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## Conflicting interests and property rights in environmental issues

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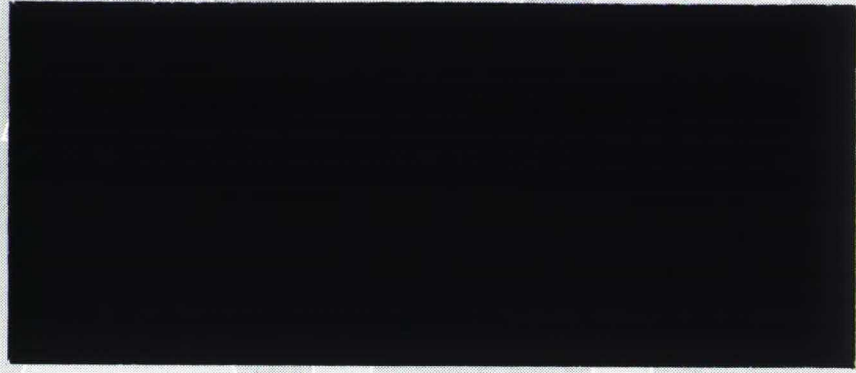
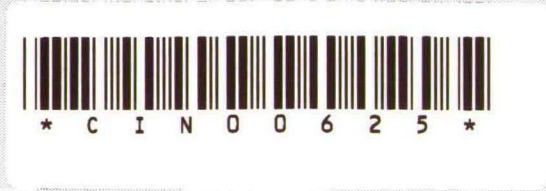
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17 **Conflicting Interests and Property Rights  
in Environmental Issues**

Frank J. Dietz and Jan van der Straaten

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# Conflicting Interests and Property Rights in Environmental Issues

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Keywords: *external effects, property rights, internalisation, air pollution, catalyser*

## 1. Internalization of Externalities

In the welfare economic literature environmental problems are traditionally described as negative externalities (cf. Mäler, 1985; Pearce and Turner, 1990; Tietenberg, 1992). This tradition has its roots in Pigou's *Economics of Welfare* (1920). As much a tradition among economists is Pigou's recommendation to internalize externalities. According to Pigou (1920, p. 192) the state should correct the market failure by imposing a tax on the production of negative externalities (e.g. charging the emission of processing water) and by subsidizing the production of positive externalities (e.g. purification of processing water). In this way the externality (e.g. the natural resource used) receives a shadow price which is included in the agents' private cost-benefit calculations. If the shadow prices are set at the right level, a Pareto optimal exploitation of nature – that is pollution of the environment and depletion of natural resources according to the preferences of the economic agents – is supposed to be the result. In current environmental economics the Pigovian internalization method of taxing and subsidizing has been evolved into a set of so-called economic instruments, including different types of levies and charges, subsidies and marketable pollution rights (Bohm and Russel, 1985; Opschoor and Vos, 1989).

Internalization methods are in the centre of the debate concerning the design and implementation of environmental policies. Traditionally, regulatory instruments such as standards regarding emissions and discharges, product and process requirements, both executed by way of licensing and monitoring, have been used as the basic means of environmental policy in most countries. Polluters' compliance is mandatory and often sanctions for noncompliance exist. The remaining pollution is frequently taken care of by public authorities. The tradition of applying this 'command and control philosophy' has historical roots in the urban sewerage and other public hygiene programs of the 19th century.



Economists consider the internalization of externalities by way of direct regulations inadequate regarding the cost-effectiveness of environmental policies. In short, uniform prohibitions and prescriptions pass over the great diversity of ecological circumstances at local level. Further, abating emissions by direct regulations do not make much appeal to the knowledge and creativity of individual economic agents. Finally, economic agents and whole sectors face the paralyzing effects of the straitjacket of direct regulations. If, however, an attempt is made to tailor the prohibitions and prescriptions to the local ecological conditions, as well as to the diverse technical and economical features of individual economic agents, the costs of gathering the necessary information and enforcing the regulations will be prohibitive. Achieving exogenous environmental standards in the most flexible way requires the implementation of incentives to less polluting behavior which mobilize the knowledge of local ecological conditions and stimulate technological development for environmental improvements (cf. Baumol and Oates, 1988, pp. 159-176). This is in a nutshell why economists urge for using more often economic instruments as a necessary condition to improve the cost-effectiveness of current environmental policies.

