

ADVANCING SUBSIDY REFORM: TOWARDS A VIABLE POLICY PACKAGE

David Pearce
*Donata Finck von Finckenstein**

EXECUTIVE SUMMARY

World subsidies may total some \$800 billion, of which perhaps two-thirds occur in the developed economies of the OECD. Reforming subsidy regimes that damage the prospects for sustainable development is immensely complex. Simply calling for subsidy removal is unlikely to succeed. The complexity arises from the fact that subsidies are manifestations of rent-seeking, which, in turn, is part of a wider category of unproductive activity in economic systems. Rent-seeking involves redirecting economic resources to special interest groups rather than using resources productively. Interest groups then use those resources to reinforce their privileged positions. Subsidy reform will inevitably conflict with those special interests. The idea that subsidy reform is a “win-win” policy is therefore misleading – there will always be losers, even if they are undeserving losers. In many cases, the most harmful subsidies will be those that are least easy to remove.

Subsidy reform is therefore about dissipating rents and has to be part of a wider macroeconomic and political reform programme. Subsidies are often linked to corruption, thus emphasising the difficulty of securing the political changes that are needed. Moreover, instituting democratic reform is not sufficient either — democratic societies have even larger subsidy regimes than less democratic societies. Political change has to be combined with economic reform. Some have advocated “sudden shocks” whereby dramatic events are seized as an opportunity to institute reform. There is some evidence to suggest that if a crisis does occur, it may be best to implement subsidy reform along with other transitional measures in one large package. An alternative is to let the almost inevitable growth of subsidies produce economic bankruptcy, and then institute reform. But many societies have proved surprisingly resilient whilst sustaining extensive subsidy regimes, and the costs of waiting may not be acceptable anyway.

In the absence of crisis, a gradual approach is best. Policies need to be pre-announced and gradual subsidy reduction needs to be combined with careful public awareness campaigns and efforts at political transparency and accountability. Bilateral and multilateral lenders have a strong role to play, even though reforming subsidies as part of a conditionality package is still controversial. Reform almost inevitably involves privatisation since exposure to market forces is essential for rent-dissipation. Nonetheless, reform is complex and its success is difficult to guarantee. For example, privatisation may simply shift rents from the public to the private sector. Subsidy regimes seem peculiarly resilient to change.

* David Pearce is Professor of Environmental Economics and Director, Centre for Social and Economic Research on the Global Environment, University College London, United Kingdom. Donata Finck von Finckenstein is a consultant in sustainable development issues.

THE ISSUE

WHILE the removal or reduction of subsidies to economic activity have widely been countenanced as “win-win” policies, the reality is that, while some considerable improvement has been achieved, subsidy removal is extremely difficult in practice. This difficulty of reform suggests that, while there may be net gains overall, there must be significant losers from reform, losers who have the ability to block reform measures. In the language of political theory, subsidy reform tends to be “non-neutral” – those who lose are often capable of strong lobbies against the reform.¹ Subsidy reform is not therefore a straightforward win-win policy, but a complex issue of wider reform, incentive design and political will. After briefly reviewing the situation with respect to subsidies, this paper lists a “menu” of policy options for reform. Whilst reform is possible, there should be no illusions that subsidies are institutionally deeply entrenched in most societies and the reform process will therefore be long and arduous.

WHAT ARE SUBSIDIES?

Advancing the reform of subsidies has, unfortunately, to begin with the problem of defining subsidies. We take a producer subsidy to be any form of intervention which lowers the cost of production of a producer, or raises the price received by the producer, compared to the cost and price that would prevail in an undistorted market. This definition allows us to distinguish subsidies from interventions which raise market prices but where the increase in price does not accrue to the producer. All product taxes, such as sales taxes and value-added taxes raise prices but not for the benefit of the producer. The definition also takes account of the fact that subsidies often take the form of price guarantees, raising producer prices over the free market price, as is common with agricultural price support schemes, as well as cost-reducing measures. Finally, the definition embraces all transfers to producers, regardless of whether they are targeted on products or simply take the form of cash sums payable to producers. Consumer subsidies similarly lower the price that the consumer would pay if there was a free market in the commodity in question.

The problem with these definitions is the meaning of an “undistorted” market. Few markets are genu-

inely competitive, and any element of monopoly will raise prices above their competitive level. If we keep the meaning of “distorted” to mean “distorted by government intervention” then the definition is fairly safe. It is usual to cite a reference point against which a prevailing price is measured. World prices, that is, the prices that would or do prevail in a freely functioning world market, are usually taken as the reference point.

HOW BIG ARE WORLD SUBSIDIES?

Table 1 records a “best guess” at the scale of world subsidies. The picture is a rapidly changing one and subsidies in the developing and transitional world are being reduced rapidly as those economies attempt to become more “open” in the context of world competition. It should be noted that the sources of information for estimating subsidies are not consistent and, therefore, some subsidised sectors are not analysed.² Nonetheless, Table 1 is instructive.

First, even allowing for the fact that only some subsidies have been identified (for example, subsidies to forestry and to the non-energy industrial sector are excluded), we see that world subsidies could amount to over \$600 billion per annum, and may be as much as \$800 billion. To get some idea of the scale of these figures, the entire GNP of the world is about \$25 trillion, so the subsidies amount to around 2.4 per cent to 3.2 per cent of world GNP.

Second, total official development assistance (ODA) is about \$60 billion per year, so world subsidies are at least ten times this figure.

Third, the subsidies are largest in the developed countries of the world: the OECD countries account for 75 per cent of the subsidies. One possible implication of this fact is that “conditionality” in aid packages could be compromised in political terms: for OECD countries to insist on subsidy reform in the developing world invites the kind of response that has become familiar in international environmental agreements, namely that the developed countries should undertake their own reforms first.

Fourth, agricultural subsidies in the developed countries dominate the picture. These tend to take

¹ Fernandez and Rodrik (1991) suggest that some reforms could have political support ex-post, but that ex-ante there is uncertainty about who the gainers and losers are. This uncertainty tends to result in an unwillingness to move from the status quo.

² Industrial subsidies to sectors other than agriculture and energy may be significant. For the United Kingdom experience and data, see Wren (1996). Industrial subsidies in the United Kingdom have declined dramatically, but even some newly privatised sectors still receive subsidies – for example, over United Kingdom £1 billion is paid to Railtrack, the company responsible for railway track and associated infrastructure. The sheer scale of subsidies can be gleaned by considering the estimate some 20 years ago that US Federal subsidies amounted to \$95 billion (Common Cause, 1980).

Table 1. Estimates of World Subsidies (\$ billion)

<i>Sector</i>	<i>OECD</i>	<i>Non-OECD</i>	<i>World</i>
<i>Water</i>			
Irrigation	2	20	22
Supply	—	28	28
Sanitation	—	5	5
Total Water	(2)	(53)	(55)
<i>Energy</i>			
Coal			
Oil/products	10	62	72
Gas			
Electricity*			
Nuclear	9-14	—	9-14
Total energy	(19-24)	(62)	(81-86)
<i>Agriculture</i>			
Transfers	362	36	398
Fertiliser	—	>0	>0
Pesticides	—	—	—
Total agriculture	(362)	(36)	(398)
<i>Fisheries</i>			
	—	—	14-21
<i>Forestry</i>			
	—	—	—
<i>Transport</i>			
	55-174 (USA)	—	
	52 (Japan, Germany, UK)	—	107-226
<i>Total</i>	490-614 +	151+	655-786

Sources: Water: Xie (1996); Energy: World Bank (1997a); OECD (1996, 1998); Fisheries: Milazzo (1998); UNEP (1997); Transport: OECD (1998); Agriculture: World Bank (1997a); OECD (1999).

the form of “price supports”, that is, guaranteed prices to farmers. The \$362 billion agricultural subsidy in the OECD accounts for 1.4 per cent of OECD GNP (OECD, 1999). Gross receipts to OECD farmers were some 59 per cent above what they would have been at world prices. The European Union accounts for about 40 per cent, or \$142 billion; Japan for about 15 per cent, or \$56 billion; and the United States for about 27 per cent, or \$97 billion. Only small fractions of this support go to agri-environmental schemes.

Fifth, subsidies to transport are extensive but usually take the form of subsidies to public transport, which often have an environmental justification.

Sixth, subsidies to nuclear power are quite important in the developed world and perhaps amount to \$9-14 billion per annum. World fisheries are subsidised by perhaps \$20 billion. The fishery subsidy is perhaps the most stark since overfishing is reported in 80 per cent of the world’s fisheries.

SUBSIDIES GOOD AND BAD FOR SUSTAINABLE DEVELOPMENT

Distributional Concerns

One initial purpose of subsidies is to protect the poor. Thus, distributional fairness is the first case in which subsidies might be justified. However, even this case needs to be treated with some considerable caution. In the context of water supply, for example, where the “protect the poor” argument is voiced very often, Briscoe (1997) points to the “hydraulic law of subsidies”. Since politicians interfere in water pricing, the effect is rarely one of protecting the poor but of actually placing them at further disadvantage. Below-cost tariffs result in losses for public water utilities who cannot then invest in proper services. The scramble for the supplies that are provided results in the better-off securing supplies, and the poor often

having to resort to high cost vendors of water. The subsidies themselves actually produce the failure to protect the poor, however their objective is first formulated. Similarly, agricultural input subsidies, often designed to counteract other discriminatory measures against agriculture in developing countries, tend to benefit larger farmers because of their greater access to the inputs in question (van Blarcom, Kneeden and Nash, 1993).

There are other more subtle ways in which subsidies, ostensibly designed to help the poor, may work against their own best interests. Housing subsidies tend to reinforce the poverty trap. In the United Kingdom, for example, the benefit paid to the unemployed is removed totally once employment is secured, effectively taxing away the marginal benefit of employment. The result has been substantial incentives to avoid employment, with a resulting complex and bureaucratic structure of work incentives having to be put in place (Kemp, 1998). Here the issue is perhaps more about the design of the subsidy, rather than the fact of subsidisation, but the example reveals that “wrong” subsidy design can worsen long-run equity rather than reduce it.

Environmental Concerns

Harmful effects of subsidies tend to come about because:

- the subsidy causes too much production or harvesting of the subsidised product, and hence too much associated effects such as pollution or resource depletion;
- governments have to find the money to pay for subsidies and this will come from taxation or borrowing, causing macroeconomic problems, or, at the very least, diverting money from socially valuable uses such as health and education;
- overproduction caused by subsidies in the developed countries has to be disposed of, and this may result in “dumping” the excess production somewhere else, perhaps in developing countries, undermining their economies;
- subsidies also divert resources away from higher value uses to low value uses, for example, the Sacramento Valley in California has arid climate conditions, yet it grows rice based on heavily subsidised water and accounts for as much as 80 per cent of California’s water consumption;
- subsidies mean that true costs of supply are not recovered, which implies that the utilities supplying energy, water and so on, may not have enough revenues to secure surpluses that they can invest in new supplies. This is why public utilities in many developing countries are often locked into a vicious circle of poor supply and have little or no money for new investments
- subsidies create “economic rents” – money for do-

ing nothing – and hence attract “rent-seekers”.

With respect to economic rents, those who benefit from the rents will organise themselves to prevent the source of the rent from being removed. The popular picture is that subsidies are designed to benefit the poor, so if the poor object to the rents being removed or reduced, many people would be sympathetic to their cause. In practice, precisely because the subsidies create rents, the rents tend to be appropriated by the more powerful sectors of society. Far from the subsidies benefiting the poor, they often benefit the better-off who are skilled at organising lobbies to retain the subsidies. These subsidies are the hardest to remove, yet are likely to be the ones where rent capture is most entrenched. Paradoxically, the easiest subsidies to remove are those that do benefit the poor since they are often powerless to resist the change in policy. Rent-seeking – the search for opportunities where rents are created, often by legal restrictions such as bans or zoning of land use, but in this case by subsidies – is unproductive. It may keep lawyers and other lobbyists in business but it does little or nothing to enhance social well-being. Much agricultural subsidisation belongs in this category. For historical reasons, farmers tend to be quite powerful lobbyists. Taking their subsidies away therefore meets with strong resistance, whether in North America, Japan or Europe.

Subsidies and Technology

Subsidies can be justified in the context of stimulating technological change. Consider the example of renewable energy. Subsidising clean fuels will encourage their substitution for dirtier fuels, but could also lower the price of electricity overall, expanding the market. Both these effects could be made larger by the fact that renewable energy sources tend to be declining cost industries. While the market expansion effect could conceivably produce more pollution than previously, this seems very unlikely. The likely effect is that less pollution would be produced. Subsidies would also help renewable energy producers to reduce the risks inherent in not knowing precisely how costs will decline as output expands. Particular forms of subsidy are also attractive: the risks in renewable energy can only be reduced by capital investment, and this in turn suggests focusing subsidies on capital costs, for example, via accelerated depreciation allowances. Van Blarcom, Knudsen and Nash (1993) also suggest that targeted agricultural subsidies can stimulate technological change, as with high-yielding crop varieties in India.

Like all subsidy justifications, the technological case has to be argued carefully. It is comparatively easy for the technology-stimulating rent to be shifted to others who are not the intended beneficiaries, with a consequent loss of the technology stimulus. But by

focusing on new and clean technology, and by strong time-limits on the availability of the subsidy, the potential for abusing the arguments is minimised.

Paying for Environmental Services

Another context where subsidies may be justified is by reforming their nature, away from paying for overproduction, towards paying for environmental services. This can be observed in the agricultural sector of developed countries where, at the margin, subsidy reform is producing payments for tree growing, hedgerow planting, protection of ecosystems and even non-production (set-aside). As will be discussed later, overall subsidy levels may not fall but the nature of the subsidy is reformed so as to achieve some environmental goods rather than environmental bads.

Subsidies and Corruption

One of the side effects of subsidies is the encouragement of corruption. This is because the process of rent-seeking is likely to lead the beneficiaries of subsidies to exaggerate the basis on which they receive subsidies. The story is well known in the context of, say, housing support benefits but is also endemic to agricultural subsidies. Subsidy beneficiaries will be tempted to falsify statements about how much land area is farmed, crops planted and so on, and the less rigorous the inspection scheme the more likely they are to succeed in securing excess subsidies. Again, the activity of deceiving the authorities is unproductive, but it may also extend to bribing officials whose responsibility it is to monitor and enforce compliance with subsidy regulations. This was noted early on by Krueger (1974). Tullock (1980) noted that investment in rent-seeking can be subject to increasing returns, further stimulating the process, a view confirmed in Murphy, Shleifer and Vishny (1993). Moreover, rent-seeking behaviour gives a high incentive for the rent-seekers to keep hold of the status quo from which they benefit so much. Hence, as Rose-Ackerman (1999) observes, subsidies and corruption are intimately linked.³

³ In an effort to contain the problem, we do not discuss corruption in any detail. Much of the analysis of corruption can be placed in the context of principal-agent theory whereby the agent agrees to act in the interests of the principal: for example, the police force acts in the interests of the public at large. The issue is then one of devising incentives whereby the principal can get the agent to act in the principal's interests, a problem that arises because principal and agent possess different degrees of information (so-called "asymmetric information"). For a discussion, see Brooks and Heijdra (1991).

THE PROCESS OF REFORM

The remainder of the paper addresses the issues of how, if they are judged detrimental to sustainable development, subsidies can be reformed. But first it is necessary to address a view that claims we may never be rid of subsidies.

The Case is Hopeless: Abandon Reform

Cost-benefit studies of subsidy reform tend to show that subsidies rarely have a rational economic justification, either in terms of economic efficiency or in terms of equity. But rationality all too often does not determine policy. Rose-Ackerman (1999) notes two extremes of the management of self-interest within any society. The first is the idealised competitive market model of Adam Smith in which self-interest produces a globally efficient outcome. The second is war, where individuals and groups compete violently for their share of the resource base of the economy. Whereas the competitive market is productive, war is totally unproductive since it destroys wealth and creates none. In between these extremes lies various mixtures of productive and unproductive activity.

As noted above, unproductive activity emerges from "rent-seeking", that is, the process of using time, effort and resources to secure a bigger share of the resource base for the rent-seeking individual or group (Krueger, 1974). Subsidies are effectively rents and thus attract rent-seekers who create a "special interest state" (Common Cause, 1980). To tackle subsidies effectively, it is argued, one has to tackle rent-seeking behaviour. But according to some, one can never destroy rent-seeking since it is rooted in human self-interest, a motivation that is genetically powerful and unlikely to be changed dramatically.

The response to this gloomy view is that rent-seeking is indeed highly unlikely to go away. But rent-seekers have to have rents to capture, and if the rents are not there they will be thwarted in their aims. The classic means of dissipating rents is to liberalise markets so that they become competitive, thus reducing rents. Against this, if the rents accrue to those in power, as is all too often the case, then government itself has no incentive to dissipate rents. Rents and rent-seeking become perpetual, and this, no doubt, explains why so many corrupt societies survive.

The answer then appears to lie in much grander realms, namely the whole process of generating participatory democracy such that (a) governments substitute some criterion of social welfare maximisation as their goal, and (b) those previously excluded from rent capture secure a "voice" to counterbalance those who remain dedicated to rent capture: rent dissipa-

Table 2. The Decline in Energy Subsidies 1990-1996

<i>Region</i>	<i>Percentage change in subsidies 1990/1 to 1995/6 (per cent)</i>
Russia	-67
Eastern Europe	-56
China	-58
Oil producers	-38
Others	-58
OECD	-21
Total	-51

Source: World Bank (1997a).

tion through countervailing power.⁴ Ultimately, then, whatever the specific policies for subsidy reform, they are unlikely to work unless the much broader conditions of participatory democracy are in place.

The unnerving feature of Table 1, however, is that subsidies are biggest in the developed countries of the world, countries that already have universal participatory democracy. This suggests that even the whole process of democratisation is insufficient to reduce subsidies. We might conjecture that, while democracies have high subsidy levels, they are concentrated in a few sectors and must surely be declining over time as the pressure to dissipate rents grows. Table 1 does indeed show that subsidies are concentrated in the agricultural and energy sectors, although it is difficult to be sure of the extent of other industrial subsidies. But the time series evidence is mixed. Agricultural subsidies in the European Union, for example, are barely less now than they were in 1980, whereas energy subsidies have declined substantially but due, in the main, to reduced support for the coal industry in the United Kingdom. Fossil fuel subsidies to R&D have also declined systematically in the EU (Steele, Hetl and Pearce, 1999).

Overall, then, the reform package for subsidy removal has to include a two-part high-level process: political reform towards democracy, and a drive for market liberalisation once democracy is in place. The ambition embodied in this conclusion should not be underrated.

Reform through Crisis

Perhaps because of the view that rent creation and seeking are endemic to non-competitive economies, it is sometimes argued that the only real oppor-

tunity for radical reform of subsidies and other distortions is via an economic and political crisis (for example, see Drazen and Grilli, 1993). Weyland (1996) argues that, since individuals are more averse to losses than they are in favour of gains, a crisis effectively puts them in a situation of taking risks. Or it may be the case that a crisis simply presents an opportunity for change, with preferences for change being unchanged pre- and post-crisis.

Some evidence in support of the view that crises accelerate change is contained in World Bank (1997a) where it is shown that energy subsidies have declined dramatically in the last decade, but most noticeably in the former Soviet Union, the economies in transition and China (table 2). Nonetheless, it can be seen that energy subsidies have declined in all countries and there is an obvious contrast between the former Soviet Union and economies in transition on the one hand, where revolution has effectively occurred, and China, where subsidy reductions are just as large and political change has been far more gradual. This suggests that crises may be instrumental in bringing about change but are not a necessary condition of desirable change.

Corrales (1997) similarly doubts the wisdom of "waiting for a crisis" to implement reforms. First, he suggests that different countries may experience the same kind of crisis but each can react in different ways. Second, those reactions may include wholly undesirable features, for example, profligate spending rather than fiscal austerity. There are, for example, just as many instances of perverse policy responses to hyperinflation as there are sound responses. Third, he argues that there is little guidance as to what constitutes the "right kind of crisis" to generate desirable reform. Some crises are just as likely to hasten the demise of reforming governments as they are autocratic and corrupt ones.

Shock therapy has, however, been used, notably in countries faced with the collapse of prior communist rule. Mongolia, for example, adopted a dramatic programme of privatisation, market liberalisation and

⁴ Sometimes called "rent avoidance".

incentives. The drawbacks of shock therapy include the chances that the public will not tolerate the short-term upheaval before reforms take effect, although much depends here on the prior culture of challenges to the state. In the case of Mongolia, there was little experience with political opposition, unlike the eastern European countries where dissidents had long voiced their concerns before the collapse of communism. Another, and perhaps critical drawback, is the need for the institutional capacity to manage the transition, for example the creation of effective local governments to manage a decentralised process (Collins and Nixon, 1993). In this respect, international technical and institution-building assistance is vital and arguably more so if the process is taking place rapidly and dramatically.

Macroeconomic crises in the 1980s were also the spur for governmental change and new governments have been the most active in undertaking structural adjustment, including subsidy reform (Krueger, 1992). Contrary to Corrales (1997), Krueger argues that only one country, Argentina, effectively failed to implement the reforms that were needed, although as she was writing five years before Corrales, some of the reform experiments were not capable of being judged fully. Nonetheless, even the reform process has problems in that the pendulum might swing too far the other way. For example, most developing countries discriminate against the agricultural sector. The reform process usually tackles this discrimination, at least in part, but then risks going too far in responding to the resulting requests and pressure for favouritism. In Korea, for example, discrimination against agriculture turned into outright protection of the sector, usually with justifications that are reminiscent of European policy after the Second World War – the need to protect against cheap imports and to ensure food security. Even today, Korea has per capita agricultural subsidies above the OECD average (OECD, 1999). As Krueger (1992) notes, using producer subsidies to meet equity goals is inefficient and if consumers must be subsidised then direct subsidies to food purchases should be used.

Overall, “waiting for a crisis” appears a risky policy measure in terms of the unknown outcomes, although the experience of structural reform in the 1980s suggests that, on balance, new governments coming in on the back of macroeconomic crises may have been successful in their reforms. Where crises do occur, and the reforming government is minded to implement a clean slate policy quickly, the critical needs are for public support and, in countries where wholesale political change occurs, the development of new institutional capacity.

Collapsing Beneath their Own Weight

A variation on the crisis theme declares that, because rent-seeking is a dynamic process, rent-seekers

have incentives to expand subsidies to a level where, ultimately, the burden on taxpayers becomes so large the subsidy regime simply collapses. If true, the policy implication is again one of waiting for the inevitable demise of the system. There is perhaps more evidence to support this variation of the crisis theory. It is well known, for example, that the gravest threat to the European Common Agricultural Policy (CAP) is not pressure from within the existing EU-15 for reform of subsidies as they currently exist, but the likely effects of expanding the subsidy system to embrace the Accession Countries.

Current total agricultural support within the EU-15 is some \$142 billion or some \$950 per EU-15 household⁵ (OECD, 1999). Existing agricultural support in Poland, Hungary and the Czech Republic amounts to nearly \$6 billion, but would of course become substantially higher on accession if support systems are not changed. Moreover, there would be a supply response as accession country farmers respond to the higher prices. Additional CAP costs of some \$30 billion have been suggested, though some have argued that this is an exaggeration in light of recent international trade agreements (Buckwell and others, 1994). Whether a 20 per cent increase in total cost is enough to cause the CAP to collapse under its own weight is open to argument. Since there are some 30 million households in the six prospective entrants, the effect would be to maintain the household average contributions if costs were distributed equally across countries. But since they will not be, existing EU-15 households can expect an effective increase in tax burdens because of accession.

The “weight of the cost” argument has prompted “Agenda 2000” under which intervention and support prices will be cut for cereals, beef and dairy sectors. But it remains the case that even under Agenda 2000, the vast bulk of transfers to the agricultural sector will remain in the form of production and income subsidies. That the CAP can survive in such a distorted and inefficient form, despite all the efforts to revise it, gives testimony to the difficulty of removing subsidies.

Tuck and Lindert (1996) detail the case of Tunisian food subsidies, which were established with ostensibly laudable aims: price stabilisation, protecting the poor, income redistribution and employment creation through subsidised real wages. Two major developments caused their collapse: (a) the leakage of subsidy benefits to higher income groups (reinforcing the caution in Section IV. A above), and (b) the high public finance cost. Early attempts at fairly sudden re-

⁵ There are approximately 150 million households in EU-15.

form proved disastrous, with public riots occurring. A new approach combined several interesting features.

First, the subsidies were lowered gradually so that price increases occurred gradually.

Second, since students were instrumental in the riots accompanying the early reforms, policy changes were announced in summer months when students were not at university.

Third, careful anticipatory statements were made so that the population was warned well in advance of actual price changes, enabling them to adapt where possible, or at least get used to the idea of price increases. It is interesting to note that the same policy has been adopted in some countries with respect to environmental taxation. Thus the United Kingdom's "climate change levy" – effectively an energy tax – was announced in 1999 to take effect in 2001. "Anticipatory" strategies can misfire, of course, since they also give losers the chance to assemble their lobbies to fight against the eventual price rise (as has happened with the climate change levy).

Fourth, the government adopted awareness campaigns with the explicit purpose of explaining why subsidy removal was essential. In the case of Tunisia, the focus was on the fiscal burden and what its reduction, in terms of subsidy payments, could mean for other public benefits.

Fifth, and an essential feature of any reform package, compensatory measures were provided for targeted groups. Some state allowances were raised for vulnerable groups and some wage rises were allowed for strategic groups. Effectively, the reforms "bought off" some of the opposition through mitigatory measures.

Finally, a subtle approach to targeting the remaining subsidies was undertaken. Subsidies were targeted at "inferior goods", that is, goods that the poor would buy but the better-off would not (for example a less well-refined brown sugar). The subsidy thus does not "leak" to higher income groups. Markets in the more superior goods were liberalised so that the wealthier households diverted their expenditures away from the inferior goods and hence away from the subsidies.

The example of Tunisia is a good one for illustrating the need for carefully constructed and gradual approaches to subsidy reform.

Subsidies may collapse not because the fiscal burden becomes too high but because the environmental resource that is affected by the subsidy itself becomes so scarce that reform is triggered. Water vendors in developing countries owe their existence to the physical scarcity of water and poor quality water from public or informal supplies. Briscoe (1997) notes that trading water rights grew in Australia not because of government initiatives but because of pressure from users who faced water scarcity.

Again, it is a risky policy to wait for scarcity to force action: the human cost in the meantime could

be considerable, not to mention the environmental damage that may be done, some of which could be irreversible.

Privatisation

Privatisation offers a means for subsidy reform since the dominant subsidies tend to be in the public sector. More broadly, the need to compete on the basis of market principles should dissipate economic rents and hence put pressure on any remaining subsidies. Privatisation not only enables the privatised sector to behave efficiently, but it also offers the chance for governments to become more efficient since they cease to be shackled by the responsibilities of nationalised industries and services (Ricupero, 1997).

The reality of privatisation is far more complex. In a review of experience with privatisation in Mexico and Chile, Glade (1989) notes that many of the rents previously available for exploitation under public sector regimes were squeezed out, but that some significant rents remained, notably in the financial sector.

In the Chilean case the effect was to subsidise borrowing for those with close links to the relevant financial institutions. In the context of an increasingly overvalued currency, the banks borrowed abroad to finance highly leveraged operations undertaken by the companies they were associated with. Essentially, then, credit was subsidised by the overseas borrowing operation and the beneficiaries were those with privileged access – rent-creation and rent-seeking continued.

Privatisation is often accompanied, perhaps paradoxically, by increased regulation of the privatised enterprises, a result of the state having to address external costs, such as pollution, but also because the state is unwilling to surrender all its controls and all the sources of rent-creation.

Glade argues for "substantive privatisation", that is, removal of all, or as many as possible, political controls on the working of the market. Chile is cited as the example of a country where privatisation proceeded apace, Mexico as an example where the removal of controls was much slower. Overall, simply privatising corporations will not remove rents unless there are coincident macroeconomic reforms that remove state control over crucial macroeconomic variables. Only this wider package of macroeconomic and microeconomic reform can insure against the creation of new rents under privatisation.

