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Economic Instruments for Environmental Protection: Can We Trust the "Magic Carpet"?

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ABSTRACT. Economic instruments appear at first to be a promising alternative to regulations as instruments of environmental policy. Because they put market forces to work for the goal of a sustainable society, they are often portrayed as achieving goals at much lower costs. In this sense, economic instruments appear as a type of "magic carpet" for the trip to sustainable development. The article presents a "pre-flight check" of the carpet's viability, and finds several potential design problems. Economic instruments in practice often don't comply with the underlying economic theory. Further, the dominating notion of cost-effectiveness is only one of many criteria which policy-makers must taken into account in the real world. It is not a question of "good science" vs. "bad politics," but a recognition that politics has a rationality of its own. The lessons learned from analyses of policy-making and implementation deserve, therefore, equal attention with the presupposed behavioral reactions of key target groups. Issues to be taken into account include the interests of the actors involved, and the institutional contexts of both policy-making and policy-learning. Such factors are discussed by using them to shed light on observed deviations in instrument design.

Introduction

If it took England the exploitation of half the globe to be what it is today, how many globes will it take India?
—(M. K. GANDHI, in Jacobs, 1991)

Gandhi's question indicates the urgency of environmental problems. Accepting the need for continuing development in Third World countries, such as India, implies that the old modes of production and consumption may have to change rapidly, because if they follow the developmental path of most industrialized countries an unprecented assault on our natural environment will occur.

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In the view of economists, the environmental degradation that has taken place during and after the industrialization of the West implies that "resources" provided by our natural environment have been and still are being over-exploited. The argument is that over-exploitation comes into being because no adequate markets exist for these resources. Therefore, their scarcity is not recognized, or at least not fully so (see, for instance, Daly, 1977; Kneese and Sweeney, 1985). One solution implies that government and other institutions should calculate the price of raw materials, commodities, consumer goods or various types of pollution, and apply these as surtaxes. The effect would be to get "the prices right," thus providing an incentive to change people's behavior, and creating development that is sustainable (see Von Weizsäcker, 1994; Vos, 1997). The argument is both elegant and attractive as is proved by statements of certain actors in the environmental discourse. President Clinton of the United States spoke of "harnessing market forces" so that companies would incorporate "environmental incentives into daily production decisions" (see Dryzek, 1997: 103). Another influential actor the World Watch Institute advocates, for example, assessing from the total amount of income tax and company tax paid annually worldwide (roughly $7 500 billion), some $1 000 billion in green taxes (Brown et al., 1996). The "polluter pays" principle has become one of the leading slogans of environmental protection.

In a sense, we could say that economic instruments such as fees and tradable permits are regarded as "magic carpets" on the road to sustainable development. A "magic carpet" allows the user to take short cuts on the way to reach his destination, avoid congestion and does not require fuel, because it is propelled by unseen forces (perhaps an invisible hand?). Like a magic carpet, economic instruments, do not require the continuous interference of somebody behind the wheel, because they rely on market mechanisms when the goals have been set by administrators. Once the prices are right, firms and individuals will take the short cut on the road to sustainable development, because the prices tell them how to get there.

But, if economic instruments were as useful as magic carpets, why don't we see a great deal more of them? Is there a lack of magic? Does somebody prevent the carpet from taking off? And, for few carpets that have already taken off, how is the flight? Smooth? Erratic? Is there, perhaps, a need for additional flying lessons?

Debate on Economic Policy Instruments

> Policy has certain goals—that's the hoop. Certain people and firms have to jump through the hoop. You can achieve this with the help of laws and regulations. That is one way: the whip. You can also hold a carrot in front of them: the subsidy, or avoidance of having to pay. Or you can simply say: Decent people would jump through that hoop.
> —(Winsemius, 1985).

Ever since the 1970s the regulating power of economic policy instruments has been the subject of much scientific literature, particularly in the field of environmental economics. The conclusion is almost always that economic instruments, such as charges and emissions trading have great potential to decrease the dilemma of choosing between ecological and economic interests, because they would allow us to attain environmental goals at much lower costs. In this sense, economic instruments are expected to be much more cost-effective than other types of instruments, such as regulations or even covenants. However, the debate on economic instruments long

remained an exchange of theoretical arguments concerning their advantages, put forth in the blind assumption that such instruments could be politically feasible and applied completely and correctly to the policy target groups. Problems relating to policy formulation and implementation were largely ignored.

In fact, however, among the "legal," "communicative" and "economic" policy instruments, economic instruments are the ones least used in practice (Opschoor, Vos and de Savornin Lohman, 1994). Of course there are examples of effective economic instruments in use. Well-known examples from the Netherlands are the water quality charge and tax differentiations for cleaner cars and unleaded petrol. Here, some of the theoretical arguments about the effectiveness of economic instruments were proved correct.

Bressers (1983, 1988, 1995) studied the effects of Dutch effluent charges on the discharge of organic pollution and heavy metals. Dramatic decreases of pollution levels were reached between 1970 and 1975 with a booming economy. Even the 1975–80 recessionary period showed a remarkable combination of continued increasing production volumes and steeply decreasing pollution levels. Alternative explanations, such as technical developments, an increase in the value of waste materials, an increase in environmental awareness among businesses, etc., could not account for these reductions. Statistical analysis indicated a very surprising result: the reduction in the waste load of Dutch industrial wastewater between 1970 and 1980 had been more the unintended result of the surcharges applied than of regulatory controls. In the case of the organic pollution load, 92 percent of the variance between the Dutch water management regions is statistically explainable by only two variables: the structure of the regional economy (the share of different branches of industry) and the increase in the surcharge rates.

Schrama and Klok (1995) describe the Dutch tax concessions on new cars meeting stringent emission limits introduced in 1986. The tax concessions were granted for new cars, meeting more stringent limits than those legally required at the time (future EC and US limits that were not yet valid). Already by 1987, 50 percent of the newly sold cars complied with future EC requirements, increasing to 90 percent by 1989. The scheme was revised in 1989 to encourage compliance with even more stringent US standards, and the proportion of newly sold cars meeting the standards rose from 36 percent in 1989 to 94 percent in 1992. National statistics on air pollution show increasing car mobility in the period 1985–91, along with decreasing pollution levels.

