Overview

Three broad categories of environmental policy instrument have evolved over the past two decades:

- **regulatory instruments**, whereby public authorities mandate the environmental performance to be achieved, or the technologies to be used, by firms;
- **economic instruments**, whereby firms or consumers are given financial incentives to reduce environmental damage;
- **voluntary approaches**, whereby firms make commitments to improve their environmental performance beyond what the law strictly demands.

These categories are not mutually exclusive, in that some policy instruments exhibit characteristics from more than one of the categories, but they provide a useful general classification.

The Research Network on Market-Based Instruments for Sustainable Development is a Concerted Action involving thirteen European research institutes funded by the European Commission's DGXII under its Environment and Climate RTD programme. The Network is largely concerned with economic instruments and voluntary approaches, which are here collectively referred to as 'market-based instruments'. This initial series of policy briefings reflects the results of six workshops organised by the Network on the following topics:

1. Voluntary approaches
2. Emissions trading
3. Non-market valuation
4. Green tax commissions
5. Institutional aspects of market-based instruments
6. **Environmental policy and competitiveness**
7. Environmental Implications of Market-based Policy Instruments

A further series of policy briefings on different topics will follow in 1998 reflecting the ongoing work of the Network.

This policy briefing is number six in the series, on the implications of environmental policy for competitiveness.
One of the most important considerations with regard to environmental policy is whether it is damaging to the economic competitiveness of firms or nations. The consensus of published research on unilateral EU environmental policy action is that there are only small effects overall and competitiveness may well improve. There is a substantial discrepancy between such a conclusion and the common perception, especially in business circles, that environmental policy, and in particular environmental taxes, represent a major threat to competitiveness. While this perception has some validity for a small number of sectors that are intensive users of energy and other environmental resources, other sectors stand to benefit from a policy of ecological tax reform. The superficially attractive policy of exempting potentially negatively affected sectors from environmental taxes actually increases the costs of environmental improvement to society at large.
1. Definitions of Competitiveness

A useful general definition of competitiveness is 'the degree to which (a country) can, under free and fair market conditions, produce goods and services which meet the test of international markets, while simultaneously maintaining and expanding the real incomes of its people over the longer term' (OECD, 1992, p.237). A similar definition may be applied to firms by referring to market share instead of real incomes.

These definitions illustrate both the similarities and differences between corporate and national competitiveness. If firms lose competitiveness they lose market share, become less profitable and, ultimately, go out of business. One firm's gain in competitiveness is another firm's loss: corporate competition is a zero-sum game. However, international trade for countries is not a zero-sum game. Through economic adjustment and restructuring that permit them to concentrate on and develop comparative advantage, all countries can benefit from trade. Countries do not go bankrupt as firms do.

However, if some economic sectors in a country become uncompetitive, the ensuing economic restructuring may involve costs. The new economic activity that substitutes for the sectors in decline may not be as productive in terms of market output or profits as those they replace. Transitional costs might be high and the equilibrium level of unemployment might rise. Moreover, the perception that nation states and groups such as the European Union and the North American Free Trade Association, NAFTA, compete with each other broadens the idea to encompass politics as well as economics. Since the collapse of the Soviet bloc, security has less to do with politico-military matters and more to do with becoming or remaining economically competitive. Geo-economics is replacing geo-politics as the driving force for international security, so it is economic performance that will establish and maintain our personal securities as well. For all these reasons, while corporate and national competitiveness are different concepts, both are important in their own right.
2. Concerns about environmental policy & competitiveness

At its simplest level, environmental policy may have an impact on competitiveness if it imposes on some firms costs which are not imposed on their competitors. If the affected firms’ products are internationally traded, then the environmental policy may disadvantage them in international as well as domestic markets. If the disadvantage is felt by nationally important firms and economic sectors, then national competitiveness might be affected.

Such a sequence of possibilities is the one most often evoked by business lobbyists concerned about these issues, and is also that of most concern to policy makers. In the discussion of the proposed introduction of an EU-wide carbon/energy tax, such arguments were put forward particularly strongly. The threat of effective policies to reduce fossil fuel use challenged the energy producing and using industries, two of the more powerful, well organised and influential of industrial sectors. They argued as above that such policies would increase firms’ costs relative to their competitors, making them less profitable and reducing employment and investment. Moreover, they maintained their opposition to the principle of a carbon/energy tax even after the proposal was modified to exempt them from it. After the 1995 Berlin climate summit the American oil and gas lobby signalled its anger over the deal to cut emissions of greenhouse gases claiming “the failure to tie in developing nations put American jobs, economic activity and international competitiveness at grave risk” (The Times 1995).