In this paper it is questioned whether internalization is the central issue. The debate on cost-effective internalization methods passes over the conflicting interests which are at the heart of each environmental problem. Moreover, the debate suggests that only some technical obstacles have to be removed to find the most adequate way of internalization for each case of externalities. But in our view the problem of choosing and developing cost-effective internalization methods is not the main obstacle on the road to a sustainable society. This assertion is elaborated in Section 2 which deals with the character of the externality concept in economic theory. In Sections 3 and 4 the argument is illustrated with two cases concerning acidification: transboundary SO<sub>2</sub> emissions and NO<sub>x</sub> emissions by motor cars. Section 5 contains a conclusion.

## **2. Externalities and Property Rights**

Externalities are at the core of mainstream environmental economics. The term externalities is today commonly used as an abbreviation of the concept once referred to as external economies and external diseconomies or, in Pigou's parlance, 'uncompensated services and disservices'. Pollution of water, air and soil, noise, stench and the destruction of the landscape are described as negative externalities or negative external effects. Since Pigou's *Economics of Welfare*

(1920), a negative externality has been defined as "an incidental and unintended by-product of some legitimate form of activity" (Mishan, 1981, p. 392). The loss experienced by the victim is not regarded as a cost-item by the originator of the externality.

On closer consideration the distinction based on the intention of the agents between externalities and private goods and services is not convincing as an analytical instrument to understand environmental problems. If A's paper mill pollutes the river and B gets ill from drinking the polluted water, conventional theory speaks of a negative externality. But if A buys and eats the only left bread at the baker's by which B suffers from hunger, no externality is thought to be created. The conventional approach (which is represented in Mishan's definition of externalities) fails to explain why it is any more or less intentional when A eats and B gets hungry than when A produces effluents and B gets sick.

Externalities points at interdependencies between economic agents which in conventional economic theory are seen as 'incidental', that is, as rare and special events. But as the previous examples indicate, there are many situations in which the actions of A affect the well-being of B. As Samuels and Schmid state, human interdependences are ubiquitous (Samuels and Schmid, 1981; Schmid, 1987). These interdependences are the basis of both cooperation and conflict. If two persons are needed to built a house, A and B could decide to cooperate. The advantage of the cooperation, however, does not mean that joint effort will be forthcoming. Often a dispute over the distribution of the fruits of joint effort keeps the the house from built at all. People unavoidably affect each other in situations of scarcity. Scarcity means conflict over the control of resources. How this conflict is resolved depends on the property rights structure in society. Property rights describe the relationship of one person to another with respect to a resource or any line of action. As Schmid (1987, p. 5) puts it: "Rights are the instrumentality by which society controls and orders human interdependence and resolves the question of who gets what". The rights structure could be called the second dimension of scarcity. It is one thing to give up something to obtain a scarce good or service. But this exchange is conditioned by social choices of who has the (recognized) rights that become inputs and costs to the production of a product and who has enough rights to sell that generate the income to buy scarce goods and services. In this sense, "scarcity is partly a matter of physical constraints ..... but it is also a matter of fundamental public choice" (Schmid, 1987, p. 8).

In conventional economic theory externalities are seen as a market failure, because market prices fail to reflect the relative scarcity of the resources available. To put it in another way, preferences concerning externalities cannot be revealed at the market. Traditionally,



internalization of externalities is recommended, preferably by economic instruments such as taxes and transferable permits. In this way an externality becomes priced in the sense that "it becomes indistinguishable from any other 'good' or 'bad' handled by the market sector. The externality then disappears from the economic scene" (Mishan, 1981, p. 407). In short, it is suggested that internalization eliminates the externalities concerned.

