^*(\bar{\theta})p(\bar{\theta})(1 - E(\theta \,|\theta \geq \bar{\theta}\,))(-C^c) + \\ & (1 - k^*(\bar{\theta})p(\bar{\theta})(1 - E(\theta \,|\theta \geq \bar{\theta}\,)))V_h^* - k^*(\bar{\theta})C^r] + \\ & (1-q)[(1 - b^*(\bar{\theta}))V_l^* + \\ & b^*(\bar{\theta})[k^*(\bar{\theta})p(\bar{\theta})E(\theta \,|\theta \geq \bar{\theta}\,)(V_l^* - C^c) + \\ & (1 - k^*(\bar{\theta})p(\bar{\theta})E(\theta \,|\theta \geq \bar{\theta}\,))V_l^w - k^*(\bar{\theta})C^r]]. \end{aligned} \tag{15}$$

In (15), the first line of the right-hand-side depicts the effect of legal errors on expected welfare: false regulation prescribed by the court will lead the high-type investor not to pursue the project. The second line shows correct high-type regulation uncontested by the group and the impact of the research costs. The expression in the third line depicts the court's role as a deterrent, the

fourth line depicts the correction function, and the first expression of the last line gives the effect of wrong regulation that is not contested in court. $W(\bar{\theta})$ is piecewise differentiable, i.e., within equilibria A.-D. In the benchmark case where $\bar{\theta} = 1$, or under a non-substantive standing (equilibrium class A), the equilibrium strategies are $b^* = 1$, $k^* = 0$; hence,

$$W_A = qV_h^* + (1-q)V_l^w. \tag{16}$$

The following paragraph compares the expected welfare of the institutional solution, under a specific standard of evidence $\bar{\theta}$, and of the incentive scheme presented in part 3. This analysis will focus on the case where the first-best mechanism is not feasible. As $W(\bar{\theta})$ is only piecewise differentiable, it is not straightforward to derive the optimal standard of evidence $\bar{\theta}^*$. However, an explicit derivation of $\bar{\theta}^*$ is not necessary for exploring the *relative* welfare performance of the institutional solution. The following analysis relies on a specific standard of evidence, which implements a specific equilibrium within the institutional solution.

5.2 Comparison with the Incentive Scheme

Consider first the possibility of granting the agency discretion, without the environmental group possessing a substantial standing. Remember from part 3 that in the case $q \to 0$, the expected welfare loss of the (constrained-) efficient scheme approaches zero. In contrast, according to (16), the expected welfare loss of granting discretion without standing approaches V_l^w. Hence, the granting of discretion without standing represents the worst solution.

Corollary 5 *For small enough q, when the legislature decides to grant agency discretion, it will always combine it with a substantial standing for the environmental watchdog.*

Therefore, consider now the solution in the case of a substantial legal standing. For notational brevity, denote by $\hat{V}_h(\bar{\theta})$ the expected welfare of regulating the high type under agency discretion, for a specific $\bar{\theta}$:

$$\begin{aligned} \hat{V}_h(\bar{\theta}) \quad = \quad & (1 - k^*(\bar{\theta})p(\bar{\theta})(1 - E(\theta \,|\theta \geq \bar{\theta}\,)))V_h^* \\ & -k^*(\bar{\theta})p(\bar{\theta})(1 - E(\theta \,|\theta \geq \bar{\theta}\,))C^c - k^*(\bar{\theta})C^r. \end{aligned} \tag{17}$$

Remember from lemma (4) that at least one equilibrium class B or C must exist. In the case IIa where equilibria C do not exist, the transition from class B to D is characterized by a specific $\bar{\theta}^+$ for which equilibrium strategies are and $b^*(\bar{\theta}^+) \in [0,1]$. When equilibria C exist (cases I and IIb), the transition from class C to D is characterized by $\bar{\theta}^{++}$ such that $k^*(\bar{\theta}^{++}) \in (\tilde{k}, 1)$ and $b^*(\bar{\theta}^{++}) = 0$. Consider now the equilibria associated with $\bar{\theta}^\circ \in \{\bar{\theta}^+ - \varepsilon, \bar{\theta}^{++} + \varepsilon\}$, ε being "very small". Under both equilibria, the agency is (almost) completely deterred from collusion: $k^*(\bar{\theta}^+ - \varepsilon) = 1$, $b^*(\bar{\theta}^+ - \varepsilon) = 0$, and $k^*(\bar{\theta}^{++} + \varepsilon) = \tilde{k}$,

$\lim_{\varepsilon \to 0} b^*(\bar{\theta}^{++} + \varepsilon) = 0$. The environmental watchdog hopes exclusively for possible errors by the court when undertaking research.