The concern about environmental policy and competitiveness is important for two reasons. First, if environmental policy produces negative impacts on competitiveness it will be associated with corporate, sectoral or national economic decline, which will make its introduction politically difficult or impossible. Second, if domestic ‘dirty’ (environmentally intensive) industry declines, to be replaced by a growth in foreign ‘dirty’ industry, overall environmental impacts may not change: a cleaner domestic environment will have been bought at the cost of a worse environment. If the environmental effect were global (e.g. greenhouse gas emissions), then loss of national competitiveness will have brought no environmental gain at all.
3. Analysis and evidence

There remain considerable differences of opinion about the costs and benefits for industry of measures for environmental protection. The conventional wisdom, both theoretical (Jaffe et al. 1995) and from industry and governments (The Times 1992a, b) is that environmental policies impose extra costs, damaging competitiveness. This view has now been challenged both on theoretical and empirical grounds. It is argued that the old static view of competition should be replaced by dynamic models of innovation in which environmental regulation can accelerate the process by providing incentives to innovate. Recent empirical studies have found little evidence of environmental regulation damaging industrial or national competitiveness (Jaffe et al. 1995) and the theoretical and macroeconomic computer simulation results are ambiguous. The policy climate has also changed; environmental policies are now widely accepted, especially in the European Union, as bringing economic benefits which potentially outweigh costs and this view has also been adopted by some industrial firms (Schmidheiny 1992, Henderson 1993).

3.1 The competitiveness of firms

As has been noted, at the firm level environmental policy may have implications for competitiveness if it imposes on some firms costs which are not imposed on their competitors in different countries. However, it may not always be the case that environmental policy imposes costs on firms; even where it does the costs may not be substantial enough to affect competitiveness; or the policy may generate benefits for the firm to set against the costs. There are many documented instances in which firms gain from adopting environmental programmes (see Box 1). The Business Council for Sustainable Development (BCSD) has stated: ‘Many of the waste reduction and environmentally positive programs in business are economically viable and are providing positive rates of return in relatively short time periods.’ (Schmidheiny 1992, p.96).
In a competitive market it is surprising that there are so many opportunities for profitable investment that appear to have been overlooked. The evidence suggests that business managers have been widely unaware of the economic, let alone the environmental, costs of resource use and waste disposal. They seem to have needed the pressure of public opinion or public policy to draw their attention to these costs before they gave serious consideration to the benefits. This may have been at least partly due to inadequate accounting of the costs of abatement, waste disposal, etc.

Porter (1990) has argued (see Box 2) that environmental policy may be good for competitiveness, because the costs of complying with such policy may be more than offset by innovations that produce competitive benefits in themselves and/or allow the firms concerned to gain a first-mover advantage in technologies that have market potential in the future.

Box 1: Economic Gains from Environmental Improvement

Between 1975 and 1992 the 3M Corporation saved more than $530 million from all the projects in its 3P (Pollution Prevention Pays) programme (Smart 1992, p.13).

Pacific Gas and Electric adopted a programme on Customer Energy Efficiency, which involved it investing in the more efficient use of energy by its customers, and sharing in the resulting financial savings. Its 1991 measures under this programme reduced emissions of nitrogen oxides by 445 tons, of sulphur oxides by 120 tons and of carbon dioxide by 340,000 tons, and earned the company $45.1 million before taxes.

A project of CEST in the UK’s Aire & Calder valley resulted in 11 participating companies identifying 542 options for cost saving waste reduction that saved over £2 million almost immediately with the prospect of similar savings in future, with over 70% of the measures having a payback of less than a year (CEST 1994, pp.6-7).
In a later publication Porter & Van Der Linde (1995, p.111) emphasise market-based instruments, instead of or as well as regulation, as very often the most effective way to give firms the incentive to overcome the various obstacles to corporate innovation and technological change, including lack of information and organisational inertia. The Porter ‘win-win’ hypothesis of the economic, as well as environmental, benefits of environmental regulation runs clearly counter to economists’ normal assumptions of efficient, competitive markets. It has been attacked as being at best a marginal phenomenon with regard to the costs of environmental regulation as whole. Palmer et al. (1995, pp.127-128) estimate that Porter’s “innovation offsets” amount to only a few percent of the total costs of conforming to environmental regulations, which in the US have been estimated by the EPA at $135 billion in 1992. They contend that the vast majority of these costs conform to the standard economic trade-off model, whereby environmental benefits are gained at the sacrifice of economic growth.