Despite such positive examples, the introduction of economic instruments in environmental policy appears to be an uphill "struggle that has made glacial progress" (Dryzek, 1997: 116). Naturally, this makes environmental economists unhappy, as well as others who hold high expectations for this type of instrument. Apparently the political feasibility of economic instruments in environmental policy depends on other factors than the hypothetical advantages for policy effectiveness, the cost of the instruments, or the practical results achieved in some subareas.

We wish to look here at the consequences of these other factors for the use of economic policy instruments. We are interested in the possibility that such instruments will be chosen at all, but even more so in the consequences of the design of the policy instruments which actually are introduced. A striking feature of the surveys of existing economic policy instruments used in the environmental policies of OECD countries (Opschoor, Vos and de Savornin Lohman, 1994), is that political decision-making also has a major impact on the final design of the instrument. This means that there are two main differences between that which many environmental economists advocate

and that which is actually accepted in practice. Environmental policy has relatively few economic instruments, and those that *are* introduced are often designed in such a way as to be unsuitable for actually realizing the expected cost-effective benefits.

Our somewhat critical tone with regard to economic theory does not imply that it is "wrong" to assume that economic policy instruments often can yield "more environment for less money" than regulations. If, by means of regulation, all firms are forced to reduce pollution in equal measure, the same effect could be achieved at a lower cost to society (or rather, at the same cost) if the firms where this is cheaper do more than average and the firms with higher costs do less. Charges or marketable permits steer firms in this direction. If regulations go so far as to prescribe measures to be taken by each individual firm, there will be little incentive within these firms to think about ways in which the same result can be achieved at a lower cost. This also affects the future. If money can be made by consuming or polluting less, this will stimulate a continuing technological innovation which will make environmental improvements in the long run both better and cheaper. An example of this is provided by the increased fuel efficiency in cars since the oil crises of the 1970s. All in all, economic instruments offer (in theory) a high degree of cost-effectiveness, which suggests that using economic policy instruments could substantially lower the need to make difficult choices between ecology and economy.

However, much depends on assumptions, particularly with respect to policy instruments (Andersen, 1994; Stavins, 1994a). One such assumption underlying the view of cost-effective economic instruments is that economic agents are "utility maximizers." Another is that they can be compared with very inflexible forms of direct regulation (cf. Peeters, 1992). Such assumptions are, however, not our present subject. Instead, we will look at another major assumption which remains implicit in many discussions of economic policy instruments, namely that economic instruments are also *feasible* in the policy-making process, once their attractiveness in terms of cost-effectiveness has been demonstrated.

In the following section we describe certain criteria which, in addition to cost-effectiveness, are important for the feasibility of instruments in the policy-making process. Next we will indicate ways by which these criteria can cause economic policy instruments to deviate in use from the ideal-typical design which is usually assumed in theory development, along with the consequences of these deviations for the expected cost-effectiveness of the instruments chosen. We will use examples from various countries to illustrate the point. Then we try to provide a contribution to theory development on policy-making with regard to economic instruments, before offering some general conclusions.

Ready for Take-off?

> Environmental degradation is not an incidental consequence of economic activity. . . .
> In many ways it is a central feature of the ways in which production and consumption are currently organized.
> If this is so, it is only to be expected that governments will hesitate before confronting the problem.
> —Jacobs, 1991: xiii–xiv

Originally, environmental economics, insofar as policy instruments were concerned, focused almost exclusively on the impacts that these instruments would have on the

behavior of target groups. Much attention was given to the application of stimuli which bring the set targets closer in a cost-effective way. Certainly in the beginning of the discussion about economic policy instruments, the processes of policy implementation and policy-making were largely ignored in theory construction. One observer of the debate notes, ". . . economic instruments are often treated in a partial equilibrium analysis; that is they are considered as complete alternatives to so-called command-and-control regulations, while, *institutional issues* are more or less ignored. . . . When institutions are considered at all, they are regarded mainly as barriers to the functioning of market forces" (Andersen, 1994). Two others state, ". . . economists seem to have refused to take seriously the political implications of some of their favorite prescriptions. These implications include both straightforward matters of cost distribution and more subtle problems of ethical content" (Bohm and Russell, 1985: 396).

Only recently has it been realized that policy implementation and policy-making matter for the adoption of economic instruments (see, for instance, Keohane, Revesz and Stavins, 1997). This implies a shift of focus. The role of the institutions involved in policy-making, for example, and the role of interest groups and other actors in the policy-making process, are now receiving greater attention and as Andersen (1994: 5) writes: "The importance of institutions is becoming better understood." It is increasingly recognized by economists that other requirements apply to policy instruments than just cost-effectiveness. Specifically there is a growing awareness of the importance of distribution issues in the policy-making process and of the transaction costs that accompany the application of the instruments. Economists are no strangers to these issues, but the reservations have not been broadcast, which may partly explain why economists receive little response to their proposals in practice. For instance, within the OECD and the staff of the US Congress, cookbook-style manuals are still being written in which, in a more or less straightforward way, policy instruments are linked to certain problem situations or policy targets, ignoring the political and administrative context of the policy process (OECD, 1991; US Congress, Office for Technology Assessment, 1995). In general, little attention is paid to the effects of the political process and to the role of the bureaucracy in the design of policy instruments introduced, leaving aside exceptions such as Hahn (1989) and to a limited extent, in Holland, the Council for Government Policies (WRR, 1992). It seems fair to say that in most studies or recommendations, policy-making is seen mainly as the "address" where recommendations are sent, and not as a necessary element in the field of study. Often this is combined with a strong emphasis on the presumed cost-effectiveness advantages.

