



# Pricing and Regulating Affect Environmental Ethics

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**Abstract.** Effluent charges and tradeable permits are economically efficient but rarely used. A new explanation for this discrepancy is offered. Pricing may crowd out environmental ethics in the pricing, and via spillovers, also in non-pricing sectors. Pricing may therefore increase pollution, providing a reason why decision-makers tend to reject environmental pricing. Five propositions showing the conditions for counterproductive effects are advanced. They are consistent with available empirical evidence. Regulation by setting standards and subsidies damage environmental ethics less than pricing, because pollution is condoned. Damaging environmental ethics may prevent political action in favor of the environment.

**Key words.** Effluent charges, environmental regulations, intrinsic motivation, ethics.

## I. Contrast between Economic Analysis and Practical Policy

The price system can be used to provide incentives to reduce pollution and to improve the natural environment. Environmental charges (or taxes) set a price in order to impose the social cost caused by the actor; marketable pollution licenses quantify the amount of pollution permitted, the price of the licenses being determined by demand and supply. The use of pricing to fight pollution is one of the major policy inventions in economics (see, e.g., Pigou, 1932; Kneese and Schultze, 1975; Baumol and Oates, 1979). It has been theoretically and experimentally shown to be an efficient instrument — far superior to its main alternative, quantitative regulations (e.g., Plott, 1983; Hahn, 1983). A review of several studies analyzing the efficiency properties of tradeable permits revealed that potential pollution control cost would be reduced by more than 90 percent in some cases (Tietenberg, 1985). Environmental pricing has “received widespread support from the economics community” (Hahn, 1989, p. 95)<sup>1</sup> and forms a proud part of the applications sections in almost all modern economics textbooks. One of the main advantages is seen in the applicability of pricing to a large array of environmental problems, be it air, water or noise pollution, land disposal etc.

In view of this wide acceptance of environmental pricing in economics it must come as a surprise, and should be a cause for concern, that charges and marketable permits are *very rarely* used in environmental policy (see the extensive surveys in OECD, 1989 and Hahn, 1989): only three applications of marketable permits are documented, and only one application (a lead trading program allowing gasoline refiners greater flexibility during the

phasing-out of lead in gasoline, see Hahn and Hester, 1989) is a success. Charges have mainly been applied in four countries but nowhere on a large scale: in France, Germany and the United States taxes are used, if at all, mainly as water effluent charges (Bower *et al.*, 1981; Brown and Johnson, 1984). The only country where a discernible effect has been found (Bressers, 1983; Brown and Bressers, 1986) is in the Netherlands where a much higher fine is imposed on water pollution. According to a detailed survey undertaken by the OECD (1989), there is also little prospect of effluent charges being applied in the future.

This paper deals with this stark contrast between economics teaching and practical application and suggests an explanation based on an aspect disregarded in standard (neoclassical) economic theory. It is argued that under identifiable conditions pricing *destroys environmental ethics* which may lead to counterproductive effects on the environment. Decision-makers are (intuitively) aware of this destructive effect and are therefore reluctant to apply pricing in environmental policy.

Section II discusses various possible explanations for the large gap between economic theory and application and finds them either unconvincing or inadequate. An alternative explanation based on an extended neoclassical theory is provided in Section III. In a simple two-sector-model, pricing is taken to crowd out environmental ethic, and to spill over into the sector where pricing is not applied. Section IV discusses the conditions under which this counterproductive effect is likely to hold. The following sector inquires to what extent regulations lead to similar or opposite results, and Section V presents concluding remarks.

## II. Why are Efficient Environmental Policy Instruments so Little Applied?

An economist's presumption is that, where efficient policy instruments are applied, the implied resource cost saving makes it possible to put some individuals in a more favorable position without detriment to others. As has been argued by Becker (1983), even if distributional aspects matter, government tends to use more efficient instruments over less efficient ones. It is therefore astonishing that so little environmental pricing has been applied.

