

Mohr, Ernst

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Courts of appeal, bureaucracies and conditional project permits: The role of negotiating non-exclusive property rights over the environment

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COURTS OF APPEAL, BUREAUCRACIES AND
CONDITIONAL PROJECT PERMITS: THE ROLE
OF NEGOTIATING NON-EXCLUSIVE PROPERTY
RIGHTS OVER THE ENVIRONMENT.

by

Ernst Mohr

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Kiel Institute of World Economics
Düsternbrooker Weg 120
D 2300 Kiel
Federal Republic of Germany

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I. Introduction

Much of what may be coined the creeping degradation of the environment is due to economic projects which are subject to public approval. The erection of buildings, the siting of factories, all require permission from bureaucracies. To answer the question whether there is too much or not enough of the environment thus requires an analysis of the criteria under which private projects are publicly approved.

An omnipotent and benevolent dictator will undertake an environmentally sensitive project under the safeguards of an optimal emission control if the public environmental costs are exceeded by the private net gains from the project, or so the story goes. To continue the tale, a benevolent bureaucracy possessing absolute authority over the use of the environment will permit projects, given optimal safeguards, if the same condition is fulfilled.

However, bureaucracies are not always benevolent. Even if they were they almost never possess exclusive property rights over the environment. Indeed, bureaucracies are nested in a legal system that usually gives potential project operators the right to take the case of unapproved projects to a court of appeal. Furthermore, courts frequently can revise stipulations of environmental safeguards imposed by a bureaucracy. As a further complication of the issue, court decisions are inherently uncertain. Hence neither the potential project operator nor the bureaucracy may have an interest in a court battle. What then determines the conditions under which environmentally sensitive project are undertaken?

The present paper addresses this issue. It entertains the view that in a situation where property rights over the environment, or vice versa over projects, do not rest exclusively with the bureaucracy because of uncertain court litigation, project permits and associated environmental safeguards are

essentially the outcome of negotiations between potential project operators and bureaucracies.¹⁾

In what follows the strategic approach to negotiations known from bargaining theory (RUBINSTEIN[1982]) is applied. Conditional project permits are determined as subgame perfect equilibrium points (SELTEN[1975]) of games in extensive form. This allows the determinants of the relative bargaining power that ultimately determine the environmental safeguards to be brought to the fore. Amongst these determinants are the values of the "outside option" of project operators to take their case to the courts. Courts of appeal are thus important even if they never have to act.

Another important determinant of negotiated environmental safeguards one would immediately expect is the bureaucracy's objective. Therefore the case where the bureaucracy represents a benevolent social planner is compared to the case where it is solely an advocate of the environment.

In this context, what complicates the issue is that the discount rate the bureaucracy applies to the negotiation process for once must be expected to influence the bargaining outcome and, for another perhaps depends on the bureaucracy's own objective.

The paper is organized as follows. In Section II the situation which gives rise to environmental negotiations is made precise. In Section III the range of possible negotiated settlements between a bureaucracy and a potential project operator is determined. The rules under which bargaining takes

1) Apart from conditional project permits there are two major areas where environmental negotiations take place. First, the problem of transboundary environmental effects can be tackled virtually only by international negotiations amongst sovereign countries (for a theoretical investigation see e.g. KUHL [1987]). Second, after environmental accidents, firms sued sometimes seek an out-of-court settlement with those who have suffered from the accident (the Hoffmann-LaRoche - City of Seveso settlement is a point in case). Also, bureaucracies sometimes are entitled to negotiate an out-of-court settlement after an environmental accident (e.g. the Environmental Protection Agency (EPA) under the "Superfund" legislation (BURTON [1988])).

place are defined in Section IV, and in Sections V and VI the bargaining equilibrium is determined. Section VII concludes the paper.

II. Institutions and the Project

Consider a private project which, if undertaken without environmental safeguards, has a discounted present value π . Suppose, that - under laissez faire - environmental costs in money terms, D_0 , are associated with this project. If a permit to undertake the project is conditioned on environmental safeguards, the private costs of which are S for the project operator, environmental costs are reduced to $D(S)$. We take it that $D'(S) < 0$, $D''(S) > 0$.²⁾

The potential project operator has the right to take the case to a court of appeal if the project is not permitted by the bureaucracy or only permitted under additional environmental safeguards. For the sake of simplicity suppose that neither the bureaucracy nor the project operator incurs additional costs from an in-court settlement. Suppose further that the probability that the project operator wins the court battle is given by k , $k > 0$. If the project operator wins in court he can proceed with the project without having to comply with any environmental safeguards. If he loses in court, the decision of the bureaucracy is final.³⁾ For the sake of simplicity, take it that all decision makers are risk neutral. The model is closed by a specification of the objective of the bureaucracy.