On account of deterrence, the low type will be adequately be regulated. Welfare losses will result from high-type regulation, because the environmental group finds favorable evidence and sues the agency with positive probability. However, high-type regulation will be inefficient under both regulatory regimes. The question is therefore which regime generates a greater inefficiency in regulating the high type investors.

In the case of agency discretion, the expected welfare loss of regulation of a high type, within equilibria implemented by $\bar{\theta}^{\circ}$, is given by

$$V_h^* - \hat{V}_h(\bar{\theta}^{\circ}). \tag{18}$$

Reconsider now the incentive scheme and lemma (2). Focus on the benchmark case where $S_l^* = \Pi_0$ and, hence, $\bar{D}_h^* \to D_0$. Consequently, for $q \to 0$, the welfare loss of regulating a high type approaches

$$V_h^* - V_0. \tag{19}$$

Proposition 6 *Consider the standards of evidence* $\bar{\theta}^{\circ} \in \{\bar{\theta}^{+} - \varepsilon, \bar{\theta}^{++} + \varepsilon\}$. *For* $q \to 0$, *when* $S_l^* = \Pi_0$ *and*

$$\hat{V}_h(\bar{\theta}^{\circ}) > V_0, \tag{20}$$

expected welfare from granting agency discretion and a substantial legal third-party standing will be higher than under the incentive-compatible direct mechanism.

Proof. Condition (20) is immediate from (18) and (19). To ascertain whether (20) may be fulfilled, remember that $V_0 = \Pi_0 + Cs - D_0$. However, D_0 does not appear in (17), which defines $\hat{V}_h(\bar{\theta}^{\circ})$. Hence, (20) will apply for an adequately high amount of initial environmental damage D_0. ■

Note that proposition 6 only involves sufficient conditions for the institutional solution to possibly be welfare-superior. First, for a large difference $\hat{V}_h(\bar{\theta}^{\circ}) - V_0$, one may depart from the benchmark case $S_l^* = \Pi_0$. According to lemma (2), the welfare loss of regulating a high type under the incentive scheme will be lower for $q \to 0$, but may be still higher than $V_h^* - \hat{V}_h(\bar{\theta}^{\circ})$. Secondly, for a large difference $\hat{V}_h(\bar{\theta}^{\circ}) - V_0$, one may also assume that the (low) q differs significantly from 0, as long as the low type is regulated according to D_l^* by the constrained-efficient mechanism. Thirdly, remember that $\bar{\theta}^{\circ}$ does not necessarily implement the maximal welfare level attainable under the institutional solution.

A comment may be in order with respect to the role of the regulatory costs. Clearly, as can be ascertained by (17), higher legal and research costs directly make the institutional solution less attractive. This impact, however, plays no role within the welfare comparison presented here. The relevant, indirect impact is that high regulatory costs may impede the emergence of equilibria

which constitute the institutional solution's original attraction. In this case, the welfare comparison is trivial. Conversely, however, as long as equilibria exist where the agency is deterred from collusion without overregulation, q and D_0 will exist for which the institutional solution is superior in welfare terms, irrespective of the specific level of regulatory costs.

6 The Court's Decision Rule

In the model used so far, the court is committed by the legislature to use a simple decision-making rule in form of a standard of evidence set by the legislators. One may wonder whether further welfare improvements are possible when giving the court leeway in assessing the case. In the literature on information disclosure, it is usually assumed that the decision-making institution, to which parties present verifiable information, uses its knowledge of the game and the evidence presented to it in order to update beliefs in accordance with Bayes' rule (see, e.g., Sobel 1985, Milgrom/Roberts 1986, Froeb/Kobayashi 1996, Lewis/Poitevin 1997). Consider therefore the decision-making rule of a Bayesian court, which decides by weighing expected costs and benefits, on the basis of updated beliefs.