Five main explanations for this discrepancy may be distinguished:

- (1) Transaction costs of applying pricing instruments are so high that it is not efficient to use them. While this argument may apply for some pollutants under some circumstances, economists have argued, and presented convincing evidence (e.g., Baumol and Oates, 1979; Schelling, 1983), that in general pricing allows attainment of environmental objectives extremely well, and that the transaction costs are not systematically higher than for other instruments, such as regulations.
- (2) Politicians and administrators do not understand the advantages of

pricing for improving the environment: "Some of the criticism of pollution fees are based on ignorance of the arguments or elementary errors in logic" (Blinder, 1987, p. 147). This explanation is not convincing: it is difficult to argue that these individuals are, on average, so much less intelligent than the economists proposing the use of pricing. Rather, politicians and administrators do not *want* to understand incentive instruments because they do not find it advantageous to apply them in the environmental area.

The following three explanations rely on politico-economic interactions, or Public Choice (for applications to environmental policy, see, e.g., Hahn and Noll, 1990; Hahn 1990).

- (3) Differences in political institutions explain the differences in application (e.g., Noll, 1983). While this approach may account for much, it is difficult, though not impossible to explain changes over time and differences between sectors. So far it has not yet been consistently applied to the question posed (Hahn and McGartland, 1989).
- (4) Producer interest groups lobby against the use of pricing. They prefer direct regulations (emission standards) which establish for them a government-imposed cartel by restricting the entry of new firms (Buchanan and Tullock, 1975). Producers also expect to have more influence over how stringent environmental policy is in the case of regulations compared to pricing. While the arguments are persuasive, they do not explain why pricing to fight pollution is little or not applied in countries and sectors where producers are weakly organized (see, e.g., Berry, 1977; Mueller, 1989; Wilson, 1990) and where environmentalists are politically strong (see Parkin, 1989). One would expect that in countries and sectors with weak producer interest groups and strong green interest groups and parties (who should favor an application of pricing instruments, see Opschoor, 1986, for the Netherlands and Henry, 1990, for Sweden),<sup>2</sup> the use of environmental charges and tradeable permits would be widespread — which it is not.
- (5) Public bureaucrats like to use non-price instruments (regulations) because it raises their influence (Mueller, 1989; Frey, 1978). While this explanation *may* be correct, it is difficult to refute, because it rests on putting an appropriate argument into the utility function of an actor. This procedure does not, as such, provide testable explanations for differences in the application of pricing instruments between countries, sectors, and over time.

These explanations are well known and need not be repeated here; they deal with important factors contributing to the explanation of the large gap between economic analysis and practical policy, but all are incomplete and leave much to be desired. In the next sections an additional aspect is

discussed which may throw further light on the issue and may contribute to explain why decision-makers have been so reluctant to use the price incentive instruments for environmental policy.

### III. Pricing and Environmental Ethics

Behavior is taken to be caused by two factors, extrinsic motivation (in the case of environmental policy-pricing)<sup>3</sup> and intrinsic motivation (environmental ethics).<sup>4</sup> This distinction is well-established in social psychology and other social sciences: an intrinsically motivated individual performs an activity for its own sake, while someone who is extrinsically motivated does so because a corresponding reward is received from some other person(s), i.e., from the outside.<sup>5</sup> Among economists, a similar distinction has been drawn by Buchanan (1978) and Schelling (1983, pp. 4–5).

Pollution  $\Pi$  is the smaller, the more extensively the pricing instruments  $P$  are used, and the larger is the extent of environment ethic  $E$ .

$$\Pi = \Pi(P, E); \quad \Pi_P \leq 0, \quad \Pi_E \leq 0. \quad (1)$$

For the sake of simplicity the analysis considers only one kind of pollution. However, two sectors of the environment are distinguished depending on whether the pricing instruments are used or not. In sector  $A$ , pricing (effluent charges and/or marketable permits) is applicable.

$$\Pi^A = f(P, E^A); \quad f_P \leq 0, \quad f_E \leq 0; \quad (2)$$

In sector  $N$ , the pricing instruments are not applicable for political or psychological reasons, or because the transaction cost for its application is too high (see Baumol and Oates, 1979).

$$\Pi^N = h(E^N); \quad h_E \leq 0, \quad (3)$$

where  $E^N$  is the environmental ethic active in sector  $N$ . Total pollution is

$$\Pi = \alpha \Pi^A + (1 - \alpha) \Pi^N; \quad (4)$$

where  $\alpha (0 \leq \alpha \leq 1)$  is the weight attributed to pollution occurring in the pricing sector  $A$ .

