

Economic instruments in environmental policy

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Abstract Due to market failures often is necessity for government to regulate environmental pollution by employing command-and-control regulations and/or economic instruments. Despite its cost inefficiency and inflexibility command-and-control policies are still dominant regulation approach to pollution control. Most important factors that are lying behind this inconsistency are lack of understanding of how economic instruments work to protect the environment, and the major influence of rent-seeking and interest group politics on the design of actual environmental policy. Opportunities for much greater environmental and economic benefits are, therefore, lost.

Key words: economic instruments, command-and-control regulations, environmental policy, political economy

1. INTRODUCTION

Existence of market failures, such as external effects, common goods, public goods and imperfect information, lead to over-exploitation of the natural resources and environmental degradation. In most cases, government intervention is necessary in order to correct negative effects of these failures. Once objectives are agreed and targets adopted, policy-makers can use command-and-control regulation or economic instruments (incentive-based instruments).

Command and control instruments operate by imposing mandatory obligations or restrictions on the behaviour of firms and individuals. Incentive-based instruments work by creating incentives for individuals or firms to voluntarily change their behaviour [11]. Rather than governments stipulating the technologies that must be used to curb pollution or the maximum allowable emissions, (command and control approach), economic instruments can provide the financial incentive to act in a more environmentally responsible manner through the use of such mechanisms as taxes, subsidies, marketable permits, changes to property rights, negotiated agreements, emissions or access charges, and other financial approaches to modifying behaviour [15].

In all cases, to design good rules, the government regulators need to know the details about specific industries and about the alternative technologies that those industries could adopt. This

information is often difficult for government regulators to obtain.

Despite the goals of environmentalists, it would be impossible to prohibit all activity that leads to environmental degradation. Thus, instead of trying to eradicate pollution entirely, society has to weigh the costs and benefits to decide the kinds and quantities of pollution it will allow [9].

Both approaches also attempt to shift the costs and responsibilities associated with pollution back onto the polluter ('polluter pays principle'). However, differences between the policy types are extremely important in terms of how successful they are in achieving their environmental targets and at what cost [15].

The literature on using incentive-based instruments to internalize externalities dates back to 1960s and has increased markedly since the 1970s. Economic instruments are also used for natural resource management. Common applications are in the management of water quantity, fisheries, forestry and wetlands. Economic instruments are also used to preserve soil and land quality, and to preserve species and wildlife [11].

2. ECONOMIC INSTRUMENTS VERSUS COMMAND-AND-CONTROL

The common rule of regulation is that intervention is justified if there are serious market

failures, and if those failures are expected to have a greater efficiency cost than the cost of the intervention—government failure [5]. In other words, there is a plausible justification for some kind of regulatory or legal action if individuals do not otherwise take into account the full social costs of their actions.

Several policy criteria should be considered when evaluating the success of policy approach. These include environmental effectiveness; economic efficiency; reduction in administrative, monitoring and enforcement costs; environmental awareness and attitudinal changes and inducement of innovation. [2].

Economists are particularly interested in the relative effectiveness and efficiency of various policies: that is, whether a specific policy meets its intended goals, and whether that policy is likely to do more good than harm when important impacts, such as those related to the environment, health, safety, or energy security, are taken into account [1].

The key to the promise of economic instruments is their ability to harness the power of the market and self interest and to turn these former adversaries of sustainable development into powerful allies [10, 14]. Also, Helm [6] argues that "economic instruments do not discriminate between the supply and demand side of markets...by contrast with planning, this approach does not 'pick winners'."

Economic instruments work by internalizing environmental costs and externalities through increasing the prices that individuals and industries must pay to use resources or to emit pollutants. As resources or emissions become more expensive, consumers have strong monetary incentives to reduce resource use, either through conservation, substituting materials with a more favourable environmental profile or rationalizing consumption. Not only does this encourage reduced emissions, but the use of economic instruments can also be more conducive to sustainable development by reducing pressure on natural resources [15].

First of all, economic instruments typically allow firms more flexibility than command-and-control regulations and capitalize on the heterogeneity of abatement costs across polluters to reduce aggregate pollution efficiently. They create an incentive for the private sector to incorporate pollution abatement into production or consumption decisions and to innovate in such a way as to continually search for the least costly method of abatement, and, in that way, encourage research to develop new, less expensive, and potentially superior technologies [2, 15]. This flexibility achieves environmental goals at lower cost,

which, in turn, makes the goals easier to achieve and easier to establish [14].