2) The project thus is the one presumed in PORTER [1988]. There, however, potential project operators and consumers negotiate environmental safeguards. Furthermore, the bargaining process itself is not analysed, with the consequence that negotiated environmental safeguards are only vaguely determined.

3) Time costs of court battles and court decisions differing from the positions of either the project operator or the bureaucracy can be included.

project (see e.g. SIEBERT[1987]). The existence of a court of appeal such that neither the bureaucracy nor the potential project operator possesses exclusive rights over the environment is a crucial prerequisite that negotiations take place. Under non-exclusive property rights the parties involved, i.e. the bureaucracy and the potential project operator, have an incentive to make concessions in order to avoid an uncertain court battle.

III. The Range of Negotiated Environmental Safeguards

The subject under negotiation is the distribution of the gross value of the project between the project operator and the bureaucracy. This distribution of the project value is achieved by an agreement on environmental safeguards, S^n , to be applied during the operation of the project. Associated with the negotiated safeguards, S^n , are environmental costs D^n , $D^n = D(S^n)$.

In determining their readiness to make concessions, the parties compare the certain costs of a negotiated settlement with the expected costs arising from a court decision. The project operator prefers a negotiated settlement over a court decision if

$$\left. \begin{array}{ll} S^n \leq (1-k) \cdot S^* & \text{(Case 1)} \\ S^n \leq (1-k) \cdot \pi. & \text{(Case 2)} \end{array} \right\} \quad (1)$$

The project operator's willingness to make concessions differs in the two cases because a pluralistic bureaucracy's stance in a court battle is at variance with the one of an environmental advocate.

Given the social optimality of the project, a pluralistic bureaucracy pleads for a conditional project permit under environmental safeguards, S^* . Hence all that the project operator can lose in a court battle is S^* . However, if he is confronted with an environmental advocate he may lose the entire project

value, π , as the bureaucracy pleads in court for an unconditional refusal of the project permit.⁴⁾

The bureaucracy prefers an out-of-court settlement if

$$\left. \begin{aligned} S^n + D^n &\leq (1-k) \cdot (D^* + S^*) + k \cdot D_0 && \text{(Case 1)} \\ D^n &\leq k \cdot D_0 && \text{(Case 2)} \end{aligned} \right\} (2)$$

Although preventing the project altogether is the first-best result for an advocate of the environment (Case 2), the bureaucracy is willing to give a conditional permit if the associated environmental damage, D^n , is not larger than the expected damage under a court decision, $k \cdot D_0$. In addition, a pluralistic bureaucracy (Case 1) will take into account the costs of environmental safeguards, S^n . Furthermore, the expected costs of a court decision include the weighted costs associated with a court decision in favour of the bureaucracy, $(1-k) \cdot (D^* + S^*)$.

The potential project operator is willing to accept some environmental safeguards without appealing to the courts if $k < 1$. Likewise, the bureaucracy, whatever its objective, is prepared to give some leeway in negotiations if $k > 0$.

In Diagram 1 a project is depicted for which under both Case 1 and Case 2 negotiations over the environment can take place. In Case 2 the range of negotiable environmental safeguards is given by the interval between C and E on $D(S)$. In Case 1 negotiable safeguards are represented by the interval between A and B, where S_1 satisfies $S_1 + D(S_1) = (1-k) \cdot (D^* + S^*) + k \cdot D_0$.

It should be noted, however, that bargaining between the bureaucracy and a potential project operator need not necessarily be possible. Consider for example Case 2. If D_0 is small enough, C is located to the right of E. Then the maximal environmental safeguards the project operator is willing to tolerate is smaller

4) If $\pi - D^* - S^* \leq 0$ the pluralistic bureaucracy also pleads for the abandonment of the project. In this case the distinction between the objectives of the bureaucracy is irrelevant.

than the minimal safeguards the bureaucracy is prepared to concede. The environmental damage caused by the project under unconditional operation is simply too small as to pose a substantial threat for the bureaucracy.

Interestingly for the project under consideration, socially optimal environmental safeguards are impossible in both cases if $0 < k < 1$, i.e. under non-exclusive property rights over the environment. This must be modified under either of two conditions.