But what happens when the advice of the economists who fail to take into account issues of implementation and feasibility arrives at the intended address? As Dryzek (1997: 117) observes: ". . . proposals for economic instruments can never enter in the clean and straightforward fashion of the economics textbooks. Instead, their entry and so their design is heavily dependent on the configuration of political forces." And, "The fairyland of neoclassical microeconomics in which economic rationalist argument for market-oriented policy instruments is rooted is very different from the real world. The good fairies are not in charge of policy design and implementation." But then, who *is* in charge of policy design and implementation? Although we acknowledge that the answer to this question is more complex, we will, for now, assume for the sake of argument that it is politicians and bureaucrats who are in charge. Most students of politics will

acknowledge that cost-effectiveness is not necessarily the primary, or even a major, concern for bureaucrats or politicians when they choose instruments for implementation. Numerous other criteria are normally applied, explicitly or implicitly, to test proposals for both policy-making and realization (Bressers and Honigh, 1986: 281–282). To mention only a few:

- effects on competitiveness at home and abroad;
- distribution effects: Which groups are burdened with the initial costs of policy at first as well as at later stages (can costs be translated into the prices of goods and services?);
- the "implementability" of the proposal: Is a well-motivated and well-equipped implementing regime available? Are the costs of implementation on the part of the government and other transaction costs for both sides possibly too high? What are the objectives and resources of the target group? etcetera;
- existing regulations and regulating traditions: Does the policy instrument correspond with these? and
- flexibility of the instrument. What is the extent to which it can be adapted to different circumstances of time and place, and to uncertainties?

Weighing the relative "scores" of instruments on these criteria is far from easy. It is quite possible, for example, for a negative score on one criterion to coexist with, or even be caused by, a positive score on another criterion. Further, what is negative along one dimension can be positive along another, and priority-setting in policy-making is definitively a multi-actor interaction process. Partly because of this, it is not just the actual properties of the instruments which are of importance to the actors during policy-making, but also their perceptions and evaluations. Of direct interest in this regard, is the position of the Dutch environmental movement toward economic instruments. At present, leading figures plead for a greening of the fiscal system, but in the 1970s the major organizations dogmatically rejected the idea of paying for pollution, because the idea implied that pollution, paid for, was thereby justified. So even if economic instruments were, at the time, judged to be effective by the environmental movement, the perception as to their overall usefulness was colored by ideology.

The issue of perception also draws attention to the fact that for actors within policy-making processes the visibility of effects is important. It can be shown that an increase in the price of petrol, for example, is certainly effective in the long run to reduce emissions from cars (see, e.g., Sterner, 1990). However, if policy-makers or the public at large do not believe this, since often there has been no reversal of the rising trend of the number of kilometers driven by car, this argument carries little weight during policy-making.

In addition, it is not just considerations with regard to these proposals that play a part during policy-making, but also considerations as to whether the outcomes of the decision-making process weaken or strengthen an actor's position in view of other issues, and whether such issues are at stake simultaneously or at a later date. Having a say in the debate on the introduction of economic instruments, may provide leverage for influencing other policy initiatives as well. Power is, in Deutsch's terms (1970: 23), both "a net and a fish."

Policy-makers are, in other words, often "rational" in numerous ways differing from the cost-effective logic, primarily because of the different criteria of relevance for their behavior. It is thus not surprising that when politicians and bureaucrats

are considering various alternative instruments, decisions are often taken which clearly are not optimal from the point of view of cost-effectiveness.

Down-drafts, Up-drafts and Side-swipes

In this section we try to summarize the effects that the policy-making process have on the final design of economic instruments, ignoring situations where no instruments are used or where instruments other than economic ones are chosen. We describe only the differences between the ideal types usually assumed in economic theory and the instruments that actually survived the policy-making process. We do this on the basis of first hand experience as advisors on economic instruments, supported by a critical review of the literature.

Insufficient Stimuli

One of the first effects, occurring particularly in the case of fees and surcharges, is that the actual level of this stimulus given by the instrument is hardly ever as high as it should be according to economic theory. This is largely due to the fact that most of the levies actually introduced are not intended to achieve a change in behavior, but to generate revenues. OECD reviews show that revenue-raising is often the main purpose of environmental taxes in member countries (e.g., Opschoor, Vos and de Savornin Lohman, 1994). The implication is that there is seldom a clear relation between the amount of the sum to be paid and the exhibited behavior. Waste tariffs for households, for instance, usually do not vary in proportion to the amount of waste produced and therefore do not accurately reflect environmental damage.

Sweden is at the forefrunt of environmental taxes and therefore deserves some attention here. Although the introduction of a number of environmental taxes in Sweden took place in a favorable political climate, and the charges imposed are quite high, internationally speaking, these charges are still too low to accurately reflect environmental costs. The fact that the Swedish charges could rise to a relatively high level is largely due to strong public support for environmental policy at the time their introduction was being discussed, and also to the fact that a linkage was made to the reduction of a number of (income and business) tax rates (see Lövgren, 1994 and Sterner, 1994). The fact that this instrument was relatively unfamiliar to industry has also been pointed out (telephone interview, 1 September, 1994, with Mrs K. Lövgren, MISTRA (Stifteltsen för miliöstrategisk forskning), Stockholm, Sweden.)

In brief, only under special conditions is it feasible to openly attach an explicit incentive character to tax measures. Even in such cases, however, the level of the charges imposed is generally too low.

Slow Progression to Full-fledged Stimulus

New "economic" instruments are often based on existing legal instruments, and take, therefore, a long time to develop into a full-fledged market-oriented approach. This effect can be seen, for example, in the introduction of "emissions trading" in the United States, where first the exchange of emissions from different chimneys was permitted within the same firm, then the exchange between firms, and finally the saving up of emission rights for later years. Because the design of the existing

legal instruments is not such that it can be easily transformed into a more market-oriented approach, it has aspects that impede the impact, or even the realization, of the new approach. Such effects may also occur for charges initially instituted as retributions. In calculating the Dutch water quality fee, for example, much attention was at first given to factors that affected the cost of purification, but were not related to the firms' environmental behavior.