When being brought into the game, the court is presented a signal $s = S_l$ upon announcement of S_h^*. Learning the quality of the signal θ, the court updates beliefs that it confronts the high type according to

$$prob[S = S_h \,|s = S_l\,] = \frac{q(1-\theta)}{q(1-\theta) + (1-q)b\theta}.$$

Consequently, the judge will reject intended regulation, if

$$\frac{(1-q)b\theta}{q(1-\theta) + (1-q)b\theta} V_l^* > \frac{q(1-\theta)}{q(1-\theta) + (1-q)b\theta} V_h^* + \frac{(1-q)b\theta}{q(1-\theta) + (1-q)b\theta} V_l^w.$$

Because the high investor type will not pursue the project in the case of a court error, yielding zero welfare, the left-hand side of the expression encompasses only one term. Reformulating gives the standard of evidence $\tilde{\theta}$ endogenously set by the Bayesian court:

$$\tilde{\theta} = \frac{qV_h^*}{(1-q)b(V_l^* - V_l^w) + qV_h^*} = \beta(b), \tag{21}$$

and $\beta'(b) < 0$, $\beta(0) = 1$. Note that the inverse function $b = \beta^{-1}(\tilde{\theta})$ monotonically decreases in a higher standard of evidence.

Proposition 7 *The standard of evidence endogenously set by a Bayesian court according to (21) will implement an unique equilibrium. Generally, this equilibrium will not implement the welfare maximum attainable under the institutional solution.*

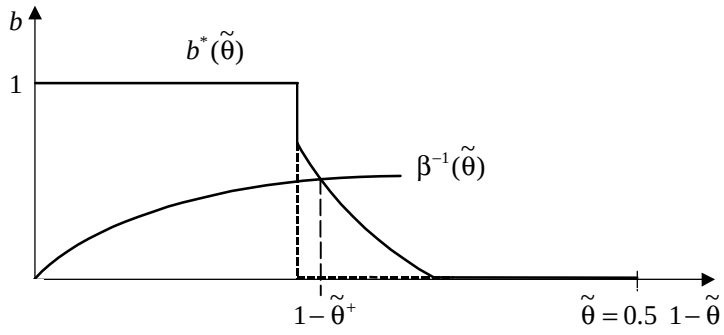

Figure 5: Equilibrium in the case of a Bayesian court

(i) Deterrence will never be complete in equilibrium.

(ii) An equilibrium where deterrence is substantial, in the sense of $b^* < 1$*, may not exist.*

Proof. Uniqueness and the welfare property will be shown under (ii).

(i) Assume that the action to never accept a bribe is an equilibrium strategy of the administrator ($b^* = 0$). Under rule (21), the court would then always dismiss a complaint ($\beta(0) = 1$). This, however, implies that the environmental group would never undertake research, according to (9), and the agency, according to (10), would always accept a bribe.

(ii) Consider a standard of evidence $\tilde{\theta}_1 = \beta(1)$. Note that the equilibrium correspondence $b^*(\bar{\theta})$ derived in part 4 is non-decreasing in a higher standard of evidence, and that $b = \beta^{-1}(\tilde{\theta})$ monotonically decreases in a higher standard of evidence. These monotonicity properties imply uniqueness. When the agency, according to (10), is always ready to accept a bribe under the standard $\tilde{\theta}_1$, the unique equilibrium implemented under decision rule (21) is characterized by $\tilde{\theta}_1 = \beta(1)$, $b^*(\tilde{\theta}_1) = 1$ and $k^*(\tilde{\theta}_1) \in [0, 1]$. When, however, the agency accepts a bribe under the standard $\tilde{\theta}_1$ only with $b < 1$, the unique equilibrium is given by a standard of evidence $\tilde{\theta}^+ \leq \tilde{\theta}_1$ implicitly defined by $b^*(\tilde{\theta}^+) = \beta^{-1}(\tilde{\theta}^+)$, which is characterized by $b^*(\tilde{\theta}^+) \in (0, 1)$ and $k^*(\tilde{\theta}^+) \in (\tilde{k}, 1)$. As (21), unlike (15), fails to take the welfare-improving deterrence effect into account, the unique equilibrium, in general, will not be the one that maximizes welfare.

■

The second part of the argument in (ii) is illustrated in figure 5 for the case IIb. Again, in the figure, the abscissa denotes $1 - \tilde{\theta}$. The weakness of

the decision-making rule (21) is that it focuses only on the issue under dispute, and does not take into consideration the impact of the decision-making rule on the parties' equilibrium strategies. It is, however, these strategies which may give rise to inefficiencies and the initial grounds for the emergence of a legal dispute. Therefore, the result of this section contains a *caveat* with respect to the policy conclusions to be drawn from information disclosure models[9]. When the decision-making institution under investigation is a court or another institution for conflict resolution, which becomes active only as a reaction to complaints concerning the decisions of other regulatory bodies, it will improve welfare to commit this institution to a simpler decision-making rule.