Additionally, privatisation can simply swap public sector rents for private sector rents. Perhaps the greatest criticism of the United Kingdom's privatisation programme has been the underpricing of public sector assets at the point of sale, creating huge capital gains and profits that translate into "fat cat" salaries and dividends, despite an elaborate system of price and investment regulation. The issue may re-

duce to which is a preferable location for the rents!⁶

Slowly, Slowly and Transparently

The Tunisian experience suggests that subsidy reform is best achieved on a gradual basis unless, of course, economic crisis does provide the opportunity for wholesale change. The gradual route has several advantages: subsidy beneficiaries have time to adjust and “death by a thousand cuts” is usually preferred to sudden shocks. As noted above, the risk is that the rentiers have time to strengthen their lobby against the reform process. Where democratic government is in place, some public information procedures can help minimise the risk that lobbies gain strength rather than lose it through gradual reform. Familiar procedures include the registration of special interest donations to politicians and to political campaign funds, and limits on the size of such donations. It is surprising that simple measures of this kind have been fairly recent in highly developed democracies such as the United Kingdom. Politicians’ interests in subsidised sectors similarly need to be monitored. Similarly, regular reviews of sectoral policies where subsidies exist are required, perhaps using cost-benefit analysis to assess their continued justification, along with “incidence assessment” to see if the subsidies are reaching those originally targeted. More radical still would be the required publication by governments of the nature and scale of prevailing subsidies (de Moor and Calamari, 1997).

Anyone who has tried to measure the scale of subsidies will testify to the formidable difficulty of identifying what subsidies exist, let alone estimating their size. But a combination of detective work and public interest motivation should be sufficient to elicit many of the facts, as the recent explosion of publications trying to estimate the size of subsidies has shown (Kosmo, 1987; Pearce and Warford, 1993; de Moor and Calamari, 1997; OECD, 1998). Where governments refuse to act, others can therefore take on the burden of publicity and transparency. To date, no single non-governmental organisation has assumed the responsibility for estimating the scale of subsidies. This may reflect the difficulty of financing the effort. The OECD’s regular reporting of agricultural subsidies in its member countries, for example – the most detailed assessment of any subsidy regime – is a major financial undertaking.

Within the gradualist approach there is also scope

for the gradual transformation of the subsidy targets. This policy involves not reducing the overall scale of subsidies, although that should remain a dominant aim, but redirecting the purpose of their payment. This process has already begun with agricultural support so that output-based payments have partly been substituted by area-based and other direct payments and, at the margin, payments are made for environmental services, including foregoing economic activity. Thus, around \$3 billion was paid to EU farmers in 1994 for set-aside schemes, and some millions of dollars are paid under the EU agri-environmental programme. As noted above, however, even this process of subsidy reform appears insignificant against the sheer scale of production and income support to the agricultural sector.

Being Pushed: the Role of Lending Agencies

The final instrument for reform is conditionality, the process of seeking economic reform as a condition of receiving a benefit, such as a loan. The major practitioners are the World Bank and the IMF, but bilateral donors increasingly include forms of conditionality, including ethical policies. Loans and technical assistance may therefore be conditional not only on economic reform but on a transition to democracy. Conditionality has always been controversial (Reed, 1992, 1996). Designing the structural adjustment package in such a way that economic reform is achieved without serious impacts on the poor or on the environment is extremely difficult. Much of the problem concerns the usual need for short-term sacrifices in the interests of longer run stability and growth, a further manifestation of the inevitable trade-offs that come with virtually any policy measure. The World Bank has reviewed its own experience and has produced useful guidelines on the design of packages of reform as they relate to the environment (Munasinghe and Cruz, 1995). One key feature, echoed in the previous discussion, is the need to integrate pricing reforms for subsidy removal with other macroeconomic adjustments: targeting one issue and one sector is unlikely to succeed.

The World Bank has also gone further and issued guidance to assist countries in tackling corruption (World Bank, 1997b). As Rose-Ackerman (1999) observes, even publishing statements about corruption enables an issue previously brushed under the table to be faced openly and honestly.

CONCLUSIONS

The reform of subsidies that damage the prospects for sustainable development is a complex process. Most of the complexity arises from the fact that subsidies are manifestations of a wider category of unproductive activity in economic systems, namely rent-seeking. Since rent-seeking and capture is essentially

⁶ The United Kingdom halted its privatisation programme in 1994 due to concerns about the emerging corruption. One government official reportedly stated “If you think privatisation is corrupt, try without it”. Quoted by Kaufman and Siegelbaum (1997).

a process of trying to maximise the transfer of resources to a group of special interests, subsidy reform will inevitably conflict with those special interests. Widespread discussion of subsidy reform as a “win-win” policy is therefore misleading – there are always losers and, virtually by definition, the most harmful subsidies will be those that are least easy to remove.

The essentials of subsidy reform are therefore the essentials of dissipating rents. Tackling subsidies alone is therefore unlikely to solve the problem. What is required is that subsidy reform be part of a wider programme of macroeconomic reform and political reform. The links between subsidies and corruption underline the difficulty of securing the political changes that are needed. Moreover, it is not even a “simple” matter of arguing that a democratic system will give rise to countervailing pressures that will provide “voice” to those with an agenda for removing subsidies. Wholly democratic societies have even larger identifiable subsidy regimes than less democratic societies. The issue is therefore a delicate one of combining political change with economic reform. While the “sudden shock” school of thought has many good insights into the process, sudden shocks rely on some catalytic event which cannot (usually) itself be manipulated by policy – the fall of communism, or macroeconomic crisis. Nonetheless, there is some evidence to suggest that if a crisis does occur, it may be best to implement subsidy reform along with other transitional measures in one large package. An alternative is to wait for things to get really bad, either because the subsidies effectively bankrupt the public finances, or because they induce natural resource change which triggers some other crisis, such as water famine or rampant disease. But many societies have proved surprisingly resilient whilst sustaining extensive subsidy regimes, and the costs of waiting may not be acceptable anyway.

Where the issue is not going to be forced by a crisis, the gradualist approach is best. Again, this has to consist of pre-announced policies and gradual subsidy reduction combined with careful public awareness campaigns and efforts at political transparency and accountability. Lending agencies have a strong role to play, even though reforming subsidies as part of a conditionality package is still controversial, especially for many environmentalists. Privatisation is likely to be part of the reform process since, in principle, exposure to market forces is essential for rent dissipation. But there are cautions on all policies: privatisation may create rents or simply transfer rents from the public to the private sector; many subsidies show a very marked reluctance to go away or even be reduced. Ultimately, subsidy removal is down to the scarcest resource of all – political will. ■

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TAXES AND TRADABLE PERMITS AS POLICY OPTIONS FOR CONTROLLING POLLUTION: A REVIEW OF COUNTRY EXPERIENCES

*John Norregaard
Valérie Reppelin-Hill**

EXECUTIVE SUMMARY

This paper examines the relative merits of two dominant economic instruments—“green” taxes and tradable permits—for reducing pollution. Theoretically, the two instruments share many similarities, and on balance, neither seems preferable to the other. In practice, however, most countries have relied more on taxes than on permits to control pollution. The analysis suggests a number of lessons to be learned from country experiences regarding the design and implementation of both instruments. While many, particularly European countries, currently have long-term programs involving environmental taxes, a willingness to experiment with tradable permits seems to be growing, especially given the Kyoto protocol emission targets.

INTRODUCTION

SINCE Pigou’s (1920) seminal contribution on the efficiency enhancing use of taxes to correct for negative externalities, the choice of instruments for environmental policy has been extensively debated. The environmental economics literature has drawn a sharp distinction between command and control approaches (CAC) and the use of market-based incentives (MBI). While on theoretical grounds, MBIs are generally preferred because they are more cost effective in practice, CAC policies have been predominantly used. This apparent contrast was highlighted at the time of the environmental revolution in the late 1960s and early 1970s. Oates (1999) suggests three explanations for this. First, at the time, there was no constituency to whom the economists’ view had much appeal (that is, environmentalists were decidedly hostile, industry was not very sympathetic and regulators were less than enthusiastic about discarding traditional methods of regulatory controls for a largely untried system of taxes on pollution). Second the state of environmental economics in the late 1960s and early 1970s did not go much beyond the general conceptual level. Third, there seemed to be a pervasive ignorance of

the economic approach to environmental policy outside the economics profession itself. In recent years, however, economic instruments have played an ever-increasing role in environmental policymaking, reflecting their perceived superiority vis-à-vis CAC policies. And while the early discussion focused almost exclusively on the tax approach, the scope has broadened to include tradable permits. The discussion has taken on a new importance following the agreement in December 1997 to reduce emissions of “greenhouse gases” under the Kyoto Protocol.

Indeed, on December 10, 1997, 160 nations reached a historic agreement in Kyoto, Japan, on limiting emissions of carbon dioxide (CO₂) and other “greenhouse gases.” The Kyoto Protocol calls for the industrialized nations—the so-called Annex I countries—to reduce their average emissions over the period 2008–2012 to about 5 per cent below 1990 levels. The United States pledged to reduce its emissions by 7 per cent below 1990, slightly less than the European Union (8 per cent) and slightly more than Japan (6 per cent). The Protocol permits some industrialized nations to increase modestly their emissions in the short run, while making special provisions for the members of the former Soviet Union. None of the developing countries, including those with large and

* John Norregaard is Deputy Chief and Valerie Reppelin-Hill is Economist in the Tax Policy Division, Fiscal Affairs Department, International Monetary Fund. They would like to thank Liam Ebrill, Angelo Faria and Harald Hirschhofer for useful comments.

growing emissions such as India and China, is required to limit their emissions.¹

The agreement reached in Kyoto sets the stage for lengthy and complex pre-ratification discussions both at the national and international levels, as the proposed targets are likely to impose significant costs on the global economy.² A key issue is the appropriate international distribution of these costs. While recent public opinion polls indicate increased concern about climate change and some willingness to share burdens to curb greenhouse gas emissions, there is no compelling evidence that the public is ready to accept significant increases in energy prices or other costs. It is thus still an open question whether countries will be willing to ratify the Protocol.

An important first step in fostering a productive debate and increased public awareness over the Protocol is a better understanding of its benefits and costs. Even after questions about the Protocol itself are settled, domestic policy options for achieving the targets and timetables will still require more thorough consideration, as clearly the magnitude of the costs will depend on the domestic policies used. No agreement yet exists on this policy menu. However, much of the debate has centered on the use of MBI mechanisms as opposed to CACs, precisely because of the large potential cost savings that MBIs offer.³ Among MBIs, the basic choice faced by policymakers concerns price-based versus quantity-based instruments or, in other words, environmental taxes versus tradable permits.

This paper discusses the choice between these two economic instruments. The first part reviews the theoretical literature, starting from the Pigouvian tradition with the aim of clarifying the contribution of economic analysis to the environmental policy debate. We show that, in a first-best setting, Pigouvian

taxes and tradable permits are equivalent. However, this fundamental result ignores crucial features of the practical world. We then proceed to review the more recent literature on the choice of environmental policy in a second-best setting. To do this, we define a set of criteria along which the two instruments may usefully be compared, and we show that no instrument is clearly preferred to the other. The second part of the paper reviews the actual use of the two instruments, mainly in the Organization for Economic Cooperation and Development (OECD) countries. In sharp contrast to the apparent similarities of the two instruments discussed in the first part of this paper, in practice, countries have relied substantially more on taxes than on permits to control pollution (with the notable exception of the United States). Yet willingness to experiment with tradable permits seems to be expanding. We discuss issues in this section that may arise in a practical setting and that are typically not discussed in most theoretical studies. Finally, we suggest broad conclusions with respect to the implementation of both types of instruments. Specific country experiences are discussed at length in the annexes.

ECONOMIC THEORY AND THE DEBATE ON EMISSION TAXES AND TRADABLE PERMITS

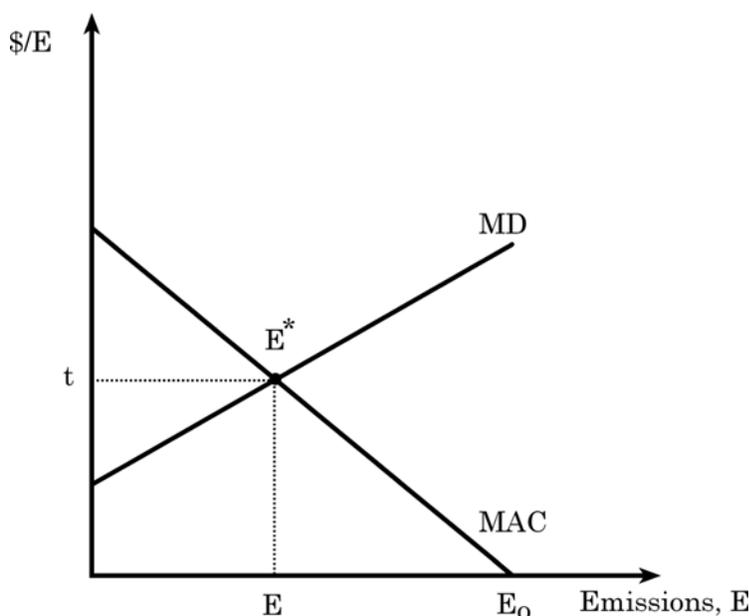
Pollution taxes and marketable pollution permits are, in principle, very similar policy instruments. Both rely on price signals and incentives for emitters to reduce the costs they impose on society. Pigouvian taxes (Pigou, 1920) involve setting a charge per unit of emissions equal to the total value of the damage caused by an extra unit of emissions. This signals the true social costs to the emitter, who then has a financial incentive to reduce emissions up to the point where the profit/loss due to a unit reduction in emissions is equal to the damage involved. In a system of marketable permits, the regulatory authority allocates permits equal to a determined aggregate quantity of emissions, possibly, but not necessarily, through an auction. The permits are tenable for a defined period (or perhaps indefinitely) and tradable. Trading of permits among emitters will, enforcement problems apart, establish a market-determined price of emissions which, as in the case of a tax, will signal damage costs and give emitters financial incentives to respond by reducing emissions. The following subsection demonstrates the efficiency equivalence of the two instruments in a first-best setting, while the subsequent subsection discusses second-best scenarios and compares the two instruments along a series of relevant criteria.

¹ The Protocol implicitly recognizes that developing countries may need additional time to meet the requirements of the agreement, taking into account potential technical and economic constraints.

² For example, the limit agreed to by the United States implies a reduction by about one-third compared to the estimated level of CO₂ emissions at the end of the next decade in the absence of such measures.

³ Tietenberg (1985), in a review of several studies, found that the potential magnitudes of these cost savings range from 50 to 90 per cent. More recent studies by O'Ryan (1996) and Klaassen (1996) show quite similar results.

Figure 1. Emission Taxes and Tradable Permits in a First-Best World



The Equivalence of Emission Taxes and Tradable Permits in a First-Best World

To establish a basis for comparison among relative policy instruments, the traditional literature often relies on the following assumptions: (1) that the same amount of emissions from different sources have equal external costs; (2) that raising revenues through environmental policies is not in itself costly—in other words, the literature ignores possible interactions with other markets and/or other revenue sources; (3) that there is no uncertainty about the costs and benefits of pollution control; and (4) that a competitive structure prevails. We will refer to this set of assumptions as the first-best world scenario. In this setting, it is easy to show that emission taxes and tradable permits are, in a fundamental sense, equivalent (for example, they achieve the same level of emissions with minimum levels of abatement costs). Figure 1 illustrates this outcome.

The *marginal damage (MD) function* specifies the damages associated with an additional unit of pollution. It is typically assumed to be increasing, for example, as the level of pollution becomes larger, the damages associated with a marginal unit of pollution become larger (possibly because dilution in the atmosphere is less effective).

The *marginal abatement cost (MAC) function* specifies the costs associated with the reduction of an

additional unit of emissions. These costs include the costs of the labor, capital, and energy needed to lessen the emissions of pollution associated with particular levels of production. These costs may also take the form of opportunity costs from reducing the levels of production. Generally, firms can reduce emissions by four means: (1) reducing output; (2) treating or intercepting emissions before they enter the environment (end-of-pipe treatment); (3) changing input; and (4) changing production processes.

The literature on pollution control makes no specific assumption as to which of the four options firms will typically choose (firms will choose whichever option minimizes costs and that will depend on the specific pollutant considered). However, the marginal abatement cost function is generally assumed to be decreasing indicating that as firms reduce pollution below the level they each privately regard as optimal and toward zero, the cost of abatement increases (as the cheaper alternatives are exhausted, more expensive steps must be taken to further reduce pollution).

E_0 corresponds to the level of emissions that would prevail in the absence of emission-control policy (firms have no incentive to abate and MAC equals zero). E^* corresponds to the optimal level of emissions, where the marginal damage of an extra unit of emissions equals the marginal costs of abating one extra unit of emissions. E^* can clearly be achieved by imposing an emission tax equal to t upon each unit of

emissions; polluters would then find it more costly to pay the tax than to adopt measures that reduce their emissions from E_0 to E . Similarly, the optimal solution can be attained if the environmental control agency issues a quantity of permits just sufficient to lead to a level of emissions equal to E . In the specific case considered, the permits must allow $(E_0 - E)$ units of emissions. Assuming that the market for permits is competitive, the price of a permit will be bid up exactly to t , that is, to the corresponding marginal cleanup cost. Thus, under the specified conditions, the two approaches will lead to the same outcome, reducing emissions to the optimal level at minimum cost.

While this basic equivalence holds in principle, the two approaches exhibit some important differences in a practical policy setting, when the basic underlying assumptions are relaxed to conform more closely to conditions that are likely to prevail in the real world. The following section discusses the choice of policy instruments in a second-best world and suggests a set of criteria along which the emission taxes

and tradable permits may be usefully compared.

Emission Taxes and Tradable Permits in a Second-Best World

Bohm and Russell (1985) suggest comparing alternative instruments to control pollution along several main dimensions: information intensity, efficiency, ease of monitoring and enforcement, flexibility in the face of economic change, dynamic incentives, and political considerations. We will also discuss revenue-raising potentials as an important additional criterion.

Information intensity

Information intensity is defined as the amount of information that the pollution control agency must have in order to operate the system in question. Clearly, in order to achieve the optimal level of emissions, the regulator must have information on firms' marginal abatement costs and the marginal damage from emissions. Hence the information requirements

Box 1. Pollution control when marginal abatement costs are uncertain

Figures 2 and 3 below illustrate the efficiency losses associated with an emission tax and a system of tradable permits when MACs are uncertain. Let MAC^A represent the regulator's anticipated MAC while MAC^T represents the firm's true MAC. Under an emission tax, the regulator would set the tax equal to t , where MD equals the anticipated MAC, which would result in a level of emissions equal to E^t , where the MD is equal to the firm's true MAC. The efficiency losses resulting from the use of the emission tax are represented by area E^*AB . Under a permits system, the regulator would issue a permit amount equal to E^P . The efficiency losses under this scenario are equal to area E^*DC . Figures 2 and 3 illustrate that when the MD is relatively flatter, the emission tax yields lower efficiency losses whereas when the MD is relatively steeper, the results are reversed and it is the permits system that generates lower efficiency losses.

Figure 2. Pollution control when the MD function is flatter than the MAC function

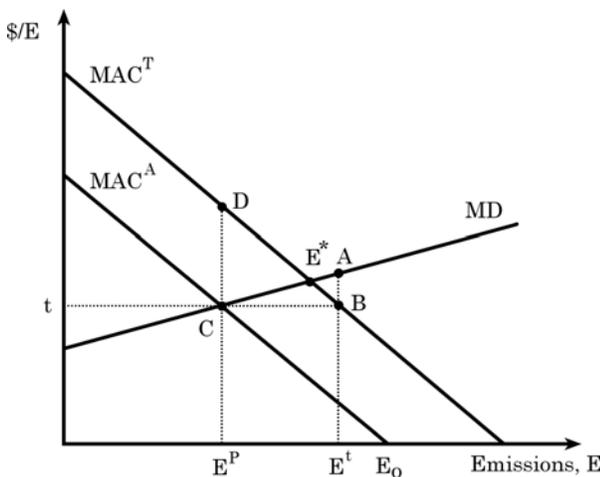
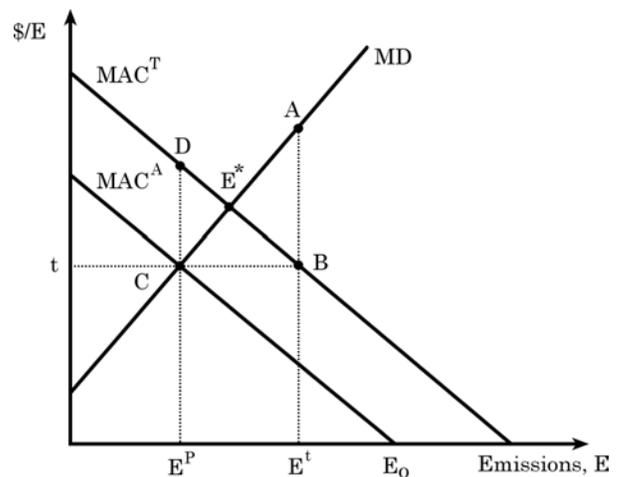


Figure 3. Pollution control when the MD function is steeper than the MAC function



are identical, whether using a system of emission taxes and/or tradable permits.

When there is uncertainty either about the marginal benefits or the marginal costs of abatement, the socially optimal level of emissions will typically not be achieved. The goal of the policy then is to minimize efficiency losses. An important result is that *when the marginal costs of abatement are known, uncertainty about the benefits does not favor one policy instrument over the other*. Firms abate only on the basis of their costs and of the policy instrument, which are both known. So, even if the benefits deviate from expected levels, the abatement level and the efficiency losses will be exactly the same for the emission tax as for the tradable permits system (Baumol and Oates, 1988).

When abatement costs are uncertain, producers are assumed to have information, which the planner does not have and their actions may therefore differ from those the planner had expected. Weitzman (1974) and White and Wittman (1983) were among the first to carry out a rigorous analysis of whether an emission tax or a system of tradable permits would be the best policy in this situation of asymmetric information. They show that *taxes minimize ex-post efficiency losses if the marginal cost function is steeper than the marginal damage function, while tradable permits are better if the damage function is steeper*. It is therefore the relative steepness of the marginal damage and marginal abatement cost curves that determines which of the two policy instruments promises the smaller efficiency losses.

The basic idea is straightforward (Box 1). When the marginal benefit curve is relatively steeper (this would represent a case where the benefits from changes in environmental quality vary dramatically with changes in pollution levels), one wants to ensure reliable and precise control over the quantity of emissions (to avoid crucial threshold effects for instance). In such instances, tradable permits are preferred. On the other hand, when the marginal cost curve is steeper, for example, deviation in emissions are less costly than unexpected marginal abatement costs, the more pressing danger from a policymaking perspective is one of excessive cost. In this setting, the danger is greater under the permits instrument for, if the supply of permits is set too low, excessive compliance costs will be set upon firms. With the emission tax, the danger is avoided since firms can always opt to pay the tax and avoid the more costly control activities to reduce emissions.

What can we say about the relative steepness of the marginal damage curve relative to the steepness

of the marginal abatement cost curve? In general, not much. Baumol and Oates (1988) argue that in real world situations, both marginal abatement costs and marginal damages are unlikely to be known with certainty by the regulator who is vulnerable to the provision of biased information by interested parties. In light of these difficulties, the literature suggests that policy should aim instead at achieving predetermined aggregate emission standards (however defined) in a least-cost manner (for example, minimizing total abatement costs). Under this second-best scenario, marketable permits seem to have a considerable advantage over emission taxes, since the regulatory target is automatically built into the instrument being used and no additional information is needed. In order to attain the same target using taxes, the regulator needs some information on firms' marginal abatement costs. In the absence of such information, the authority may have to alter the tax in a process of trial-and-error iterations until the targeted level of emissions has been reached.

Efficiency under noncompetitive market structure

Efficiency is defined as the ability of an instrument to reduce emissions to a predetermined level at minimum abatement costs. This dimension is almost always interpreted in the literature in a static sense (assuming fixed environmental goals and fixed technology and allowing only for the first round of reactions to the respective instruments). We will also limit ourselves to static considerations in this section but will consider dynamic incentives in a latter section.

As noted earlier, in a first-best setting, the efficiency equivalence of emission taxes and tradable permits is well established. In the previous section, we discussed efficiency considerations under uncertainty. In this section, we assess how the efficiency properties of the two instruments are affected when one allows for noncompetitive market structure.

In the case of noncompetitive market structure, there are two sources of market failure: pollution externalities and market power. The first best solution to achieve efficient resource use would require the use of two instruments to address each failure separately (for example, a subsidy on output to correct for market power and an emission tax and/or a system of tradable permits to correct the pollution externality). But can the environmental instrument alone correct for both sources of market failure?

In general, when the output market is not assumed to be perfectly competitive, neither emission

Table 1. Summary of Efficiency Considerations and Market Structure

<i>Market Structure</i>	<i>Emission Tax</i>	<i>Tradable Permits</i>
Perfect competition	Efficient	Efficient
Noncompetitive market structure in the output market	Efficiency can be achieved by suitably adjusting the Pigouvian tax but only if firms are all identical. Inefficient when firms have different pollution technologies.	Inefficient but literature suggests that efficiency losses may be smaller than under an emission tax (when firms have different pollution technologies).
Noncompetitive market structure in the permits market	n.a.	Inefficient

taxes nor tradable permits achieve the social optimum. Buchanan (1969) considers the most simple case, the taxation of a monopolist polluter, and argues that a Pigouvian tax is likely to generate welfare losses by further reducing output in a situation where the monopoly's output is already less than optimal. Analyzing general control instruments, Burrows (1981) points out that the risks that pollution taxes will increase welfare losses rise as the importance of output reduction from abatement rises; equivalently, the risks get less as the importance of process switching (end of the pipe purification) rises.⁴ The problem of calculating a "second-best fee" then weighs these needs against each other by combining a Pigouvian tax and a subsidy on output.⁵ Similar considerations can be made for market powers other than monopoly.⁶ Hence, the literature appears to suggest that the social optimum can be achieved by a

⁴ In this case, there are two sources of market failure that need to be addressed, namely, pollution externalities and market power characterized by a level of output that is less than optimal. Any instruments to correct for the environmental externality will encourage firms to reduce emissions. And to the extent that emission reductions are accompanied by reductions in output, the second type of market failure (for example, suboptimal output levels) will be exacerbated and hence some welfare losses will occur. This risk is reduced when emissions reductions can be achieved through other means (end-of-pipe treatment, and the like).

⁵ This sum collapses to the familiar Pigouvian tax if the industry is competitive, and it will equal zero if, as Buchanan suggests, the two effects cancel each other.

⁶ In the case of an oligopoly for instance (Ebert, 1992), the derivation of the second best fee would depend on the behavioral assumptions about the firms, but would essentially incorporate the same trade-off between the concerns of market power and excessive pollution.

suitably adjusted "Pigouvian" tax, although, as Requate (1993) points out, the argument holds only when firms are assumed to be identical (for example, with similar pollution technology). Pigouvian taxes fail to achieve first-best outcomes when firms have different pollution technologies (in such instances, the social optimum can only be reached through firm-specific emission taxes).

Malueg (1990) considers the distribution of permits in a Cournot Oligopoly on the output market, and shows that the social optimum cannot be achieved either. Permits fail to achieve first-best because they encourage firms to collude. Given that neither an emission tax nor a system of tradable permits can achieve the social optimum, the question is whether in general terms one of the two policies is less inefficient. Requate (1993) argues that although no policy can be said to be superior to the other in all cases, the permits policy yields a higher welfare for a considerable range of parameters. In particular, if one firm's technology is globally inefficient, meaning that the firm should not produce in a social optimum, this inefficient firm will never produce under a permits system, regardless of how the permits are initially allocated. The optimal emission tax, on the other hand, does not always induce the inefficient firm to close down.

When dealing with tradable permits, however, the danger of market power is more prevalent in the permits market, since when firms behave as price setters—whether as sellers or buyers—many of the potential benefits of a tradable permits system will be lost (Koustaal, 1997; Xepapadeas, 1997). For this reason, the potential for market power on the permits market has long been recognized as a disadvantage of tradable permits, relative to other MBIs such as taxes, for instance. When is market power most likely

to occur? Clearly it depends on the degree of concentration on the permits market. Harrison (1999) presents estimates of the extent of concentration of emission sources in the United States which suggest that the greatest potential for market power would be in a market for permits for particulate matter, followed by SO₂ and CO. Indeed, since the effects of the former are quite localized, any program for particulate permits would have to be local in nature. This is also true for water pollutants since the environmental problem is localized and thus the permits market is likely to be spatially restricted (Misiolek and Elder, 1989; Lyon, 1982; Hahn, 1989). The potential for market power is also a function of the sectoral scope of the permits market. For instance, in the United States SO₂ program, only electricity generators were included and not other sources. As a consequence, very few firms dominated permits trades. In 1995 and 1996, over 75 per cent of all interutility purchases of permits were bought by one firm, Illinois Power (Ellerman and others, 1996).