Pricing may reduce, or crowd out, environmental ethics: individuals feel that their moral stance is unnecessary when they are induced by the price system to reduce pollution.

$$E^A = \Lambda(P); \quad \Lambda_P < 0. \quad (5)$$

Some authors like Goodin (1980) (implicitly) assume perfect substitutability between pricing and environmental ethics when they argue that if governments use both material and moral incentives to the same end, the "purity" and "seriousness" of the moral incentives are destroyed. As a consequence,

so it is argued, individuals will simply remove those moral considerations from their decision calculus.

That the use of prices may crowd out people's morals has also been observed by modern economists. In particular, Arrow (1970, 1974) stresses the importance of maintaining the ethical bases of human action against purely rationalist pricing. Possible destructive effects of pricing on environmental ethics are noted by Kelman (1981, 1983). In experimental psychology, the negative effect of monetary (external) rewards and intrinsic motivation has been extensively discussed under the heading of "hidden costs of reward."<sup>6</sup> The reason why external rewards decrease intrinsic motivation has been attributed (Deci, 1971) to a shift in the locus of control or, similarly, to a change in the concept of why a person is working. An extrinsic intervention reduces intrinsic motivation the more strongly, the more individuals' self-determination is impaired, and the less the intrinsic motivation is acknowledged by the intervener. One may also speak of "oversufficient justification" — of being motivated at the same time, and unnecessarily, by two motivations for the same task. Many experiments support the notion that the use of pricing damages intrinsic motivation: "the evidence for a detrimental effect comes from a wide variety of works in which a large number of subjects and methodological parameters have been varied" (McGraw, 1978, pp. 55–56).

Normally, environmental ethics is applicable to the *whole* natural environment and is not thought to apply to either sector *A* or sector *N*.<sup>7</sup> No distinction is made as to whether the price system is applicable or not: ethics is "absolute" in nature (Niebuhr, 1932). It may therefore be hypothesized that a change in environmental ethics in sector *A* leads to a change in environmental ethics in sector *N* going in the same direction.

$$E^N = \sigma(E^A); \quad \sigma_A > 0. \quad (6)$$

It is now possible to analyze the total effect of an increased use of pricing to fight pollution. Combining equations (1) to (6) yields

$$\Pi = \alpha f[P, \wedge(P)] + (1 - \alpha)h[\sigma(\wedge(P))]. \quad (7)$$

A more intensive use of pricing has the following effect

$$\frac{d\Pi}{dP} = \alpha[f_p + f_E \wedge_p] + (1 - \alpha)h_E \sigma_A \wedge_p \gtrless 0. \quad (8)$$

The first term describes the direct price effect on pollution, and the second the effect of crowding out environmental ethics, both in the pricing sector *A*. The third term indicates the destruction of environmental ethics in the non-price sector, caused by the motivation crowding effect spilling over.<sup>8</sup> The first term is negative ( $f_p < 0$ ), the second and third are positive, i.e., there are countervailing forces acting on the pollution level.

Two propositions on a counterproductive effect on the environment may be distinguished:

- (1) A *strong* counterproductive effect ( $d\Pi/dP > 0$ ), in which the crowding and spillover effects of environmental ethics dominate the direct price effect;
- (2) A *weak* counterproductive effect in which a more intensive use of prices induces more pollution in the sector where it is *not* applied ( $d\Pi^N/dP > 0$ ), only.

The second case is of particular interest because it conforms to the way standard economic theory has looked at the environment. Empirical as well as circumstantial evidence has been collected *for the sector in which pricing has been applied* (this is clearly visible, e.g., in Schelling (1983) or in Hahn's (1989) survey). No attention has, however, typically been paid to whether the quality of the environment has decreased *elsewhere* as an (indirect) consequence of using the pricing instruments. Neither has the issue been studied by researchers from other fields, because they have not related possible decreases in environmental quality to the introduction of pricing (elsewhere). As a consequence, there exists as of now no *direct* empirical evidence on the matter. It will be most difficult to come by because in reality there are many different types of pollution. One is therefore forced to rely on *indirect* evidence concerning the crowding out and the spillover effects of environmental ethics as adduced above.