A trend noted by Hahn (1991: 49) is that, once they have been introduced, fees tend to increase faster than inflation, since in order to keep political resistance at a moderate level, they began at a very low level. The Dutch water quality surcharge, now one of the highest environmental taxes in the world, was introduced gradually starting at a very low level during the first half of the 1970s. Even then it was only accepted because it was seen as a compensation for services rendered, namely, water purification. The fact that this was linked to the expensive water purification process subsequently increased the fee more and more (Bressers, Huitema and Kuks, 1994), leading eventually to an exceptional degree of effectiveness.

The implication is, therefore, that even when a choice is made in favor of economic instruments, it often takes a relatively long time before the instruments achieve a design which enables them to make an optimum contribution to a cost-effective environmental policy.

Earmarking Revenues

A third effect is apparent in the way in which revenues from surcharges are spent. In principle, the most rational approach economically speaking, is to treat these revenues as no different from other forms of governmental income, and to choose their most effective destination based on the preferences of the democratically-chosen administration. As it happens, however, they are quite often used to subsidize activities intended to reduce environmental pollution, such as major investments in, for example, waste processing and sewage water purification. Revenues are then earmarked, and often used to subsidize improvements in the behavior of specific target groups.

Policy-makers have a strong preference for subsidies. Vermeulen (1994: 161) indicates that, in Dutch environmental policy, there is a rising trend in the amount of money available for environmental subsidies. He estimates that, in the Netherlands, 20 percent of net environmental costs are covered by subsidies, despite the fact that subsidies in general are rejected on the basis of the "polluter pays" principle. Moreover, the effectiveness of environmental subsidies can be called doubtful at best (Vermeulen, 1992; van der Doelen, 1989).

Howe (1991: 7) finds, furthermore, that many subsidies are aimed at the introduction of so-called "end-of-pipe" techniques, where pollution is not prevented but only purified afterwards. These techniques are often not the most cost effective ones. A high effectiveness expectation, therefore, is not the main reason for introducing environmental subsidies. In a study of American environmental policy in various states, Brierly (1992) even found that subsidies on emission reductions resulted in higher levels of economic activity in environmentally polluting sectors, when compared to direct regulation.

In sum, the way in which revenues from environmental taxes are spent is often not aimed at an optimum contribution to the policy target or to the general good of society, but rather at making the extra charges acceptable by reducing

(re)allocation effects as much as possible, regardless of the overall economic rationality of the process.

Allocating and Valuing Permits

A fourth effect is seen in the case of marketable permits and is closely related to the above-mentioned effect on surcharges. When trade in permits begins, the permits naturally acquire monetary value. They achieve importance for the firm not only because they serve as a legal justification of the firm's behavior, but assuming a decline in the firm's pollution level they also serve as (often quite valuable) trading goods. Firms wishing to enter the market will have to start by buying the required permits from already existing firms. If the initial allocation takes place on the basis of actual pollution in a given year instead of on the basis of an equally strict pollution standard for all actors, free allocation also means that firms that already did their best in the past to reduce pollution as much as possible are disadvantaged as compared to firms that so far have invested little in the environment—a "first remiss; then rich" effect.

According to economic theory (the Coase theorem) it makes no difference, from the point of view of cost effectiveness, how pollution rights are initially allocated. Nevertheless, it will be clear that the allocation of pollution rights does affect income distribution in society. In this way forerunners can be punished for their progressiveness. Because managers are not only interested in maximizing utility, but also are capable of humane reactions, such policies can have a discouraging effect. Furthermore, Stavins (1994b) has shown that in a market with so-called transaction costs the initial allocation of pollution rights certainly does affect the market's cost-effectiveness. Transaction costs are costs that need to be made by market parties in order to find one another, to gather information, to negotiate and make decisions, and to verify whether agreements made are being complied with.

All this indicates that the negative allocation effects of tradable permits are likely to be minimized, even if this happens at the expense of the cost-effectiveness or fairness of the instrument.

Limiting or Supplementing Direct Regulation

The fifth effect concerns regulations that affect the flexibility of the instrument. In the case of economic instruments, it is imaginable that a concentration of pollution occurs in areas which already are strongly polluted. This is often described as a possible effect of tradable permit markets, where all permits may be bought by firms in a single area (so-called "hot spots"). To prevent this from happening, mechanisms are incorporated which enable the government to intervene in the market. An approval procedure for an exchange of permit rights is thus standard for permit markets.

Also in the case of surcharges, politicians will want to have as much certainty about the time and place of the emission reductions as they think they have with traditional (non-tradable) permits. The fact that this certainty is partly an illusion in the light of the failing effectiveness of many permit schemes does not really matter. Usually, surcharges do not replace existing regulations, but these regulations remain in place as a "safety net" or even, if the charge is officially just a destination charge, as the official policy instrument. From the perspective of an

optimally functioning market system, many of these supplementary rules and procedures are impediments.

Often, approval procedures for trades between firms are introduced, which implies that firms willing to trade have to make costs before trading. The existence of these so-called transaction costs considerably reduces the cost savings which could be realized. Less trade takes place than would be possible. Hahn and Hester (1989: 376) find that transaction costs constitute the main factor in explaining the success or failure of permit markets. In practice, this phenomenon is reflected mainly by the fact that the trade in emission rights takes place mostly internally, that is between the branch offices of various firms, and hardly at all between the firms. In internal transactions, transaction costs are far lower. The limiting effect of transaction costs and uncertainty about cost-effectiveness depends, among other things, on the number of firms participating in the market (Stavins, 1994a: 11). Summarizing, Hahn (1989: 51) concludes that cost savings from both charges and from marketable permits have remained "far below their theoretical potential."

Regulations not only affect the extent to which firms can save costs. Governments may also have to bear considerable implementation expenses. Klaassen (1994: 5), for example, speaks of the limited implementability of several permit markets. A fixed approval procedure also entails uncertainty for the firms that wish to enter into a transaction.

To sum up, economic policy instruments are rarely given the chance to create a "free" market. Additional requirements and procedures, whether or not they are justified in themselves, interfere with the economic mechanism that the economic policy instruments are intended to realize.