The benchmark used to evaluate a market-based approach is typically a command-and-control regime that often involves technological requirements that the regulator might impose to achieve a similar environmental objective. Not surprisingly, economists find most market-based approaches have the potential to produce cost savings [1].

Economic instruments are, in general, administratively and bureaucratically light, in that the burden falls on setting and revising the economic instrument, whereas command-and-control requires administrators for each aspect of the policy, with inspection, compliance and enforcement procedures, based upon information requirements.

A number of empirical studies have sought to compare the costs of obtaining a given reduction in pollution using an incentive-based versus command and-control approach. The particular results depend on the type of pollution being considered and the site of the pollution. A vast majority of the relevant empirical studies have found the control costs to be substantially higher with the regulatory command-and-control system than the least cost means of allocating the control responsibility. One summary of 11 studies reviewed [14] shows that command-and-control ranges from 1.07 to 22 times (average of 6.13) more expensive than the cost-effective approach.

Also, empirical studies in the United States show that the efficiency gains associated with using economic instruments rather than command-and-control regulation have been substantial. The authors estimate that in 1992, existing incentive-based programs saved \$11 billion over command-and-control approaches, and that they will save over \$16 billion by the year 2000 [3, 15]. Other studies analysed potential cost savings from marketable permit systems [1]. They suggest that the range of potential cost savings is large. Most of the studies predict cost savings above 40 per cent by moving to marketable permits from an existing command-and-control approach, and some predict cost savings above 90 per cent.

Also, economic instruments have been argued to provide a double dividend [6]. Many of them have the benefit that they generate revenues for the public sector. Revenues that can potentially help to enforce, improve, and expand environmental and resource protection programmes [15], or can be used to reduce distortionary taxes such as income taxes, which reduce the incentive for work, or sale taxes which distort consumption decisions [10]. For example,

revenues from environmentally related taxes in 2000 constituted about 7% of total OECD tax revenue, a figure that is growing steadily and which had accelerated at the end of the 1990s [11].

There are many advantages of economic incentives as instruments of environmental management in *developing countries* over command-and-control regulations. First, they can achieve the desired effect at the least possible cost—this is vital to developing countries with limited resources and a dire need to maintain their competitiveness in world markets. Second, economic instruments can serve to provide a decentralized, non-governmental enforcement mechanism to ensure environmental responsibilities are upheld, a great help in countries with severely limited enforcement budgets [15]. Third, economic incentives present fewer opportunities for rent-seeking behavior than do regulations and therefore they are likely to both be more effective and more equitable. Finally, unlike regulations that require bloated bureaucracies and large budgets, economic incentives generate revenues which should be welcomed by countries facing tight budgets and budgetary deficits [10].

To summarize, main benefits of economic instruments include:

- Reduction in overall cost of achieving emission reductions by providing flexibility,
- Encouraged use of innovative abatement technologies, and
- Allocation of natural resources to parties who value them most [15].

Because of this, economic instruments are ideally situated for reconciling environmental concerns with development needs and integrating environmental and economic policy [10].

Finally, there is a wider learning effect: the economic instrument itself carries information. The process of introducing the instrument educates the affected parties. It attracts the affected parties' attention, and is often accompanied by media information on ways of substituting to mitigate the impact [6].

Nevertheless, incentive-based approaches are far from replacing command-and-control regulation for dealing with environmental issues. As the costs of traditional environmental programs continue to increase—it is estimated they already amount to more than 2 percent of GDP—the efficiency of incentive-based approaches may make them more attractive to policymakers [12].

3. POLITICS AFFECTS POLICY

With regards to above-mentioned analysis, it is important not only to establish which instrument works best in particular contexts, but also why the optimal instruments are so rarely chosen [5]. Interestingly, country analysts have noted that often there is no formal process of evaluation at all prior to recommending a particular policy approach [15].

Several scholars have argued that the actual design of economic instruments typically departs dramatically for political reasons from the "efficient" design of such instruments. Frequently, taxes have been used to raise revenues rather than to reflect optimal damages [3].