When decision-makers expect that a strong (or even a weak) counterproductive effect is likely to obtain, they are reluctant to apply pricing to fight pollution. All groups (such as the greens) and decision-makers who have a vested interest in environmental ethics because it forms the basis for their popular support, will, under these conditions, oppose pricing as an instrument of environmental policy. The extension of economic theory by explicitly including possible damaging effects on environmental ethics thus provides another explanation of why pricing is little-used in environmental policy. The following section inquires into the conditions under which counterproductive effects of pricing in environment are to be expected.

#### IV. When is Environmental Pricing Counterproductive?

Examining eq. (8) reveals that whether the application of environmental charges or tradeable permits reduces overall pollution depends on three sets of factors: (1) parameters relating to environmental ethics ( $\Lambda_p, \sigma_A, f_E, h_E$ ); (2) the relative size of the pricing sector ( $\alpha$ ); and (3) the effectiveness of pricing ( $f_p$ ).

## (1) CONDITIONS RELATING TO ENVIRONMENTAL ETHICS

Within the sector in which *pricing is applied*, individuals can safely be assumed to have environmental ethics (at least in developed economies, see, e.g., the survey evidence in Kelman, 1983), and to be (marginally) influenced in their behavior ( $E^A > 0$ ,  $f_E < 0$ ). They are likely to react negatively if they are forced by pricing to undertake what they would otherwise have done out of ethical considerations. Environmental ethic is substituted, and crowded out ( $\Lambda_p < 0$ ). This consideration may explain the behavior of "some environmentalists [who] think it important to stigmatize the act of pollution. They want the polluters to be criminals . . ." (Blinder, 1987, p. 148).

The situation is more complicated for firms. There is a (philosophical) question whether corporate entities represented by managers can be attributed ethical beliefs. For the purpose of this analysis, however, it only matters whether firms behave *as if* they were motivated by consideration of environmental ethic. Two aspects should be distinguished:

(i) Are firms able to follow environmental norms? Under perfect competition this possibility does not exist because all firms are tightly constrained to maximize profits (so that  $E^A = 0$  and  $f_E = 0$ ). In strongly competitive markets environmental ethics are of little concern of firms, and consequently there is little or no damaging effect of pricing ( $f_E \Lambda_p$  is zero, or close to zero).

(ii) Do firms have an incentive to act as if they followed environmental norms? This will happen under three conditions:

- when potential customers are thereby induced to increase the demand for "environmental conscious" firms' products, or if a boycott can thereby be circumvented. If environmental ethics is a viable sales argument, the introduction of pricing should not affect it ( $\Lambda_p = 0$ ). However, if pricing is increasingly used to combat pollution, polluting less than prescribed becomes increasingly expensive for sales promotion, and the firms will shift to proclaiming that they pollute little (even if such behavior is forced upon them by governmental policy). In that case,  $\Lambda_p < 0$  until firms have reduced their "excess" environmental zeal to zero.
- when firms pre-empt impending government environmental policy in order to be on good terms with government and its administration. Such behavior is important in societies in which there is a lot of bargaining between firms and the public authorities. (This is, for example, a crucial element in Switzerland or Austria.) When pricing instruments (or for that matter other environmental actions) are introduced, the firms correspondingly reduce what appears to be "environmental ethics", resulting in a (temporary) crowding out ( $\Lambda_p < 0$ ).
- when owners of firms, and/or managers, follow environmental ethics because they believe that pollution should be abated. For empirical



evidence see Kadish (1963, p. 435) or Hawkins (1984). When pricing instruments are applied which directly bring about a reduction of pollution and environmental damage (i.e., if  $f_p < 0$ ), they reduce their environmental ethic, which works in the opposite direction. This crowding out effect ( $\Delta_p < 0$ ) is in line with what has been said for individual consumers/citizens.