Exceptions and Exemptions

A sixth effect concerns the determination of the actual impact of the instrument. This includes two aspects: the target group and the basis of the instrument. Because of such factors as international competitiveness, firms may claim that they deserve to be exempted when an instrument is introduced at the national level. This limits the target group of the instrument and thus its scope as well.

After the introduction in Sweden of charges on energy and transport in 1991, a conflict arose between the environmental movement and industry. The environmental movement felt that industry was granted too many exemptions, while industry felt that the additional fees reduced their competitiveness. In the end it was decided that industry would be exempt from the energy charge in view of its international competitiveness. This reduced the energy prices for industry to a level lower than that before the tax reforms (industry had obtained lower company taxes in return for increased environmental taxes). So as not to increase the budget deficit, surcharges for households and the transport sector were increased. In the Netherlands, the recent charge on energy consumption also affects mainly private consumption.

Along these lines, a study by De la Fuente (1994) indicates that it is too easily assumed that higher environmental costs automatically involve less competitiveness. Since the 1970s the Netherlands have had by far the highest water pollution charges in the world, used to pay for waste water treatment. In other countries, these costs are often paid out of the treasury. Of all branches of industry, the Dutch paper industry was probably the most vulnerable. It operates in an international market; its products generally do not have brand names; it initially produced one

of the highest quantities of pollution in proportion to the size of the sector; and it was required, therefore, to pay relatively high taxes. All the same, though there were ups and downs, it did not fare that badly during the 1970s and 1980s.

In Belgium, water-quality policy was initiated only at the end of the 1980s. Thus the Belgian paper industry was able to economize both on the cost of the charges and on the cost of purification measures during this period. Yet the Belgian paper industry fared no better during the 1970s and 1980s than its Dutch counterpart. At the end of the period, the competitiveness of the Dutch paper industry certainly did not appear to be any less than that of the Belgian one. There are indications that the pressure to which the Dutch firms were subjected led to their beginning to modernize more quickly.

So we see that, far from being only negative for competitiveness, environmental taxes can also very well result in ecological modernization, and thereby in competitive advantage. It is, moreover, hardly clear in advance which is the key factor in a given situation. Thus the exemption of certain branches of industry not only hampers the impact of the economic policy instrument in question, but can be of doubtful use for competitiveness. It is also relevant here, therefore, that, in the policy-making process, it is not just the facts that count, but to an equal extent the perceptions of those involved in the process.

In short, the criterion of (international) competitiveness can lead to exemptions for specific businesses, which, in turn, can reduce the (cost) effectiveness of the economic instruments employed.

Sub-optimal Scale

As a seventh effect, we can mention that environmental issues often are not dealt with at the right level with respect to administrative hindrances. Williams and Matheny (1995) indicate that environmental policy in general is redistributive in nature. According to them, the implementation of redistributive policies will have to take place at the highest possible level of government because the target group of the policy can otherwise move from one jurisdiction to another to avoid the burden of environmental policy.

The emission of a number of substances causes environmental damage at the supra-national (either regional or global) rather than the national level, causing further problems for national cost-effective instruments. Individual countries have, therefore, stressed the need for the introduction of economic instruments at the international level. At the same time, however, there is considerable resistance to trying to tax at the supra-national level, because there is a fear of losing sovereignty to international organizations. In spite of support from the European Parliament and the European Commission, the European Union has had great difficulty in trying to arrive at an effective carbon emissions tax (Liberatore, 1995).

In short, the potential for cost-effective instruments in terms of both rationale and popular support is peculiarly bound up with the logic of sovereign national actors.

We can thus conclude this section by saying that, because other criteria than the optimization of cost-effectiveness are applied during policy-making, economic policy instruments have relatively little chance of being chosen. Moreover, if they are chosen, they are usually designed in such a way as to deviate in many respects from the ideal types of the instruments as grounded, explicitly or implicitly, in applied economic theory.

Starting from this conclusion, we can proceed in at least three directions. We can moan about the lack of vision of policy-makers who seem to be insufficiently aware of the enormous potential of economic instruments of control. Or, we can turn away completely from economic policy instruments as a serious option for environmental policy. Or, finally, we might admit that the development of theory as to the application of economic instruments cannot be meaningfully limited to the way in which citizens and firms are likely to respond to the actually chosen and correctly applied policy instruments. We have here chosen the third course. In the next section, therefore, we make an initial attempt to supplement theories of instrument application with perspectives from policy analysis.

Back to the Wind Tunnel?

The argument thus far indicates a need to make recommendations for economic instruments more grounded in reality. If we want to better predict how economic instruments will work in practice, we also need to pay attention to their implementation and feasibility. The debate on theories that explain the choice of economic instruments is making limited progress according to Andersen (1995). OECD "cookbooks" for economic instruments are intended to promote their use, but they tend to underestimate the problem. The implicit assumption is that government intervention is a conscious, well-considered treatment of choice by a single central actor. However, this model is hardly realistic, as shown, for example, by the political (as opposed to informative) role played by economic calculations in the decision-making process surrounding the regulatory energy charge in the Netherlands. The outcomes of scientific studies of the effects of this particular surcharge were politically manipulated (see Jaarsma and Mol, 1994: 120).

Theory development about the choice of instrument is clearly a highly complex matter. This is due mainly to the numerous factors influencing the decision-making process. There is no contingency approach such as the one developed for the implementation and impact of policy instruments (Bressers and Klok, 1988; Klok, 1991). There are, however, many partial explanations of the choice of instruments. Traditions relating to the choice of instruments have already been mentioned, but other factors also exist, such as bureaucratic culture (Andersen, 1995); the effects of various arenas (De Savornin Lohman, 1994); institutional, procedural and structural obstacles (Larrue, 1995); "captive agencies"; communist strongholds (Nentjes quoted in Sliggers, 1995); and overall uncertainty as to ultimate effects (Opschoor and Turner, 1994: 33–37).

We want to pass over this multitude of possible partial explanations and turn instead to an alternative approach from political economics, one which we believe offers more relevant points of contact for the phenomena listed above. We will supplement the approach with key perspectives from policy science, most particularly Sabatier's so-called "advocacy-coalition" approach (see Sabatier and Jenkins-Smith, 1993).