7 Minimizing Legal Costs

Return now to the model where the standard of evidence $\bar{\theta}$ is exogenously set by the legislature. In the legal discussion on liberalizing standing, it is sometimes argued that such reforms of administrative law would lead to an augmentation of filed suits and a subsequent increase in costs for running the legal system (see Bizer et al. 1990 for a summary of the German discussion). From the welfare perspective of the preceding paragraphs, the objective of minimizing court costs is clearly of restricted value, as those costs are only one component of society's well-being. Nevertheless, the following analysis will accept the objective of minimizing legal disputes for the sake of the argument, and consider local variations of the standard of evidence $\bar{\theta}$, within a given class of equilibria.

Denote by $\zeta(\bar{\theta})$ the *ex ante* probability of a legal dispute. Using (7) and (8),

$$\zeta(\bar{\theta}) = qk^*(\bar{\theta}) \int_{\bar{\theta}}^{1} (1-\theta) f(\theta) d\theta + (1-q) b^*(\bar{\theta}) k^*(\bar{\theta}) \int_{\bar{\theta}}^{1} \theta f(\theta) d\theta \qquad (22)$$

or

$$\zeta(\bar{\theta}) = qK \left(\frac{\int_{\bar{\theta}}^{1} (1-\theta) f(\theta) d\theta}{\int_{\bar{\theta}}^{1} \theta f(\theta) d\theta} + \frac{C^r - \int_{\bar{\theta}}^{1} (1-\theta) f(\theta) d\theta D_h^*}{\int_{\bar{\theta}}^{1} \theta f(\theta) d\theta \Delta D - C^r} \right) \qquad (23)$$

The first term of the right-hand side of (22) is the probability of a legal error and the second one is the probability of the court correcting wrong regulation. Like $W(\bar{\theta})$, $\zeta(\bar{\theta})$ is piecewise differentiable, that is, within equilibrium classes A-D. When standing is non-substantial, within equilibria of class A, $\zeta(\bar{\theta})$ is trivially zero.

[9] With respect to efficient decision-making, the assumption of Bayesian behavior plays an important role in information disclosure models. For instance, while Milgrom/Roberts (1986) show that sufficiently opposed interests of the parties and subsequent intense competition for information disclosure can substitute to some extent for strategical sophistication of the decision-maker, competition in general is not sufficient for efficient decisions. Froeb/Kobayashi (1996) show that competition for information disclosure will yield efficient outcomes even when the decision-maker is biased and naive (in the sense of not accounting for selectively produced evidence); however, they still assume Bayesian updating.

For equilibria B and D, lowering the standard of evidence increases the probability of legal disputes. This can immediately be seen by setting $b^* = 1$ and $k^* = 1$, or $b^* = 0$ and $k^* = 0$ in (22), and differentiating $\zeta(\bar{\theta})$.

Focus now on equilibria C. The sign of the derivative of (22) or (23) cannot be determined unequivocally without putting more structure on the model. Consider therefore a variant of the model where $\bar{\theta}$ is equally distributed: $f(\bar{\theta}) = 2$. Hence, $p(\bar{\theta}) = 2(1-\bar{\theta})$ and $E(\theta \,|\theta \geq \bar{\theta}\,)$. Furthermore, assume that both investor types will execute the project, when falsely regulated. Then, (23) transforms into

$$\begin{aligned} \zeta(\bar{\theta}) &= qK\left(\frac{1-\bar{\theta}}{1+\bar{\theta}} + \frac{C^r - (1-\bar{\theta})^2\Delta D}{(1-\bar{\theta}^2)\Delta D - C^r}\right) \\ &= qK\left(\frac{2\bar{\theta}C^r}{(1+\bar{\theta})[(1-\bar{\theta}^2)\Delta D - C^r]}\right), \end{aligned} \tag{24}$$

the derivative of which is

$$\frac{d\zeta(\bar{\theta})}{d\bar{\theta}} = qK\left(\frac{2C^r[(1-\bar{\theta}^2)\Delta D - C^r] + 4\bar{\theta}^2(1-\bar{\theta})C^r\Delta D}{[(1+\bar{\theta})[(1-\bar{\theta}^2)\Delta D - C^r]]}\right) > 0.$$

To see the sign of the derivative, note that $p(\bar{\theta} = E(\theta \,|\theta \geq \bar{\theta}\,) = (1-\bar{\theta}^2)$; hence, $(1-\bar{\theta}^2)\Delta D - C^r > 0$ for every equilibrium in class C. The following result can immediately be stated.