There is, unfortunately, little empirical evidence of the extent to which market power is a problem in existing tradable permits systems. However, firms themselves clearly perceive the danger. For instance, in the case of SO₂ permits, utilities in fast-growing states advocated that at least some of the permits be auctioned—even though this would appear to have adverse effect for them in financial terms, because of concerns that utilities in other states would exploit the market to their advantage (Joskow and Schmalensee, 1998). This fear was also behind the concerns of small firms advocating an auctioned permits allocation for the Regional Clean Air Incentives Market (RECLAIM) system, even though it would not appear to be in their financial interest (Polesetsky, 1995). Table 1 below summarizes the main findings of our discussion.

Ease of monitoring/enforcement

The third criterion refers to how difficult it is to make and interpret the necessary technical measurements to judge compliance with a reasonable degree of accuracy. In many cases, it is almost impossible—or at least extremely costly—to obtain accurate information about emission levels. But a central point is that the monitoring and measurement problems are no harder if an emission tax is involved than if compliance with a system of tradable permits is the concern. When permits are marketable, the problem may be compounded by the necessity of being current with completed trades. In other words, in this case, two types of monitoring are required: the monitoring of

emissions as required under a emission tax as well as the monitoring of trades. This extra difficulty might be exploited by dischargers trading in the short run to stay one jump ahead of agency monitoring teams.

To lower excessive administrative and monitoring costs, regulators often target the polluting output and/or the inputs used in the production of polluting goods through the use of output and/or input taxes as alternatives for true emission taxes.⁷ Indeed, where emission taxes pose major problems for implementation, a tax levied at an earlier stage in the production cycle may be the preferable approach since monitoring of emissions levels is not required and it can be administered like any other tax, thereby reducing administrative costs (since governments do not need to create an additional administrative apparatus). While systems of this nature typically do not achieve the most efficient result economically, they are often preferred by policymakers who argue that the gains in terms of lower administrative costs exceed the efficiency losses. In contrast, targeting input or output rather than emissions is typically not applicable with a system of tradable permits,⁸ thereby reinforcing the relative appeal of the tax in terms of ease of monitoring and enforcement.

Flexibility in the face of change

For our purposes, flexibility is defined as the ease with which the system can be adjusted to maintain the desired ambient quality as the economy changes. The most common measures of ease are: (1) the amount of information the agency needs and the amount of calculations it has to do to produce the appropriate set of incentives for a new situation; and (2) the extent to which adjustments involve a return to a politically sensitive decision process. In terms of flexibility, it is often argued (Bohm and Russell, 1985) that marketable permits have a distinct advantage over an emission tax. Once established, and assuming necessary monitoring and enforcement efforts, a permits system maintains either total emissions or

⁷This approach seems particularly warranted when inputs and/or outputs are assumed to be closely correlated with emissions.

⁸At a conceptual level, a system of marketable permits for input is conceivable (Helfand, 1999). However, in practice such systems have never been used since it is extremely difficult to determine the levels of aggregate inputs use necessary to achieve a specified level of total emissions. Developing a system of marketable permits in input markets, then, will not clearly achieve a specified pollution level without a great deal of information on the part of the regulator.

ambient quality standards without constant intervention and recalculation by the regulator. If the demand for permits shifts because of regional growth or decay, this will be reflected in the market prices of permits. Permits relocation takes place as long as firms find it in their interest to reduce emissions and sell permits to new entrants and/or expanding existing firms. In the case of an emission tax, the tax itself does not protect ambient quality unless it is adjusted by the regulator as change occurs. Such adjustment requires new calculation if the tax is to be efficient.

The above argument relies mainly on the fact that flexibility is defined from the perspective of the regulator. In the case of an emission tax, the adjustment responsibility to maintain a fixed emission target in the face of change is borne entirely by the regulator. Hence, the adjustment process is typically associated with high administrative costs and, therefore, qualified as "less flexible." With a system of tradable permits, on the other hand, the adjustment responsibility in the face of change is borne by firms in the permits market. It is typically not associated with high administrative costs but it may be associated with high transactions costs. Indeed, trade of permits involves the costs of identifying exchange partners and revelation of willingness to pay and to accept. If these transactions costs are perceived to be high relative to anticipated gains from acquisition and/or sales of permits, there will be little exchange and the adjustment process may not take place. In such instances, the least cost configuration of emissions will not be achieved and a permits system may not be more flexible than an emission tax.

The efficiency and flexibility property of the permits system thus relies on the assumption that trading does indeed occur (for example, transactions costs are low). How high are the transactions costs likely to be? Estimates of transactions costs for the United States EPA's Emissions Trading System were as high as 10–30 per cent of the total costs (Koustaal, 1997). Klaassen and Nentjes (1997) cite a figure of 5 per cent for brokerage fee for the United States SO₂ allowance trading program. The CFC and lead trading programs are also thought to have had relatively low transactions costs (Stavins, 1995; Hahn and McGartland, 1989). Conversely, the Fox River biochemical oxygen demand (BOD) program appears to have been burdened by very high transactions costs, partly explaining the limited trading activity. Transactions costs are likely to be determined by the characteristics of the affected sectors. Koustaal (1997) argues that, in most cases, there is likely to be a positive relationship between the size of the market and transactions costs (that is, the larger the market, the

higher are the search and bargaining costs likely to be). In case of a thin permits market, the infrequency of transactions may not generate a clear price signal for firms to indicate the opportunity cost of their emissions and is likely to impair the functioning of the permits system, unlike a regime of emission taxes where the tax itself gives a clear and clean measure of the cost of emissions.

Dynamic incentives

The concept of dynamic incentives refer to the types of actions that are encouraged by the instrument in the longer run: does the instrument encourage entry or exit of firms (for example, what is the impact of the instrument on industry size) and a search for and adoption of new, environment-saving technologies?

Concerning the respective impact of the two instruments on industry size, both emission taxes and tradable permits raise emitters costs and thereby reduce their profits from the polluting activity. In the short run, firms may reduce output in response to the higher unit cost of production. In the longer term, if the industry producing the pollutant is competitive, some firms will leave the industry. As industry output falls, the price of the industry's product will rise, restoring normal levels of productivity for those firms which remain. In the long run, both instruments result in reduced industry output and reduced pollutant emissions, compared to a situation of no pollution controls. It is important to note that whether tradable permits are auctioned or distributed freely makes no difference to industry output and emissions in the long run, provided that the initial distribution of permits is not conditional on whether the recipient continues to produce. If permits are issued "unconditionally," any amount paid to acquire a permit will, in effect, be a lump-sum payment to the initial recipient and will have no effect on firms' decisions to exit or enter the industry.

In practice, however, permits are rarely distributed unconditionally but rather in proportion to historical pollution, a system that is referred to in the literature as grandfathering. It has been argued (Howe, 1994; Stavins, 1998) that grandfathering creates a bias against new firms entering the product market since existing firms get their permits free while new firms must buy them. Hence tradable permits may foster noncompetitive market structure or higher industry concentration. Freely allocated tradable permits under a grandfathering scheme would convey rents to existing firms which would in effect be sustainable since, unlike auctioned permits or

taxes, the freely allocated permits give rise to entry barriers. For this reason, auctioning of permits is typically preferred to grandfathering on economic ground.

Concerning the issue of providing incentives for technological change, if compliance is costly and if there is some choice of how to comply (for example, what equipment or technique to use), then there will be an economic incentive for firms to seek cheaper ways of complying in the long run. In principle, the incentives for technical change provided by an emission tax are equivalent to those produced by a tradable permits system. In either case, reducing discharges produces a monetary gain to the firm. However, to the extent that the permits market is thin, the monetary gain may not materialize as easily under a permits system as under an emission tax. If firms do take such considerations into account, the incentive to switch to cleaner production techniques may be lower with a permits system. The literature also suggests that an auctioned tradable permits system is likely to have much stronger incentive effects than a system of grandfathered permits. This result is likely to arise for two reasons: (1) under an auctioned allocation, the innovating firm will get the benefit of lower permits prices if other firms adopt the innovation, while under a grandfathered scheme the decrease in price will benefit buyers, but hurt sellers (Harrison, 1999); and (2) a system of grandfathering may prevent the entry of new firms on the market, and new firms are often important instigators of new production processes.

Revenue-raising potential

In terms of revenue-raising potential, the critical distinction is not much between an emission tax and a system of tradable permits per se but rather between systems where permits are freely allocated and systems where permits are auctioned. Both an emission tax and a system of auctioned permits generate government revenues. Yet, when evaluating these instruments as potential sources of government revenue, an apparent trade-off is highlighted between the primary function of these instruments (for example, reducing pollution) and their revenue-raising function, an issue which will be taken up again below in the context of green tax reforms. Some authors (Endres, 1997) have argued that environmental instruments cannot serve as the main pillars of public income since their primary purpose is to cut back the environmentally detrimental activity to which these activities apply. Hence, the tax is intended to erode its own base.

Oates (1992) argues that to implement an optimal tax, it is necessary to have a regulator whose interests transcend competing environmental and revenue pressures and who is in a position to weigh environmental concerns against revenue needs. This is a demanding institutional requirement, which is unlikely to be met in practice. Typically these instruments are introduced in either of two forms: by an agency concerned with environmental management, or by those whose primary responsibility is budgetary management and who are seeking additional sources of revenues. OECD (1996) argues that environmental taxes have typically been used as revenue-raising devices while tradable permits have been used primarily as instruments to reduce pollution.⁹

Emission taxes and tradable permits have mostly been examined in the literature as instruments for environmental management. Little has been said about the precise disposition of the revenues that these instruments may raise. There is one proposition that comes out of the standard environmental theory: the revenues should **not** be used to compensate the victims of pollution or for earmarking (Baumol and Oates, 1988), as compensations may encourage a higher-than-optimal level of pollution.

In more recent years, the literature on environmental taxes has started to focus on the interaction between environmental taxes and the rest of the tax system. In this context, a critical question was raised, namely, is the welfare gain and hence the case for introducing environmental taxes greater or less than that implied by a partial equilibrium setting? It has been suggested that the welfare gains from an environmental tax are larger under a general equilibrium setting as the tax may simultaneously correct for the environmental externality and provide other gains, when the revenues are raised to cut other distortionary taxes (Sandmo, 1975; Parry, 1995). However, more recent studies (Bovenberg and De Mooij, 1994; Goulder, 1995) have questioned the existence of this "double dividend." The double-dividend discussion has essentially centered on environmental taxes but could equally apply to a system of tradable permits to the extent that the permits are auctioned (and hence constitute a source of public revenues). The issue of

⁹ In most permit systems implemented to this date, permits were distributed free of charge and hence did not generate revenue for the government (this will be discussed in greater detail in the next section).

Table 2. Summary of the Basic Criteria for the Choice of Policy Instruments

<i>Criteria</i>	<i>Argument for Choosing an Emission Tax versus a System of Tradable Permits</i>
Information intensity	<p>Emission taxes and tradable permits are equally preferred under a first-best scenario (they both require knowledge of marginal damages and marginal abatement costs to achieve the optimal level of emissions).</p> <p>When there is uncertainty about MDs, neither instrument is efficient. But efficiency losses are the same whether using an emission tax or a permits system hence both instruments are equally preferred.</p> <p>When there is uncertainty about MACs, efficiency losses are minimized with an emission tax if the MD curve is relatively flatter than the MAC curve. On the contrary when the MD curve is relatively steeper than the MAC curve, then a permits system is preferable as it leads to lower efficiency losses.</p> <p>Under a second-best scenario, when the regulator attempts to achieve a predetermined level of emissions (however defined), permits are preferred because they give direct control over the level of emissions.</p>
Efficiency under noncompetitive market structure	When the output market is noncompetitive, neither instrument is efficient. The efficiency losses are smaller under a permits system when firms are assumed to be heterogeneous (with different abatement technologies).
Ease of monitoring/ enforcement	The emission tax is preferred as it only requires the monitoring of emissions while a permits system also requires the monitoring of trades (for example, permits trading).
Flexibility in the face of change	A system of permits is preferred since once established, such system maintains the desired level of emissions without intervention from the regulator. With an emission tax, the tax needs to be adjusted in the face of change to ensure that the ambient quality is maintained at the desired level.
Dynamic incentives	<p>Both an emission tax search for new cleaner technologies, provided that the permits and a permits system are equivalent in terms of their ability to encourage the market functions properly. If the permits market is thin, the incentive to switch to cleaner production techniques may be lowered and hence the tax may be preferred.</p> <p>As for the impact on industry size, if the permits are auctioned, both instruments are equivalent. However, under a grandfathering system, the permits may be used as effective barriers to entry on the permits market (they would create a bias against new firms trying to enter the market).</p>
Revenue-raising potentials	If the permits are auctioned, both the permits system and the emission tax are equivalent in terms of revenue-raising potentials.
Distribution issues	<p>If the permits are auctioned, both the permits system and the emission tax are equivalent and can achieve the same distributional outcome.</p> <p>If the permits are given out freely, they represent a windfall gain for receiving firms and may create a bias against new firms entering the market. In that respect emission taxes would be preferred.</p>
Competitiveness issues	Tradable permits are typically preferred as they make the cost of environmental protection less visible.

double dividend will be revisited in the next section when discussing green tax reforms.

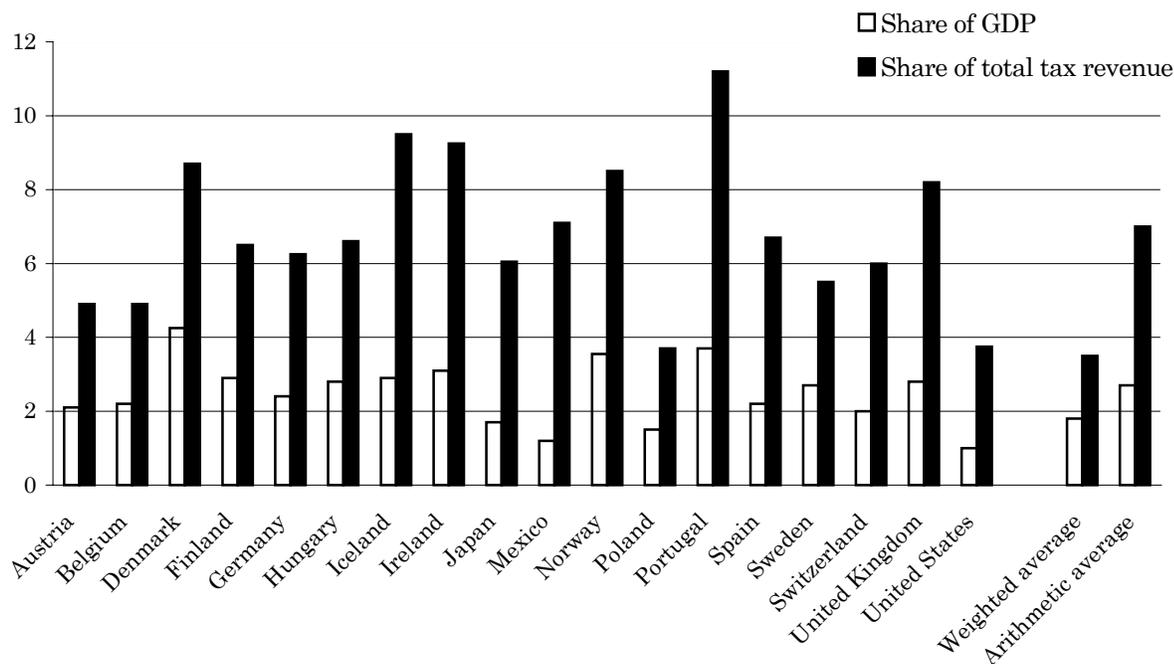
Political considerations

Political considerations cover aspects such as distributional, ethical, and broader economic stabilization concerns, which may affect society's choice of policy instruments. We will limit our discussion to three issues that appear to be particularly important: distributional issues, competitiveness, and political acceptability.

Distribution

It is in principle possible to achieve the same distributional outcomes with an emission tax and a system of tradable permits. The emission tax embodies the polluter-pays principle, which involves the assumption that the recipients have the legal right to be free of emissions; thus polluters have to pay for the right to pollute. Government auction of marketable permits can achieve the same distributional results but clearly the equivalence would not hold when permits are allocated freely, because the permits in

Figure 4. Revenues from Environmentally Related Taxes as Per cent of Total Tax



Source: OECD (1999c).

this case would represent a windfall gain for the (owners of the) receiving firms.

Distributional issues in the context of environmental taxes are centered on the potential regressivity of such type of taxes. The debate is more relevant in the case of product taxes (as opposed to emission taxes) since insofar as environmental taxes apply to mass consumption products, such as motor-driven vehicles and energy for instance, they may have a substantial effect on low-income households. OECD (1999c) argues that a distinction needs to be drawn between relatively low environmental taxes on products such as detergents, fertilizers, batteries, and pesticides, and large-scale and fiscally heavier taxes such as those on energy. In the first case, there seems to be no observable distributional impact, while in the second case, some studies indicate a risk of regressivity.

In the tradable permits literature, distributional issues seem to have received less attention. Nonetheless, such issues are relevant, especially in cases where permits are distributed freely, the key issue being the initial allocation of permits.

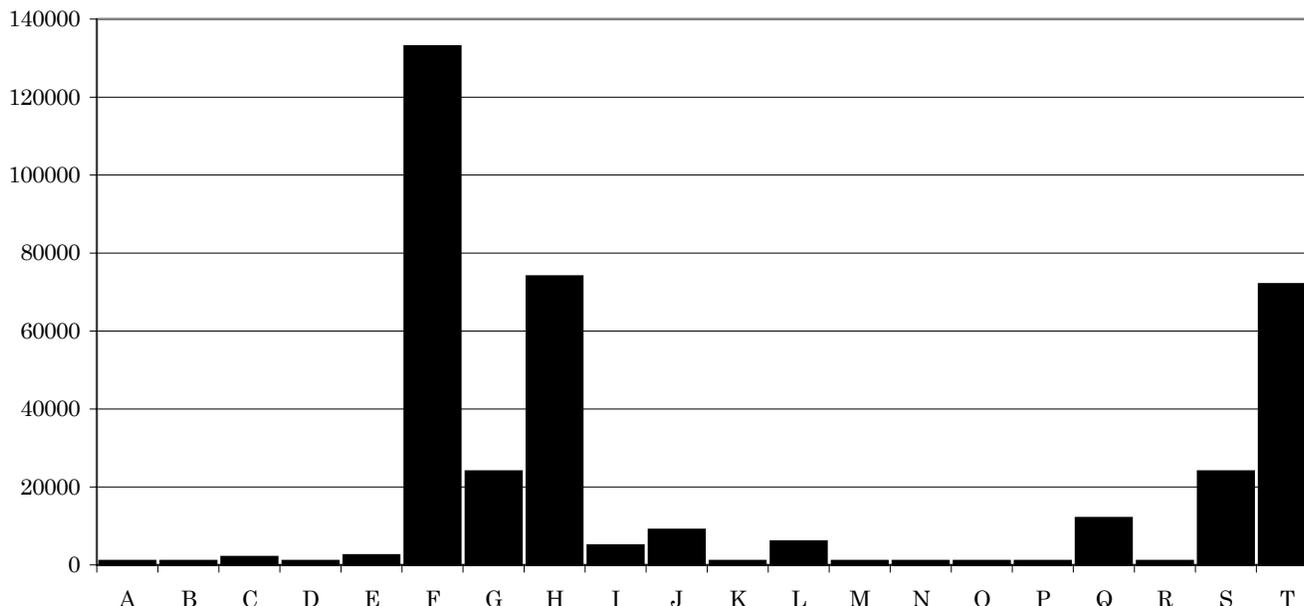
Competitiveness

Even if environmental policy considerably in-

creases aggregate welfare, some economic sectors or regions may be adversely affected. In this respect, the impact of an emission tax and a system of tradable permits are likely to be equivalent provided that the permits are auctioned. If, on the contrary, the permits are freely allocated to firms, the equivalence breaks down (in such instances, the burden imposed on the firms is reduced and shifted to government in the form of reduced revenues).

For the firms directly affected by such systems (auctioned permits or emission tax), the issue of revenue recycling is key. In theory, it is possible that the existence of revenue recycling could entirely compensate firms for their cost, and thus there might be no reason to expect any competitiveness effect. Such schemes would clearly reduce the fear of any adverse competitiveness effect without granting existing firms the rent as under a grandfathered permits scheme. In practice, however, such revenue-recycling schemes are not used (most probably by fear that they would lead to a higher-than-optimal level of pollution in the long run). Hence in order to protect firm competitiveness, a grandfathered permits scheme would appear to be preferred (explicit effort can be taken to make sure that the rent is captured through

Figure 5. Revenues from environmentally related taxes in 1995 (\$ millions)



Source: OECD (1999c).

Notes: A = Measured or estimated emissions to air; B = Ozone depleting substances; C = Measured or estimated effluents to water; D = Certain non-point sources of water pollution; E = Waste management; F = Unleaded petrol; G = Leaded petrol; H = Diesel; I = Other transport energy; J = Light fuel oil; K = Heavy fuel oil; L = Natural gas; M = Coal; N = Coke; O = Biofuels; P = Other fuels, stationary use; Q = Electricity consumption; R = Electricity production; S = Motor vehicles, one-off import or sales taxes; T = Registration or use of motor vehicles, recurrent.

proper taxes, profit tax, and the like).

The issue of competitiveness is also critical at the international level, focusing on the competitiveness of nations as opposed to firms. The key issue in this context relates to differences in environmental policies across countries that may affect competitiveness and trade patterns. The problems are particularly obvious when considering environmental taxes but the issue is also relevant (although somewhat different) with a system of tradable permits. Even under an international system of tradable permits, where several countries are regulated by the same central system, issues of competitiveness may arise. The critical issue is the initial allocation of permits, since whoever obtains the initial permits, especially if the permits are given out freely, will have a competitive advantage over whoever did not. The basic issues of the wealth effects of the international allocation of permits, and the absence of international institutions needed for cross-country enforcement are very complex and very different from those related to domestic use of tradable permits. The focus of this paper is on domestic tradable permits regimes. Overall, however, issues of

international competitiveness have mainly centered around environmental taxes presumably because they make the costs of environmental protection more visible.¹⁰ This naturally leads us to the issue of political acceptability.

Political acceptability

From the firm's perspective, freely allocated permits are clearly preferred over an emission tax and/or auctioned permits because they convey rents to firms. Stavins (1998) also argues that tradable permits are preferred by environmental advocates who have a strong incentive to avoid policy instruments that make the cost of environmental protection highly

¹⁰ As will be discussed in the next section, one of the main obstacles to implementing new environmental taxes is the possible loss of international competitiveness, as illustrated by the EU example.

Table 3. CO₂ Taxes in Selected Countries (Norwegian kroner per ton CO₂)

<i>Country</i>	<i>NOK per ton CO₂</i>
Norway (1997)	
Gasoline	376
Natural gas	373
Oil	328
Light mineral oil	164
Heavy mineral oil	140
Coal	179
Coal	136
Sweden (1996)	
Gasoline	354
Auto diesel	380
Natural gas	321
LPG	352
Light mineral oil	380
Heavy mineral oil	326
Coal	362
Denmark (1996)	
CO ₂ households	111
CO ₂ industry	56
Finland (1996)	
CO ₂	53
The Netherlands (1994)	
CO ₂	20

Source: Moe (1999), table 8.1.

visible to consumers and voters; and taxes make those costs more explicit than permits. Freely allocated permits are easier for legislators to supply than taxes or auctioned permits, again because the costs imposed on industry are less visible and less burdensome, since no money is exchanged at the time of the initial permits allocation. Joskow and Schmalensee (1998) argue that freely allocated permits offer a much greater degree of political control over the distributional effects of regulation, facilitating the formation of majority coalition. An auction, on the other hand, allows no such political maneuvering.

Obviously, the political considerations associated with the use of an emission tax and/or a system of tradable permits will also depend on how the revenues raised are spent. Overall, however, the critical distinction to evaluate the political impact of alternative instruments is not so much between an emission tax and a system of tradable permits per se, but rather between systems where permits are freely allocated and systems where permits are auctioned. In many respects, the political considerations associated

with a system of auctioned permits are very similar to that associated with an emission tax.

As Table 2 illustrates, from a theoretical perspective, no obvious result seems to emerge concerning which instrument (emission taxes or permits) is preferable to the other. This result stands in sharp contrast to the use that countries are actually making of the two instruments, as laid out in more detail in the following section.

ENVIRONMENTAL TAXES VERSUS TRADABLE PERMITS AS POLICY OPTIONS IN OECD COUNTRIES

This section addresses the issue of how—and to what extent—countries actually have made use of the two instruments of environmental control discussed above, and the practical administrative and technical problems encountered in this process. The review is meant to be illustrative rather than exhaustive, since keeping track of environmental policies in all countries would truly be an immense task.

Broad Experience with Environmental Taxes

Toward a definition of environmental taxes

The theoretical literature on the choice of optimal instruments for environmental policy focuses for the most part on a pure emission tax. On the other hand, the practical reviews of country experiences seem to be using a much broader definition to capture the concept of an "environmental tax." Indeed, little consensus seems to exist in these reviews on the basic question of what constitutes an environmental tax, and different sources apply various definitions. In their overview of environmental taxes, McMorran and Nellor (1994) make a distinction between pure Pigouvian taxes, that is, taxes based truly on the units of emissions with specific rates set so that the net marginal benefits of reducing emissions by another unit would be zero; indirect environment taxes, that is, taxes on inputs or consumer goods whose use is related to environmental damage (for example, excises on gasoline); and environment-related provisions in other taxes, including personal income taxes, corporate income taxes, general sales taxes, and fuels and motor vehicle taxes such as, for example, Germany's accelerated depreciation provisions for energy-saving and pollution-reducing equipment, and the lower VAT rates applied in a number of countries to pollution-reducing devices (for example, recycled paper, solar energy equipment, etc.).

Box 2 reviews some other current definitions of an environmental tax. Obviously, the lack of a generally accepted definition has complicated the establishment of a consistent statistical classification of such taxes.¹¹ Depending on the nature and scope of the definition chosen, the concept of environmental or ecotaxes may encompass only pure emission taxes, or these as well as product taxes, which may be only indirectly related to actual emissions. In practice, and using the wider definition preferred by the OECD, most environmental taxes are not true emission taxes,¹² but take the form of product taxes.

¹¹ To address this problem, the OECD in cooperation with other institutions is working on a statistical framework, which in time will provide a clearer picture of the level and structure of environmental taxation in developed countries. In the same context, the OECD has also established a comprehensive database with information on environmentally related taxes in its member countries (OECD, 1999a).

¹² In practice, the concept of a true Pigouvian tax set optimally such that it equals the marginal damages of emissions is rarely applicable, given that regulators are unlikely to have the information needed to set such a tax.

For the purposes of this paper, the approach adopted focuses to the extent possible on pure emission taxes, that is, the discussion generally excludes product taxes on energy (although some revenue data are provided on the wider concept applied by the OECD).

The nature and revenue importance of environmentally related taxes in the OECD

Following the OECD (1999a) broad definition of the concept (that is, including all environmentally related product taxes, and in particular taxes on petroleum products), figure 4 shows, for the 19 countries covered by the OECD databank, that the (weighted) average of the ratios of ecotaxes to GDP is just below 2 per cent, with the highest ratio in Denmark (well above 4 per cent) and a ratio close to 4 per cent in the Netherlands, Norway, and Portugal. The lowest ratios (around 1 per cent) are found in Mexico and the United States. A similar wide dispersion among the countries in this sample is found with respect to the weight of ecotaxes in total taxes, around an average of about 5.5 per cent.