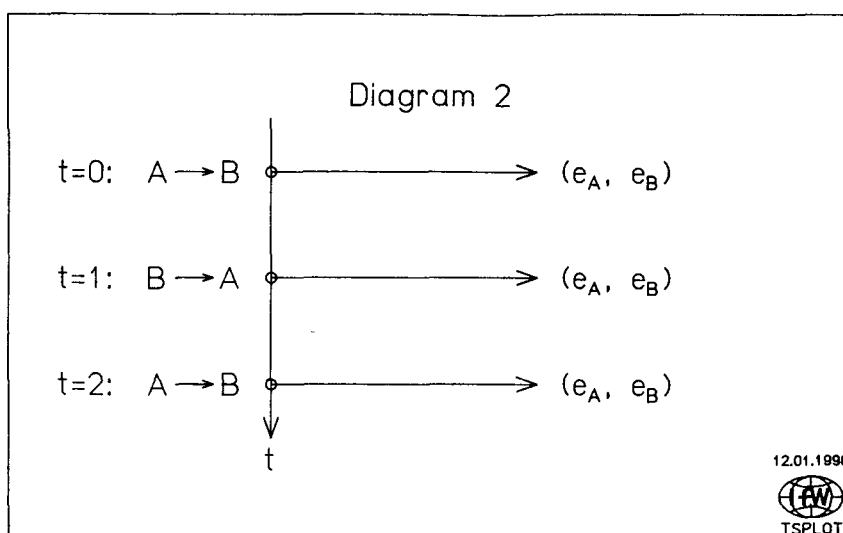
First, if side-payments between the parties to environmental negotiation are feasible, socially optimal safeguards are possible (see e.g. KUHL [1987]). However, for legal reasons side-payments from potential project operators to bureaucracies or vice versa are not a widespread real world phenomenon. I therefore have abstracted from them.

Second, if D_0 is large enough C is situated to the left of F . In this case socially optimal safeguards, S^* , can be negotiated if the bureaucracy is an advocate of the environment. To see whether S^* can be the outcome of negotiations or, more generally, to determine which of the negotiable environmental safeguards will be agreed upon requires, however, an analysis of the bargaining process that precedes such a negotiated settlement. We address this issue next.

IV. Bargaining

Following the strategic approach to negotiations, negotiated environmental safeguards must be an equilibrium point of a game in extensive form, defined by the rules of bargaining. Consider the bargaining game depicted in Diagram 2.⁵⁾

5) This bargaining game is an application of a modified version of the bargaining model in SUTTON [1986].



At time $t=0$ a potential project operator (A) applies for a project permit and the bureaucracy (B) decides on the issue. If it grants unconditional permission then the game ends. If it rejects the project unconditionally then the case is settled in court.⁶⁾ The value of a court settlement for the potential project operator and the bureaucracy is e_A and e_B respectively. These values are defined as fractions of the value of the project, π . Litigation thus is an outside option for the parties by which they can quit negotiations without having reached an agreement.

The bureaucracy need not take either of these alternatives. It can continue bargaining by making a formal or informal counter-proposal in $t=1$. This counter-proposal could take the form of a project permit subject to additional environmental safeguards. If the potential project operator rejects the proposal of the bureaucracy in $t=1$ it can take the case to the courts or make a counter-proposal in turn in $t=2$. The bargaining game ends if either party takes the outside option or if it accepts an offer made.

6) Note that under the assumptions made, the potential project operator always has an incentive to appeal in court if the bureaucracy unconditionally rejects the projects. This need not be the case. Costly litigation or the possibility of the court taking a stance which is even harder than that of the bureaucracy reduces this incentive.

Time costs of bargaining occur because counter-offers can only be made after one period has elapsed. This is represented by a discount factor h_A and h_B , $0 \leq h_A, h_B \leq 1$, for the project operator and the bureaucracy respectively. The discount factor applied to bargaining by the bureaucracy, h_B , depends on its objective.

The potential project operator's discount factor is determined by the interest rate on profits it can make when running the project. That is, $h_A < 1$. A pluralistic bureaucracy takes these interest costs into account and sets

$$h_B = h_A < 1. \quad (3)$$

A bureaucracy which is an advocate of the environment, however, suffers no time costs of bargaining because the project value π does not enter the bureaucracy's objective. During negotiations it therefore sets

$$h_B = 1. \quad (4)$$

The outside option to search litigation can constitute a threat in negotiations and thus can impinge on the relative bargaining power. However, this requires that the threat to search a court battle be credible. If parties are rational, such a threat by one party is incredible whenever continued bargaining leads to a more favourable outcome for that party than uncertain litigation.