Jaffe et al. (1995, p.158) also do not accept that market failure can generally permit ‘win-win’ outcomes from environmental policy making. To explain the lack of empirical evidence revealed by the study of significant negative effects of environmental policy on competitiveness, they cite data limitations, the low proportion of environmental expenditures in most firms’ overall costs, the small difference between US regulations and those of its major competitors, and the preference of many companies to standardise their pollution controls to those of the most stringent countries. However, while these reasons may have validity in themselves, it is not clear that they are incompatible with the Porter hypothesis, which Jaffe et al. reject largely on theoretical grounds. The substantial case-study evidence of win-win outcomes remains.

**Box 2: The Porter Hypothesis of Competitive Advantage for Environmental Policy**

“Stringent standards for product performance, product safety, and environmental impact contribute to creating and upgrading competitive advantage. They pressure firms to upgrade quality, upgrade technology and provide features in areas of important customer (and social) concern. ... Particularly beneficial are stringent regulations that anticipate standards that will spread internationally. These give a nation’s firms a head start in developing products and services that will be valued elsewhere.”

3.2 The competitiveness of nation states

As has been seen, the concerns of industry about increased costs due to the imposition of environmental policy have been translated into national fears for jobs and output. However, nations can respond differently from firms to such concerns. For example, they may be able to depreciate their currency to bring about a short-term improvement in national competitiveness. However, depreciation may be unattractive as an act of policy because of the risk that it will set off a domestic wage price spiral, that it will become ineffective through the competitive depreciation of other currencies, or that it has the long term effect of encouraging price competition at the expense of quality competition.

However, the evidence does not support fears of adverse effects from environmental policy on the competitiveness of countries any more than it does with respect to firms. According to the OECD: “The trade and investment impacts which have been measured empirically are almost negligible.” (OECD 1996, p.45).

The first-mover advantage and innovation offsets hypothesised by Porter to give competitive benefits at the firm level would, if realised at a substantial scale, result in gains in national competitiveness. Certainly the environmental protection industry that has sprung up at least partly as a result of environmental regulation is now a major arena for international competition in its own right. By 1991 this sector was valued at DM 26 Billion alone (Sprenger forthcoming) and was estimated to be among the fastest growing sectors in OECD countries. Those countries which are major net exporters in this sector - USA, Germany, may certainly be considered to have gained in national competitiveness from it. They are also countries which have been characterised by high environmental standards for many years.

The fact that environmental policy in the past does not seem to have affected national competitiveness does not mean that it will not do so in the future for several reasons:

- The new goal of sustainable development seems to be requiring more stringent policy, with more potential effects on competitiveness, than in the past.

- There is the task of cleaning up past environmental damage. For example, the US faces clean up costs of $750 billion for hazardous waste sites and $200 billion for nuclear weapons manufacturing (Brown et al. 1993, p.10). Such clean up problems face all industrial countries to some extent and may well not yield ‘win win’ gains of the kind hypothesised by Porter.

- Given increasing globalization with ever fiercer international competition, environmental policy may be more disadvantageous than before.

- Finally, it seems likely that environmental policy in the future will make more use of environmental taxes than in the past. Their implications for competitiveness may be different to those of an environmental policy which has so far relied largely on regulation; this issue will be explored in the next section.
Clearly it makes sense for environmental policy to seek to achieve environmental improvements at least cost. Even where it has not been possible to offset the cost of environmental policy in the ways hypothesised by Porter, their macroeconomic effects seem small, and, where they are negative, certainly seem less than the environmental benefits achieved. The reviews by Christainsen & Tietenberg and the OECD in 1985 stress that any macroeconomic costs are only one side of the environmental policy picture. According to the former: “One basic and overriding point should be made with respect to environmental regulations. The contributions to economic welfare which they are intended to make are, by and large, not reflected in marketed or measured output. ... Although they are difficult to quantify, let alone value, numerous studies have indicated marked increases in these outputs from environmental policy. ... If this is in fact the case, the effect of these regulations on ‘true’ productivity would be positive and not negative, and the inclusion of the outputs of these regulations in the numerator of the standard productivity measures would both offset the negative effects of other factors on productivity growth and change the sign of the effect attributable to environmental regulations.” (Christainsen & Tietenberg 1985, p.388) The message appears to be that even where environmental policy leads to a modest cost in terms of marketed outputs (i.e. in terms of competitiveness) this may be justified by the environmental benefits gained.

3.3 Environmental taxes and competitiveness

In some ways environmental taxes seem to present the greatest competitiveness challenge to firms, because they require firms to pay for all their use of the taxed environmental good, even for that use below the regulated or socially acceptable level. Indeed, this feature of environmental taxes is responsible for one of the advantages of these instruments over regulation, because for the firm it represents a constant financial incentive to improve its environmental performance.