The use of effluent charges and tradeable permits has a counterproductive effect on pollution if the damage of environmental ethics spills over strongly to the sector in which *pricing is not applied*. As behavior in that sector is guided solely by moral considerations, individuals and firms will behave in a less environmentally conscious way. A damage in environmental ethics spills over the more strongly to sector  $N$ , the lower is the cost of differentiating between the pricing and the non-pricing sectors. A spillover is the more likely:

- the more similar the two sectors are with respect to their *environmental content*. Actors cannot be expected to differentiate ethically between sectors  $A$  and  $N$  when, say, the purity of air or water is at stake in both sectors. From the ethical point of view, the environment (the ecosystem) is seen as a whole, and if the intrinsic motivation to protect the environment is affected in sector  $A$ , it will also be affected in sector  $N$ .
- the larger the number of *people acting in both sectors* is. Some actors may only be active in the non-price sector, and they will tend to maintain their environmental stance. Other actors are active in both, which will lead them to adjust their environmental ethic applied in sector  $N$  downwards in order to evade the cost of being a “split personality.”
- the more *similar the processes* are which guide behavior in the two sectors. Experimental evidence (Deci, 1972) suggests that such a condition facilitates transfers. In particular, if a calculating attitude obtains in both sectors, it is more likely that damaged environmental values spill over into the non-price sector.

## (2) SIZE OF THE TWO SECTORS

Assuming that pricing is effective in the sector in which it is applied, at least when the prices are sufficiently raised (weak counterproductive effect), the application of the respective instruments is the more likely to improve environmental quality, the larger the sector is in which it can be applied. If pricing were applicable to all pollution, the problems discussed would not arise. This seems to be the implicit assumption of many economists who acknowledge that environmental ethics is relevant to behavior. However, as has been pointed out, the application of pricing for environmental purposes is severely restricted, and sector  $A$  is likely to be small, at least at the beginning. As a consequence, the spillover effect of reduced environmental ethic

into the non-price sector is relevant. As pricing can only be introduced gradually, the counterproductive effects due to ethical spillover are (*cet. par.*) strongest at the beginning, discouraging further applications even if the effect on pollution is more favorable were it applied to a larger extent. This may contribute to explaining why introducing pricing in environmental policy meets with so much resistance.

### (3) DIRECT PRICING EFFECT

Effluent charges and tradeable permits are often not effective ( $f_p$  is small) because they are not appropriately applied and their working is hampered by restrictive regulations. Compared to this well-recognized aspect (see, e.g., Hahn, 1989), little attention is paid to the fact that the addressees of the pricing instruments are often not utility-maximizing consumers or private, profit-maximizing firms, but rather semi-public or public firms or municipalities (this holds, for instance, in Austria, France or Germany), who react quite differently to a change in the relative prices they face. Not rarely, such institutions receive additional funds from the government because, and to the extent in which, their "cost" has risen. The imposition of effluent charges or the introduction of tradeable permits does then not induce them to reduce pollution, and the pricing instruments cannot work ( $f_p$  is too small or even zero).

To summarize, the following *propositions* based on the model including pricing effects on environmental ethics can be advanced:

- (1) Pricing tends not to improve the quality of the environment when it is addressed to individuals (who in today's developed countries can be attributed a significant environmental ethic);
- (2) When pricing is addressed to firms, environmental quality is the less likely to improve, (i) the more consumer-oriented firms are; (ii) the closer their interaction with government and, (iii) the less intensive is competition.
- (3) Pricing is the less likely to reduce pollution, the more it is addressed to institutions not maximizing profit, in particular, public firms and municipal bodies.
- (4) The smaller the sector of the environment in which pricing is applied, the more likely it is that pollution does not decrease overall.
- (5) When pricing is gradually introduced, the effects on the quality of the environment are likely to be small or negative.
- (6) *Provided* pricing can be broadly introduced and the price for pollution is high (and as a result environmental ethics have been crowded out), environmental quality is likely to improve.

The empirical evidence collected is consistent with these propositions. The few documented applications on environmental pricing (Hahn, 1989; OECD, 1989) are *not* directed at consumers, though according to standard theory (e.g., Baumol and Oates, 1979; Schelling, 1983), it would be particularly efficient to so direct them. According to survey evidence collected by Kelman (1981, 1983, pp. 312–317), one of the major reasons is that decision-makers fear that environmental ethics are damaged. Charges, and even more so tradeable permits, are generally considered to be a “license to pollute”. The only successful application of tradeable permits is to firms (lead reduction by oil refineries), which do not directly sell to consumers, are not particularly close to government and act in a competitive environment. Propositions (4) and (5) are consistent with the very weak or non-existent overall effects of pricing reported by Hahn (1989, p. 108), and quoted above. Proposition (6) remains a conjecture at the present time, because no country exists in which pricing has been widely used as an instrument of environmental policy.