An impact of incredible threats on the outcome of negotiations can be ruled out by requiring that bargaining strategies are subgame perfect (SELTEN [1975]).⁷⁾ The bargaining solution then is given by the subgame perfect equilibrium.

7) Subgame perfectness is a necessary and sufficient condition for threats to be credible in the present game, as, by assumption, the bargaining game ends when litigation begins. Whenever the game continues after a threat is executed conditions on the credibility of threats are much stronger (MOHR [1988]).

To determine the subgame perfect equilibrium note that the size of the cake to be divided in environmental negotiations is given by π . In Case 1 the value of the outside option for the potential project operator and the bureaucracy then is given by

$$\left. \begin{aligned} e_A &= [k \cdot \pi + (1-k) \cdot (\pi - S^*)] / \pi \\ e_B &= [k \cdot (\pi - D_0) + (1-k) \cdot (\pi - S^* - D^*)] / \pi. \end{aligned} \right\} \quad (5)$$

In Case 2 the value of the outside option is given by

$$\left. \begin{aligned} e_A &= k \\ e_B &= -k \cdot D_0 / \pi. \end{aligned} \right\} \quad (6)$$

From a comparison of equations (5) and (6) it readily follows that the outside option for both parties is larger in Case 1 than in Case 2. This is so because in Case 1 the project operator does not run the risk of losing the project in court. And in Case 1 the bureaucracy can balance the positive net private gains from the project against the environmental costs.

Following the method outlined in SUTTON [1986] to determine the subgame perfect bargaining equilibrium, let m be the supremum of the share of π the potential project operator can reap in a negotiated settlement in period 2, say. Then, by backward induction, the shares the potential project operator (A) and the bureaucracy (B) can reap by an earlier negotiated settlement are those depicted in Box 1 where

$$X = \left\{ \begin{array}{l} h_A \cdot m \\ e_A \end{array} \right\} \text{ if A } \left\{ \begin{array}{l} \text{does not take} \\ \text{takes} \end{array} \right\} \text{ the option.} \quad (7)$$

Period	Offer made by	Project operator (A) receives at most share	Bureaucracy (B) receives at least share
t = 0	A	$m = \begin{cases} 1-h_B \cdot (1-X) \\ 1-e_B \end{cases}$	$1-m = \begin{cases} h_B \cdot (1-X) \\ e_B \end{cases}$
t = 1	B	X	1-X
t = 2	A	m	1-m

Box 1

Solving the first row in Box 1 for m, we obtain the share the potential project operator receives in a subgame perfect bargaining equilibrium. It is given by

$$m = (1-h_B)/(1-h_A-h_B) \quad \text{if} \begin{cases} e_A \leq h_A \cdot (1-h_B)/(1-h_A \cdot h_B) \\ e_B \leq h_B \cdot (1-h_A)/(1-h_A \cdot h_B), \end{cases} \quad (8)$$

$$m = 1-h_B \cdot (1-e_A) \quad \text{if} \begin{cases} e_A > h_A \cdot (1-h_B)/(1-h_A \cdot h_B) \\ e_B \leq h_B \cdot (1-e_A), \end{cases} \quad (9)$$

$$m = 1-e_B \quad \text{otherwise.} \quad (10)$$

We are now ready to determine the publicly approved private provision of safeguards for environmentally sensitive projects.

V. Environmental Advocacy

If the bureaucracy is an environmental advocate, for the equilibrium partition (8)-(10) we obtain from equation (4)

$$m = 0 \quad \text{if} \begin{cases} e_A \leq 0 \\ e_B \leq 1, \end{cases} \quad (11)$$

$$m = e_A \quad \text{if} \begin{cases} e_A \geq 0 \\ e_B \leq 1 - e_A, \end{cases} \quad (12)$$

$$m = 1 - e_B \quad \text{otherwise.} \quad (13)$$

From the values of the outside option (6) $e_B < 1 - e_A = 1 - k$ and hence the equilibrium partition of π is given by (12). From the upper equation in (6) it then follows from (12) that

$$m = k \quad (14)$$

if the bureaucracy is an environmental advocate.