Figure 5 shows estimates of the corresponding revenue raised from the individual tax bases for the group of countries as a whole. Evidently, by far the largest individual revenue raiser is unleaded petrol with almost 40 per cent of the revenue raised (in 1995), followed by more than 20 per cent raised from taxes on the use of motor vehicles. It is interesting to note that the taxes on petrol and diesel together with the taxes on the sale or use of motor vehicles generated more than 91 per cent of all the environmentally related tax revenue covered by the OECD study. In other words, in relative terms, the revenue raised from pure emission taxes is very modest. However, while this holds for the OECD countries as a group, in individual countries, and in particular in the "ecotax leaders" dealt with below, emission taxes may be of quite some revenue importance. Despite these broad developments, there has been no strong general move toward comprehensive green tax reforms, except in a limited number of countries.

Overall, a distinction can be made between two groups of (developed) reform countries: the first encompasses countries which have opted for a radical restructuring of the overall tax system, with increased reliance on environmental taxes, and includes Denmark, Norway, Sweden, and the Netherlands. The other group of countries is characterized by important but more incremental policies in this area, and encompasses Austria, Finland, Germany, Belgium, France, and Switzerland. The distinction,

Table 4. Summary of Main Tradable Permits Applications in OECD Countries

<i>Country</i>	<i>Program</i>	<i>Period</i>	<i>Type of Program</i>	<i>Initial Allocation</i>	<i>Banking</i>
Air protection					
United States	EPA Emission Trading Program	1975-	Credit-Based	n.a.	Yes
United States	EPA Lead-in Gasoline Program	1982-87	Cap-and-Trade	Grandfathered	Yes
United States	Post-Montreal CFC Trading System	1988-	Cap-and-Trade	Grandfathered	No
United States	SO ₂ Allowance Program	1990-	Cap-and-Trade	Grandfathered (auctioned)	Yes
United States	RECLAIM	1992-	Cap-and-Trade	Grandfathered	No
United States	OTC Nox Budget	1994-2003	Cap-and-Trade	Grandfathered	Yes
Germany	VOC Control	1993-	Credit-Based	n.a.	Yes
Water protection					
U.S./Wisconsin	Fox River	1981-	Credit-Based	n.a.	No
U.S./Colorado	Dillon Reservoir	1984-	Cap-and-Trade	Grandfathered	No
Australia	Murray-Darling Basin Program	1988-	Cap-and-Trade	Grandfathered	Yes
Fisheries					
Australia	Individual Transferable Quota (ITQ)		Cap-and-Trade	Grandfathered	No
Canada	ITQ		Cap-and-Trade	Grandfathered	No
Iceland	ITQ		Cap-and-Trade	Grandfathered	Yes
Netherlands	ITQ		Cap-and-Trade	Grandfathered	No
New Zealand	ITQ		Cap-and-Trade	Grandfathered	No
United States	ITQ		Cap-and-Trade	Grandfathered	No

Source: OECD (1999d).

though, is to some extent subjective. The focus of this section is on the former group referred to as the “ecotax leaders.” This focus was adopted mainly for two reasons: first, comprehensive overviews of the use of environmental taxes and tax provisions have been attempted elsewhere (see, in particular, OECD, 1995, 1997b, 1999b, and McMorran and Nellor, 1994); and, second, the experiences of the “leaders” may well provide some useful lessons for other countries with respect to which taxes realistically can be applied; the administrative and other complications they may meet in trying to do so; and the revenue yields that can realistically be expected.

Trends in and objectives of the reforms of the “ecotax leaders”

Generally, reforms of environmental taxes may be based on three different approaches or combinations thereof (OECD, 1997b): (1) a removal or modification of existing distortionary subsidies and tax provisions; (2) a restructuring of existing taxes to take account of environmental considerations; or (3) the introduction of new ecotaxes. Characteristically, in the countries

having implemented comprehensive “green tax” reforms, all three approaches have been attempted. Also a key characteristic is the fact that environmental tax reform in these countries have been implemented as part of fundamental tax reforms with a much wider scope than just that of improving the environment.

Annex I provides summaries of the main environmental tax provisions introduced in Denmark, Norway, Sweden, and the Netherlands. The recent experiences of green tax reforms in these countries illustrate the variations both in the approach and scope of the reforms, as well as in the implementation strategies chosen across countries. But, perhaps more importantly, they also show some important general issues and problems which have confronted the early reformers. These experiences may be useful for other countries in their preparations for green tax reform. In our view the following six issues, some of which have been touched upon in the conceptual discussion above, figure prominently in this context.

First, the reforms have not taken place in a vacuum but have been adopted against a common back-

ground of international agreements to reduce emissions of greenhouse gases. This background follows in turn from the increasing scientific consensus that global warming *is* underway and is linked in part to the emissions of greenhouse gases. In some countries such as Norway, the goal of taking the lead internationally has, indeed, played an important role in the domestic reform debate. The OECD and European Union constitute important focal points for discussions and exchange of information on these issues among developed countries, and have taken innovative initiatives in this respect.¹³

The most prominent international agreement is the Kyoto Protocol, agreed in 1997 but yet to enter into force,¹⁴ which calls for a reduction of greenhouse gas emissions of some 7 per cent on average for OECD countries in 2008–2012 relative to their base level (generally 1990).¹⁵ Because of significant increases in emissions since 1990, the “effective” reductions implied by the Protocol are typically significantly larger than the 7 per cent mentioned above for OECD countries as a whole (under a “business as usual” scenario, required reductions are about 30 per cent). The European Union has adopted a separate burden-sharing agreement to achieve the targets under the Protocol for its 15 membership countries. While few of the specific domestic policies necessary to achieve the targets are in place today, much research has gone into estimating the costs of implementing the Kyoto targets. Simulations seem to suggest that if the targets are met using only cost-effective domestic measures (that is, disregarding mechanisms such as international emission trading), real income in the OECD overall would be reduced by about 0.5 per cent—seemingly a modest reduction, but hiding much larger impacts on some sectors.

¹³ In September 1999, for example, the Environment Committee of the European Parliament passed a draft resolution on climate change containing a harmonized ecotax plan in which the 15 EU countries can opt in or out.

¹⁴ The Protocol will not enter into force until ratified by countries accounting for at least 55 per cent of so-called Annex 1 emissions, and by at least 55 countries. Eight countries have ratified so far, but none of the Annex 1 countries. The institutions and procedures for monitoring and reporting of noncompliance are yet to be established.

¹⁵ Developing countries are not subjected to binding targets under the Protocol, and only a few of these countries have voluntarily adopted emission targets similar to those of the developed countries.

Moreover, the estimates are based on some strong assumptions, and may well underestimate the true costs (OECD, 1999b).¹⁶ International trading of emission allowances could substantially lower the costs and would generally allow OECD countries to meet the targets with higher levels of GDP, but as with other parts of the implementation, little progress has been made with regard to the practicalities of international emission trading.

Second is the fact that the introduction of CO₂ taxes have been the common key element of all the reforms discussed here. Hence, all the countries have found that the most efficient way to achieve environmental objectives is through emission taxes targeting CO₂ emissions, which are by far the dominant greenhouse gas. However, since technical complexities prevent fully accurate measurements of actual emissions, the tax bases are measured as the estimated average carbon content of the products in question; hence, in practice, these taxes fall somewhere in-between product taxes and pure emission taxes (Box 2). Also, as illustrated in Table 3, the rates of the tax chosen vary markedly across countries (for convenience, the rates are shown in Norwegian Kroner). Norway and Sweden have introduced by far the highest tax rates, although it should be noted that statutory rates may be somewhat misleading indicators of the “effective” rates owing to differences in the scope of exemptions granted across countries.¹⁷

Third, the green tax reforms dealt with here have generally not intended, as their main motivation, to raise significant amounts of revenue; indeed, in most cases, dual objectives have been pursued by applying measures aimed at improving environmental conditions, mainly through increased taxation, and at the same time to utilize the resources raised to alleviate the distortions created by other taxes, first of all taxes on labor. In Denmark, this was done through reductions in the marginal tax rates on labor income and reduced social security contributions; in Sweden, a major general reduction in income taxation was implemented; and in the United Kingdom, the Climate

¹⁶ The costs are also estimated to increase over time, and will reach 1.5 per cent of GDP in 2050 if emissions are to be maintained at the level embodied in the Protocol.

¹⁷ “Effective” rates of taxation could be measured as the ratio between actual green tax yield collected and the potential tax base (that is, including what is currently exempt). Data deficiencies have prevented the calculation of effective rates.

Change Levy announced by the chancellor in March 1999 is intended to be balanced by a reduction in National Insurance contributions. While employment considerations have played an important role in the reform initiatives, it should be recalled that the employment impact generally is expected to be fairly modest (see Annex I for country examples); but also that the primary *raison d'être* of any green tax reform is relative price corrections and not its revenue-raising capabilities. More generally, many of the reforms reflect the strive toward less distortive tax systems that at least could alleviate some tax-induced distortions with an adverse impact on employment and at the same time would remove incentives to degrade the environment.

Fourth, and closely related to the issue of revenue neutrality, is the alleged adverse impact that the introduction of green taxes may have on international competitiveness. As noted in Annex I, this issue has so far barred progress on a harmonized green tax reform in the EU. Industry arguments about adverse effects on competitiveness have led countries to grant tax exemptions mainly to heavy emitters, even though these exemptions tend to seriously weaken the link between the tax paid and carbon emitted and, obviously, reduce the yield from the tax and hence the potential for reducing labor taxes. To mention just a few examples, these considerations have played a significant role in the discussions: in Germany, where the energy tax is capped; in Finland, where the electricity sector has been exempted from the carbon tax; in Denmark, where the yield from emission taxes are "recycled" to industry, and taxation in some cases has been replaced by voluntary agreements; and in Norway, where possible steps to scale back the carbon tax to counter a fall in investment in the oil sector, prior to new offers for oil exploration, are being contemplated. Hence, key policy interactions between environmental goals and considerations of competitiveness and regional development have played and still play a dominant role in the scope and practical design of environmental taxes at both the national and international level. The ongoing discussions in the United Kingdom on the introduction of the Climate Change Levy provides another clear example of the inherent political and economic controversies involved in basic green tax reforms.

Fifth, perhaps of less political significance than the competitiveness issue, is the perception that green taxes are predominantly regressive, as supported by a number of empirical analyses. However, at their present levels, ecotaxes do not seem to have any significant regressive impact, although some simulation models involving significant carbon taxes

indicate modest regressivity (OECD, 1997b), Section II; see also Annex I, Section III on Sweden). It should be noted, though, that—ideally—the distributional consequences of ecotaxes should be measured net both in relation to the taxes that they replace in cases of revenue neutral reforms (mainly labor taxes which may be heavily regressive) but also with regard to the incidence of the environmental improvements that they generate, which may well be progressive.

Sixth and lastly, the sustainability of ecotax revenue has been noted as an important issue because of the trade-off between the environmental and the fiscal (revenue-raising) objectives of ecotaxes: there are merits to the view that ecotaxes should be analyzed using the same basic criteria typically applied to taxation in general: efficiency, equity, simplicity, and buoyancy. However, for a typical ecotax, there may well be trade-offs which are lacking for other type of taxes since, in a sense, pure Pigouvian ecotaxes are ultimately aimed at eradicating or certainly limiting their own bases, that is, there is a conflict between the economic efficiency and buoyancy objectives. Thus, while fiscal considerations would favor a broad and stable revenue basis, from an environmental point of view the aim of an ecotax is to diminish its own base. Perhaps the most successful example in this context is the impact of high excises on leaded petrol (as compared to those on unleaded petrol) in many OECD countries which may help to explain the total disappearance from the market of this product in some countries (Austria, Denmark, Finland, Norway, and Sweden). However, as this example illustrates, ecotaxes may change the composition of consumption (in this case petrol) through substitution from highly polluting to more cleaner products, but still with a substantial and fairly stable (price inelastic) tax base intact (in this case in the form of unleaded petrol).

More generally, the conflict between fiscal and environmental objectives should not be overstated. For instance, the base of many existing CO₂ taxes seems to be fairly stable or even growing in countries where such taxes have been introduced, and at their present levels, existing environmental taxes are not likely to trigger strong behavioral changes or demand shifts. Furthermore, there still seems to be ample opportunities for introducing or increasing taxes on harmful or polluting products, which have a fairly low demand elasticity. This may, however, change in the future with increased use of these taxes and, as indicated earlier, cases have, indeed, occurred where a tax has had a substantial impact on its own base, the Swedish sulfur tax being one good example.

Limited Experience with Tradable Permits

Tradable permits systems are implemented only in a few countries, and with limited scope. In Europe, very few applications exist. In Germany, the air pollution legislation allows the transfer of emission reduction obligations (offsets) but this possibility has been used in less than two per cent of the cases (OECD, 1997a). In the Netherlands, power plant bubbles are allowed under an agreement signed between the 12 provinces and the Association of Electric Producers in 1990. In the United Kingdom, provisions for intrafirm bubbles for power plants were introduced in 1996. Australia and New Zealand have also introduced provisions for pollution trading as well as some developing countries such as Chile and Singapore.

While provisions have been introduced for pollution trading in several countries, OECD (1997a) argues that the systems have been applied on a very limited scale. One notable exception is the case of the United States where support for the use of this market approach has clearly grown, as reflected by the increasing number of applications both by the federal government and by state governments. Indeed, the United States was the first country to apply tradable permits widely in the context of its environmental protection programs, and even today, most applications of tradable permits can be found there. These applications have mainly related to the emission of air pollutants, but both water-based and land-based applications have also been used at times. Hence, while there have been applications in other OECD countries (for example, Germany, Australia, Netherlands, the United Kingdom), usage of the instrument has been much less in these countries than in the United States. Consequently, most of the efforts to date to evaluate the use of such systems have focused on the United States experience. Table 4 provides an overview of the main tradable permits systems currently in place in OECD countries. Specific country experiences are discussed at length in Annex II.

While the theoretical advantages and characteristics of tradable permits have been well established for many years in the literature, there are many decisions that must be made to turn theory into practice. We first present some of the issues that may arise in a practical setting but are typically not discussed in most studies. Harrison (1999) suggests organizing these decisions into three broad categories (that is, threshold, design, and implementation issues), corresponding roughly to the chronology in which they would be addressed.

Threshold issues include decisions regarding the

basic purpose and nature of the system, most specifically with respect to: (1) the emission goal to be achieved—this includes the distinction of whether the system is set up when emission goals are set, or whether the system is set up as an adjunct to existing goal; (2) geographic area covered—this includes the decision of whether trade can be made within local air quality control regions, states, or group of states; and (3) the nature of the commodity to be traded—these issues include the important distinction between two types of programs: cap-and-trade versus credit-based systems. In the former, overall emissions are capped and parties trade an allowance (that is, the right to emit a unit of the given pollutant). In the latter, the commodity is an emission reduction credit (that is, a credit based upon the showing that the seller has reduced emissions below a baseline level).

Design issues cover issues such as: (1) the allocation of initial allowances (note that this issue is only relevant in a cap-and-trade program); (2) geographic or temporal flexibility or restrictions—this includes the possibility of restricting trade among different parts of the geographic range of the program, and the possibility of banking (that is, reducing emissions more than is required and “banking” the surplus for future internal use or sale); (3) specification of emission sources that are required or allowed to participate—this includes the possibility of allowing other sources to “opt in” to the program; and (4) possible establishment of institutions to facilitate trading.

Implementation issues cover issues such as (1) the certification of permits—whether emission restrictions must be certified before they can be traded; (2) the choice of methods for monitoring and reporting emissions; and (3) the means of determining compliance and enforcing.

Lessons learned from the United States experience

We suggest a number of important lessons that might be drawn from the United States experience.¹⁸

First, tradable permits remain somewhat controversial, even in the United States with its relatively long history with the instrument. Overall, and at least in the case of permits systems aimed at air pollution abatement objectives, political support for

¹⁸ These lessons are drawn for the most part from the proceedings of an OECD workshop held in Paris in September 1998, on the theme: “Domestic Tradable Permit Systems for Environmental Protection: Issues and Challenges.”

these systems seems highest when they are introduced as completely new initiatives, rather than additions to already existing program. There are several potential explanations for this (Stavins, 1998), the main one being the lack of constituencies for the status quo, namely new programs do not have the difficulties of modifying expectations that are set up for existing programs among various constituencies.

Second, tradable permits programs can be implemented at different geographic scales. Successful tradable permits systems have been established for sources throughout the United States (for example, SO₂ trading program, lead-in gasoline), as well as for sources in individual geographic areas (for example, California's RECLAIM). In both cases, however, trades take place in a single administrative region. No existing program so far has involved trades across different states or different air quality control regions within a state. The NO_x Budget Program represents the first attempt at such program and should provide important information on the additional issues involved in interstate programs. There appears to be a trade-off between the increased efficiency generated by expanding the size of the permits market, and the risk of creating environmental "hot spots"¹⁹ as a result of increased trading. In some programs, this problem has been solved by constraining the size of the market, so that only nearby emitters can trade with each other. Another approach is to use two types of environmental regulations. For instance in the SO₂ program, there are no geographical constraints on the market (that is, trading can occur between any two participating firms); however, these firms are also subject to additional local environmental constraints.

Third, cap-and-trade programs are used more frequently than credit-based programs. Overall, the volume of trading in these programs tends to be larger than it is for emission reduction credit systems. This is at least partially because the commodity being traded is usually better defined, therefore reducing the obstacles to trading and increasing the likelihood of potential costs savings. Credit-based trading requires the computation of arbitrary and often controversial baselines in order to establish a reference point for future reductions, often ending up with per-

manent administrative oversight and/or cumbersome certification procedures. This uncertainty may also complicate the initial allocation of rights, which can involve controversial procedures and assessments.

Fourth, determining the initial allocation of permits is crucial. Despite a theoretical preference for an auction approach, grandfathering of the initial permits has been applied in virtually all applications that have been observed in practice. Only in the SO₂ allowance program is a portion of the permits offered at auction. This is done in an attempt to make up for market imperfections and/or to accommodate newcomers to the market. Usually grandfathering is done to achieve some perceived equity considerations. As long as the number of firms, which are granted permits free of charge is large, and as long as the systems eliminate rents from the newly created assets, grandfathering seems to be socially acceptable. However, there was at least one case where the boundaries of social acceptability were apparently surpassed. This involved ozone depleting substance quotas allocated in the United States under the Montreal Protocol. In this case, CFC producers and importers were expected to receive large windfall gains as a result of the introduction of the system. These windfall profit were then taxed away by the United States Congress.

Fifth, allowing intertemporal trading (banking) can provide important flexibility for sources to undertake early reductions in order to accumulate allowances that can be used to ease compliance in the future. Most tradable permits systems in the United States have used banking. This flexibility appears particularly important when reductions are phased in over time such as in the SO₂ allowance program and lead-in-gasoline program. By allowing early abatement efforts to be banked for later use, the environmental benefits can be increased, in the sense that large emission reductions are achieved when emissions are the highest (that is, when the marginal damages from emissions are the highest). There are also economic benefits associated with banking because it reduces the exposure of emitters to a large shift in permits prices.

Sixth, private institutions typically develop to facilitate trades and provide market information, although government institutions (for example, auctions) can be useful initially. Brokers are important elements of the trading program for both the SO₂ allowance program and RECLAIM. The brokers lower the overall transactions costs for trades, increasing the volume of trades and overall costs savings. In the SO₂ program, for instance, brokers and other private market transactions account for the bulk of allowance sales and purchases. In contrast, few transactions are

¹⁹ Hot spots are very high concentrations of pollution in particular locations; tradable permits could contribute to the formation of such hot spots if they allowed more clustering of emissions in vulnerable areas.

accounted for by the auction mechanism set up to help newcomers. Such auctions can, however, be useful in the early stage of the program to provide information on prices.

Seventh, flexibility in monitoring requirements may increase participants beyond large sources. Emissions under a cap-and-trade programs must be monitored to ensure that the quantity of allowances purchased and sold is accurate. Continuous emission monitoring systems offer some degree of certainty in the emission monitoring process, and are therefore often mandated by tradable permits programs. However, this costly requirement often precludes the participation of small emitters (such as in the case of the SO₂ program for example).²⁰ Experience with the RECLAIM program on the other hand proves that it is possible to combine both large and small sources, with different regimes being applied to both groups. In that case, small firms were given an opportunity to participate in the program, with emissions being estimated (for example, by fuel meters and/or using emission technology factors). However, it should be noted that this approach has only been tried in the United States, where emitters tend to be covered by a complex and well-established system of supplementary environmental controls, in addition to the permits system itself. Similar programs replicated in other jurisdictions may face compliance and enforcement problems.

EXPLORING THE POTENTIAL OF ENVIRONMENTAL TAXES AND TRADABLE PERMITS: TENTATIVE CONCLUSIONS

This paper has presented the relative merits of green taxes vis-à-vis tradable permits as the two dominant economic instruments in pollution control. The scope for making greater use of economic instruments in environmental policy has been an increasing theme in recent policy discussion. Indeed in many countries, more particularly OECD countries, there has been an important shift in national policy towards the use of market mechanisms such as environmental taxes and tradable permits. The key argument behind the use of these instruments is now widely recognized, namely that in comparison with conventional "command-and-control" regulation, they

have the potential to reduce economic costs associated with a given level of environmental protection.

While the primary emphasis of the paper has been to compare environmental taxes and tradable permits as policy options for controlling pollution, two important points need to be stressed at this time. First, while the role of economic instruments has clearly increased over the last decade, this progress should not be exaggerated since most regulatory measures are still of the command and control variety, in other words economic instruments have not replaced command and control policies but rather seem to have been implemented in conjunction with existing regulations. Second, while we have discussed environmental taxes and tradable permits as two alternative instruments to control pollution, we should stress, that our discussion does not rule out the possibility of using the two instruments simultaneously (although, in this context, some specific compatibility issues may arise that were not discussed in the paper, see Smith, 1999).

Going back to our primary objective, namely comparing environmental taxes and tradable permits, from a conceptual and theoretical point of view, the two instruments have many similarities and no obvious result seems to emerge concerning which instrument is preferable to the other. From a practical point of view, however, there is no doubt that the majority of countries engaging in the use of economic instruments for environmental policy purposes have relied much more on taxes than on tradable permits. The reason is presumably that taxes constitute a more familiar tool than permits—a tool that, furthermore, can be implemented through an existing administrative apparatus. Tradable permits, in contrast, are new policy instruments, which have a lot of promise, but with which governments and their administrations are less familiar.

Given the positive results achieved so far in various programs in the United States, tradable permits systems seem likely to continue to be applied in the United States (and perhaps even at an increasing rate). However, the political climate for tradable permits in Europe is not as certain and several European governments are currently contemplating or engaging in long-term programs involving mainly environmental taxes. For those countries, we suggest three important lessons, based on the experience of the ecotax leaders:

First, green tax reforms should not be expected to yield significant revenue. Consequently, realistic expectations must be adopted concerning the existence of a double dividend, including the potential for a significant positive impact on employment. True eco-

²⁰ In some instances, the combined emissions from small emitters may turn out to be more significant than those of the larger emitters.

taxes are more likely to be successful as environmental instruments rather than fiscal instruments.

Second, CO₂ taxes have been at the core of all the reforms discussed. Hence, all countries concerned have found that the most efficient way to achieve environmental objectives is through emission taxes targeting CO₂ emissions, which are by far the dominant green house gas.

Third, there is an important trade-off between environmental objectives and the potential loss of international competitiveness relative to other countries that impose lower or no such measures. Considerable opposition should be expected as a result of the imposition of MBIs, particularly from the industries most affected by the introduction of such systems. This calls for careful design of the "recycling" mechanisms to be adopted for revenues, along with careful consideration of phasing-in provisions and extensive consultation and information campaigns prior to the introduction of any such reform.

As for tradable permits, both actual experiences (in the United States mainly) and willingness to experiment with it seem to be expanding. Experiences gained at the national level may, furthermore, help to ensure wider implementation at the international level—an important consideration in view of the fact that trading forms a key part of the Kyoto Protocol. The implementation of an international tradable permits system would probably be facilitated if domestic systems have already familiarized local stakeholders with the permits approach (by the early identification of marginal abatement costs, and also by facilitating the eventual establishment of monitoring and control systems at the international level). In short, considerable potential exists for a wider use of the tradable permits approach, both nationally and internationally. The key challenge now is to realize that potential. ■

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ANNEX I

COUNTRY EXPERIENCES WITH ENVIRONMENTAL TAXES: ECOTAX LEADERS

Environmental Tax Reform in Denmark

Environmental concerns became the focal point of the tax policy discussions in Denmark around 1990 when Denmark passed an *energy action plan* with the objective of reducing the level of emissions of CO₂ by 20 per cent in 2005 compared to the level in 1988 (Helbo Hansen, 1999). Furthermore, Denmark acceded to the EU agreement for emissions in the year 2000 not to exceed their level in 1990.

The action plan was followed up by three important tax reform initiatives:

- In 1992–93, a CO₂ tax was introduced at a level of about \$17 per ton of CO₂, initially only on households, but later extended to industry, followed by a reduction in the taxes on oil and gas. For households, the CO₂ tax rate was about 20 per cent of the consumer price net of taxes, in addition to the standard energy tax rate of 105 per cent of consumer prices net of taxes. For reasons of competitiveness, industry paid only a rate of 10 per cent, with reduced rates applied to energy-intensive industries (a degressive rate schedule was introduced with reference to the value added of industrial companies). Because the degressive rate schedule gave only limited incentive effects compared to the average tax burden on a company, the tax provisions were supplemented by a system of voluntary agreements through which eligible enterprises would be refunded all the tax if they carried out energy-saving programs, controlled through an independent audit. The extra revenue raised from this tax (0.2 per cent of GDP) was in part used to increase energy saving expenditures, and in part to reductions on the tax on beer and wine (by some observers characterized as an interesting variation of the double dividend).
- A major green tax reform was to be phased in during 1994–98, the main objective being a substitution of taxation on labor corresponding to about 2.2 per cent of GDP (with marginal tax rates on labor to be reduced by 10 per cent) by increased ecotaxes and charges on energy, waste, water, and sewage (1.2 per cent of GDP), as well as by higher capital income taxes (1 per cent of GDP). The overall reform was intended to be revenue neutral through “recycling” of the revenue gain back to industry, through lower social security contributions of employers and investment incentives to induce industrial energy-saving measures. The higher energy taxes initially only applied to consumers, but work was initiated to prepare higher energy taxes on industry as well.
- This led to the introduction in 1996 of a tax on SO₂ emissions of about \$1.7 per kg, as well as a further increase in the CO₂ tax on businesses. Particularly the SO₂ tax had a radical impact on consumption, since industry with relative ease could move consumption toward low-sulfur fuels. During the whole of this process there was an extensive activity in industry to introduce meters, and to negotiate individual agreements on pollution-reducing measures and plans. Considerations are under way to further increase green taxes and to broaden the scope of their use. Energy tax rates were further increased and new ecotaxes introduced during the fall of 1998, including in particular a new tax on nitrogen consumption outside agriculture, which was combined with comprehensive regulatory measures to restrict nitrogen use in agriculture. Interestingly, despite the arguments that regulation involves higher costs than economic instruments such as taxes, Danish farmers strongly opposed the tax route and argued in favor of regulation to reduce

nitrogen emissions to the environment.

The overall macroeconomic impact and the impact on overall employment is expected to be modest, although the impact for individual sectors and industries may be quite significant.

Environmental Tax Reform in Norway

Since the late 1980s, a strong focus on sustainable development has become a cornerstone of policymaking in Norway (Moe, 1999). In this respect, Norway was clearly among the frontrunners with regard to devising ways to encompass environmental concerns in general economic policies, with the aim of achieving a high level of employment and growth without harming the environment. Today, Norway probably has the most extensive framework for environmental policy of all countries in the world. As just one element of this framework, an annual document annexed to the budget examines the environmental profile of the state budget, identifying all expenditure items that are wholly or partly motivated by environmental policy objectives.

While environmental legislation in general has a fairly long history in Norway, environmental tax policy moved to the mainstream of policymaking only in the late 1980s. Based on the recommendations of an early environmental tax commission established in 1990, a number of environmental taxes and charges were put in place in subsequent years *inter alia* with the aim of stabilizing CO₂ emissions in the year 2000 at 1989 levels. It was calculated that achieving this ambitious goal would inevitably have negative consequences for employment. The key policy instrument was the CO₂ tax introduced in 1991 with different rates for different fossil fuels. A number of tax exemptions, mainly for export-oriented manufacturing industries, mean that only about 60 per cent of total CO₂ emissions are subject to the tax, and only about 20 per cent of emissions from manufacturing. The exempt manufacturing sectors—similar to the situation in the other countries with a CO₂ tax—are heavily exposed to international competition.