Robert Hahn

The concept of utility maximization is central to political economy. The simplest policy models in this tradition assume that a single actor determines the mode of instrument application to be employed, and that the instrument chosen is that which maximizes the utility of the actor in question. More developed models also

leave room for the influence of interest groups such as the regulated branches of industry and the environmental movement. Robert Hahn (1989, 1991) offers a relatively well-structured survey of the current status, building on existing insights and constructing a state-of-the-art model. At the same time that he indicates the defects of existing theories. He posits an essential contrast between the environmental movement and industry, with industry mainly concerned with profits and the environmental movement with the quality of the environment. Hahn assumes that decisions about instruments are taken by a single political actor who pursues utility maximization and who, for this reason, is mainly bent on acquiring political support. This political support can be obtained by the actor by choosing those objectives of environmental policy that most appeal to both interest groups. Hahn shows that the optimum of political support is located wherever stricter targets are applied to new firms ("new firms don't vote"), and more lenient rules applied to existing firms.

Hahn goes on to assume that, in essence, instruments differ in the extent of their *market orientation*. Generally speaking, industries will prefer market-oriented instruments over direct regulation, because they involve lower costs to the industry; the more influential an industry is, the more often a choice will be made in favor of this type of instrument. Furthermore, industry prefers a weaker to a stronger stimulus, while for the environmental movement the reverse is true. Both have in common that they feel that the earmarking of the revenues from surcharges is an attractive option: the environmental movement because they are in favor of an adjustment of environmental taxes; industry because the same revenues are a sign of its efforts with respect to the environment. This means that when a charge is introduced, it will soon yield earmarked revenues.

Furthermore, Hahn discusses the visibility of the cost of instruments and the importance of symbolic politics. Politicians generally tend to prefer instruments that entail little visible cost to industry and that appear to stimulate employment. Economic instruments score badly on both counts, because they entail rather visible extra costs for industry and offer few visible positive effects on employment. Hahn also models the importance that may be attached to symbols by interest groups. He assumes that the environmental movement is, in fact, in favor of symbolic policies, mainly because such policies set unrealistically high targets, which can be utilized in the long run as a basis for demanding ever stricter policies and which, moreover, can enhance the perception of the environmental problem on the part of the general public.

On the basis of the model outlined above, a number of the previously identified effects of the policy-making process on the design of economic instruments can be explained. The lack of an effective stimulus (Effect 1 above) can be explained from resistance on the part of industry. The same also partly applies to the earmarking of revenues from taxes (Effect 3), at least if this involves earmarking on behalf of subsidies. The fact that marketable permits are generally allotted free of charge (Effect 4) can be understood from Hahn's conclusion that old firms will be privileged with respect to new ones ("new firms don't vote"). The fact that all sorts of supplementary regulations remain in place (Effect 5) could be explained from the interest that the environmental movement is purported to attach to the symbolic aspect of the policy. We find this explanation only partly satisfactory, however. The providing of full or partial exemptions (Effect 6) may be partly due to the general resistance on the part of industry and partly to the fact that existing firms are given privileges.

Other aspects of the policy-making process are more difficult to discern from Hahn's model: Why economic policy instruments develop so gradually in many cases (Effect 2); why government expenditures often are financed through direct assessments rather than subsidies (which would, after all, make both politicians and industrialists happy [Effect 3]); why so many supplementary rules continue to exist when an economic instrument has been chosen (Effect 5); and why the use of instruments at a supranational level is generally not feasible (Effect 7).

As compared to the model of policy-making as a process of choice for a single actor's pursuit of maximum cost-effectiveness, Hahn's model is more realistic since it takes into account both the rationality of the political actor as well as that of others involved in the policy-making process. Also, the introduction of the possibility that a policy can be purely symbolic is interesting and rarely seen elsewhere, although it can be quite realistic and rational from the perspective of politicians (see Gustafsson and Richardson, 1979).

Yet theory development on the choice of instruments in political economy, where Hahn's work can be viewed as "state of the art," has a number of limitations, many of which are recognized by the author himself. The most important of these are:

- An over-simplification of reality by limiting the number of parties involved in policy-making to a single decision-maker, who allows himself to be influenced by only two interest groups, each of which has only a few motives;
- too little attention paid to the learning effects of past experiences with certain types of policy instruments;
- too little attention paid to the institutional component of policy-making.

A Diversity of Actors and Motives

For all three of the defects we have identified, interesting theoretical supplements can be found in the policy/political science literature. To begin with the first: Svoboda (1992), in a study on the influence of selected groups on American air-quality policy, shows that at least four groups exerted influence: the bureaucracy, the environmental movement, industry, and political elites. According to the "captive-agency" theory, the influence of industry should be dominant, but Svoboda's study shows that it is only marginal. The role of political elites and the bureaucracy, which is largely ignored in Hahn's model, is striking, however. It hardly seems wise, therefore, when developing theories on policy-making, to limit complexity by reducing the number of actors in the analysis (Allison, 1970). A large number of actors or factors in the analysis, on the other hand, quickly makes it impossible to arrive at a predictive model (Bressers and Klok, 1988). A possible solution allowing us not to limit the number of actors in the analysis, and still to construct a controllable theoretical framework, is to place the actors in a limited number of "coalitions" (see below). This approach was chosen by Bressers (1997) in constructing a sub-theory about the relation between the nature of policy networks and the choice of instruments.

Supplementing the model with additional actors and their motives makes it easier to understand the use of the revenues from charges in financing government activities (Effect 3). Bureaucracy in particular is interested in a high level of activities, and the revenues from charges offer opportunities in this respect which are all the more interesting because many other tax tariffs have been subjected to pressure since the 1980s. The example of the Polish mining sector, in which subsidies were

not just a response to general resistance from industry but were precisely intended to influence the allocation *between* industries, also becomes easier to explain by identifying the actual existing coalitions in the policy-making game instead of using categories such as "industry" or "the environmental movement." Also full and partial exemptions (Effect 6) can be partly reduced to such differences between various groups of firms. Limiting or supplementing regulations (Effect 5) can be partly understood as an attempt on the part of the bureaucracy and political elites to limit the loss of capacity to directly influence the behavior of firms which accompanies the use of general economic instruments.