However, we do not share the common view that internalization procedures eliminate externalities. If interests conflict one or more of the interests are inevitably external and must go unmet. Property rights determine which interests count, that is, whether A is allowed to affect B or vice versa. Internalization means a shift in the rights structure. As formerly the paper mill was allowed to pollute the river, it has now to pay for effluent discharge (Pigovian tax), to buy an amount of discharge rights (transferable permit) or to install equipment which purifies the effluents to a certain degree before discharging them (prescription). Internalization reduces the opportunity set of the paper mill, *but expand the opportunity set of people living down stream*. The interdependence between the paper mill and down stream inhabitants is not diminished, disappeared or eliminated, as little as the conflict of interests. The change in the distribution of property rights does not imply that the externality is made internal. The change in rule only shifted the externality from one party to the other, that is, the interest of tapping drinking water from the river has been given more weight than the interest of discharging effluents into the river.

Since Coase's influential article (1960) interest grew in the relationship between externalities and property rights. From the literature one gets the impression that only property rights have to be established (and, of course, enforced in the legal system) to leave the internalization of externalities to the market. An efficient resource allocation would be quite independent of who was given the property rights – either the generator or the victim. All that is said to matter is that the parties involved will easily bargain on the compensation to be given to the rights owner with the aim to reduce the externalities once the rights have been allocated.<sup>1</sup> It should be pointed out that this result hinges upon two very critical assumptions: (1) internalization requires no transaction costs, that is, the gathering of the information needed, the bargaining on an agreement and the enforcement of the agreement are without costs; (2) there are no wealth effects of alternative rights structures. But as Bromley (1991, p. 63) makes clear, "in a world without transaction costs there could be no externalities". All physical interactions which would

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<sup>1</sup> If the rights owner refuses any kind of compensation the externality is also internalized.

unintendedly but unwantedly arise would have costlessly bargained away in the absence of transaction costs. This does not mean that all physical interdependences are disappeared, but that the conventional notion of an externality could not exist (Bromley, 1991, p. 64).

In a world with transaction costs environmental damage is highly determined by the initial property rights assignment. Mobilizing the population living down stream to make a bid to tempt an upstream paper mill to reduce its legitimate effluent discharges will result in a more polluted river than would be the case if the paper mill has to make a bid to the inhabitants down stream having the legitimate right on a clean river. Although clearly defined property rights helps to solve environmental problems, the most relevant issue is who has the rights and thus who has the effective protection of the state to do as he wish (Bromley, 1991, p. 35). State protection is, however, not always needed. As Schmid (1987, p. 97) points out, even without an explicit right those interested in the status quo could be well protected by high transaction costs.

In conventional theory, internalization of externalities is expected to improve economic efficiency. However, the existing distribution of property rights determines the concrete contents of the efficiency improvement. As long as the paper mill is legitimately entitled to discharge effluents, a reduction or purification of the effluents without adequate compensation is not efficient. Because the existing rights structure defines what is a cost and who shall bear unwanted costs, an efficient outcome of the economic process is uniquely related to a specific rights structure. As Bromley (1991, p. 67) puts it, for every structure of resource endowments – and institutions define and specify resource endowments – there is a Pareto-efficient outcome. Change the institutional environment and there will be a new efficient solution."

To summarize, property rights determine which effects of A's actions on B are costs to A and which are external to A, that is, which can be ignored. Internalization of externalities is irrelevant in the sense that externalities cannot be eliminated, but can at best be shifted or transformed by a change of the rights structure. Consequently, social decisions on the rights structure directs externalities and determines whose interests count.

### **3. Transboundary SO<sub>2</sub> Emissions**

The irrelevance of internalizing externalities can be illustrated with the case of acidification in Europe. Two sources of acidification will be briefly discussed: the emissions of SO<sub>2</sub> (this section) and the motor car emissions of NO<sub>x</sub> (next section).