#### V. Pricing, Regulations and Subsidies

The discussion has so far proceeded under the assumption that pricing instruments are the only extrinsic factor influencing pollution. Government regulations (emission standards) are also instruments targeted at improving the quality of the environment by externally motivating actors (see, e.g., Hahn, 1990).

In an important way, regulations imposed by government have a similar effect as that of pricing: individuals may consider them to be alternatives to environmental ethics, which would lead to the latter being crowded out. It may even be argued that the “command” approach implied by regulations is perceived to restrict self-determination even more than pricing (which leaves a measure of choice) and therefore undermines the intrinsic motivation to preserve the environment even more. Actors would feel “overjustified” (see Deci and Ryan, 1985) in saving the environment if they are forced to do so by regulations while maintaining their environmental ethics. As a consequence, a downward adjustment of that factor which individuals can control themselves (i.e., environmental ethics), is likely to happen.

In one respect, however, regulations *differ* from pricing. When, for instance, efficient effluent charges are introduced, polluters pay a fee corresponding exactly to the external social cost imposed, and therefore “if the charges were to be paid, few economists would express any criticism of a person undertaking the behavior” (Kelman, 1983, p. 313; see also, in another context, Cooter, 1984, p. 1523).<sup>9</sup> Environmentalists strongly object to such statements. According to Blinder (1989, p. 148) “environmentalists . . . want business to reduce pollution because it is the right thing to do, not because it is in their financial interest.” On the other hand, when regulations are intro-

duced, the act of pollution addressed is morally condemned. It would be considered wholly cynical to argue that pollution is admissible if one is prepared to face the punishment if detected. Unlike pricing therefore, the application of regulations gives a signal that the environment is to be protected and that it is commendable to have environmental ethics. In those circumstances, regulating crowds *in* rather than crowds out environmental ethics, making regulations more effective than they would otherwise be. In areas and conditions in which this crowding in effect is strong, regulations may be a more efficient environmental policy instrument than pricing.

Another instrument of environmental policy is *subsidies*. When individuals (and firms) receive monetary support from the government to preserve nature, their self-determination is maintained, if not expanded, which tends to support intrinsic motivation. Quite in contrast to effluent charges and tradeable permits, and in line with the application of regulations, a clear sign of acknowledgement of an ethical behavior towards the environment is given, which again tends to support intrinsic motivation. While there are (well-known) disadvantages of using subsidies (e.g., Baumol and Oates, 1979), the positive effect on environmental ethics makes it a more preferable instrument than if only the direct relative price effect were considered. The widespread use of regulations and subsidies in environmental policy (Hahn, 1989; OECD, 1989) is consistent with this analysis. (There are, of course, other possible explanations such as interest group pressure).

The results are also consistent with the empirical observation that governmental environmental agencies use a style of enforcement which is predominantly conciliatory and based on compromises rather than on compulsion and coercion (Hawkins, 1984, p. 3, with many references). Such behavior has been called "ineffective" (e.g., Freeman and Haveman, 1973; Gunningham, 1974). However, if it is taken into account that harsh interventions damage the individuals' and firms' environmental ethics, it is rational for environmental agencies to use regulation less intensively, i.e., to act in a more conciliatory way. It has been found that many polluters comply as a matter of principle, showing a "personal disinclination to act in violation of the law's commands" (Kadish, 1963, p. 435) and "to use the big stick" or "crack the whip" too zealously is likely to be counterproductive (Stjernquist, 1973; for forest management, Hawkins, 1984, p. 115; Veljanovski, 1984).