A broad-based second environmental tax commission established in 1994 submitted its report to the government in 1996. A key objective of the commission was to design policies to ensure that the economy can deliver both high employment and a better environment, and the approach adopted was to seek ways to integrate environmental policies and objectives in mainstream macroeconomic policies. Core to the work of the commission were the questions of whether taxes on labor could be relieved and replaced with incentive-based green taxes, and the possible implementation strategies for such a reform in a small open economy. A key issue in this regard was also the cost effectiveness in reducing *national* CO₂ emissions in accordance with the binding commitments reached in Kyoto in December 1997. In this respect, Norway was one of the only five countries that implemented a carbon tax to curb CO₂ emissions, which in 1996 accounted for 70 per cent of total greenhouse gas emissions in Norway.

Based on fairly extensive empirical research and a large number of simulations, the commission concluded that taxes on labor and on investment are the most distortive at the margin, and that environmental taxes, set correctly, can improve the efficiency of the economy. Substituting the one with the other would represent win-win policies. Despite these clear but theoretical advantages, the commission also pointed to a number of drawbacks of such a policy. For instance, labor taxes in the form of payroll taxes and social security contributions constitute an important and stable revenue source; and structural changes of a nature and range required would lead to opposition from the groups and sectors adversely affected.

The model simulations carried out by the commission, which illustrates the effect of raising green taxes by 1 per cent of GDP with a broadly offsetting reduction in payroll taxes, showed a mar-

ginally positive effect on key macro variables (disposable income, inflation, employment, and unemployment), combined with significant environmental benefits. On the key question of whether green tax reform may produce a *double dividend*, the commission points to the theoretical a priori inconclusiveness, but also—through its empirical simulations—seems to underpin the view that a double dividend will, in fact, materialize over the long term, if reforms are correctly designed, although the effects in long term equilibrium may be modest. It should be stressed, though, that in the view of the commission, a double dividend is not a necessary condition for carrying out reforms, as long as the policies benefit the environment without hurting employment, or strengthen employment and the efficiency of the economy in general without affecting the environment negatively.

Empirical research suggests that the CO₂ taxes in Norway may have reduced emissions by about 3 to 4 per cent in 1991–93. However, the above-mentioned commissions pointed to the need to raise the effectiveness of the carbon tax structure: hence, the exemptions and the weak link between the rates of taxation and the carbon content of products imply that the incentives for reducing carbon emissions are weakest in industries where marginal abatement costs are lowest. The majority of the latter commission, therefore, advocated a rapid change to a carbon tax system without exemptions. A governmental proposal of April 1998, to extend the carbon tax to exempted sectors (with compensations) met fierce opposition in parliament, and was eventually watered down, with the new CO₂ taxes coming into effect as of January 1999. Parliament decided in this connection to set up a commission to prepare a national system of tradable emission quotas for mainland processing industries, linked to the Kyoto mechanisms, with a report ready by the end of 1999. According to a Ministry of Finance estimate, the introduction of international emission trading may significantly reduce the annual abatement costs of compliance with the Kyoto targets compared to national solutions, to as much as a third (from 0.6 to 0.2 per cent of GDP).

Environmental Tax Reform in Sweden

The comprehensive tax reform of 1991 signaled a major shift in the emphasis of environmental policies in Sweden, from the previous extensive use of subsidies to achieve environmental objectives, toward the use of taxes as the main economic instrument (Brannlund, 1999). The 1991 reform was in part based on the work of a Commission on Environmental Charges set up as early as in 1988. The overall reform was based on a significant reduction in income taxes, largely offset by a series of new ecotaxes, especially on carbon, sulfur, and nitrogen oxides by a restructuring of energy taxation and by a broadening of the VAT base. The net effect was a 6 per cent redistribution of GDP, including about 1 per cent related to ecotaxes. A key element in the green tax reform was the introduction as of January 1, 1991 of a CO₂ tax on oil, coal, and natural gas. Following a second round of reform in 1993, the manufacturing sector pays only 25 per cent of the tax for reasons of competitiveness. The initial intention (but later abolished) was to stabilize CO₂ emissions at the 1988 level. It was estimated that environmental and environmentally related taxes in Sweden in 1996 yielded about 3.2 per cent of GDP or 6 per cent of total tax revenues.

In the spring of 1995, a new commission, the Green Tax Commission, was established to analyze the scope for using taxation to improve environmental quality and at the same time—as a second dividend—achieve a more efficient resource allocation through a reduction in unemployment. The commission was given a very broad terms of reference, including the effect on the environment, employment, industrial competitiveness, and revenue yields. While no specific reform was suggested, the commission offered some principles to guide future policies including a more proactive effort

in international fora to combat global and regional environmental problems, and increased efforts regarding research, including in the EU and Nordic contexts. Recommendations also included increased attention to the equity aspects of ecotaxes and the need in general to avoid earmarking. An important conclusion of the Commission's work is that increase in green taxes cannot be expected to yield revenues of a level, which could finance substantial reductions in labor taxes. Hence, any revenue gains should be allocated carefully and selectively.

The work of the commission also included useful analysis of key questions, mainly based on general equilibrium (GE) models, such as the existence of a double dividend: the final report points to the fact that recent literature (for example, Oates, 1995) questions the existence of a double dividend with reference to the fact that the green taxes by themselves are distortionary, and that these distortions may well outweigh the benefits of reducing other distortionary taxes such as taxes on labor. The GE-model simulations undertaken by the commission indicate that a tax reform comprising a 100 per cent increase of the CO₂ tax and a revenue-neutral reduction of labor taxes is likely to have a negative welfare effect on Swedish households, environmental effects excluded. In other words, there is no double dividend. Other interesting results of the analyses carried out by the commission includes simulations of the distributional consequences of the reform showing that CO₂ taxes are somewhat regressive.

The Swedish draft budget for 2000 calls for a number of green-tax increases which in part will fund employment measures, including through job skill training.

Environmental Tax Reform in the Netherlands

Introduction of green taxes in the Netherlands dates back to 1988 when a new fuel charge replaced a fragmented system of earmarked levies (Zom, 1999). The fuel charge was transformed in 1992 into a general fuel tax with the financing responsibilities for environmental expenditures at the same time being shifted to the general budget. This marked the start of a more comprehensive tax reform effort based on the introduction of green taxes.

By 1996, five distinct environmental taxes had been introduced (tax on the extraction of ground water, tax on waste disposal, fuel tax, tax on uranium, and the regulatory energy tax) with a total yield corresponding to about 1.8 per cent of total taxes in that year, subsequently reaching about 2.5 per cent in 1998.

While an important objective of the first four taxes was to raise revenue, in addition to their obvious environmental policy motives, the regulatory energy tax was somewhat different. The dual objective of this tax was, first, to provide financial incentives for energy conservation and the reduction of CO₂ emissions and, second, to enable an efficiency enhancing restructuring of the tax system from direct taxes, particularly on labor toward environmentally related taxes. A special feature of this tax is a volume ceiling on the use of taxable energy which contributes to focus the tax on small users of energy (households and small commercial establishments) which are often thought to be the most difficult group to reach through other policy instruments (such as permits); simultaneously, the tax avoids the adverse effects on international competitiveness that would follow from taxes on large industrial enterprises. The rate and base of the tax is in line with the 1992 proposal for a European Union directive for a CO₂/energy tax, with half of the tax base related to carbon content and the other half to energy content.

These initiatives on the indirect tax side (that is, consumption taxes) have been supplemented during the 1990s with important reform measures on the direct taxes (that is, income taxes), primarily through the introduction of tax incentives to promote environmentally friendly investments (free depreciation on environmental investment; tax relief for benefits from green investments;

and an energy investment tax credit).

In March 1995, a Green Tax Commission was established in the Netherlands with the purpose of evaluating the practical possibilities for using taxes to improve environmental quality and sustainable economic development. The Commission, which has applied a tax-by-tax approach to its assessment, adopted a list of fairly strict criteria for evaluating potential green tax measures, including: demonstrable environmental benefits; consistency with international law; simplicity of implementation; absence of adverse effects on the economy as a whole; and broad revenue neutrality. In addition, according to the commission, green taxes should not be applied to behavior that should not or cannot be changed to avoid the taxes. Some of the commission's proposals have already been implemented in practice. The commission's third and last report dealt with the potential for further greening the Dutch tax system in a long-term perspective, *inter alia*, by shifting further from direct to indirect taxes.

The Dutch approach to green tax reform is somewhat different in its careful emphasis on "greening" the existing tax system rather than, as the main approach used in most other countries, basing the green tax reforms mainly on the introduction of new types of taxes.

ANNEX II

COUNTRY EXPERIENCES WITH TRADABLE PERMITS SYSTEMS

The United States Experience

The United States emission-trading program

As an instrument of abatement policy, tradable permits were used for the first time in 1975 by the Environmental Protection Agency (EPA) through its Offset Program for air pollutants. Interestingly, the program arose from an attempt to implement strict emission regulations, which in many areas could not be met within the timetable or could be met only at substantial opportunity cost in terms of forgone economic growth. By 1975, it had become clear that a number of regions, designated as "nonattainment" regions by the Clean Air Act, would fail to attain the ambient air quality standards by the deadlines mandated in the Act. The Offset program was an attempt by EPA to improve air quality while fostering economic growth as well. The program worked as follows. New firms were allowed to enter nonattainment regions provided that they acquired sufficient emission-reduction credits (representing excess reduction) from other facilities in the region so that total regional emissions would be lower after entry than before. This was accomplished by requiring new sources to secure credits for 120 per cent of the emissions they would add, the extra 20 per cent being retired as an improvement in air quality.

The program evolved over a number of years and eventually led to the 1986 Emissions Trading Policy Statement, which covers several pollutants such as carbon monoxide, sulfur dioxide, particulates, volatile organic compounds (VOCs) and nitrogen oxides. The program is characterized by several elements. The geographic "netting" or "bubble" element allows trade of emission reductions among different sources within a firm, as long as the combined emissions under the bubble are within the allowable limit. The "offset" element allows firms to trade emission credits between existing and new sources as long as the new emissions are more than offset by a reduction from existing sources. Finally, the "banking" element allows firms to accumulate and store emission-reduction credits for future use or sale. Overall, the program is assessed as successful both in terms of environmental effectiveness and economic efficiency, despite certain weaknesses, which have limited participation and interfirm trading.

The lead-in-gasoline program

Following the path set by the offset program, the government began applying the tradable permits approach more widely. One prominent use involved facilitating the regulatory process for getting lead out of gasoline. Under this program set up in 1982, a fixed number of lead rights (authorizing the use of a fixed amount of lead over the transition period) were allocated to the various refiners. Refiners who did not need their full share of authorized rights (due to early compliance) could sell their rights to other refiners. Refiners had an incentive to eliminate the lead quickly because early reductions freed up rights for sale. Acquiring these credits made it possible for other refiners to comply with the deadline. Designed purely as a means of facilitating the transition to this new regime, the lead-banking program ended as scheduled on December 31, 1987. Two features of the program are noteworthy. First, it resulted in a much easier phaseout of lead than would have traditionally be possible because of the interrefinery flexibility that it offered (Tietenberg, 1998). Second, the program was designed to eliminate a pollutant not merely to place an upper limit on its annual use. In that respect, the program was rather unique.

Trading of permits for water pollution control

Tradable permits programs have also been used in the United States to control water pollution. The two most notable cases are: (1) the Wisconsin Fox River water permits for point pollution sources; and (2) the Colorado Dillon Reservoir water permits for nonpoint pollution sources. In 1981, the State of Wisconsin issued discharge permits to 14 paper mills and 4 waste water treatment plants discharging effluents into the Fox River. The permits were issued only for reduction in BOD discharges exceeding the levels required by treatment standards. Trading was allowed to give firms more flexibility in controlling and treating their effluents. Despite estimates of potential cost savings of up to \$7 million per year, only one trade has taken place (Smith and Vos, 1997) under the program. The reason most frequently cited to explain this lack of trade is the oligopolistic structure of the pulp and paper industry and the regulated public utility status of the wastewater treatment plant which limited competition (Panayotou, 1998).

Under the permits trading program between point and nonpoint pollution sources at the Dillon Reservoir in Colorado, point sources are allowed to treat their effluents at less than required (drinking water) standards in exchange for treatment of nonpoint pollution sources. In this case, the point sources are publicly owned sewage treatment plants, and the nonpoint sources are agricultural, recreational, and urban activities. The fact that trading in this system is between the waste treatment facilities and the water authorities implies low transactions costs and hence easier implementation. Despite some estimates of cost savings of approximately \$1 million a year (Hahn and Stavins, 1991), only one point/nonpoint source trade and a few nonpoint source trades have taken place since the program's inception in 1984. Hahn and Hester (1990) attribute this dearth of trades to the requirement of prior government approval.

The SO₂ allowance program

More recently, EPA has employed a tradable permits system to control acid rain. Under the program, SO₂ allowances have been allocated freely to existing sources based on baseline fuel use and a specified emission rate; the number of allowances will then be restricted to two phases to assure reduction of 10 million tons in emissions from 1980 levels by the year 2010. To comply with the program, each existing firm must hold allowances equal or greater than their emissions during the year. Allowances can be traded within and between utilities as well as banked for future use. Firms found to produce excess emissions pay a penalty of \$2,000 per ton and are required to offset their excess the following year.

Except for monitoring compliance, EPA's involvement in the program was minimal. For this reason, it is said to have worked better than earlier programs. Other reasons often attributed to the program's success are the existence of monitoring technologies for SO₂ and the mandatory requirements for firms to install continuous emission monitors. The first phase of emissions reduction was achieved in 1995 and applied only to the most emission-intensive generative units. Under Phase II of the program (to begin in year 2000), all fossil fuel power plants will be included. So far, the program seems to have worked very well, achieving and exceeding the targeted emission reductions. More than four million tons of allowances were transferred in 1996 between independent plants (Panayotou, 1998).

The post-Montreal CFCs trading system

Through the Montreal Protocol which 24 nations signed in September, 1988, and, later on, the London Conference which 59 nations signed in July 1990, signatory nations agreed to restrict their production and consumption of the chief gases responsible for the depletion of the ozone layer in order to eventually achieve a complete phase out of these gases between the years 2000 and 2005. To implement its responsibilities under the protocols, the United States has chosen to use a transferable permits system. In August 1988, the EPA issued regulations implementing a tradable permits system to achieve the targeted reductions. According to these initial regulations, all major U.S. producers and consumers of the controlled substances were allocated baseline production and consumption allowances using 1986 levels as the basis for proration. Each producer and consumer is allowed 100 per cent of this baseline allowance initially, with smaller allowances being granted after predefined deadlines. These allowances are transferable within producer and consumer categories and allowances can be transferred across international borders among signatory nations if the transactions are approved by EPA and results in the appropriate adjustments in the buyer or seller allowances in their respective countries. (Very few cases of such international trades have been reported to this date.) Production allowances can be augmented by demonstrating the safe reduction of an equivalent amount of controlled substances by approved means. Some inter-pollutant trading is even possible within categories of pollutants. All information on trades is confidential, so it is difficult to know how effective this program has been. One estimate suggests that as of September 1993, the traded amount was roughly 10 per cent of total permits (Hahn and Stavins, 1991). It was also suggested that by allocating allowances to the major domestic producers of CFCs and halons, EPA created sizable windfall profits (estimated to be in the billions of dollars) for those producers (Tietenberg, 1998). These windfall profits were then taxed away by the United States Congress.

States' initiatives

While all of the above programs were initiated and promoted by the federal government, the newest programs have arisen from state initiatives. One of the most ambitious of these programs is California's RECLAIM program of the South Coast Air Quality Management District of Southern California. This program was initiated in 1992 and covers trading in SO₂ and NO_x. Tradable permits were issued to 2,700 large polluters in proportion to the pollution emissions they would produce in 1992 at full production capacity. The number of permits issued annually will be reduced 8 per cent annually for NO_x and 6 per cent annually for NO₂ until the entire region is in full compliance with federal ambient standards. Trading is allowed and encouraged. Several brokerage firms are involved in making markets. The district has estimated savings of at least \$270 million per year over previous programs (Howe, 1994).

Another example is the Ozone Transportation Commission (OTC) initiative to control NO_x emissions. In 1994, a group of North-Eastern states participating as members of the OTC, committed themselves to achieving region-wide NO_x emission-reduction targets by 1999 and 2003 through a tradable permits system. The NO_x budget program is a "cap-and-trade" program that allows large emitters of NO_x emissions to trade allowances to meet the emission targets in a cost-effective manner. Since the multistate committees that negotiated the agreements had no statutory authority, a model rule was developed to serve as a template for state laws that must be enacted for each state to participate. Elements covered by the model rule include: program applicability, control period, emission limitations, emission monitoring, record keeping, and electronic reporting equipment. Each state has now the responsibility for developing and adapting state rules that are consistent with the model rule, and a number of states have already done so. The first phase of the program was due to start in May 1999 with an initial cap of 219,000 tons per year per region. This cap will remain in place until 2003, the start of the second phase, when the cap will be reduced to 143,000 tons. The United States experience with tradable permits has stimulated interest in many countries. Yet, there has been rather limited experimentation in other countries either developed or developing, although serious considerations to this effect are being made.

Experience in Other Developed Countries

The European experience

The major EU countries have long made extensive use of an array of pollution taxes (as described in the previous section) but have rarely used tradable-permits schemes. The few applications that do exist are briefly mentioned below. In Germany, the air pollution legislation allows the transfer of emission-reduction obligations (offset) but this possibility is reported to have been used in less than 2 per cent of the cases (OECD, 1997a). In the Netherlands, power plant bubbles are allowed under an agreement signed between the 12 provinces and the Association of Electric Producers in 1990. In the United Kingdom, provisions for intrafirm bubbles for power plants have been introduced in 1996. While provisions have been introduced for pollution trading in these countries, OECD (1997a) argues that the systems have been applied on a very limited scale.

The Australian and New Zealand case

Tradable permits have been used on a somewhat greater scale in Australia and New Zealand. In Australia, the Murray-Darling Basin Commission's program for salinity abatement of agricultural land and river system, began on January 1, 1988, as the "Salinity and Drainage Strategy." The strategy requires the state governments to desalinate the river Murray so as to reduce salinity by approximately 113 electric currents (EC) by 2015. (Electric currents are a standard measure of salinity and are used in calculating the number of salinity credits available for trade.) As a reward for such reductions, each state government receives salinity credits and may then choose to allow persons to resalinate the river, by selling or issuing their credits. It is estimated that after credits have been issued, river salinity would improve by approximately 78 EC (Australian Bureau of Industry Economics, 1992).

Tradable permits systems have also been used both in Australia and New Zealand in a slightly different context, namely, fisheries management. (Other countries such as Canada, Iceland, the Netherlands, and the United States have experimented with such programs, but on a much smaller scale.) Tradable permits (referred to, in the context of fisheries management, as individual transferable quota or ITQ) provide individuals with rights to harvest up to a given quota of the fish stock. The sum of all the quotas is the Total Allowable Catch (TAC) which is also the maximum

yield consistent with the survival of the species. These permits are tradable between vessels. They are denominated in tons of catch per fishing year (of the specified fishing stock). Numerous ITQ systems have been used in Australia and abroad. One of the most notable ones, the tripartite (Australia, New Zealand, and Japan) Southern Bluefin Tuna (SBT), failed from two main reasons allegedly: (1) authorities consistently failed to measure the true size of the population stock; and (2) population growth was volatile and unpredictable, thereby placing the stock at risk of over harvesting. A much wider application of tradable quotas is New Zealand's Quota Management Scheme (QMS). Concern has been raised with regard to its operations because of an apparent failure to reach an adequately stable and unique price for quotas. It was argued that trades had not been active enough to generate sufficient observations for reliable analysis (Australian Bureau of Industry Economics, 1992). Despite this problem, many believe that to this day New Zealand has been the most effective country in imposing this type of system (Panayotou, 1998).

Experience in Developing Countries

As yet, there has been no survey of the use of MBIs in developing countries comparable to those done for OECD countries. Only two major instances of operational tradable permits were reported in the still limited reviews of the literature on environmental policy in developing countries (O'Connor, 1998, OECD, 1997a, and Panayotou, 1998): in Chile and in Singapore.

Chile's 20-year experience with tradable water rights

Under Chile's water policy, individuals are granted freely tradable water use rights which are defined for a fixed quantity per unit of time and are awarded following application by a potential user. A water right is granted provided that it does not impair existing rights and that the ecological requirement of minimum flow has not yet been reached by previous allocations. These rights are granted free of charge and recorded in a national register, the granting authority reserving the rights to restrict water consumption in time of shortage. While owners of consumptive rights (for example, irrigation mainly) have no specified obligation with regard to quality and quantity of return flows, owners of nonconsumptive rights (for example, hydropower and recreation) are re-

quired to return the same quantity and quality of water. Water rights are freely tradable and the market for water rights is reported to be quite active (Panayotou, 1998).

Singapore's experience

Singapore's CFC permits auction scheme began in the late 1980s, after the ratification of the Montreal protocol. Each quarter the national consumption quota was allocated among importers and users, half on the basis of historic consumption (grandfathering) and half through auction. Importers and users were required to register to participate in the bidding process, with each firm specifying the amount of its demand and its bid price. Bids were ranked by price, with the lowest winning bid price (the one just exhausting the stock) serving as the unit permits price. That price was then charged on the full national allotment. Initially, there was a steep increase in permits price, providing users with incentives to adopt conservation measures, substitutes, and alternative technologies. As a result, CFC demand fell sharply. Since the decline in demand depressed the price, the government accelerated the phase-out schedule in an effort to support the price and maintain the incentive for continued demand reductions.

Singapore has also devised a vehicle ownership quota system designed to limit the growth in supply of private automobiles. The Vehicle Quota System (VQS) was introduced in May 1990, following essentially the same principles as the CFC quota system. Under VQS, anyone wishing to own a vehicle (except for buses and emergency vehicles) must have a certificate of entitlement (COE). Those vehicles already registered at the inception of the system were assumed to have a COE (another instance of grandfathering), while anyone wanting to buy a new one is required to bid for a COE in monthly tendered exercises. Each bidder must indicate the amount he or she is willing to pay for the right to own a vehicle in a particular category. Bids are ranked from highest to lowest; each successful bidder pays a COE price equal to the lowest successful bid price. The COE is valid for ten years from the date of registration of the vehicle, after which the COE must be renewed at the prevailing price defined as the 12-month moving average price of the COE in that vehicle category. By mid-1992, the COE price for a standard car had risen by more than 60 per cent and represented about one-quarter of the total sale price (Panayotou, 1998).

OVERVIEW AND RECENT EXPERIENCES WITH ECOLOGICAL TAX REFORMS IN EUROPE

*Kai Schlegelmilch**

EXECUTIVE SUMMARY

At the turn of the millennium the use of environmental taxes has accelerated, at least at the level of the individual member states of the European Union (EU). However, at the EU level hardly any progress, particularly in the area of energy taxes, is visible, though a vast majority supports broadening and increasing minimum excise levels for all energy products (European Commission, 1997). In particular, large EU countries such as France, Germany, Italy and the United Kingdom have started applying this instrument. Central and Eastern European (CEE), some Asian and South American countries are also increasingly starting to experiment with environmental taxes, while in North America application is visible only at the individual state level—and apart from comprehensive tax expenditures.

In the EU, the unanimity voting rule renders much enhanced action hardly possible due to competitiveness concerns as long as a few cohesion countries are not convinced of the positive impacts of such instruments. Still, in the context of the current Intergovernmental Conference, the Portuguese Presidency and the Commission aim for a qualified majority voting on environmental taxes. For the time being it remains also unclear whether the flexibility clause of the Amsterdam revision of the European Treaty, facilitating a coordinated approach of like-minded countries, can help to overcome the deadlocked situation.

When entering the debate and implementation of ecological tax reform, several issues are at the core of debate. Potentially negative impacts on competitiveness are the major concern, which is closely related to impacts on employment. However, practically no negative experience is available, as the designs have been chosen appropriately. Other concerns debated are related to equity, inflation, and the potential trade off between raising revenues and showing environmental effects.

Evaluation studies or brief assessments of at least 30 environmental taxes and environmentally related fiscal provisions have been identified and are briefly reviewed in this report. Within the limitations of the studies, it appears that these taxes have been environmentally effective (achieving their environmental objectives) and they seem to have achieved such objectives at reasonable cost. Examples of particularly successful taxes include those on sulphur dioxide in Denmark and Sweden, on nitrogen oxides in Sweden, on Dutch water pollution, and all kinds of tax differentiation schemes for fuels in most countries.

Most barriers to implementation, especially to energy taxes, such as potential negative impacts on competitiveness, on employment (particularly on specific sectors and regions), on inflation, and on low income groups can be overcome by the removal of environmentally damaging subsidies and regulations, careful design, the use of environmental taxes and respective revenues within broader tax reforms, looking at distributional impacts by taking into account the proportionally higher positive physical impacts of reduced environmental damages for low-income groups; and abolishing the requirement of unanimity voting at EU level. Countries applying ecological tax reforms have demonstrated through the specific design of their taxes that these measures help to overcome the barriers.

There is still a wide scope for a much greater use of these instruments and for a much more coordinated policy, particularly between like-minded countries. If these national policies are better coordinated, current exemptions mostly given to the industrial sector can be reduced substantially while increasing the environmental effects. A breakthrough at the EU level has become more likely during the last two years.

If environmental taxes are well designed and implemented to exploit the advantages described above, they could deliver improvements in five key areas of public policy: the environment; innovation and competitiveness;

* Kai Schlegelmilch is Advisor on Ecological Tax Reform, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Germany.

employment; the fiscal system; and the functioning of other instruments such as environmental agreements and regulations.

For least developed countries the concept of an ecological tax reform (ETR) should be adopted to the circumstances of these countries. Aiming at the increased efficiency of the use of resources, a very first step would be to make people pay for environmental services such as the provision of clean water, sewage, waste infrastructure, and transport infrastructure. Another element that can be adopted to national circumstances would be the elimination of environmentally damaging fiscal provisions in existing taxes and expenditures. The introduction of tax differentiations, such as for leaded and unleaded fuels, has turned out to be a very effective instrument in developed countries if alternatives are at hand.

INTRODUCTION

ECOLOGICAL tax reform (ETR) is a theory and a policy concept that is not only gaining increased attention, but whose first steps are also being implemented by more and more countries. It was “invented” about two decades ago, but its cautious implementation started only a decade ago. It then became more popular in the mid-1990s, while it gained strong momentum in the late 1990s in European countries. Environmental taxes are a major part of environmental tax reform, but only with the simultaneous reduction of other taxes is it recognised as an ETR. Depending on the circumstances, either the entire ETR or only the environmental taxes are considered in the examples reviewed in this paper.

The idea and theory behind an ETR is fairly simple: Shifting the tax burden from “goods” such as labour, investment and capital to “bads” such as environmental pollution and consumption of natural resources, whereas not increasing overall tax burden (revenue neutrality). Such a tax shift would contribute to:

- reducing environmental pollution and the use of natural resources;
- increasing employment and/or economic performance;
- internalising externalities, particularly of environmental pollution;
- providing market-based incentives for both consumers and producers to change their behaviour towards a more efficient use of resources;
- encouraging innovations which can lead to an increased competitiveness;
- raising revenues which can be used in different ways, such as cutting other taxes on labour and capital or increasing environmental expenditures;
- being considered as an effective tool to tackle diffuse pollution sources such as transport, waste and chemicals;
- enforcing existing regulation which is otherwise often hard to control or costly to administer;
- accelerating the required integration of environmental aspects in other policies;

- broadening the range of instruments (so far, policy has relied heavily on regulations);
- contributing to the implementation of the precautionary principle—in addition to the polluter pays principle.

Although the advantages seem to be fairly clear, implementation turns out to be much more complex. This paper thus aims at providing insights into the specific discussions and the implementation of ecological tax reforms in various developed countries, mainly in Europe where the most experience is available. The issues which are often at the core of the debate are briefly discussed here and in more depth in the subsequent chapter.

The evidence for the environmental effectiveness of an ETR is of most importance for environmentalists. Since these taxes were introduced only during the last years, not much empirical data are yet available. Environmental taxes mostly aim at structural changes, but these only happen in the mid- and long-term. However, several studies show that environmental taxes bring about positive environmental impacts. Even energy-related taxes, aimed at the most fundamental structural changes, show initial positive effects, thus supporting the importance of that instrument.