Most of the SO<sub>2</sub> emissions originate from large incinerators such as refineries and electric power plants. Today it is commonly known that SO<sub>2</sub> emissions are transported and dispersed over great distances, especially since at the end of the sixties and the beginning of the seventies tall chimneys have been erected to abate the smog in industrial areas. Hence, SO<sub>2</sub> emissions are an excellent example of transboundary air pollution. As a consequence, the acidification due to SO<sub>2</sub> emissions can only be abated in an international context, that is, by way of international negotiations. Prior to being an issue on the international agenda the recognition is required that the environmental damage, that is in this case acidification, is caused by transboundary emissions.

Already a century ago Smith (1872) indicated that air pollution has a transboundary character. He proved that considerable economic losses were the result of it. However, it took 100 years before international action was taken. This long delay is strongly connected to high transaction costs when international environmental problems are at issue. International action only makes sense if the damage in the victim country exceeds the transaction costs. This was apparently the case in 1972, at the United Nations Conference of 1972 in Stockholm. At this conference Sweden argued that the ecological deterioration of the fresh water lakes and streams in Scandinavia was mainly caused by transboundary SO<sub>2</sub> emissions originating from industrial areas in other European countries. In particular steel mills and power plants were seen as significant emitters. Sweden was of the opinion that the joint production of air pollution and steel should be reorganized in such a way that air pollution brought to their country should come to an end. Other European countries did not pay for the ecological damage in Scandinavia.

Clearly, until 1972 no explicit property rights were established concerning transboundary emissions. Actually, European producers had simply been taken the opportunity to emit SO<sub>2</sub> on a large scale, due to the circumstance of high costs for the victim to relate the ecological damage to individual emitters, to bargain with all the emitters involved and, in the event of a satisficing bargaining result, to enforce the agreement. The existence of high transaction costs protected the implicit pollution rights of SO<sub>2</sub> emitters. European countries such as England, the Federal Republic of Germany, Poland and the German Democratic Republic refused to recognize the Swedish charges and arguments, because of their interests in the status quo. These countries insisted that the relationship between their SO<sub>2</sub> emissions and the ecological damage in Sweden was never proved.

At the Stockholm Conference an agreement could not be realized due to the objections of the emitting countries. They were not willing to change the rights structure, that is to redistribute the rights on the Scandinavian air in favor of Sweden. The participants of the Conference could only agree upon starting an international research concerning the relationship between SO<sub>2</sub> emissions in Europe and the reported ecological damage in Scandinavia. This research was done by the Economic Commission for Europe of the United Nations. After many years of research it could be proved that, indeed, SO<sub>2</sub> emissions are transported and dispersed over great distances. As a result of the dominant southern and western winds 80-90% of the acidifying deposition in Scandinavia originates from other European countries. The continuous increase of industrial production after 1950 combined with the construction of tall chimneys in the European industrial areas were the main reasons for the acidification in Scandinavia.

The Scandinavian lakes could only be rescued by a significant reduction of the SO<sub>2</sub> emissions in other European countries. It took a long period and many laborious negotiations before an agreement on reductions could be realized. At a conference in Geneva in 1983 the Scandinavian countries proposed to reduce all emissions by 30% compared with the emission levels of 1980. However, some countries such as West-Germany and the Netherlands had already considerably reduced their emissions before 1980. They fiercely objected against this redistribution of property rights because it would imply a reward for the obstinate attitude of several countries, such as England and East-Germany.

It took a long time before all countries were convinced that emission reductions were inevitably. Agreement on the main goal does not imply, however, agreement on the way emission reductions must be realized. At the IIASA Institute in Vienna a model has been developed which explores the possibilities of emission reductions in whole Europe (Alcamo, Shaw and Hordijk, 1991). Using this model it is possible to determine which emission reductions are the most cost-effective given the desired reduction of acidifying depositions. This approach could be interpreted as an attempt to internalize the negative externalities (acidification) of especially steel, oil derivatives and electricity production processes in the most efficient way, implying the generation of the largest possible aggregate reduction of acidifying depositions for the lowest possible aggregate cost. However, this model has never been used in the negotiations due to the dominant distributional consequences of this internalization. Instead, in 1985 it has been decided in Helsinki to reduce *all* SO<sub>2</sub> emissions by 30%. This outcome obligates some countries to realize small emission reductions at high costs, while the same amount of money would produce large emission reductions elsewhere in Europe.