## VI. Concluding Remarks

Environmental instruments based on pricing, namely effluent charges and tradeable permits, are rarely used in practical policy. There are various explanations why the economists' preferred instruments are so little-applied, but they are either wanting or incomplete. An alternative explanation is suggested. Pricing may crowd out environmental ethic in the sector in which pricing is applied, which may also damage environmental ethics in areas in

which pricing is not applied (spillover effect). The use of pricing may, under identifiable conditions, lead to a counterproductive effect: pollution may increase in the non-pricing sector (weak effect) or may increase overall (strong effect). This concern about counterproductive effects is one of the major reasons why environmentalists in some countries oppose the use of pricing instruments — an aspect largely disregarded by economists. Six propositions are advanced showing under what conditions pricing increases pollution via the destruction of environmental ethics. These propositions are consistent with available empirical evidence. Regulating the environment by setting standards may also provoke a substitution of environmental ethic because actors feel “overjustified” — but this outcome is less likely to obtain because environmental regulations are accompanied by an explicit disapproval of polluting which is not so in the case of pricing. Subsidies tend to support environmental ethics both because individual self-determination is maintained and because preserving nature for intrinsic reasons is acknowledged. Regulation and subsidization turn out to be more preferable instruments of environmental policy than according to the direct relative price effect.

One important consequence of the analysis has not been explicitly mentioned so far. Both in the case of weak and strong counterproductive effects the environmental ethic in the non-price sector is damaged. This reduces the incentive not to pollute. As *political* activities also belong to the non-price sector, the incentive to support, to lobby and to vote for environmental laws is diminished. As has been argued by Brennan and Buchanan (1983) and Brennan and Lomasky (1983), voting is a low incentive (public good) activity in which constraints play a small, and morals a large role, so that an undermining of environmental ethics must be expected to have a strong effect on voting behaviour. If conditions in which pricing damages the environmental ethic obtain, the probability of getting laws for the protection of the environment passed diminishes which is a grave consequence in view of the fact that such laws are often the only practical solution to overcome the public-good aspect of environmental protection.

### Acknowledgements

This paper was written while the author was visiting Professor of Economics at the Graduate School of Business, University of Chicago. A preliminary version was presented at the Rational Choice Seminar and at the Workshop on Legal and Economic Organization at the University of Chicago and at the Departments of Economics of Northwestern and Toronto University. I am particularly grateful for insightful discussions of the issues to Gary Becker, Alan Blinder, Iris Bohnet, James Coleman, Harold Demetz, Reiner Eichenberger, Stephen Magee, Sherwin Rosen, Angel Serna, George Stigler and Burton Weisbrod.

## Notes

- <sup>1</sup> For an empirical study of economists' evaluations of the usefulness of pricing instruments in environmental policy see Frey *et al.* (1985).
- <sup>2</sup> In some countries, however, environmentalists oppose pricing instruments (for the United States, see, e.g., Hahn and Noll, 1990, p. 351).
- <sup>3</sup> Other external motivations which are effected by regulations and subsidies will be discussed in Section IV.
- <sup>4</sup> Discussions of the concept and content of environmental ethics are provided, e.g., in Rolston (1988), Hargrove (1989), in the readers by Blackstone (1974), Scherer and Attig (1983), and Hanson (1986), and in the articles in the journal *Environmental Ethics*.
- <sup>5</sup> See, e.g., DeCharms (1968), Deci (1975), Calder and Staw (1975), Fischhoff (1982) and Wright and Aboul-Ezz (1988). According to social psychologist Deci (1971, p. 105) "one is said to be intrinsically motivated to perform an activity when one receives no apparent reward except the activity itself."
- <sup>6</sup> Deci (1971, 1972, 1975); Lepper *et al.* (1973); Lepper and Greene (1978). A review of the theoretical bases and experimental evidence is provided by Staw (1976), McGraw (1978), Deci and Ryan (1980, 1985) and Pittman and Heller (1987).
- <sup>7</sup> "Wholism" plays a central role in the discussions of environmental ethics. It is not addressed to isolated parts but to the ecosystem as a whole. A widely-accepted definition due to Callicott (1980) is: "Environmental ethics is one in which the most fundamental value is that which conduces to the maintenance and vitality of the ecosystem" (Scherer, 1983, p. 73).
- <sup>8</sup> The same spillover effect has been noted in other areas, e.g., with respect to tax morale, see Graetz *et al.* (1986, p. 2).
- <sup>9</sup> This is taken to be an advantage of pricing because it economizes on love or ethical values which are the ultimate scarce resource (Robertson, 1956). According to Arrow (1974, p. 355), "we do not wish to use up recklessly the scarce resources of altruistic motivation".

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