Proposition 8 *Assume $f(\bar{\theta}) = 2$ and that both investor types will execute the project, when falsely regulated. Consider a legal reform which strengthens legal standing for watchdog organizations by lowering the standard of evidence required to prevail in court. When courts have both the role of ex post correction and ex ante deterrence before and after the legal reform, lowering the standing barrier unambiguously decreases the probability of a legal battle.*

Thus, a stronger legal standing for watchdog organizations does not generally lead to a higher caseload for the courts. Even when any out-of-court dispute resolution is explicitly ruled out, the converse may be true, where a more restricted access to the legal system increases the number of filed suits.

8 Summary and Conclusions

The paper presented a model where granting discretion to collusive agencies in environmental regulation can be supplemented with legal standing for environmental organizations, which empowers them to let the agency's decision-making be scrutinized by a court. Within the model, the extent of legal standing is given by the minimum quality of evidence required, which is a continuous parameter whose choice can be optimized by the legislature. The model allowed us

to neatly analyze the interaction of the various impacts stemming from the legal system: the correction of wrong regulation, collusion deterrence and the possibility of legal errors. The deterrence effect lay at the core of the derived results. First, it was shown that, for high levels of initial environmental damages and some type distributions, the regime of indirect, institutional regulation is welfare-superior to direct regulation by the legislature *via* an incentive scheme. Thus, the former, real-world solution, even while generating substantial regulatory costs, may have its economic merits. From the absence of incentive regulation cannot be inferred that welfare improvements could be achieved by a change of institutional arrangements in regulation. This result relies on the assumption that overregulation will lead to high inefficiencies, in the sense that some investor types will not execute their projects when subjected to overregulation. The point is, that this assumption also influences the performance of the incentive scheme, because participation constraints are then binding for some investor type. When no investor will be discouraged, an efficient and balanced incentive-compatible mechanism is always feasible in the simple setting considered here. It seems, however, natural to assume that participation constraints will bind for some investor types under too strict environmental regulation.

Secondly, the superiority of the institutional solution was shown to crucially hinge on a substantial standing for the environmental watchdog, which gives an economic rationale for the liberal standing doctrine applied in the United States. Therefore, it may be wondered whether the United States may serve as a role model for countries with more restrictive standing doctrines. In this respect, a qualification has to be made. The analysis restricted attention to standing for an organization which seeks to minimize technical externalities. Hence, it carefully avoided to speak of standing for affected "third parties" in general. Positive or negative pecuniary externalities of the project under dispute, resulting from a change of relative prices, do not constitute an allocation problem in the first place. Hence, granting standing to parties affected by pecuniary externalities would give rise exclusively to distributional disputes. Given this *caveat*, the policy conclusion that lowering standing barriers for organized environmental interests may have beneficial welfare effects is especially interesting for countries (like Germany) where administrative law traditionally is reluctant to extend standing.

The deterrent effect that legal standing has on the agency's incentive to collude provided some additional insights. When the legislature decides to grant discretion, the probability of "meritless" suits, where plaintiffs exclusively rely on welfare-reducing court errors, will be positive in equilibrium: a welfare-maximizing legislature is ready to trade court errors for the deterrence of collusion. Specifically, restricting the courts' leeway in decision-making by committing them to simple decision-making rules will improve overall welfare, when deterrence from activities giving rise to trials is explicitly considered in the analysis. And, finally, it is because of the deterrence effect that the analysis casts doubts on the validity of the - seemingly reasonable - argument that extending standing will increase the courts' caseload. In contrast, it was shown that impeding access to the courts may increase the number of suits.

A conclusion can also be drawn with respect to the efficient punishment of agency misbehavior. Reconsider the agency's incentive to issue overly strict regulation in order to avoid costly legal battles. This possibility was derived under the British cost recovery rule, where the agency has to bear all legal costs if it loses a trial. Hence, when collusive administrators pay at least a minimum of attention to public funds, legal costs play the role of a fine[10]. Overly harsh fines intended to avoid inefficiencies from collusion may thus generate inefficiencies from overregulation, which gives a rationale for low-powered incentives for administrators. Clearly, this adverse effect is countervailed to some extent when the investor can also take action against intended regulation; however, it can be concluded that the punishment of agencies' misbehavior has to be fine-tuned.