To summarize, no property rights were formally established and assigned concerning the use of air as a sink for SO<sub>2</sub> emissions until the Helsinki agreement of 1985. As a matter of fact, extensive pollution rights were informally bequeathed to emitters of SO<sub>2</sub> due to the high transaction costs of initiatives to reduce the emissions. This informal rights structure created the externality of acidification. In international negotiations no attempts were made to internalize this externality in either the Pigovian or the Coasean tradition. Instead, the rights structure was changed and formalized simply to redistribute the unwanted costs of economic activities.

#### **4. The Abatement of NO<sub>x</sub> Emissions by Motor Cars in the European Community**

Economists adhering the conventional internalization approach may object that the apparently irrelevance of internalization efforts in international negotiations on SO<sub>2</sub> emission reductions is the natural consequence of the absence of a generally recognized and accepted authority able to implement the internalization of externalities. Formal property rights must be established prior to negotiations on emission reductions. Moreover, explicit property rights are indispensable if economic instruments such as regulatory taxes or transferable pollution permits are used as an internalization method.

To investigate whether the existence of a rule making authority weakens the argument of the irrelevance of internalization efforts, the reduction of NO<sub>x</sub> emissions by motor cars is analyzed in the following paragraphs. Like the SO<sub>2</sub> emissions, NO<sub>x</sub> emissions substantially contribute to the acidification beyond the own country borders. Among the most important emitters are power plants, oil refineries and motor cars. Motor cars are in a special position as they are mobile. They cross the borders of countries. Because both sources and emissions cross borders attempts to reduce the emissions only have sense in an international context. But unlike the attempts to reduce SO<sub>2</sub> emissions in international negotiations, NO<sub>x</sub> emission reductions could be agreed upon within the institutional context of the European Community (EC). The EC has much more supranational features – without being a fullfledged supranational organization – than the international consultation rounds on SO<sub>2</sub> emission reductions.

In the EC the discussion about the abatement of NO<sub>x</sub> emissions by motor cars started in the beginning of the eighties after it became clear that the dying off of forests in the Federal Republic of Germany was caused by 'acid rain'. The discussion was focused on which measures could be taken. The UK preferred the so-called lean-mixture engine in which fuel is burnt in a special way, resulting in less heat of combustion. The relatively low combustion temperature

results in lower emissions of CO<sub>2</sub> and NO<sub>x</sub>. With this type of engine NO<sub>x</sub> emissions could be reduced by 70%. At that moment, however, the lean-mixture engine was in an experimental phase. The British preference for the introduction of this engine is strongly related to the comparative advantage British industries had in this field of research and development<sup>2</sup>.

The Federal Republic of Germany preferred the installation of catalysers. The fast developing process of deterioration and dying off of the forests shocked a large part of the German population. Therefore, the abatement of 'acid rain' was given a high profile in Germany. A catalyser achieves a higher reduction of NO<sub>x</sub> emissions, viz. 90%, than a lean-mixture engine does. However, the addition of a catalyser to car motors would increase petrol consumption by 10 to 20%. However, the consequence of an increase of CO<sub>2</sub> emissions had no impact on the discussion, because in the beginning of the eighties the greenhouse effect hardly had public attention unlike recent years. The vitality of the forests in the United Kingdom was much better than elsewhere in Europe due to the dominance of calcareous soils in large parts of the UK. Calcareous soils are not so vulnerable for acidification as other types of soil. Moreover, the UK takes advantage of a favorable geographical location implying that the UK is a net exporter of acidifying substances due to the dominant western winds blowing British emissions to the continent.