Competitiveness of industry has become the major concern in most countries implementing steps of an ETR, closely related to the strong demand for international harmonisation. Industry often claims that the implementation of regular tax rates within an ETR would lead to a reallocation of companies abroad. As a consequence, environmental pollution—as far as climate relevant emissions are concerned—would not be reduced, but just take place abroad because the products would still be imported. Also, the economy would lose due to the loss of jobs.

The impact on employment of an ETR is another big issue. Protagonists argue that major positive job impacts would arise from a shift of supply and demand to more labour-intensive products and processes. Many computer simulations have been carried out, aimed at finding more insight into the existence of a “double dividend”. This double dividend would consist of higher environmental protection while at

the same time also increasing overall welfare, either by higher growth or by creating more jobs. In a nutshell, they indicate that a small, yet positive double dividend can be expected (INFRAS/Ecoplan 1996). Even if only a single dividend existed, it would still be beneficial to introduce an Ecological Tax Reform.

Equity issues are also raised. On average, low-income groups spend relatively more of their income on energy products. Still, they also often benefit physically more than average from reduced pollution as they are normally hit hardest by environmental pollution. Depending on the social and cultural background of a society, this issue is either only a side-issue or even becomes the guiding principle when implementing an ETR.

The potential trade-off between reaching an environmental target and raising revenues is often an issue when countries are about to start implementing an ETR. Achieving both objectives seems to exclude each other which, indeed, holds true in theory. However, practice and simulations have clearly shown that an ETR can serve both purposes over a long term. So did the ordinary mineral oil tax in the past. Still, it is not always predictable to what extent which objective can be achieved.

Reducing environmentally counterproductive subsidies and tax expenditures is often claimed to be the best way of starting a green budget reform instead of introducing environmental taxes. Although this is theoretically certainly the adequate order, policy does not often follow. Surprisingly, after implementing the first steps of an ETR, countries often have shifted the focus towards subsidies. Hence, it is interesting to note that through an initially second best approach the first best approach can then be more easily followed.

Impacts on inflation are an issue in countries which are members of the European Monetary Union (EMU). Here three criteria for entering and staying in the EMU apply, of which one is an inflation rate of no more than 3 per cent. Hence, this topic has attracted particular attention for southern countries with traditionally high inflation rates. Some use this argument for preventing any additional energy taxation, others even reduce existing taxes to mitigate the effects triggered by the increase of world market prices for oil. Particularly in CEE countries, environmental tax rates are often linked to income or inflation in order to keep up the level of incentive.

Legal restrictions are raised, particularly when it comes to the discussion of international action. Here EU and World Trade Organisation (WTO) rules play an important role. A major question is often if, and by which means, a country which implements ETR is allowed to ensure that its industry is not set at a disadvantage by higher environmental taxes. The possibility that such measures could be abused for protectionism is of great importance. But also at the na-

tional level debates on the eligibility of certain environmental taxes within the constitutional frame are taking place.

An institutional approach of how to overcome various barriers has been the setting up of an ETR-Commission. These commissions often help to shift the focus from ETR only to subsidies and other provisions which are potentially environmentally damaging. Hence, "Green Budget Reforms" (GBR) are increasingly considered, taking into account all environmentally relevant fiscal activities of a state.

To avoid any misunderstanding about the papers content, the paper does not aim at providing theoretical insights in the debate of a potential "double dividend". To this end see Bovenberg and Goulder (1996); Bovenberg and Mooij (1994); and Repetto and others (1992) and for empirical modelling overview INFRAS/ECOPLAN (1996). There, the various aspects and pre-conditions, such as characteristics of labour markets, distortions of other taxes, deadweight losses of various taxes, of the existence of a double dividend are described in detail and discussed with respect to their existence in the real world. Here, however, they are neglected in order not to duplicate this work, but instead to enlighten theory with empirical aspects as outlined above. This is the innovative approach which enhances also the theoretical understanding of an Ecological Tax Reform.

DEFINITIONS AND STRUCTURE

Environmental taxes are part of an ecological tax reform. In this paper, tax reform are considered as ecological tax reforms only if (a) environmental taxes are introduced/increased; and (b) the revenue is mainly spent for reducing other taxes and charges.

A statement given in OECD (1995, 7), which also dealt with environmental taxes, applies: "Defining the scope of the work is inevitably imprecise. Similar measures in different countries may be variously defined as taxes, charges, levies, fees or duties, and it is not the intention to enter into semantic discussions of the borderline between these concepts."

It is the "greening" of the tax system or—more precisely—the fiscal system and/or the budget (thus sometimes called "Green Budget Reform"), which comprises three complementary approaches:

- The introduction of new environment-related taxes, generally on environmentally harmful products such as pesticides, fertilisers, batteries, motor vehicles, and waste products;
- A restructuring of existing taxes with a strong environmental relevance (energy products), to include an environmental component; for instance, a CO₂ and/or energy tax on energy products; and
- The modification or removal of tax provisions and subsidies with potentially detrimental effects on

the environment (such as agriculture subsidies or tax provisions in the transport sector) (OECD 1998a).

Hence, environmental taxes are a major element of an environmental tax reform which are themselves a major element of a green budget reform.

The objective is to present various kinds of taxes. From a statistical point of view, fiscal data from national sources have to be defined regardless of national individualities. Terms and concepts are used quite differently in each country, thus causing problems when making international comparisons.

The criterion for deciding if a payment to state authorities is a "tax" in the statistical meaning depends on whether it is accompanied by a benefit which is roughly equal to the amount which the subject is obliged to pay. If there is a good or service in exchange, the payment, usually called a charge or fee, is simply seen as the price of the delivered good. Only those payments where there is no benefit to the individual subject in relation to the amount of money paid are called "taxes".

To complete the picture of possible definitions, the three categories of environmental taxes as classified by EUROSTAT are the following: (a) energy taxes; (b) transport taxes; and (c) pollution taxes.

However, in the following mainly energy taxes—and the term environmental taxes is mostly used as a synonym if not otherwise mentioned—are at the core of the next chapter on implementation issues. This is justified on the grounds that most problems with respect to implementation of ecological tax reforms become relevant when implementing energy taxes. The reason behind this is that energy costs normally have the highest share of environmental costs of a company and that energy taxes also can lead to substantial revenues with their respective financial and economic impacts. However, since environmental evaluations are available for all three kind of environmental taxes they will also be considered where appropriate. Comprehensive reviews of all kinds of environmental taxes are available from OECD (1998b and 1999b). Finally, conclusions are drawn.

Full references are at the end of the paper. In Annex I, details on the design of the ecological tax reforms of the countries at the forefront, Denmark and the Netherlands, can be found. Annex II contains information on countries of Central and Eastern Europe (CEE).

Overall, the paper comprises analytical assessments as well as descriptive elements though the focus is on the latter given limited evaluations available due to fairly recent introductions of environmental tax reforms. Previous meetings of the Expert Group Meeting on Financial Issues of Agenda 21 in 1996 and 1997 (United Nations, 1996 and 1997) are also referenced, as their proceedings contain several

articles on similar and the same topic, however with different focusses.

ISSUES OF IMPLEMENTATION

This chapter is structured along the most important issues of implementation. In order to give insights in practice, the paper does not stay at the theoretical level briefly outlined in the introduction, but illustrates these issues by providing experience from several countries. A comprehensive assessment is still difficult to do since ecological tax reforms were only introduced a few years ago and are aimed at mid- and long-term impacts.

Environmental effects

Environmental taxes were initially invented to primarily pursue environmental objectives. As set out in the introduction and when part of an ETR, they often serve several purposes. Still, the main purpose is to reduce environmental pollution and the use of natural resources. To this end, it is necessary to collect information on the environmental impacts of an ETR.

Since these taxes were introduced mainly in the 1990s, much empirical data are not yet available. Still, a distinction between energy taxes and pollution and transport taxes can be made. Whereas energy taxes aim at fundamental structural changes, pollution and transport taxes aim at achieving specific environmental improvements. On the one hand, the latter show more concrete results in the short- and mid-term. On the other hand, the former tend to show impacts mainly in the mid- and long-term. This renders evaluation of energy taxes difficult, in addition to the difficulties related to the unsteadiness of the world oil/energy market.

Consequently, most evaluations concentrate on transport and pollution taxes, but a few preliminary evaluations are also available for energy taxes. Three comprehensive overviews of evaluated environmental taxes are available. Two are published by the European Environment Agency (EEA 1996 and 2000—forthcoming), and the third was published by the OECD (1997a). For the year 2000 or 2001, an assessment of the evaluations is foreseen by Mikael Skou Andersen on behalf of the Nordic Council. Subsequent summaries of evaluations are mainly based on a draft for publication by the EEA in the year 2000.

Although environmental taxation has for several years been at the core of the environmental debate in Europe and the OECD, there is no systematic and coordinated evaluation of market-based instruments. In 1997, the OECD formulated a framework for "Evaluating Economic Instruments for Environmental Policy" (OECD, 1997a), but hard scientific evidence on the effectiveness of environmental taxes

is still difficult to obtain. As the OECD (1999b, 78) puts it: "There is still a lack of evaluation of the environmental effectiveness of economic instruments, not to speak about their static and dynamic efficiency... Effectiveness is rated positively in general, although the substance of this information is meagre. Many statements regard sometimes remote proxies for environmental effectiveness, rather than effectiveness itself."

In CEE countries it is even worse. There are hardly any recent ex-post evaluation studies of environmental taxes available which could provide reliable data. Apart from the general difficulty of disentangling policy packages, which cannot be underestimated, evaluations are made even more difficult for several reasons:

- Most taxes—at least in the past—only worked under a centralised planning system. Hence, environmental funds often only became effective when the phase of transformation started and the market mechanism reflected more appropriately any scarcity. Otherwise, any kind of incentives were often offset by counteracting subsidy schemes or non-implementation of regulation.
- High rates of inflation threatened all environmental taxes in accession candidates. Some, such as Poland and Estonia, have thus linked charge rates to inflation.
- The transition phase often led to reduced growth and thus also reduced environmental pressure. It is difficult to separate this from the effects of economic instruments which have just started to function properly.
- Since most environmental taxes often have the dominating function of raising revenue and then go to environmental funds, it is necessary to take into account the effects of the spending since major environmental improvements may be expected from that side.
- For large polluters, comprehensive exemptions are often provided which reduce the environmental effects, but it is difficult to evaluate them if other instruments are part of a policy package.

Given these severe limitations, one can only rely on empirical observations without aiming at scientifically sound data: "For the Polish air pollution charges, there are incentive effects even if not at the efficient level. In Hungary, the packaging product charge had substantial environmental impact in the preparatory phase" (Klarer 1999, 211).

Poland was particularly successful in increasing charge rates. Levels have been increased to approximately 18-20 times the levels during the communist regime and now are among the highest in the world. Still, the estimated marginal cost of investments to achieve, for example, a 30 per cent reduction

(equivalent to the new standards for large combustion sources that took effect in 1998) in SO₂ using the RAINS (Regional Acidification Information and Simulation) model developed by the International Institute for Applied Systems (IIASA, Laxenburg/Austria), is approximately \$600 per ton for large combustion sources. However, there is at least some interesting evidence that the high fee rates have provided incentives for polluters to make low-cost improvements to reduce emissions of particulates and SO₂, although not necessarily in compliance with the standards. As a result, fees are complemented by permits and emission and discharge standards (Peszko, 1999, 132). The indication of the non-implementation of the fee regime is supported in part by simulations from London Economics (Pototschnig 1996, 219): "A tougher environmental policy characterised by higher charges (...) would impose an extremely high resource cost to the Polish economy. A cost that few countries, let alone a country in transition, would be able to afford."

Since evidence is difficult to obtain and experience with environmental taxation is rather recent, a number of western European countries have created environmental tax commissions for the further development and partly also for the evaluation of their environmental taxes (see below on institutional approaches/capacity-building and Schlegelmilch 1998a). The commissions usually have the format of a round-table. Representatives from different interest groups, science, politics and sometimes only public administration, support the governmental and parliamentary decision-making. Some exist(ed) for a short period, some for a long period, others have been set up several times. Thus far, environmental tax commissions have been established in Austria, Belgium, Denmark, Ireland, the Netherlands, Norway, Sweden, the United Kingdom; similar approaches were chosen in Canada, the USA and Japan.

Conclusions and recommendations are usually connected to the national debate. However, according to OECD (1997b, 26) certain conclusions have general validity for the assessment of environmental taxes:

- Environmental taxes are an effective and efficient instrument for environmental protection.
- An ecological tax reform which shifts the tax burden from nature to labour and which contributes to the reduction of distorting taxes and subsidies, increases the economic performance by improving the environment and reducing market failure and distortions through wrong price signals.
- The improvements do not result in significant job losses, and could even increase employment opportunities.
- An ecological tax reform alone will only play a small contribution to the solution of unemployment in OECD countries.

- Increasing mobility of production factors can result in significant adjustment costs, if small open markets introduce measures which create a different environment for investments than in the rest of the world market. Ambitious environmental policies should therefore be co-ordinated internationally.

Next to “hard” scientific evidence, for example on quantitative reduction, there are a number of “soft”, sometimes capacity-building effects which deserve more attention when evaluating market-based instruments. An example of “soft effects” is the “capacity-building” effects of the German waste water charge (Kraemer 1995).

The German water effluent charge system induced a “capacity-building” process. In particular, the charge improved administrative competence by:

- providing financial resources for increasing the number and capability of staff engaged in determining and issuing water pollution permits, and in monitoring and modelling activities;
- creating the need for better information and monitoring of effluent discharges—better monitoring strengthened the position of environmental authorities vis-à-vis polluters;
- introducing into the relationship between authorities and polluters the objective elements of control and enforcement associated with fiscal legislation;
- providing polluters with an incentive to review their discharges, and to consider technological options (awareness effect);
- giving more attention and recognition to issues of municipal sewage treatment;
- signalling the legislators’ determination to ensure more effective compliance with existing pollution control requirements.

The simple fact that taxes are subject to a public debate makes not only the financial aspect, but also the environmental reason for introducing these instruments known to a broader public. As the evaluation shows, even negligible volumes of taxes and charges can result in a change of preferences which are not necessarily in proportion to the economic benefits which are gained by behavioural change. A purely economically based approach to evaluating environmental taxes is thus neither reasonable nor followed here.

Table 1 summarises the results of the review and qualitative assessment of the evaluation studies available on environmental taxes. The main conclusions are:

- the number of evaluation studies has increased substantially recently, not least due to a similarly increased application of environmental taxes and

the need for evaluating their effects. The quality of these evaluations varies considerably and a water-proof causal relationship can likely never be established, though in some cases this relationship is very obvious;

- the taxes evaluated revealed environmental benefits and in most cases appear to be cost effective within the constraints of the evaluation performed;
- examples of particularly effective taxes are those on Swedish NO_x-emissions; on Dutch water pollution; on Danish sulphur emissions; all kinds of tax differentiation schemes for fuels in most countries were also very effective;
- incentive taxes are, in general, environmentally effective when the tax is sufficiently high to stimulate abatement measures;
- a significant contribution to the environmental effectiveness of the cost-covering charges is provided by the use of revenues for related environmental expenditures. In addition, some even had an unexpected incentive function;
- taxes can work over relatively short periods of time (2-4 years), and so compare favourably with other environmental policy tools;
- environmental taxes are often more effective than environmental agreements as supported by the fact that several of the latter had to be substituted by taxes after agreed targets were not achieved (examples are the Danish tax on NiCd batteries and the PVC tax);
- for several energy taxes there are now first evaluations available which provide first evidence for their achievement of their twin role as revenue raisers and as environmental incentive taxes;
- evaluating a tax and its environmental impact is often difficult. Environmental taxes are often part of a policy package that is hard to disentangle. Therefore the effectiveness of the tax ‘per se’ cannot always be clearly identified;
- evaluations of environmental taxes in accession candidates are basically not available; their evaluation has often been hindered or deteriorated by the fact that either hardly any environmental taxes were applied or that surrounding their applications the absence of market conditions were hampering their impacts. Still, they definitely worked in raising revenues and thus provided the funding for environmental expenditures and respective environmental effects.

Overall it is often found that environmental taxes can have multiple environmental effects and secondary benefits that could improve policy in five key areas: the environment, innovation and competitiveness, employment, the tax system, and the reinforcement of regulatory and other, e.g. so-called “voluntary” policies.

Table 1: Summary of an assessment of selected environmental taxes

<i>Instrument</i>	<i>Environmental Effect</i>	<i>Remarks on Effectiveness</i>
Annual car taxes (A, B, CH, CZ, D, DK, E, FIN, F, GR, HU, I, ICE, IRL, L, N, NL, P, S, UK)	+	Not quantified
Differentiation or temporary exception by certain criteria	+	Not quantified
Battery charges (S)	+++	Collection rate increased from 60% (1988) to around 100%, after the charge was introduced in 1989
CFC tax (DK)	++	Reduction of consumption of CFC by 50% (from 5.660 tons to 2.225 tons) between 1986 and 1992 supported by taxation
charges on domestic air traffic (S)	++	— Unknown for the noise effect but 90% reduction of hydrocarbon emissions by the change of the combustion chambers of Fokker F28
CO ₂ tax (DK)	+	— Reduction of 1 million t CO ₂ (1988-1995) — CO ₂ emissions (industrial sector) were, compared to 1988, 3.0% lower in 1996 and 3.4% lower in 1997
CO ₂ tax (N)	++	— Reduction of CO ₂ emissions: — Private cars 2-3%(1991-1993) — Stationary combustion plants up to 21% in 1991 (year of introduction) — Production of intermediate products 11% (in 1991) — Government services 10% (in 1991) — Oil industry (1.5 per cent) — Total decrease 2-4% (1991-1993) — Household transport volume: — Total decrease by 1.5-1.9%/a — Private cars decreased 2-3% (1991-1993) — Public transport increased 0.5%/a
CO ₂ tax (NL)	+	Reduction of CO ₂ emissions by 1.7 million tons in 1994
CO ₂ tax (S)	++	— Reduction of Swedish CO ₂ emission by 5 million tons in the period of 1991-1994 (9 per cent of total emissions) — Amount of biomass fuel used at heating plants doubled from 10.2 to 20.4 TWh or from 25% to 42% of total district heating, whereas fossil fuels decreased from 36% to 30% (1990-1995) — Reduction in the district heating sector by 1.5 million tonnes
Environmental classification of diesel oil (S)	+++	In 1991 almost no automotive diesel was sold of Environmental Class (EC) 1 and EC 2, it rose to 50% in 1992 (4% for EC 1 and 46% for EC 2) and in 1993 20% was sold in EC 1 and 57% of EC 2
Environmental classification of petrol (S)	+++	EC2 (more environmentally friendly) accounted for 6% in first half of 1994, 16% for the second half and 85% in December when the tax differential took effect
Excise duties on motor fuels (A, B, CH, CZ, D, DK, E, FIN, F, GR, HU, I, ICE, IRL, L, N, NL, P, S, UK)	++	(See UK road fuel escalator below)
Fertiliser tax (FIN)	++	— Consumption of nitrogen fertiliser was in the 1990s about 40m kg less than in the 1980s and about 22% less than without the price increase of the levy — 11% reduction [period unclear] of total fertiliser use brought by changes in prices of production factors
Fuel duty escalator (UK)	+/?	Average miles per hour for lorries over 33 tonnes increased by 13% (1993-1998)
Landfill tax (UK)	++	64% of interviewed companies recycled, reused or minimised their waste, whereas only 29% were already engaged in re-use, recycling and minimisation beforehand, 13% knew about the tax but did nothing and 11% knew, analysed though did nothing

Table 1. (continued)

<i>Instrument</i>	<i>Environmental Effect</i>	<i>Remarks on Effectiveness</i>
NO _x charge (S)	+++	— NO _x emissions from combustion plants would have been 25% or 10.000 tons higher in 1995 (likely against 1992) (app. 3 per cent of total NO _x emission of Sweden) — Emissions from boilers would have been 80% higher
Pesticide tax (DK)	+	Consumption fell by 10-13% (1995/96-1997), although this is not entirely to the tax
Pesticide tax (S)	++	Reduction of sales of pesticides by 35 per cent between 1981-1985
Petroleum tax differential (P)	++	Share of super unleaded petrol increased from 0.3% to 18.3% (1989-1993)
Regulatory energy tax (NL)	+	— Estimated Increase of energy-saving by 1-3 per cent — Increase of economic feasibility of energy-saving measures by 5 per cent
Sales tax differentiation for 'clean' cars (S)	+/?	'soft effects' had an impact on newly registered cars belonging to classes 1+2, it did rise from about 16% to over 75% (1993-1996)
Sulphur tax (DK)	+++	— Decreasing sulphur content of fuel gas oil from 0.2 to 0.05% (within a few weeks from introduction in 1996) and the sulphur content of coal has been reduced by 30-35% — 33% reduction of SO ₂ emissions in 1996 in the "other sectors" by a changeover to low sulphur content fuels
Sulphur tax (S)	++	— Decrease of sulphur content of oil-based fuels of more than 50 per cent below the legal limit (0.2 per cent). — Total reductions of 19.000 SO ₂ (1989-1995) which stands for 30% of the total emissions reduction
Tax differential on high sulphur diesel (UK)	++	Proportion of ultra low sulphur diesel (ULSD) increased from 0 to 43% by Feb. 1999
Tax differentiation on leaded petrol (A, B, CH, DK, E, FIN, F, D, GR, HU, IRL, I, ICE, L, N, NL, P, POL, S, UK)	+++	Seldom quantified
Tax on some substances in commercial fertiliser (S)	++	— Fertiliser use declined by 2-3% in the first years — Reduction in use of nitrogen fertiliser by 15-20% (1991/1992) — Reduction in cadmium content from 35 to 20 grams cadmium per tonne phosphorus (likely in 1994)
Taxes levied on the purchase or registration of a new car (A, B, CH, DK, E, FIN, GR, HU, I, ICE, IRL, N, NL, P, S)	++	— e.g. car fleet in Denmark is about 30% versus over 50% in Germany
The energy package (CO ₂ tax, sulphur tax, energy tax) (DK)	++	— Decrease of consumption on space heating by 10-15% (1970s to the 1990s) — Share of energy-saving refrigerators increased from 40% to 85% (1994-1996)
Vehicle scrapping charge (S) Vehicle scrapping premium	+/?	A "clear reduction" in number of abandoned cars
Waste tax (DK)	++	— Return rates increased from 35 to 61 per cent (1985-1995) — Recycling of construction waste increased from 0.8 to 1.6 mio. tons (1991-1995) — Waste dumping decreased from 39 to 18 per cent (1985-1995) — Household waste reduced by 16 per cent, construction waste by over 60 per cent, "miscellaneous" waste by 22 per cent, industrial waste increased by 8 per cent (1987-1993) — More than 80% of the reduction occurred in areas not subject to regulation, where establishment of new recycling facilities played a big role

Source: EEA (1996), excerpt from Wuppertal Institute's contribution to EEA (2000)

Note: Size of effect: + (small) ++ (medium) +++ (large) ? (unknown effect)

Competitiveness

Competitiveness has become the major concern in most countries implementing steps of an ETR, strongly related to the demand for international harmonisation. Industry often claims that the implementation of regular tax rates within an ETR would lead to a reallocation of companies abroad. As a consequence, environmental pollution—as far as greenhouse gases are concerned—would not be reduced, but would just take place abroad because the products would still be imported. Also, the economy would lose due to the loss of jobs.

However, this perspective presents only one side of the coin. So far, the polluter pays principle is not sufficiently applied, and the so-called external costs are not internalised in market prices. This means that the costs caused by environmental damages are borne by society, but not by the polluter. Hence, companies offering environmentally friendly, eco-efficient technologies, processes, products and services are facing a disadvantage. Were these costs internalised, the demand for such commodities would be much higher leading to increased competitiveness of these companies. Consequently, the perceived problem is more a problem of transition. The crucial question is thus: To what extent can a government burden its energy-intensive industries without the industry reallocating or closing down in the short run while providing incentives to increase demand for efficient commodities of advanced industries?

This ambivalence is also mirrored by the fact that initially an ETR was considered as an effective instrument to spur innovation and reach environmental targets more effectively. Though this still holds true, it is no longer so much at the core of discussion. Instead, concerns about the competitiveness of energy intensive industries dominate debates for a long time.

Another surrounding debate is that on the “national go-it-alone effort”. To what extent may a country go ahead with implementing an ecological tax reform, possibly damaging its energy intensive industries, if others have not yet done so? Considering the recent implementation of the first of five steps of an ecological tax reform in Germany by 1 April 1999, Germany has in no way chosen a “national go-it-alone effort”, as is so often asserted, usually by domestic industry; quite the opposite. The majority of the EU States have meanwhile implemented more or less many elements of ecological tax reforms—and partly even higher energy taxation. Now that Germany is one of the countries implementing ecological tax reform, others have again more windows of opportunity to further increase their tax levels. This holds true for Denmark and the Netherlands, which explicitly orient their environmental, but particularly energy tax policy along the steps Germany is taking.

Both immediately increased diesel taxes, while Denmark was even a quarter earlier by accident since the initial time for its introduction was January 1999. Germany thus helped to break the deadlock situation and has allowed for new dynamics in Europe.

Italy also contributed to this dynamic substantially. In 1999, Italy was the first southern country to embark on carrying out eco-tax reform in five stages up to 2004.

The question of “national go-it-alone effort” or not is based moreover on a somewhat peculiar understanding of progress. Once one transfers the development of progress to companies, products and processes, this can only mean that something is tried out and done individually, without everything being done the same way and at the same time by everyone. This is how innovation happens—by trial and error. Transferred to the environmental tax debate, it means that one or two countries must, of course, lead the way and experiment, to learn from their experiences. Then, when they see that the concept makes sense, others will follow to a certain extent and as a result make that progress a part of everyday life. In that light, ecological tax reform is well on the way to being introduced and developed by most countries in Europe, and possibly also other industrialised countries.

Denmark and the Netherlands have both taken different approaches to combat possibly negative impacts on the competitiveness of energy-intensive industries. Denmark has applied differentiated tax rates depending on the existence of environmental agreements and respective measures taken and on the energy-intensity of various processes (for example, space heating is equally taxed as households since this is not relevant for competitiveness), gradually increasing rates while recycling all revenues through energy investment grants and reduction of social security contributions. The Netherlands has simply differentiated according to the amount of energy consumed. More details can be found in Annex I.

Interestingly, some of the countries at the forefront, like Denmark and the Netherlands have good economic indicators that show high growth rates and low unemployment figures (Annex I). There has been no apparent negative effect on the competitiveness of the pioneer states either. This can also be concluded from a worldwide comparative study by the *Institute for Management Development*, in which Denmark, Norway and the Netherlands were identified as the most strongly competitive (IMD, 1996). Furthermore, an empirical study unveils that the design of the ETR in Denmark is most profitable for industry (Clasen, 1998a and 1998b).

By using two examples—the Netherlands and Denmark—it is clear that an ETR can be organized so that it avoids negative effects without necessarily stopping the positive ones from being effective. No com-

pany reallocated abroad because of environmental tax reform; on the contrary, the export of environmental technologies was able to be increased in Denmark. There is an analysis of the impacts on employment, which is closely related to competitiveness, in the next section on employment.

Employment

The impact of an ETR on employment is another big issue. Protagonists argue that major positive job impacts would arise from a shift to more labour-intensive products and processes. Many computer simulations have been carried out, aiming at finding more insights in the existence of a "double dividend". This double dividend would consist of higher environmental protection whereas also increasing overall welfare, either by higher growth or by creating more jobs. In a nutshell, the large majority of studies indicates that there will be a small, but positive double dividend (INFRAS/ECOPLAN, 1996).

Looking for practical evidence is much more difficult since the macro-economic impacts of ecological tax reform is often over-estimated. Thus, other factors such as exchange rates, labour market developments, tariff agreements, interest rates, demand, and so on, have a much larger influence on the economic performance in general and on employment in particular. However, theory on the one hand, but also politicians on the other, increasingly ask for empirical evidence. Still, this is a very hard task given so many influencing and dominating factors. It is thus hardly possible to carry out such a task. Still, an attempt is made in the following, providing comparisons on a macro level, but also giving some indications for possible employment impacts on a micro level. It is very important to note that the following analysis is based on figures before the ecological tax reform was introduced in Germany.