Learning Effects

Existing theories pay little attention to learning effects. Such effects can be observed in practice, quite often however. An example is the system of marketable permits which was set up recently in the United States with respect to acidification. Under this system, a portion of pollution rights is not allocated among the existing polluters, but is sold annually at public auction. The gradually increasing introduction of market elements in the US emissions trading program itself can be seen as a learning effect. Furthermore, following the American example, "emissions trading" is now being considered and applied in other countries as well. Another observation is that the level of charges applied is often adjusted regularly to maximize environmental impact.

A theoretical framework that is suitable for the study of policy change is Sabatier's "advocacy coalition" approach (Sabatier and Jenkins-Smith, 1993, 1997). This approach sees changes in policy as being a function of (a) the interaction of competing coalitions in a sub-system of the political system and (b) external changes, such as changes in the socio-economic situation, against a background of (c) a number of stable parameters, including constitutional rules. This theoretical framework is based on the assumption that decisions about certain policy fields are made within sub-systems of the political system, and that within such a sub-system coalitions are created which oppose one another. Here coalition formation is based on shared values, shared problem perceptions and shared causal assumptions. Coalitions are bent on manipulating the rules that concern government organizations, which they want to use to achieve their aims. Coalitions try to obtain this influence in three different ways: (a) by gathering and using information; (b) by trying to manipulate the forum where decisions are being made; and (c) by supporting politicians who sympathize with the coalition. Here, policy changes can be realized by means of compromise, through external factors which may change the resources of actors; through policy experiments and policy evaluation; and through changing insights within the coalitions. Information gathering and learning from past experiences are particularly seen as a driving force behind policy changes.

An interesting idea in this perspective is that the policy style of the US Environmental Protection Agency (EPA) may well have been a decisive factor underlying the introduction of economic policy instruments. Vogel (1986) has shown that this agency functioned in a very bureaucratic manner, with extremely little room for consultation and a highly formal attitude. This forced firms to go to a great deal of expense, and there was a strong stimulus to obtain more freedom of action. A similar process can be seen, for instance in Poland, where the energy sector aims to reduce interference on the part of the local authorities, and is advocating a permits market at the national level.

Differences in policy styles may also serve to partly explain the lack of interest in economic policy instruments in Europe. In European countries such as the Netherlands, the dominant policy style in environmental policy has more of a consensus orientation (Huitema and Van Snellenberg, 1996). Many of the possible cost benefits of economic policy instruments in the United States are already being realized in various European countries through wider negotiations during the permit procedure.

In addition to having a positive or negative influence on the choice of policy instruments, learning effects can also affect the design of instruments. This is reflected particularly in the gradual growth of the instruments toward more adequate economic stimuli (Effect 2). This perspective also makes clear why such policy improvements reflect a gradual process whereby numerous different factors must interact positively to bring about a shift in policy.

Institutional Factors

In the above, we have already briefly indicated the third item: a lack of attention given to institutional factors in existing theories on policy-making. Although this factor is mentioned in many partial explanations of the choice of instruments (see, e.g., Larrue, 1995), it is rarely incorporated in more extensive theories on policy-making. Majone pointed out as early as 1976 that many theories on policy-making do not take into account the attempts made by actors to change the institutions within which they operate. The "advocacy-coalition" concept provides considerably more leeway for this, but further additions can be found in the work of Ostrom and others (Kiser and Ostrom, 1982; Ostrom, 1990; Tang, 1992).

The approach is based on the idea that institutions can be seen as rules, and that institutions have a layered structure. There are at least three levels of rules which can influence the actions of actors who operate within set regulations: the constitutional level, the collective level, and the operational level. The actions of actors at these levels depend on their motives and their resources. The rules that determine decision-making at the level in question, however, limit the actors' latitude. Other limiting factors are the culture of the society and physical circumstances. Together these factors determine the so-called "arena of action" in which the actors find themselves.

The introduction of several levels of regulation and arenas appears to constitute a particularly promising addition to existing theories about the choice of economic policy instruments. De Savornin Lohman (1994) points out that the choice of *economic* policy instruments often takes place in arenas other than those involved in the choice of *legal* instruments. Due to the nature of their subject matter, choice here often involves other actors, such as the ministry of finance. These actors may in fact introduce motives which are prejudicial to the selection of economic instruments, for example, the pursuit of fiscal neutrality. Precisely because the rules of the game have a layered structure and vary for each arena, actors may also try to manipulate the situation. Under the rule of fiscal neutrality, the chance that economic instruments will be adopted is relatively poor. Not just the game, but also the rules of the game can be manipulated, such as rules providing access and role responsibility. This implies, of course, that theory development on policy-making must be sensitive to differing rules at different levels of the game.

Supplementing this with an institutional perspective provides more insight into the question of why growth toward "real" economic stimuli (Effect 2) often happens so slowly. There are many formal and informal rules that need to be changed, and the impact of the instrument often affects institutions that are used to pursuing fiscal neutrality rather than a maximum behavioral effect. A similar point applies to the existence of external delimiting and supplemental regulations (Effect 5). Many of these regulations may not have resulted from the process that led to the choice of the economic instrument, but were already present as a result of previous decision-making, sometimes even as a framework which had to be adhered to during policy-making. In Europe, the limitation of the impact of the instrument (Effect 6) may also have something to do with the fact that agreements had already been made with various branches of industry about the reduction of environmental pollution, in which case high tax assessments are seen as violating the principle of legal security. Finally, international covenants and supranational organizations may provide a basis both for economic instruments and for their realization, or hinder the choice of the optimum scale level (Effect 7).

In sum, we believe that a combination of state-of-the-art political economy, allowing for greater complexity than that associated with classical rational choice models, supplemented by insights from theories of policy analysis in political science, can produce more adequate explanations of the phenomena described in this section. Though it has not been the purpose of the article to illustrate this in practice, we have argued that an integration of these insights is both feasible and productive.