A second reason for the German preference for catalysers is related to the competitive position of the national car industries in different European countries. The West-German car industry produces more cars with heavy engines than the British, French and Italian industries do. A catalyser only functions adequately if it is installed together with hightech equipment. Generally speaking, German industries took the lead in the development of this technology. Therefore, German car industry reckoned with an improvement of its competitiveness if the catalyser technology could be introduced. The industries involved pressed the German government doing the utmost in the EC negotiations on the reduction of motor car emissions to favor the introduction of the catalyser in the EC.

The competitiveness of the national car industries varies in Europe. The position of the West-German car industry was considered to be strong, while the UK car industry was evaluated as being weak because of the outdated production processes. The Italian and the French car industries took up a middle position. The Japanese car industry had been able to obtain a strong

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<sup>2</sup> Boehmer-Christiansen (1992) elaborates on the comparative advantage of both the United Kingdom and the Federal Republic of Germany concerning emission reduction techniques for motor cars.



position in Europe. Against this background the British, French and Italian car industries feared that a EC requirement to add on a catalyser would raise the price of their small cars relatively more than the price of the bigger West-German cars. In addition, they were afraid that the German car industry, having a comparative advantage regarding this new technology, would considerably improve their competitive position. A substantial decrease of returns on the small cars market followed by large-scale unemployment was feared. Such a scenario easily arouse the memories of the drastic reorganizations of the European steel sector as well as the textile industry, which used to be important branches of industry, particularly in France and the United Kingdom. For these countries the effects on the employment were a key issue during the EC negotiations on the reduction of motor car emissions.

Regarding the complications previously mentioned it is not surprising that the negotiations on the reduction of motor car emissions took many years. The crucial issue appeared to be the level of the standards. Weak standards would undoubtedly favor the introduction of the lean-mixture engine, while strict standards would clear the way for the add on technology of the catalyser. A further complication was that the negotiation process could easily be delayed due to the practice of taking unanimous decisions in the Council of Ministers. If a single EC member state feared unfavorable (economic) consequences, an agreement on the level of the emission standards was blocked by a veto. During the negotiation process this unanimity 'rule' was changed (in 1988) into (qualified) majority voting, which considerably hampers the delaying tactics. Finally, in the face of the next elections for the European Parliament in June 1989 politicians feared a bad image if no decision would be taken concerning the level of the emission standards. The decision making process suddenly gained momentum in the first six months of 1989. Ultimately strict standards were accepted. Once this decision was made, the choice in favor of the catalyser was also made. As a result the research and development on the lean-mixture engine was given a low profile<sup>3</sup>.

In our view the decision making process on the abatement of NO<sub>x</sub> emissions by motor cars in the EC cannot be interpreted in terms of an internalization effort of negative externalities. The continuous tug-of-war only demonstrates the interdependence of the agents involved, in this case because their interests conflict in a complicated way. In this context the position of Germany was a special one. On the one hand, Germany played the role of the victim because it

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<sup>3</sup> Elsewhere we analyzed this decision making process in more detail (Dietz, Van der Straaten and Van der Velde, 1991).

considerably suffered from the effects of acid rain. On the other hand, while pushing a particular method for emission reduction it favored the national industrial interests. Ultimately, a change in the 'rules of the game', that is the possibility of majority voting, as well as the electoral pressure of the European citizens concerning environmental issues, did much to help forcing a breakthrough and changing the rights structure.

## **5. Conclusion**

This paper should not be interpreted as an argument against the calculation of specific efficiency or cost-effectiveness when objectives are made explicit. Only an argument is given against presumptive choices among conflicting interests contained in the theory expecting efficiency improvements by internalization. Whenever interests conflict efficiency cannot be improved without making a value judgement weighting the interests of one party over another.

Externalities are an expression of human interdependences. They are not rare and it does not matter whether they are intentional or not. They cannot be eliminated, but only transformed or shifted. Put it in another way, 'external effects on B of A's acts can at best be reduced by increasing the external effects on A of B's acts" (Schmid, 1987, p. 10).



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