Unemployment rates and ecological tax reform

Largely simultaneous with the introduction of an ETR, unemployment rates in Denmark and the Netherlands are falling. In Germany, on the other hand, where no ETR had been introduced up to the end of March 1999, the rate of unemployment rose almost continuously. Moreover, the rates in Denmark of 7.4 per cent and in the Netherlands of 5.6 per cent in 1998 were the lowest for several years, while Germany notched to 10.9 per cent.

On the one hand, it is clear that as yet no causality is connected with the observation of these phenomena. On the other hand, a connection can be assumed on the basis of the theoretical discussion. In the example of Denmark in particular, the effects of the ETR on the job market can be described. The 1999 publication of the evaluation of the CO₂ tax in

Denmark also suggests that positive effects ensued in the job market (Danish Government, 1999a and 1999b).

The falling unemployment rates in the Netherlands and Denmark can clearly be attributed to a great extent to the higher proportion of part-time employment in Denmark and in the Netherlands. Also the noticeably more active jobs market policy in these two countries is reflected here. Another factor is the different statistical definition of who shows as unemployed in the statistics. In Germany, a substantial

Table 2: Unemployment rates 1990-1998 (per cent)

Country	1990	1995	1996	1997	1998
Denmark	9.6	10.3	8.8	8.1	7.4
Germany	6.2	9.4	10.3	11.1	10.9
Netherlands	6.0	7.1	6.7	6.2	5.6

Source: OECD (1997c), p. A24, table 21.

part of the increase in the rate of unemployment can be explained by the unification of Germany and the associated de-industrialization of East Germany. Consequently, at the present time probably only a small part of the declining unemployment rate is attributable to the introduction of an ETR. (Schlegelmilch 1998c).

(a) Denmark

Since energy intensive processes were only burdened to a very low degree, no job losses happened there as far as is known. The relatively constructive co-operation of the Danish Industry Confederation (Dansk Industri) contributed to this (Schlegelmilch, 1998a).

In the field of regenerative industries, Denmark forced the development of wind power and biomass thermal power stations. New, competitive jobs no doubt resulted from this. Thus in 1997, the turnover of Danish manufacturers of wind power plants climbed to 1.3 billion DM. Meanwhile, they employed more than 10,000 people (Zank, 1998, 16). In 1996 Denmark was the third largest market in the world for the installation of wind power plants (Worldwatch Institute, 1997, 52). This positive development was confirmed by the Danish Department of Trade and Industry and it supplemented its good experiences with an associated export drive: "Danish experience through many years is that we have not damaged our competitiveness because of green taxes. In addition, we have developed new exports in the environmental

area.” (Danish Minister of Economic Affairs, 1996)

The sales of refrigerators experienced a boom after the introduction of the ETR, which also led to additional employment. Not only were significantly more refrigerators sold than previously, but the demand for energy-saving appliances rose sharply. During the early part of 1994 just 40 per cent of the appliances sold were of more than average efficiency, but by the end of 1996 energy-saving appliances accounted for over 85 per cent of sales. In 1994 and 1995, mainly C-class appliances were bought, which use 10 per cent less electricity than the average. In 1996 B-class appliances were in most demand, which are up to 35 per cent more efficient. In the meantime, A and B class appliances account for more than 50 per cent of refrigerators sold in Denmark (Jänicke and others, 1997).

The Danish Energy Agency took on about 40 employees to cover the voluntary energy audits. Since energy audits are also partially carried out by outside consultants, a positive employment effect was also registered here. In the case of tax consultancies such as KPMG, the actual implementation of the ETR provided a demand for advisory services at the company level with a corresponding employment effect.

However, there is, in part macro-economically, the methodical problem of clearly allocating these positive employment effects to an ETR. The essential instrument in support of wind power is the obligation of electricity companies to pay an appropriate refund to the wind turbine operators. In real terms about EUR 0.08 per kilowatt-hour must be paid. High energy prices would also be of additional assistance for wind power. Denmark is one of the few countries to have kept the energy price level artificially high after the oil price crisis of the 1970s and has not reduced them, with the result that efforts in energy conservation continue to pay off and were not reduced by the fall in oil prices since the beginning of the 1980s.

The presumed connection of the medium and long term drop in unemployment rates and the introduction of the ETR is supported by the estimate of the expected macro-economic effects of the changes in taxation of energy by the Danish Ministry of Finance. According to that estimate, employment will rise by a net 2,000 additional jobs by the year 2000 (Danish Ministry of Finance, 1995, 17-20). This is explained in part by the fact that the total industrial costs burden will decrease by one half of one per cent in the year 2000, which is conditional upon a reduction in the employers' social security contributions and a special fund for small businesses.

A comparative study shows that the tax solution in Denmark has produced noticeably lower CO₂ emissions in the industrial sector than a solution mainly based on covenants (a kind of environmental agreement) for energy intensive industries provided with few incentives in the Netherlands (Enevoldsen, 1998 and 2000).

(b) *The Netherlands*

As pointed out above, the Netherlands has falling rates of unemployment. There is still no information available at company and sector levels. There is only an estimate of the expected employment effects of the ETR in the Netherlands prepared by the Centraal Planbureau (CPB)—the official economic advisory bureau of the Netherlands government. In it the effects of the ETR on employment are assessed as minor but positive. The unions are asked not to boost the wage-price spiral to compensate for price rises. Indeed, two large unions have undertaken not to take possible price rises triggered by the ETR as a reason for higher wage demands. As a result they are meeting a very important condition for ensuring the creation of extra jobs. Whether a price rise has been caused like that has not yet been analysed.

Interim Conclusions

The politically important conclusion is: No exodus of industry or even single branches or companies—so often feared—occurs with an intelligent concept for ecological tax reform. Rather, it has a tendency to secure jobs and create new ones.

The arguments produced for the net employment effect of an ETR on the national leadership anticipates the occurrence of a positive net effect. The innovations initiated by the ETR and the associated dynamic contribute to this. Also of considerable importance is the intelligent concept of the tax reform in a manner that allows it to use national leeway even in a time of increasing globalization and to be a pioneer in tax/environment policy. The positive development of unemployment rates and the approximately simultaneous introduction of an ETR in Denmark and the Netherlands as well as the positive effects at sector and company levels suggest the conclusion that a causality is to be seen between the two—a confirmation of the “double dividend” theory, as it were. However, these developments in the job market are partly attributable to an active employment policy and more part-time working. The effects of the ETR could be relatively low in the short term, but positive. In the long term, and that is where an ETR is aimed, the effects on the employment market could be greater. But an ecological tax reform cannot be expected to remedy the unemployment problem by itself, even in part. Besides, deeper evaluations of the connections are missing. In summary, it may be worth remembering that the ETR—as far as is known—had no negative effect on the job market either in Denmark or the Netherlands. On the other hand, there are obvious positive indications and evidence for the policy.

The OECD also encourages its Member States to introduce an ETR: “Consequently the individual countries, as part of the current process of structural adaptation and regulation shaping in the OECD area, should investigate the possibilities and the potential for ecologizing their tax systems considering the

country-specific economic, financial and environmentally political constraints. Concerted action would reduce potential emission transfer and unwanted interference with competitiveness to a minimum." (OECD, 1997b, 12). Thus, the greatest employment policy effects could be implemented.

Equity

Low-income groups normally have to spend relatively more of their income on energy products than on average and than rich people. Still, they do also often benefit physically more than on average from reduced pollution as they are normally hit hardest by environmental pollution. This has been shown by an empirical comparison between the distribution of incomes and the environmental pollution in a city such as Berlin where data for such an analysis was available (Luhmann, Ell and Roemer, 1998). Depending on the social and cultural background of a society, this issue is either only a side-issue or even becomes the guiding principle when implementing an ETR. Implementation issues are shown through the examples of the United Kingdom and the Netherlands where these issues were very dominant. Still, equity will also be considered with respect to the terms of trade and the relation to least developed countries.

For the United Kingdom, this issue is the most relevant concern. On 9 March 1999, the United Kingdom announced in its budget—which was greener than ever before—the introduction in April 2001 of a tax on—and this is extremely noteworthy—industrial energy consumption. This was detailed in November 1999. This means explicitly that higher taxation on private households will not be aimed at. The background to this is as follows. In 1993 the John Major government attempted to raise the VAT rate on private energy consumption, in particular on light heating oil, in two stages from the then 0 per cent to 8 and 17.5 per cent. The first stage was implemented successfully, but the full plan was felt to be socially unjust. The British weather, together with the relatively poor standard of heat insulation of British houses and the shortage of capital of many house owners (to possibly invest in better insulation) had significantly increased energy costs. Labour at that time was vehemently opposed to this, and promised to lower the VAT from 8 to 5 per cent, which they in fact did in 1998 after the change of government. Against the background of this public dispute, the almost revolutionary "fuel duty escalator" was able to be pushed through in 1993 without much discussion, though its revenue will be hypothecated from the year 2000 on and spent for public transport means.

A different approach was chosen by the Netherlands in order to meet social concerns. Apart from competitive concerns, social ones were at the core of the debate and many calculations were carried out so

as to ensure the social balance of the environmental tax reform. So as not to overburden lower income groups excessively, tax-free allowances of 800 kilowatt-hours (kWh) and 800 cubic meters (cbm) of gas were introduced, on which neither households nor companies need to pay tax. In order not to tax bulk consumers too heavily, at the beginning (between 1996 and 1998) quantities over 170,000 cbm of gas and 50,000 kWh of electricity were also exempted from the tax. Other minor adjustments were also made. However, according to information from the Netherlands Finance Ministry, the complete gas and electricity consumption by households and about 95 per cent of the corresponding company consumption are affected by the tax. A drop of five per cent is expected in CO₂ emissions by the year 2000 because of the taxation on consumption.

In 1998, the government noticeably raised the tax-free limits on the basis of the third and final report of the environmental tax reform commission. The limits up to which electricity and gas are taxed were increased from 50,000 kWh of electricity to 10 million kWh and from 170,000 cbm of gas to 1 million cbm respectively (this equals approximately 10 million kWh).

The expected revenue of 2.1 billion Dutch Guilders (NLG) in 1998 was refunded in proportion to the revenue to households (less than 60 per cent) and companies (more than 40 per cent). For this purpose the income tax for households was changed at three points: (1) the entry tax rate was reduced by 0.6 per cent, (2) the tax-free subsistence level minimum was increased by 80 NLG and (3) tax allowances for senior citizens were increased by 1 per cent.

Furthermore, employers' social security contributions were decreased. Small companies are able to claim higher tax relief, and the corporation tax was reduced by three per cent over the first 100,000 NLG. Lastly, the regenerative energy source operator obtained a full refund, and is thus exempted from the tax. Until 2001 the Netherlands will double the tax rates introduced between 1996 and 1998 again.

This example demonstrates that one can keep up the entire incentive function for households while keeping the tax burden low. It is done by mainly taxing the marginal energy consumption and leaving bulk energy consumption, here considered as required for living (a kind of existence minimum), tax free. The marginal tax rate is high while the average tax burden is low. Though the concept is administrable in the Netherlands, it does certainly depend on a metering infrastructure. However, in this electronic and technical world it appears feasible to transfer such an approach to other countries, too.

If equity is considered in the context of the developing countries, the fear often is that taxing energy or other raw materials will hit their export economy. At first sight this certainly is an argument. However, it does not specifically apply to the concept of an ETR

but it holds true for any measure or simply reduction of demand of a commodity. Hence, one first has to analyse the policy that is followed in industrialised countries. If, and this is mostly the case, the aim is to increase efficiency, be it energy or resource efficiency, then it is this policy which might affect demand, but not the chosen instrument such as a tax. An ETR can neither solve nor worsen the problems that exist. Still, if pressure from least developed countries is increased they might succeed in gaining some of the additional revenues (currently not the case due to the guiding principle of revenue neutrality) for official development assistance (ODA).

Trade-off between environmental and fiscal objectives

When countries are about to start implementing an ETR, a trade-off between environmental and fiscal objectives is often perceived as an unresolvable issue. Both aims seem to exclude each other, which, indeed, holds true in theory. However, practice and simulations have clearly shown that an ETR can serve both purposes over a long term. Still, it is not always predictable to what extent which objective can be achieved. Furthermore, the motivation to introduce such taxes often differs between various stakeholders. Hence, quite a few taxes serve at least two purposes, whereas the trigger for high revenues often stems from the labour side wishing to reduce the burden on labour. Still, the environmentalists are not unsatisfied since the interest of the finance and labour side will ensure a steadily increasing level of taxation and thus incentives.

Some considerations on two fundamentally different types of environmental taxes may help to get an understanding in which cases the trade-off becomes irrelevant and which cases it is negligible.

Introducing a product tax can make that trade-off occur significantly. This holds particularly true if alternatives are readily available and if no tax is levied on that alternative. For example, given the introduction of a tax on aluminium cans, consumers might easily change preferences due to increasing prices and buy glass bottles. Then tax revenues would soon fall, but the environmental impact would be large. However, product taxes are one element of an ecological tax reform only. And in fact, they mostly constitute only a minor part in terms of revenues.

If an ecological tax reform is introduced, not product but energy taxes are practically at the core of the reform since they ensure a broad and fairly stable source of revenues. Only given this prerequisite is it possible to do a reform. By counting on substantial revenues at least for mid-term, finance ministries are ready to use the revenues for the reduction of other taxes or levies. Energy consumption can simply not be substituted either in the short-term or in the mid-term. Hence, taxing energy is an ideal revenue raiser

(only a little bit less ideal is CO₂). Looking back on the outgoing century one easily notices that finance ministers have relied heavily on some kind of energy taxation. Mineral oils in particular often provide for the third largest source of revenues in federal budgets (after income and value-added taxes). And ministers were not afraid of losing revenues when increasing rates. Quite the opposite. They did the latter again and again while revenues did so as well. Still, now as they are not only increased for financing the budget, the announcement of further increases is likely to have a certain environmental impact. But it should not be overestimated since mobility is increasing and basically not price driven, but demand driven.

Of course, the question immediately arises of whether these mineral oil taxes have had any environmental impact. This is certainly not true since increase of demand for mineral oils would certainly have been higher than without any tax. However, the assessment is difficult as shown in the previous section.

In the case of the Netherlands a specific problem appears to emerge, which is that revenue recycling seems to become difficult. Still, it is interesting to note that the Netherlands have already achieved such a state.

A final remark shall be made on the expectations which an environmental tax reform meets. Hardly ever has a tax reform concept had to meet so many requirements. Compared with dozens of income tax reforms where long-term predictability of revenues were often not even considered, environmental tax reform must prove this. Looking back in time, the history of public finance tells us that as soon as a potential new tax base is ready to be taxed, it will be taxed. This still holds true and thus any worries about a decrease of revenues should not be overestimated.

Reducing environmentally counterproductive subsidies and tax expenditures

Reducing environmentally counterproductive subsidies and tax expenditures is often claimed to be the best way of starting a fiscal reform instead of starting with introducing environmental taxes. Although this is theoretically certainly the adequate order, policy does not care too much about it, but often seems to prefer the second best approach of introducing taxes first. Still surprisingly, after implementing first steps of an ETR countries often shifted the focus towards reducing environmentally damaging subsidies. Hence, it is interesting to note that through an initially second best approach the first best approach can be more easily followed. This holds true for Norway and the Netherlands. This was, if not triggered, at least essentially influenced by reports from commissions on ecological tax reforms in these two countries.

Still, the United Kingdom first reduced support to coal mining substantially before introducing environ-

mental taxes. This also appears to be the way forward in the United States. Introducing new taxes or increasing existing ones appears to be almost like committing political suicide. Hence, decreasing subsidies, possibly first the most environmentally damaging subsidies presents an approach that was at least partially successful (Friends of the Earth, 1999). However, in times of falling world market prices for oil, as in the first half of 1999, the government seemed to abandon its initial approach and put the profitability of oil and other energy companies higher on the agenda and provided generous tax exemptions for those sectors. The danger emerges again that abandoned subsidies revive again and that past small steps are now turned into fake reforms, easily reversible. Apparently economic considerations are still dominating fiscal and environmental ones.

Impacts on inflation

Impacts on inflation are an issue in countries which are members of the European Monetary Union (EMU). Here, three criteria for entering and remaining in the EMU apply, of which one is an inflation rate of no more than 3 per cent. Hence this topic has attracted particular attention from southern countries with traditionally high inflation rates. Some use this argument for preventing any additional energy taxation, others even reduce existing taxes to mitigate the effects triggered by the increase of world market prices for oil.

This topic is particularly stressed by the so-called cohesion countries such as Spain, Ireland, Greece and Portugal, since Greece is not yet a member of the EMU because it failed compliance with some criteria and the others fear being penalised due to non-compliance. However, reducing other taxes than energy or environmental taxes is another possibility of how to avoid such effects.

Particularly in CEE countries, environmental tax rates are often linked to income or inflation in order to keep up the level of incentive. This is of great importance to really provide incentives. In the past this has not always been the case given that inflation rates were often far more than 10 per cent. Indexation ensures an automatic increase, possibly also above inflation rates in order to increase the incentive. This has been established in the United Kingdom, which is already well-known for the automatic increase in fuel tax of about 6 per cent above inflation without time restriction, the so-called "fuel tax escalator". First, at the beginning of the 1990s, the taxes on diesel and petrol—a worldwide one-off—were raised to the same level. Secondly, in March 1993, it was resolved that a start would be made with a real annual tax rate increase of 3 per cent, in November the annual rate increase was raised to 5 per cent, and the new Labour government under Tony Blair resolved to raise it to 6 per cent in

1998.

Legal Restrictions

Legal matters are raised, particularly when it comes to the discussion of international action. Here EU and WTO-rules play an important role. The major question is often, if and by which means is a country which implements ETR allowed to ensure that its industry is not set at a disadvantage by higher environmental taxes whilst not abusing them for illegible protectionism. But also on a national level, debates on the eligibility of certain environmental taxes within the constitutional framework are taking place. The latter is perceived as too specific to be discussed here since every country has its own evolution and thus constitutional framework for such taxes.

Environmental tariffs can ensure that imports pay a similar level of tax to domestic products, thereby neutralising any competitiveness effects in the domestic market, while export rebates can ensure that the taxed domestic industries' ability to compete abroad does not suffer. However, calculating appropriate tariffs on imports, especially when the environmental tax base is an industrial input, such as energy, rather than a final product, is difficult, and easily interpreted, rightly or wrongly, as protectionism.

Border tax adjustments may run counter to international trade rules which are exactly designed to prevent protectionism. This is particularly true if domestic and foreign products are not treated equally. But in general, border tax adjustments are an important means of providing an equal level playing field. However, so far it is only applied in a single case with respect to environmental taxes, whereas it is often applied in the case of turnover taxes in the particular case of value added tax as in the European Union. The United States has set up a border tax adjustment for its tax on chlorofluorocarbons (CFC). It is levied on imports on the basis of calculations of CFCs used as content as well as in the imports' manufacture (Hoerner, 1998, 185-199). Still, whether border tax adjustment on energy or carbon content will be set up is unclear since calculation appears to be more difficult. Given the enormous amount of information available nowadays it is though not only of theoretical value, but could well become relevant in practice.

Another example of legal problems became visible when the EU Court of Justice in a sentence on 2 April 1998 ruled that Finland must abolish a discriminatory fiscal provision. An importer of electricity from Sweden to Finland had complained that the electricity, which he argued was generated from renewable energy sources, was taxed at a higher rate than electricity domestically generated from renewable energy sources in Finland. This sentence rendered it even more difficult to exempt electricity from renewables from electricity taxation. But it was stated that not even the possibility of proofing that the electricity

was generated from renewables was eligible which may be interpreted as a possible solution. Hence, a network called Renewable Energy Certificate System (RECS) is currently carrying out a pilot project to establish such a certificate system on which all participating countries could rely (<http://www.recs.org>). This appears to be a prerequisite for trading renewables, but also for treating them preferentially from a fiscal point of view.

There are many more legal problems involved and particularly countries at the forefront in Europe have a long (and often bad) experience with respect to extending environmental taxation. Examples are that Denmark was neither allowed to tax kerosene on flights of commercial carriers, nor to tax at least the fuel consumption of its domestic ships and ferries.

State aid poses another particular problem for countries who wish to go ahead. Here, clear guidelines and practice from the European Commission are required to ensure that Member States of the EU are not facing problems when applying reduced tax rates for energy-intensive branches which might otherwise reallocate abroad. As long as no sufficient international harmonisation is achieved, such provisions must be allowed if forerunners are not to be discouraged. Still the Commission always asks for degressive and limited exceptions even though international harmonisation has not made real progress.

At the EU level the biggest barrier to progress is the requirement for unanimity voting on all fiscal matters thus, including those environmentally related. After the many years of fruitless discussions on an EU-wide CO₂-energy tax since 1992, there has been a new Directive proposal from the Commission on the table since 1997 (so-called Monti proposal), that (a) provides for an extension of the already currently valid minimum taxation of mineral oils to all energy sources—with the exception of renewable ones, and (b) an increase of all minimum tax rates in three stages (initially 1998/2000/2002).

Although several Presidencies tried to get the Council to adopt this proposal, it failed until now. Cohesion states in particular, mainly Spain and Ireland, have come out against the Commission proposal. As a result in the first half of 1999, the German Presidency for its part, has attempted to identify the specific problems that the individual states have with the proposal, and to point out correspondingly specific solution approaches in a compromise paper (<http://www.oeko-steuer.de>). Specific often means that exceptions and interim periods are authorized in order to achieve a way in at EU level. However, a breakthrough could not be achieved. This means that 13 of the 15 countries are in favour. The negotiations are proving to be very difficult, and, because of the consensus principle, it is hardly foreseeable how a compromise can essentially be achieved about the lowest common denominator, if at all. The right of veto of one of the countries prevents EU-wide pro-

gressive energy taxation.

In the conclusion of the presidency of the Cologne EU summit in June 1999 the subject was touched upon in three points:

“The European Council emphasises the need to make tax systems in Europe more employment-friendly and to combat harmful tax competition: Confirming the conclusions of the Vienna European Council, the European Council calls for: ... the Council to continue its work on a framework for the taxation of energy on the basis of the ECOFIN Council report, bearing in mind the impact it will have on the environment” (No. 22).

“The European Council also considers an appropriate framework for energy taxation to be necessary and urges the Council (Economic and Financial Questions) to reach an early decision in the course of its discussions. The European Council takes note of the incoming Presidency’s initiative to step up the Community’s activities on climate matters.” (No. 31)

“It calls upon the Council ... (Economic and Financial Questions)... to report back to it in 2000 on the integration of environmental issues and sustainable development into each of the policy areas.” (No. 32)

Behind it are concealed in part very different initial situations. How is one to deal with the fact that we are indeed talking about an EU-wide energy taxation, but the energy policy and also the energy mix in the individual Member States differ widely on occasions? Would it make sense to start with the uniform minimum taxation of products that are used in similar ways in most of the countries, such as petrol and diesel, and possibly also electricity?

In December 1997 a consensus for a code of behaviour with regard to company taxation was made. Why should something similar not be possible in relation to energy taxation? The Monti proposal can also be interpreted as such a behavioural code, since on the one hand it stipulates a minimum taxation, but on the other hand it makes no stipulation for the structure and maximum rates. Sometimes it is easier if the thing is called by another name. Perhaps the latter would be an approach for making progress EU-wide.

At the same time, the so-called “like-minded” countries, should include their previous meetings and at least come to closer co-ordination of their next stage of ecological tax reform. As a result, problems that might otherwise arise for the economy could be reduced. Even the exemption from the electricity tax for renewable energy sources aimed at for Germany and other countries could happen much more elegantly and simply if all the pioneer states could decide on a similar procedure.

As part of the next intergovernmental conference on the further development of the EU Treaty the subject of consensus about tax regulations, especially of environment policy relevant decisions, will certainly be on the agenda again.

Moreover, one should not only cast one’s eyes in

Table 3. Details of Ecological Tax/Budget Reform Commissions

Country	Date of introduction	Environmental taxes	Recycling revenues	Damaging subsidies	Other damaging effects of fiscal reform	Within the context of broader tax reform
Austria	1998	+	+	+	+/?	+
Belgium	1993	+	+	-	-/?	?
Denmark	1993	+	+	-	-	+
Ireland	1996/97	+	+	-	?	?
Netherlands	1995/1990*	+	+	-/?	+	+
Norway	1994/1990*	+	+	+	+	+
Sweden	1995	+	+	-	+/?	+
U.K.	1998	+	+	-	-	+
Canada	1994	+	+	+	+/?	?
Japan	1994	+	+	-	-/?	?
USA	1993	+	+	+	+	+

Source: Schlegelmilch (1999a).

Note: + = considered; - = not considered; ? = unknown or unclear; * = earlier commission existed in this year

Comments:

- (a) Austria: Though environmental taxes were examined as part of a major tax reform, no implementation of either results of the Commission took place due to forthcoming elections. The report was published at the end of 1998 (<http://www.bmf.gv.at>).
- (b) Belgium: So far, packaging taxes appear to be the focus of the Commission.
- (c) Denmark: Commission facilitated the implementation of an ecological tax reform; strong political commitment.
- (d) Ireland: Initially almost no information was available as it was a purely inter-ministerial committee, but it published a report with several deliberations mid-1999.
- (e) Netherlands: Commission helped to accelerate implementation and acceptance of environmental taxes. A summarising report of all three Commissions is available, dated 1998.
- (f) Norway: Commission made concrete proposals for ecological tax reform, taking into account the employment issues. The Commission released a report on its work in 1997.
- (g) Sweden: Commission did some macroeconomic modelling and came up with concrete proposals.
- (h) U.K.: The results of the consultation paper by Lord Collin Marshall (1998) prepared the floor for the announcement of the introduction of a tax on industrial energy consumption for 2001 by the Finance Minister, Gordon Brown.
- (i) Canada: Commission ended its discussions due to a disputed range of approaches and recommendations; hardly any implementation as a result.
- (j) Japan: Commission promoted the use of economic instruments, particularly environmental taxes; a summary of the report is available in English.
- (k) USA: general fiscal considerations within a broader approach, of which the environment is one of several issues. A report was published in 1997.

the direction of energy taxes. There are several dozen other types of eco-taxes on various substances and activities that could also be subject to taxation. So there is very vague consideration by the EU Commission about taxation on pesticides and/or fertilizer.

Institutional Approaches, Capacity Building

An institutional approach of how to overcome various barriers has been the setting up of an ETR-Commission. These commissions often helped to shift

the focus from ETR only to subsidies and other provisions which are potentially environmentally damaging. Hence, "Green Budget Reforms" (GBR) are increasingly considered, taking into account all environmentally relevant fiscal activities of a state. They are particularly valuable if the political will for continuous efforts of greening the budget is given. If political will is lacking it also renders implementation very difficult although a commission may have been set up (Japan, Canada, USA, Ireland). The following table 3 provides an overview.

Procedural Aspects

Considering the procedure how ecological tax reforms are implemented, the United Kingdom, apart from the abovementioned Commissions provides useful guidance.

Of particular interest, is the extremely transparent and open procedure by which this political decision to introduce a tax on industrial energy consumption was arrived at. At the beginning of 1998 the Chancellor of the Exchequers, Gordon Brown, commissioned Lord Collin Marshall, the former president of the Confederation of British Industry (CBI) (comparable to the German BDI) and currently chairman of British Airways, to investigate which economic instruments would be most suitable for lowering industrial energy consumption. Lord Marshall then published a consultation paper containing many questions, which were also placed on the Internet, addressed to interested specialists in general, and asking for answers to be given to the questions. These were mainly concentrated on whether an energy tax or an emissions trading would be more suitable for reducing the greenhouse gas emissions. Until July 1998 anyone could deliver an opinion on the subject. In spite of this "world-wide" publication, the Wuppertal Institute for Climate, Environment and Energy, Germany, was the only foreign institute to comment. In November 1998 Marshall then delivered his report to the Government, with the conclusion stating "Hence, my conclusion is that there probably is a role for a tax if businesses of all sizes and from all sectors are to contribute to improved energy efficiency and help meet the UK's emissions targets." (Marshall, 1998). Report and recommendations were then considered by Gordon Brown and his team. In a budget speech on 9 March 1999 he announced the introduction of a tax in April 2001, mentioning several details of the tax which was also named climate change levy (CCL). This is two years prior introduction that the Chancellor delivered a report specifying the legal, administrative and economic questions that would have to be answered about the organization of the CCL. Anyone who wished to respond could do so by 28 May 1999. After intensive consultations with industry the Chancellor announced on 9 November 1999 the concrete rates which were substantially reduced against the initial plans. Though industry is not in favour of this tax, it recognises the transparent and open process.