Conclusion: A Rational Fear of Flying

This article started with the observation that economic instruments are, in theory, very attractive because of their cost-effectiveness. The innate appeal of this feature is that there exists a viable short-cut on the road to sustainable development. Economic instruments such as surcharges and tradable permits are often presented as "magic carpets," wondrous devices which do not require the continuous interference of someone behind the wheel because they rely on "the invisible hand" of the market.

We have stressed a less fantastical perspective, however, by pointing out that in the real world of policy-making more criteria are taken into account than that of cost-effectiveness. Because of this, the design of economic instruments often fails to satisfy the ideal model outlined in environmental economics, and the magic fails to bear the weight of the instrument. Various types of effects may be distinguished, including effects on the level of the stimulus applied by the instrumentarium, the direction of the stimulus applied, and the target-group at which the instrumentarium is aimed. The consequences of this are that the constellation of economic instruments falls far short of flight-manual expectations. These expectations are frequently unrealistic because they assume an ideally designed instrument functioning within the confines of a well-functioning market. Unfortunately, too many economists still seem to view policy-making as just another domain for their instrumental recommendations, rather than an independent arena which requires its own mode of scientific analysis.

Basically, much theory development about the choice of instruments today is still faced with a number of difficulties which were pointed out as early as the 1970s, primarily a belief that policy-making can be modeled after a single actor operating with a relatively concise goal-oriented rationality. When observing the deficiencies

of existing theories concerning the choice of instruments, and the possible supplements to these theories from policy science, we conclude that a combination of approaches would yield more enlightening results. Work by both Sabatier and Ostrom, in particular, appears to offer a strong potential for the elaboration of such theories. Here the basic principle might be that the choice of instruments at the operational level is influenced not only by the features of the problem situation and the basic conflicts of interest with regard to the problem and the way it is handled, but also by a multitude of actors with different motives who tend to "learn by doing." The context for decision-making with respect to sustainable development is thus seen as both highly flexible and contingent. Actors who are involved in decision-making also try to influence the "rules of the game," most tellingly by demanding to be admitted to the decision-making arena itself, but also by insisting on defining what the arena and borders for instrumental change are to encompass.

We feel that the issues raised in the article have implications for both academics and policy practitioners. Before discussing these, however, we wish to make it clear that, despite our critique, we view economic instruments as a potentially attractive option for pursuing sustainable development, provided the matching of contextual factors and operational premises is more thoroughly explored and integrated.

However, as we have demonstrated, recommending economic instruments purely in terms of cost advantages is not likely to bring the desired result. Even when economic instruments are chosen within political and bureaucratic arenas, they are usually not shaped according to the book. As we have seen, this can be explained primarily by the fact that those involved in the decision-making process attach value to many more aspects than merely cost-effectiveness. We have thus called for a closer cooperation between environmental economists and political scientists. Economists have come a long way in explaining the possible effects of instruments once they are in place—much less so for the process-related effects of policy-making and policy implementation.

We have, in this regard, drawn attention to the work of Robert Hahn, who takes a necessary additional step by applying a public-choice approach to the selection of economic instruments, giving promise thereby of better predictions of the acceptability of certain options. His work, however, lacks sufficient focus on both the institutional setting wherein decision-making occurs and the possible learning effects between people involved in the decision-making process. In our experience, it makes a significant difference as to whether the decisions are taken in the fiscal arena or in the environmental arena, and it is clearly important whether or not those making the decisions have experience with the use of economic instruments. The Swedish case clearly illustrates how industry can accept taxes partly because of a lack of experience with such instruments. It also shows that cost-effectiveness may be an attractive argument for the business community in general, but that experience with the powerful effects of this type of instrument can reduce acquiescence at a later stage. This creates difficulties for studies in the area because it may signal that resistance against economic instruments is not so much caused by the instrument itself, but rather by the purposes it tries to achieve. Sustainable development requires fundamental changes in our economy, and efficient instruments may temporarily ease the tensions this causes; but *ultimately* effective remedies may lie in more fundamental issues which can be glossed over by short-term abatement. The perspective lends credence to the observation (Press, 1994) that the essential dilemma here may lie in the confrontation between technocracy and democracy.

Should this be the case, several further questions can be posed. Would it be feasible to come to a more holistic ex-ante judgment of effectiveness, implementability and acceptability of a certain instrument at the same time? As pointed out, we believe this clearly implies that we must improve our knowledge of how learning effects occur and how they tend to influence decision-making processes on economic instruments. Also, we need to find out which institutional settings provide a greater chance for acceptance. And, further, what are the trade-offs between the three criteria just mentioned? Is an acceptable instrument ever going to be interesting from an environmental perspective? And whose acceptability are we striving for? The answer to these questions clearly requires more empirical work than currently available; a challenge for greater integration between, for example, survey research and rational-choice modeling.

We feel that the article also has implications for practitioners. The importance of the acceptability of policy instruments places heavy demands on the need to acquire support for particular measures. The importance of learning-effects and institutional influences may make the struggle for legitimacy somewhat easier. Learning-effects may not only be negative (in relation to what *does not* work), but may also positively contribute to the acceptance of economic instruments. Whereas the position of the Dutch environmental movement, for example, used to be negative on matters of principle, ("selling" the environment is inherently wrong), there now seems to be greater acknowledgment of the overall usefulness of this type of instrument. Certainly, in the Dutch case, decision-making processes on many types of policy tend to be dominated by judicially trained specialists who, in general, favor legal solutions to most problems. In this respect, there may be a significant overall gain in the hiring of more environmental economists (at the expense of environmental lawyers). Policy learning can be also be stimulated by closer cooperation and exchanges between national civil servants and administrative personnel with first-hand experience of different instrumental approaches.

Nobody in the real world, of course, believes in magic carpets. But belief is hardly the only motivation for unencumbered flight, and the attraction of a discipline offering rigorous science on the basis of an invisible hand is self-evident (at least for hard-pressed politicians). Our task has been to try to put the carpet in perspective—without trying to ground it completely.

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