Associated with the equilibrium partition (14) is a conditional project permit requiring environmental safeguards, S^n , to be undertaken by the project operator. Hence the project operator's share in the cake under negotiations, π , is given by $m \cdot \pi = \pi - S^n$. From equation (14) equilibrium environmental safeguards are thus given by

$$S^n = (1 - k) \cdot \pi. \quad (15)$$

The bargaining equilibrium in Case 2 thus is given by E in Diagram 1. The project operator accepts costs from environmental safeguards equal to the entire costs it has to expect from a

court decision. The bargaining power rests exclusively with the bureaucracy.

The intuition behind this transpires from Diagram 2. As the environment remains in the first-best state for as long as negotiations take place the bureaucracy's outside option to trigger a court decision is incredible. This, however, requires that the outside option for the potential project operator must be credible, or else an agreement would never be reached. Thus the bureaucracy can at most require costs from environmental safeguards equal to $(1-k) \cdot \pi$. Apparently the bureaucracy has no incentive to settle for less.

The bargaining solution under environmental advocacy is socially optimal only if E and F coincide in Diagram 1. As $S^* < \pi$ for any project which to undertake is socially optimal, there exists a k , $0 < k < 1$, for which this is indeed the case. Furthermore, for large enough D_0 , C remains to the left of E. A socially optimal provision of environmental safeguards cannot therefore be ruled out.

However, the value of k is determined by factors specific to the legal system. Furthermore k may be interpreted as an index for the ex ante distribution of non-exclusive titles to the environment. Environmental policy therefore can function only indirectly. Environmental laws and stipulations of bureaucratic procedures affect the provision of environmental safeguards only in as much as they affect the distribution of uncertain titles to the environment.

That environmental policy can be effectuated by inflicting on environmental property rights implicitly defined by the reputation of a court of appeal perhaps is not surprising. The result obtained here, however, is stronger. It suggests that no other environmental policy instrument exists if the bureaucracy is an advocate of the environment. In particular, environmental policy cannot influence the bargaining power of potential project operators. It is always nil.

VI. Pluralistic Bureaucracy

If the bureaucracy is pluralistic, from equation (3) $h_A = h_B \equiv h < 1$. Hence from the equilibrium partition (8) - (10) and from equations (5) it follows

$$m = \frac{1-h}{1-h^2} \quad \text{if} \quad \left\{ \begin{array}{l} 1 - \frac{(1-k) \cdot S^*}{\pi} \\ 1 - \frac{(1-k) \cdot (S^* + D^*) + k \cdot D_0}{\pi} \end{array} \right\} \leq \frac{h \cdot (1-h)}{1-h^2} \quad (16)$$

$$m = 1-h \cdot \frac{(1-k) \cdot S^*}{\pi} \quad \text{if} \quad \left\{ \begin{array}{l} 1 - \frac{(1-k) \cdot S^*}{\pi} > \\ 1 - \frac{(1-k) \cdot (S^* + D^*) + k \cdot D_0}{\pi} \leq \end{array} \right\} \frac{h \cdot (1-h)}{1-h^2} \quad (17)$$

$$m = \frac{(1-k) \cdot (S^* + D^*) + k \cdot D_0}{\pi} \quad \text{otherwise.} \quad (18)$$

From $m \cdot \pi = \pi - S^n$ we obtain for the partitions (16), (17) and (18) respectively

$$S^n = h \cdot (1-h) \cdot \pi / (1-h^2) \quad (19)$$

$$S^n = h \cdot (1-k) \cdot S^* \quad (20)$$

and

$$S^n = \pi - (1-k) \cdot (S^* + D^*) - k \cdot D_0. \quad (21)$$

The bargaining solution in Case 1 depends on the availability of a credible outside option for the parties. Environmental safeguards represented in Diagram 1 by points on $D(S)$ to the left of A represent safeguards for which the bureaucracy's threat to trigger a court decision is credible. The threat point for the project operator is G in Diagram 1. In G environmental safeguards

are given by $h \cdot (1-k) \cdot S^*$ (equation(20)). To the right of G the project operator's outside option is credible.

To see that G instead of B is the project operator's threat point return to Diagram 2. As to the right of A in Diagram 1 the outside option of the bureaucracy is incredible the game ends at the earliest in period $t=1$ if the bureaucracy turns down an offer in $t=0$, say. The project operator can take advantage of the bureaucracy's impatience in that he needs only offer safeguards equal to the discounted expected costs of a court decision, $h \cdot (1-k) \cdot S^*$, in order to obtain a permit for the project.

If by forgoing its outside option the project operator has to accept safeguards in excess of $h \cdot (1-k) \cdot S^*$, then the bargaining solution is given by G in Diagram 1. Environmental safeguards agreed upon, then are given by equation (20).