The most important consideration with regard to environmental taxes and competitiveness is the use to which the tax revenues are put. In particular, if the revenues are returned to business in some way, then there is no reason for thinking that the competitiveness of business as a whole will suffer at all, even though some sectors may stand to gain while others lose.
Pezzey (1991) showed this effect clearly in a simulation for ten UK industrial sectors which were subject to a carbon tax, the revenues from which were returned to the same sectors on the basis of their economic output. Four sectors ended up as net losers, while the other six were net winners, the outcome depending on the relative carbon intensity of the sectoral outputs. A similar result was observed in fully modelled simulations for the UK (Barker 1995) and Germany (Bach et al. 1994). The NOx charge in Sweden provides an example of how such a tax-plus-rebate system has been implemented in real-life. Even those sectors which seem in such simulations to be made worse off by environmental taxation may be able to mitigate these effects if they are able to use innovation or technical change in order to make less or more efficient use of the taxed environmental resource.

Where the revenues of environmental taxes levied on business are not returned to business, then the resulting effects on competitiveness should not be compared with the no-tax situation, but with the effects caused by raising the same revenues, and achieving the same environmental improvement, in some other way. If other forms of taxation are distorting economically, in that they result in a loss of output, as much analysis suggests (e.g. Ballard et al. 1985, Jorgenson & Yun 1990), and if environmental taxes are often the most cost-effective way of achieving environmental improvements, as economic theory suggests, then not using such taxes in environmental policy because of fears about their effects on competitiveness may be counter-productive. Similarly, exempting environmentally intensive firms from environmental taxes could also be counter-productive in that it could make a given environmental improvement more costly to society than it need be. The study by Böhringer & Rutherford (1997) illustrates precisely this effect.

### 3.4 Environmental quality as an element of competitiveness

In an advanced industrial society environmental quality is highly valued and may be expected to play an important role in firms’ locational decisions as well as contributing to society’s overall quality of life. In a study of two neighbouring states in the North East USA, Meyer (1992) found that the one with the highest environmental regulations and best environmental quality also had the better economic performance. He concluded that this was at least partly due to the superior living environment afforded by the environmentally superior state. Certainly if the environmentally inferior state had kept its regulations relatively low in order to attract industry from its neighbour, its neighbour does not seem to have suffered unduly, and the benefits, if any, of such environmental laxity seem to have been limited.
4. Policy implications and conclusions

- Although two decades of environmental policy have required substantial costs for environmental protection to be incurred at the company level, there is little evidence of this having had negative effects on the competitiveness of even the most affected sectors. Where the revenues from environmental taxes are recycled back to the affected industries, there are no grounds for thinking that there will be any long term effects on national competitiveness whatever. Negative effects of environmental policy on the competitiveness of even the most affected sectors will be offset if firms in the sector respond by improving the efficiency of their use of the relevant environmental resources.

- Both ‘command and control’ environmental regulation and ‘market based incentives’ such as taxes to increase the price of a product in order to achieve an environmental objective can be useful depending on the nature of the environmental problem and the non environmental benefits associated with the instrument.

- Environmental policies improve competitiveness by making a locality or a country more attractive as a place to live and work. This is may be very important in the long term particularly in economic sectors such as research and development where the well being of the workforce is important to economic success.

- Environmental policies, if they are part of a general drive to raise standards, reduce waste, and modernise a national industry, may well lead to an increase in quality. This can take the form of better service, shorter waiting time, better design, less waste in the use and disposal of the product, as well as in new product attributes attractive to the purchaser.

- In order to avoid the costly premature scrapping of capital, to give time for industrial adjustment, and to influence future investment plans, environmental taxes should be introduced at low levels and gradually escalated according to a pre-announced schedule.

- Exemptions from environmental taxes reduce the efficiency of the taxes and increase the overall costs of attaining a given environmental improvement.
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Many of these ideas come from Ekins and Speck 1997 (forthcoming) and the geo-political approach is described by Thompson in Barker & Köhler (forthcoming).

Further Information

For further information please contact Terry Barker and Jonathan Köhler at the address below.

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The European Union Research Network on Market-based Instruments for Sustainable Development.

The European Commission (Directorate XII), as part of its Environment and Climate RTD programme, “Human Dimensions of Environmental Change”, provides financial support for a network of research institutes devoted to the study of the design and use of market-based instruments for sustainable development. A series of workshops have been held, where the latest research on particular market-based instrument or related theme has been presented and discussed by leading scholars and policy practitioners. One of the products of each workshop has been the synthesis of the findings into a research policy brief.

The network is co-ordinated by Frank J. Convery and managed by Sheenagh Rooney, Environmental Institute, University College, Dublin. Web Page address for further information: http://www.ucd.ie/~envinst/index.html.

Author and Editor

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