The starting point in trying to understand this reluctance is the positive theory of government, regulation and bureaucracy. Rather than simply assume that public bodies pursue the public interest, these bodies are better understood as rent-seeking agents [6].

A government failure can arise if the government selects a policy which leads to an inefficient outcome. In certain cases, this outcome may actually reduce overall economic efficiency compared with the status quo. Government failures may arise for a number of reasons. For example, politicians or regulators may simply not have an incentive to pursue efficient policies. In addition, regulators may lack adequate information. Both market failures and government failures can contribute to the inefficient if they are not rectified [1].

One study [16] provides a comprehensive analysis of the empirical evidence on the economic impact of government policies to correct market failures in the United States. Main findings are that the government interventions frequently occur when no significant market failure exists. In addition, many policies aimed at addressing market failures could have corrected them at significantly lower cost.

Still, despite all advantages and potential benefits of economic instruments command-and-control environmental regulations are prevalent in the world [2,7,11,15]. These approaches are often viewed as more "secure" in terms of addressing a particular environmental concern because they are proscriptive, although the causes of this dominance are, as we will see, more diverse. Rosen and Gayer [12] argue that "...perhaps legislators like to immediate sense of doing something that enacting regulations gives them, even though more passive measures like creating a market would probably do the job efficiently. A cynic would

argue that the regulatory solution is the result of politicians' desire to have it both ways: Pass noble sounding legislation to please environmentalists, but make it unworkable to keep business happy." As a matter of fact, this is not far from truth.

A combination of factors seems to explain the current dominance of command-and-control approaches throughout the world despite the benefits of economic instruments. These include: a lack of understanding of how economic instruments work to protect the environment and how to choose the appropriate instrument; political interests that seek to minimize control costs via regulation; and a preference for keeping the status quo. Opportunities for much greater environmental and economic gains are, therefore, lost [15]. Hepburn [7] states that political factors are more important than economic considerations in explaining why particular instruments are employed for particular problems.

Actually, many environmental policies are not economically efficient, though some improve on efficiency relative to the status quo. This is not terribly surprising, given that politics plays a large role in policy choice and economic efficiency is not widely accepted as an overarching objective for particular policies [1]. Indeed, one of the primary lessons of the political economy of regulation is that economic efficiency is not likely to be a key objective in the design of policy [3]. Economics can illustrate the costs and benefits of intervention, but not the desirability [5]. In fact, countries are often reluctant to set taxes and charges high enough to act as economic incentives because of political reasons, resistance by industry or concerns about competitiveness [10].

For example, from an efficiency perspective, the world as a whole is doing too little to reduce net CO₂ emissions. Most of the world's countries are doing little or nothing to limit CO₂ emissions, yet almost all economic studies find significant marginal damages from emitting CO₂ into the atmosphere. One study finds a social cost of carbon of \$27/tC, and other meta study of social cost of carbon estimates finds a social cost of carbon of \$20/tC [1].

Finally, observation made by Helm [6] reveals interesting aspect of the matter in question: "...there is typically an asymmetry between the response to greater efficiency through the use of economic instruments and the exposure should policy fail. The losses tend to have greater influence than the gains. This asymmetry is reflected in the way politicians respond to 'events'. When a negative case arises in the media, there is a demand to 'do something', with

command-and-control regulation the typical response to ensure 'it never happens again.'"

4. CONCLUSION

Economic instruments are, without doubt, uniquely suited for the integration of environmental and economic policy, and can be designed to advance sustainable development.

Yet, despite their many advantages, such as potential to achieve environmental targets at a lower cost than traditional regulation, and to generate technological innovation in the areas of pollution control and prevention, role of economic instruments has been limited, and politicians and their officials show a reluctance to move away from traditional command-and-control approach in environmental policy.

It is sure that as the focus on efficiency sharpens, the use of economic instruments will become more appealing. Also, as citizens' legitimate demands for better public outcomes increase, so the social argument for using economic theory to improve instrument choice will become more powerful.

Although the role of economics is becoming more prominent, it does not follow that environmental policy will become more efficient. This apparent inconsistency, and even paradox that economic instruments remain the exception rather than the rule, can be explained by the political economy of environmental policy. In short, rent-seeking and interest group politics have been shown to have a very important impact on the design of actual policy.

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