If by forgoing its outside option the bureaucracy has to accept an environmental damage such that triggering a court decision would imply a larger gain for the bureaucracy, then the bargained environmental safeguards are given by equation (21). A glance at Diagram 2 reveals why the discount factor is not a determinant of the bargaining solution.

If litigation constitutes a credible threat of the bureaucracy then the project operator simply offers safeguards equal to the expected social net value of the project if safeguards are determined in court. As in Diagram 1 the interval of possible bargaining solutions is located on $D(S)$ to the left of the social optimum, F , $-D'(S^n) > 1$. Offering lower safeguards than those given in equation (21) therefore would entice the bureaucracy to seek immediately a court decision. It is straightforward that under these conditions the project operator has an incentive neither to offer nor accept higher safeguards.

As the bureaucracy is indifferent between the bargaining solution (21) and the expected court decision the upper condition in (2) holds with equality. In Diagram 1 the bargaining solution is therefore located on $D(S)$ in A.

From equations (2) and (21) we obtain

$$S^n = 1/2(\pi - D^n). \quad (22)$$

The parties split the value of the project net of environmental costs.

Equation (22) points to an interesting fact. The larger the environmental damage of the project for any given safeguard, the lower the safeguards the project operator has to observe. This seemingly implausible result is readily explained in light of Diagram 1. If $D(S)$ shifts upwards to $\bar{D}(S)$, for any given k , the advantage for the bureaucracy from winning in court declines whereas the threat of losing increases. This lets the bureaucracy be more lenient in negotiations. Given $\bar{D}(S)$, the bargaining solution then is given by \bar{A} , say, implying lower environmental safeguards.

Finally, if neither party's outside option is credible then the bargaining solution is given by equation (19). As $dS^n/dh > 0$ the share of the cake the project operator obtains is larger, the larger the common time preference of the bargaining parties. The project operator can simply take advantage of the fact that he can make the first proposal.⁸⁾

It should be noted that with a pluralistic bureaucracy the effectiveness of environmental policy crucially depends on the regime which applies. If the bargaining equilibrium is given by equation (19), environmental policy intending to influence the application of safeguards by changing the ex ante distribution of property rights, k , is doomed to fail.⁹⁾

If either party's threat of taking the outside option is credible, environmental policy inflicting on k can be effective. However, the direction of induced changes in equilibrium

8) If bargaining takes place continuously then the first mover advantage disappears. Equation (19) then reduces to $S^n = 1/2\pi$. The parties equally split the gross project value.

9) However, k influences the range in which the equilibrium is given by equation (19). Thus environmental policy can trigger a change of regime.

safeguards differs with the regimes. If only the project operator's outside option is credible then from equation (20) $\delta S^n / \delta k < 0$. Reducing the project operator's ex ante title to the environment reduces his bargaining power and thus increases his leniency to accept higher environmental safeguards.

If the bureaucracy's outside option is credible then from equation (21) $\delta S^n / \delta k = S^* + D^* - D_0 \geq 0$. Reducing the project operator's ex ante title to the environment increases the application of environmental safeguards only if, for given $S^* + D^*$, $-D_0$ is smaller than some critical value.

Intuitively, the bargaining power of the bureaucracy can decrease if k declines because a smaller k increases the incentive of the bureaucracy to trigger a court decision. However, it is the taking of this option which is a necessary precondition that the bureaucracy can lose in court the title to all of the environment. If this loss is associated with large enough costs, D_0 , the bureaucracy's bargaining power decreases if environmental policy increases the bureaucracy's rights over the environment.

VII. Conclusions

The paper identifies severe limitations to the efficiency of environmental policy in constitutional democracies. If bureaucracies are nested in a legal system that guarantees the right of appeal in court, environmental safeguards specified in conditional project permits are socially suboptimal. In general, this is so irrespective of whether the bureaucracy acts as a social planner or as a pure advocate of the environment. Furthermore, if the objective of the bureaucracy is unknown to policy makers, stipulated environmental safeguards can be socially too low or too high.

Even if the direction in which to improve on the social benefit is known, environmental policy can cause a further departure from the social optimum if the regime, under which safeguards are determined, is unknown to policy makers. Or it can happen that policy makers possess complete knowledge of the conditions under which safeguards are set, yet incremental environmental policy is completely ineffective.

The gist of the analysis therefore seems to be that effective environmental policy conflicts with the objective of the trichotomy of governmental powers. If the environment becomes increasingly scarce the constitutional democracy may be increasingly put under pressure.

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