References

[1] Asimov, M. (1994): "On Pressing McNollgast to the Limits: The Problem of Regulatory Costs. *Law and Contemporary Problems 57*, 127-37.

[2] Banks, J.; B. Weingast (1992): "Political Control of Agencies Under Asymmetric Information". *American Journal of Political Science 36*, 509-24.

[3] Baron, D. P. (1985): "Regulation of Prices and Pollution Under Incomplete Information". *Journal of Public Economics 28*, 211-31.

[4] Bizer, J.; T. Ormond, U. Riedel (1990): *Die Verbandsklage im Naturschutzrecht*. Taunusstein.

[5] Boyer, M.; J.-J. Laffont (1999): "Toward a Political Theory of the Emergence of Environmental Incentive Regulation". *Rand Journal of Economics 30, 137-57.*

[6] Che, Y.-K.; D. Earnhart (1997): "Optimal Use of Information in Litigation: Should Regulatory Information be withheld to Deter Frivolous Suits?". *Rand Journal of Economics 28*, 120-34.

[7] Epstein, D.; S. O'Halloran (1995): "A Theory of Strategic Oversight: Congress, Lobbyists, and the Bureaucracy". *Journal of Law, Economics, and Organization 11*, 233-260

[8] Froeb, L. M.;B. H. Kobayashi (1996): "Naive, Biased, yet Bayesian: Can Juries Interpret Selectively Produced Evidence?" *Journal of Law, Economics, and Organization 12*, 257-276.

[9] Greve, M. S. (1989): "The Non-Reformation of Administrative Law: Standing to Sue and Public Interest Litigation in West German Environmental Law". *Cornell International Law Review 22*, 199-244.

[10] See Lupia/McCubbins (1994) favoring such agency penalties, and Asimov (1994): 132, for a critique which, however, does not address the danger of overregulation.

[10] Khalil, F., J. Lawarée (1995): "Collusive Auditors". *American Economic Review (Papers and Proceedings)* 85, 442-7.

[11] Kofman, F.; J. Lawarée (1993): "Collusion in Hierarchical Agency". *Econometrica 61*, 297-326.

[12] Laffont, J.-J., J. Tirole (1993): *A Theory of Incentives in Procurement and Regulation.* Cambridge, MA; London: MIT Press.

[13] Laffont, J.-J. (1994): "Regulation of Pollution with Asymmetric Information". in: Dosi, C., T. Tomasi (eds.): *Nonpoint Source Pollution Regulation: Issues and Analysis.* Dordrecht: Kluwer.

[14] Lewis, T. (1996): "Protecting the Environment When Costs and Benefits are Privately Known". *Rand Journal of Economics 27*, 819-47.

[15] Lewis, T.; M. Poitevin (1997): "Disclosure of Information in Regulatory Proceedings". *Journal of Law, Economics, and Organization 13*, 50-73.

[16] Lupia, A., M. D. McCubbins (1994). "Learning from Oversight: Fire Alarms and Police Patrols Reconstructed". *Journal of Law, Economics, and Organization 10*, 96-125.

[17] McCubbins, M.; R. Noll; B. Weingast (1987): "Administrative Procedures as Instruments of Political Control". *Journal of Law, Economics, and Organization* 3, 243-77.

[18] Milgrom, J.; J. Roberts (1986): "Relying on the information of interested parties". *Rand Journal of Economics 17*, 18-32.

[19] Rodgers, W. H., Jr. (1994): *Environmental Law.* 2nd ed., St.Paul, Minn.:West Publishing.

[20] Rose-Ackerman, S. (1995): *Controlling Environmental Policy. The Limits of Public Law in Germany and the United States.* New Haven, London: Yale University Press.

[21] Sobel, J. (1985): "Disclosure of Evidence and Resolution of Disputes: Who should bear the Burden of Proof?". in: Roth, A. E. (ed.): *Game-theoretic Models of Bargaining.* Cambridge (Mass.), New York, etc: Cambridge University Press, 341-61.

[22] Tirole, J. (1986): "Hierarchies and Bureaucracies: On the Role of Collusion in Organizations". *Journal of Law, Economics, and Organization* 2, 181-214.

[23] Varian, H. (1990): "Monitoring Agents with Other Agents". *Journal of Institutional and Theoretical Economics 146*, 153-74.