A less positive example is Slovenia. It introduced a CO₂ tax in 1997 as the first EU accession candidate. Its price effects varied between three and eleven per cent. At the beginning of 1998 it tripled, which caused small disgruntlement in trade and industry. The particular reason for this was the unexpected increase and the way the tax revenue was applied. As in 1997, the tax was increased unannounced, so that no one had been able to anticipate

the increase with the corresponding investment and consumer behaviour. Furthermore, the revenue was not returned to trade and industry as a whole, but used clearly and specifically for the investment in filters of a refinery.

The Central and Eastern European (CEE) countries still have a ways to go in order to increase the proportion of environmental taxes and their public acceptance. In many of these countries the grounds for comprehensive ecological tax reform are not yet prepared, e.g. in the Czech Republic. This may be due to a lack of interest in general politics, but also a lack of discussion of environmental issues and thus a lack of environmental awareness. In western countries it took about 30 years to come to the level of common understanding on the high necessity for environmental protection, but CEE countries have to run through all these phases in a very condensed time.

This is very important since the envisaged accession to the EU requires an increase energy taxes anyway. Thus one side of the reform is foreseeable and the challenge is to use this pressure from the EU to implement a broad ecological tax reform which finds acceptance. Now is the unique opportunity to establish the correct general conditions to avoid repeating the undesirable trends of the western states with regard to providing the wrong incentives. Still, the frame for additional environmental taxes is not so bad as it might sound like. Many charges and fees are already levied in CEE countries for a long time (Annex II).

CONCLUSIONS

Greater use of environmental taxes. The fact that environmental taxes are used increasingly more, recently by large European countries such as France, Germany, Italy, and the United Kingdom, shows that the reasons for their application are convincing. Hence, it is likely that more countries and also the EU as a whole will follow sooner or later.

Greater coordination and harmonisation. However, there was hardly any coordinated harmonisation and compatibility at the EU level. But factual pressure for following this approach is increasing. At least joint initiatives of like-minded countries, which are in the meantime the vast majority of all EU countries, are likely to emerge if no action is taken on the EU level. Accession candidates could be part of such initiatives in order to soften possible negative effects on trade and border transactions, and to spur their economies directly towards sustainability.

More incentives for industry. Amongst countries at the forefront the need remains to better harmonise the often very different ways of taxing industry at a lower rate. In significant contrast to this general feature, the United Kingdom will introduce a tax on industrial use of energy only which will prepare the

ground for a generally higher taxation of industry, at least if several environmental agreements - now being the favourite instrument for this sector - should turn out not to achieve agreed targets.

More and better evaluation. While the theoretical evaluation of environmental taxation is a well developed field, and adequate evaluations of practical experiences with such taxes is increasing, often the quality is still not so good. However, it has improved and it is well possible that this fact is owed to the methods of evaluation reaching limits due to several constraints. The need to integrate evaluation with tax design has been recognised by OECD, which has agreed on methodological guidelines for economic instrument evaluation. Still, apparently these are hardly followed, or at least it is seldom referred to.

More research - especially of policy packages and externalities. Environmental taxes often work best when part of a policy package aiming at addressing one (or more) environmental problems, but the interaction of several policy tools is then complex. Further analysis and understanding of these issues could be helpful for future policy making. Particularly worthwhile would be the further development of the OECD framework and its application. Of major interest would be assessing the evaluations since qualities and methodologies differ substantially. More research is clearly needed, but there is sufficient knowledge to justify much further policy development on environmental taxes.

Conclusions for Least Developed Countries. The overall aim of an environmental policy should be to increase efficiency of the use of resources as they are particularly scarce in these countries. Copying the concepts of an ETR from developed countries would likely not be appropriate, but rather make ETR disreputable as the conditions are quite different from developed countries. However, some general ideas can and should be tested and applied in these countries, not at least because these indirect taxes are less vulnerable to tax fraud.

A very first step would be to make people pay for environmental services such as the provision of clean water, sewage, waste infrastructure, transport infrastructure. However, this does immediately raise the issue of the effectiveness of administrations and concerns about corruption. The situation is not rendered easier by the fact that mostly wealthy people have access to such environmental infrastructure which mostly also are part of the governing society, thus being more hesitant to charge themselves. However, a modest surplus only could be used to extend the network of water and sewage pipes to quarters which are not yet connected.

Another element that can be adopted to national circumstances would be the elimination of environmentally damaging fiscal provisions in existing taxes and expenditures. The introduction of tax differentiations such as for leaded and unleaded

fuels has turned out to be a very effective instrument in developed countries if alternatives are at hand. This should even be the easiest way to start with an enhanced use of economic instruments for environmental protection.

Whereas the perspective that concerns individual countries in Europe is very promising, the opposite holds true at the EU level and in other developed countries. Not least due to the dynamic that is increasingly taking place in Europe, one can guess that ETR will soon be accepted even more broadly. To close with a saying of the French author Victor Hugo: "Nothing is so powerful as an idea whose time has come." ■

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ANNEX I

Designs of Ecological Tax Reforms in Denmark and the Netherlands

Denmark

After a CO₂ tax for households had been introduced on 15 May 1992 and for industry on 1 January 1993, this CO₂ tax was embedded in an ETR of wider scope. This was modified in 1996 and is at the moment in place until the year 2000. In 1999 an evaluation was made of the experience gained until then, which confirmed that this system basically worked and had produced the desired results. Only the administrative costs connected with the energy audit needed to be reduced.

The ETR of 1994 included various eco-taxes. Here only the taxes on energy, CO₂ and sulphur (the latest basis for assessment was only set up in 1996) are referred to. Conceptually, particular attention was paid in Denmark to safeguard companies' competitiveness, depending especially on the energy intensity of the production.

Thus the energy tax is refunded up to 100% to the company is refunded. The CO₂ tax is refunded up to at least 50 per cent. The rate of tax moreover depends on a ratio formula worked out from the proportion of energy tax and the net product. To put it very simply: the greater the proportion of energy tax on the net product, the larger the share of CO₂ tax refunded.

To put it in slightly exaggerated terms, this resulted in the incentive for legally taking operating units out of store being so strong that these were widely excepted and the remaining operating units no longer had any substantial energy consumption. The revenue decreased and the ecological aim went amiss—similar incentives are also contained in the organization of the first stage of the ecological tax reform in Germany, which must be abolished in the third stage at the latest.

The reform that came into force in 1996 should plug the gaps contained in the 1994 ETR concept. In addition, things were no longer geared to the legal unit of the company, but to operations, and within them to the use of energy for space heating and the type of production process. (Danish Ministry of Finance 1995; Luhmann 1996). Since then, energy intensive processes have been defined by two criteria: the tax burden must be more than one per cent of turnover and three per cent of net product. A (definitive) list of a total of 35 production processes was drawn up on this basis, to which a reduced CO₂ tax rate is applicable. In addition, the effective tax rates for companies were modified depending on whether they participated in an energy audit or not. Since 1998, the rate of taxation for space heating, after an introductory phase and transition since 1996, is that of non-companies. In all there are 5 different tax rates for companies in Denmark. Comparing these values with each other, three characteristics are established:

- The spread of tax rate between the cases "with" and "without"

energy auditing increases significantly with time—this a strongly effective behavioural factor in the 96 reform.

- From 1996 to 2000, for energy intensive processes, only those tax rates that became due through refusing to participate in energy auditing are increased, so the increases are avoidable.
- A type of indexation to keep the real value of the only nominally constant tax rates stable was not chosen. Thus the tax rates are exposed unprotected to a decline through inflation.

The tax burden per unit energy source between companies and non-companies varies depending on the energy intensity by more than a factor of 100. As a result, Denmark clearly differentiated the tax rates for energy consumption between companies and households/state. In addition, pressure to act was applied, in that all companies not carrying out an energy audit are increasingly burdened for energy intensive processes, and are more and more heavily burdened for other processes as such without energy auditing (Schlegelmilch 1998b).

This concept of the ETR in Denmark is a tailor-made one, since competitiveness is taken into account as closely as possible by being geared to the process level. In principle, such a structure and approach is a possibility for future stages of the ecological tax reform in Germany.

The Netherlands

After the Netherlands introduced increased eco-taxes some years ago (e.g. a groundwater tax), they brought in an energy tax (regulatory energy tax) at the beginning of 1996, which is generally seen as the nucleus of an ETR. An energy tax was imposed on light heating oil, natural gas, LPG and electricity, based on the example of the original 1992 EU proposal. Fuels are not additionally taxed, since they are burdened anyway via the mineral oil tax, which is adjusted annually to the rate of inflation. The new CO₂-energy tax rates were increased to three times the starting rate from 1996 to 1998 in accordance with the 1992 EU proposal. Since the start of 1996 electricity has been burdened with the retail tax rate. As a result, in 1998 the retail price of gas for small consumers and households rose by 20 to 25 per cent, and that of electricity by about 15 per cent. The energy tax was borne mainly by households and small consumers.

In order to preserve international competitiveness, a consensus policy was agreed to organize tax as follows, so long as other neighbouring states such as Germany are not ready to draw even. Hothouses are only charged with the electricity tax. As a countermove, these must undertake to increase their energy efficiency by 50 per cent between 1980 and 2000. This should prevent relocation of production facilities and job losses.

So as not to overburden lower income groups excessively, tax-free allowances of 800 kilowatt-hours and 800 cubic meters of gas were introduced, on which neither households nor companies needed to pay tax. In order not to tax bulk consumers too heavily (rather a permanent tendency in competition), at the beginning (i. e. actually between 1996 and 1998), quantities over 170,000 cubic meters of gas and 50,000 kilowatt-hours of electricity were also exempted from the tax. Other minor adjustments were also made. However, according to information from the Netherlands Finance Ministry, the complete gas and electricity consumption by households and about 95 per cent of the corresponding company consumption are affected by the tax. A drop of five per cent is expected in CO₂ emissions by the year 2000 because of the taxation on consumption.

In 1998, the government noticeably raised the tax-free limits on the basis of the third and final report of the eco-tax reform commission. The limits up to which electricity and gas are taxed were increased from 50,000 kWh of electricity to 10 million kWh and from 170,000 cbm of gas to 1 million cbm respectively.

Table 4: CO₂ tax rates for companies in Denmark, 1996 and 2000 (DM/Gigajoule)*

<i>Sectors</i>	<i>Electricity</i>	<i>Light heating oil</i>	<i>Hard coal</i>
<i>CO2 tax: 1996</i>			
Energy intensive processes			
– Participation in energy auditing	0.21	0.06	0.07
– No participation	0.35	0.09	0.12
Other processes			
– Participation in energy auditing	3.47	0.92	1.19
– No participation	3.47	0.92	1.19
Space heating		3.71	
<i>CO2 tax: 2000</i>			
Energy intensive processes			
– Participation in energy auditing	0.21	0.06	0.07
– No participation	1.74	0.46	0.60
Other processes			
– Participation in energy auditing	4.72	1.26	1.62
– No participation	6.25	1.67	2.15
Space heating		11.12	

Source: Danish Ministry of Finance (1995, 13).

*The average SO₂ tax is already included in the figures.

Table 5: Regulatory Tax on Energy Tax Rates in the Netherlands

<i>Energy sources (in DM/GJ)</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>
Natural gas	0.85	1.71	2.54
Electricity	7.21	7.21	7.21
Light heating oil	0.08	0.17	0.25
LPG	0.64	1.28	1.92

Source: The Netherlands' Ministry of Housing, Spatial Planning and Environment 1996 (converted to DM/GJ)

The expected revenue of 2.1 billion NLG in 1998 was refunded in proportion to the revenue to households (less than 60 per cent) and companies (more than 40 per cent). For this purpose the income tax for households was changed at three points: (1) the entry tax rate was reduced by 0.6 per cent, (2) the tax-free subsistence level minimum was increased by 80 NLG and (3) tax allowances for senior citizens were increased by 1 per cent.

Furthermore, employers' social security contributions were decreased. Small companies are able to claim higher tax reliefs, and the corporation tax was reduced by three per cent over the first 100,000 NLG. Lastly, the regenerative energy source operator obtained a full refund, and is thus exempted from the tax. Over the next three years the Netherlands doubles the tax rates introduced between 1996 and 1998 again.

ANNEX II

Environmental Taxes in Central and Eastern Europe

The opportunities for a comprehensive introduction of eco-taxes (and economic instruments in general) in Central and Eastern Europe are unique for many reasons—quite apart from the reasons not yet adduced here, which also argue in favour of its introduction in the west:

(a) In the first place, the social and economic systems are in a radical state of change in any case towards a strong free enterprise system. It only depends on influencing the direction of this change towards a forward-looking society.

(b) In order to meet the requirements for entry into the Euro-

Table 6: Overview of some economic instruments in Central and Eastern European States

	B&H	BUL	CRO	TR	EST	HUN	LAT	LIT	MAC	POL	ROM	SR	SLO	YUG
Air emissions														
— Emissions tax				X	X		X	X		X		X		
— Residual pollution tax*		X	X	X	X	X	X	X		X	X	X		X
— CO ₂ tax													X	
Water pollution														
— Sewage tax			X	X	X		X	X		X	X	X	X	X
— Residual pollution tax		X	X	X	X	X	X	X		X	X	X		X
— Sewage charges		X	X	X	X	X	X	X	X	X	X	X	X	X
Refuse														
— Communal refuse charges	X	X	X	X	X	X	X	X	X	?	X	X	X	X
— Refuse taxes				X	X		X			X		X		
— Residual pollution tax		X	X	X	X	X	X	X		X		X		X
— Deposit regulations for drink packaging	X		X	X	X	X		X		X	X	X		X
Refuse related product taxes														
— Fuels						X								
— Packaging material					X	X	X			X				
— Batteries/Accumulators						X	X							
— Refrigerators and coolants						X								
— Lubricating oils						X	X							
— Car tyres						X	X							
— Ozone damaging substances (CFCs etc.)												X		
— Mineral oils							X							

pean Union (the so-called “acquis communautaire”), many rules, laws and also tax regulations, such as minimum tax rates for several mineral oils, must be adopted.

(c) Achieving the Kyoto target also requires efforts from the joining countries that should be managed as cost-effectively as possible.

(d) The integration of ecological aspects into all other policy areas got a very high priority through the Amsterdam Agreement that came into force on 1 May 1999 and the last and next EU Summit, so that the joining countries must also be appropriately active in this matter, particularly if they hope to join that much sooner.

(e) With the environment policy based strongly on market econ-

omy instruments, there is an opportunity, on the one hand to go increasingly for dynamic incentive effects and with them more cost-efficient solutions and moreover speed up the conversion of the regulatory law. At the same time the integration of environmental aspects into other policy areas could be accelerated. This would, in particular, provide the opportunity not to repeat the errors in the west but to go instead as a priority for integrated environmental care instead of predominantly “end-of-the-pipe” technologies. Finally the structures for the next decades are being set up there, that will determine very decisively the production and consumer patterns and with them the environmental consumption.

(f) As a result the overall entry of the Central and Eastern

Table 6. (continued)

	B&H	BUL	CRO	TR	EST	HUN	LAT	LIT	MAC	POL	ROM	SR	SLO	YUG
<i>Transport</i>														
— Lower tax rates on lead-free petrol	X	X	X			X			X	X	X	X	?	
— Higher import duty on cars without catalyzers	X			?		X		X	X	X	X	?	?	
— Road tolls			X	X		X	X		X			X	X	?
— Noise/air pollution taxes in air traffic				X										
<i>Nature conservation and biodiversity</i>														
— Nature conservation residual pollution taxes		X	X		X	X		X		X		X		X
<i>Natural resources and raw materials</i>														
— Raw material taxes and transport charges			X	X	X	X	X	X		X				
— Water tax		?	X	X	X	X	X	X	X	X	X	X	X	X
<i>Other</i>														
— Income tax/VAT reduction for environmental technologies		?		X	X	X	?		X	X	X	X	?	X
— Reduced import duty on conservation technologies		X	X	?	X	?	?	?	X	?	X	?	?	?
<i>Environmental funds</i> ²														
— at national level		X		X	X	X	X	X	X	X		X	X	X
— at regional level					X					X				
— at communal level		X						X		X				
— Funds for debt relief for nature conservation measures		X								X				

Source: Klarer (1999), author's translation.

Notes: B&H = Bosnia and Herzegovina; BUL = Bulgaria; CRO = Croatia; CR—Czech Republic; EST = Estonia; HUN = Hungary; LAT = Latvia; LIT = Lithuania; MAC—Former Yugoslav Republic of Macedonia; POL = Poland; ROM = Romania; SR = Slovak Republic; SLO = Slovenia; YUG—Federal Republic of Yugoslavia; ? = unclear if such instruments are in use at present. Comment: (i) Only those raw materials taxes and transport charges that have been introduced on environmental grounds, or whose revenue is spent at least in part for environmental purposes are listed. (ii) According to different classifications, environmental funds are viewed as environmental policy economic instruments and are therefore included here. (iii) Residual pollution tax means that only a part of the emissions that exceeds a specified limit is subject to tax.

European States into the EU be noticeably less expensive than earlier assessments assume. These are based on the acceptance of the assumption that the EU environmental policy in the fields of water, air and refuse, based in the main on the disposal of harmful substances. Costs would run to 120 billion DM on estimate. With their reduction, the costs for present and future Member States would fall, and with them the pressure on their public budgets.

(g) With entry into the EU, those countries that up to now to a great extent support very environmentally harmful industries and manufacture must drastically reduce subsidies, probably after pe-

riods of transition. This reduction is required on ecological, fiscal and legal competition and EU legal grounds, and can be accepted politically relatively easily by the entry process.

(h) Positive effects on employment can be assumed, not least because often old industries are kept alive by subsidy payments, their contributions to employment are low and will be even lower in future because of mostly declining importance. At the same time, funds will be freed up to offer tax relief to innovative companies.

(i) An EU consisting of 25 Member States is hardly governable

under the principle of consensus. It is therefore not improbable that a at least a qualified majority (3/4) will be agreed on. But then it will depend decisively on building up sufficient coalition partners for voting on eco and energy taxes. The Central and Eastern European states are absolutely predestined for this. However, the extension of the harmonization principle must first be agreed by consensus. And here there could be a high political price to pay (and that also probably means economic).

Expectations for a clearly stronger use of economic instruments in Central and Eastern European states are indeed high. When you look at table 6 below, it is evident that these will be fulfilled. However, various organizations leave a lot to be desired in terms of efficiency. Thus, on the one hand, not all markets are fully functioning, to allow the price signals to come into effect. Adequate privatization and deregulation is therefore prerequisite. At least the first step, that is to say the complete shifting of administrative costs onto prices has been taken in most countries. This is not always quite the case in the areas of energy and transport. Other important social and political constraints cannot be addressed at this point. Instead, an incomplete mention of some aspects must suffice. Environmental awareness, responsibility for the environment is the state's affair, lack of experience with a decentralization process, new institutions and responsibilities (Klarer and Moldan, 1997).

An internationally accepted approach for combating environmental problems was presented as part of an environmental action programme for Central and Eastern European states in Lucerne at the beginning of the 1990s, emphasizing the importance of economic instruments. The countries did indeed take in the message, but the focus of most eco-taxes is on clearly achieving the greatest possible revenue, that—often via environmental funds—can be used specifically for the environment. Table 6 gives an overview of the present application of economic instruments Central and Eastern European States.

The table shows that emission taxes and residual pollution taxes—most linked to limiting values set by law—come into use very frequently. Product taxes on the other hand are only used in isolated cases. The ratio of these types of taxes is reversed in the OECD. Moreover, the taxes in Central and Eastern European states mostly contain a large variety of harmful substances, which complicates their administration. They often still result from the start of their use in the 1970s and 1980s when efficiency was no criterion in the policy of a planned economy. On the whole, higher rates had the effect of drawing level with inflation. Eco-taxes served mainly to procure money for environmental measures. The associated subsidy payments were relatively effective. Residual pollution taxes, which should have resulted in limiting values being kept to, were in fact far too low to have the appropriate effect.

That is why there is a great potential for introducing eco-taxes that are independent of limiting values and that have a strongly incentive-oriented function. Considerably more use could be made of other economic instruments such as deposit regulations and emission certificates in addition to eco-taxes as part of an appropriate mixture of instruments. In the end, it is only in this way the "level of the playing field" can be changed. The entry into the EU aimed at by the Central and Eastern European states should, like the target of new initiatives from different sides, be used to integrate environmental policy with other policy areas, to make considerably greater use of economic instruments in the EU than before and thus reduce the estimated costs of entry.

An overview of the use of environmental taxes by accession candidates is described in more detail below. Environmental policy in the accession candidates is often underestimated. In a recent survey on 'Economic Instruments for Pollution Control and Natural Resources Management' the OECD OECD (1999b, 77) comes to the conclusion: "The accession countries apply environmental taxes and charges to a significant level. The Czech Republic

and Poland appear to have full-grown charges-cum-subsidy schemes which play a structural part in bringing environment investments to substantially higher levels (in particular in the context of environmental funds). The number of pollutants in the charge schemes is larger than found on the average in the OECD countries. Hungary is operating many environmentally-related taxes." The following more detailed remarks are based on Peszko (1999, 127-141) and Klarer (1999, 202-216).

Emission charges and non-compliance fees are very extensively used in the accession candidates. In the past they often took the form of fees, non-compliance charges and fines and have been closely linked to environmental facility permits. The emission charges applied are mostly very comprehensive. Each charge covers as many as 200 pollutants, for example in the case of the Polish charges. Here, all emissions are subject to fees, and exceeding the maximum hourly emission rate set in the authorisation, if detected, is subject to fines, which are generally ten times higher than the corresponding fees (Pototschnig, 1996).

The extensive use of emission charges and non-compliance fees in Central and Eastern Europe originates in the 1970s and early 1980s. In the economic and institutional context of centrally planned economies, charges did not play an effective incentive role. The major function was to raise revenue into earmarked funds (national and local), because subsidies often constituted the only effective enforcement tool in the hand of environmental authorities at that time. After transformation started, it required political strength to defend and develop the charge level under new economic conditions.

Product charges are less often used, but they can be considered to be the emerging set of new instruments. Product charges are applied in Hungary, Latvia, Estonia and Slovakia, being most extensively used in Hungary where no emission charges are in force.

Since 1990 a number of product charges have been introduced in Hungary. First, in 1992, an environmental charge was levied on the sales of gasoline. According to the Hungarian Environmental Framework Act of 1995, the purpose of the existing levies is "de facto to create revenue for subsidies that can be used to lure polluters into compliance" (Lehoczki 1999, p.159). In 1995, after long negotiations, four new product charges were introduced. These charges are levied on the sales of tires, refrigerators, batteries and packaging materials. In addition, new or substantially revised natural resource access charges (rents on mining and water abstraction) were included in the system which includes the re-establishment of the Central Environmental Protection Fund as an extra-budgetary fund.

Although the Hungarian system is oriented to charges and subsidies, there are opportunities for an ecological tax reform. There are tax rates that could be considered as a burden for competitiveness and employment: the 25 per cent VAT rate is among the highest in Europe, the tax rate on marginal income is around 45 per cent and social contributions eat up more than 50 per cent of the gross wage. Considerations in connection with economic efficiency, OECD membership, EU accession and WTO negotiations are likely to require reduced taxation on labour. The budgetary deficit will nevertheless demand sufficient revenue for the state budget. This could create momentum to shift the tax burden on labour to the environment (Lehoczki 1999, p.160). In fact, the Hungarian government is currently considering intensively how to implement either an input or an output-based tax as part of an ecological tax reform.

The budget of Slovenia—taking also into account the expenditure side of it and thus applying a newly developed methodology—had shown a slight tendency towards a greener budget on the revenue side between 1992 and 1996 (Markovic-Hribernik/Schlegelmilch 1999, p. 293). However, in 1997, this trend was offset. A CO₂ tax, introduced in 1997 (EUR 5.5/t CO₂) and tripled in 1998 (EUR 15.5/t CO₂), and the waste water charge, introduced in

September 1995, raise most of the revenues from 'bads', whereas smaller environmental taxes comprise a water charge and water concessions, a levy for the decommission of the Krsko nuclear power plant, a duty on the use of agricultural land, a car registration fee, a road tax, tolls and a 'gasoline tolar'. Revenues from the CO₂ tax alone, though levied only on some parts of energy consumption, amount to EUR 97.3 million which equals 2.1 per cent of

the central government budget. Options for tax relief are provided if capital is spent for combating CO₂ emissions (Radej 1999). Tax relief led to investment which reduced CO₂ emissions in the amount of 1.4 million tons (0.09 per cent of Slovene total emissions). Slovenia used the opportunity to adapt its tax system to EU standards and increased the tax on electricity by 9 percentage points.

INCREASING THE ROLE OF ENVIRONMENTAL TAXES AND CHARGES AS A POLICY INSTRUMENT IN DEVELOPING COUNTRIES: SOME CONCEPTUAL CONSIDERATIONS

*J.G. Backhaus**

EXECUTIVE SUMMARY

The judicious use of natural resources is a crucial prerequisite for sustainable growth not only in developed countries, but even more so in Sub-Saharan Africa and the Third World. More generally, to a substantial degree, natural resource use is determined by the tax structure governing a country's economic activity. When a tax system can be designed which stimulates the judicious use of natural resources, an important step towards achieving sustainable growth has been made. Designing such a constitution is not a simple task, however. For Third World countries, the task is further complicated by at least three factors. First, the tax system has to be exceedingly simple, since both the number and quality of tax instruments available to governments in developing countries tend to be limited. Second, the legal system tends to mirror the state of economic development. This limits not only the tax structure an economy can bear; it also limits a government's ability to regulate natural resource use by legal means. Third, the more elaborate a legal system, the more diversity it affords the country for economic activity, including opportunities for the division of labour.

The second section of the paper discusses the use of the environment and the natural resource endowment from the point of view of public finance theory. This point of departure is central, as it serves to identify the net product (le produit net) of economic activity after full consideration of the use of natural resources in the process of production. From this point of view, the question of what constitutes spillover effects or externalities in a market economy can be seen in the broad public finance perspective developed in the third section. The paper then discusses some standard problems in designing a tax constitution for a third world country. The fifth section of the paper explores possibilities for creating a framework in which the sustainable use of the natural resource endowment can take place. Central to the sustainable use is the notion that the environment has to be put to different uses, which raises the issue of the reversal of use dealt with in the sixth section. The possibilities of ensuring reversibility of the use of natural resources is discussed in the seventh section and a specific procedure is developed which is designed to ensure that reversibility of use can be achieved with simple administrative means, that is, means that are available to developing countries' governing authorities. Finally, the ninth and tenth sections deal with the issue of institution building. Clearly, the effective use of environmental taxes and charges as a policy instrument requires the availability of the institutions in which such policies can be conducted. Hence, the ninth section gives an overview of basic institutions of the market economy. The tenth section draws the implications for an effective use of environmental charges and taxes. The paper ends with some concluding observations.

* J. G. Backhaus is Professor of Economics, Maastricht University, The Netherlands.

INTRODUCTION

THE judicious use of natural resources (United Nations, 1997) is a crucial prerequisite for sustainable growth not only in developed countries, but even more so in sub-Saharan Africa and the Third World. More generally, to a substantial degree, natural resource use is determined by the tax structure governing a country's economic activity. When a tax constitution can be designed which stimulates the judicious use of natural resources, an important step towards achieving sustainable growth has been made. Designing such a constitution is not a simple task, however. For third world countries, the task is further complicated by at least three factors. On the one hand, the tax system has to be exceedingly simple, since both number and quality of tax instruments available to third world governments tend to be limited. Secondly, the legal system tends to mirror the state of economic development. This limits not only the tax structure an economy can bear; it also limits a government's ability to regulate natural resource use by legal means. Thirdly, the more elaborate a legal system, the more diversity it affords its country for economic activity, including opportunities for the division of labour.

In trying to develop a perspective for the design of a tax constitution which allows sustainable growth in a third world scenario, this essay tries to merge insights from three economic subdisciplines which tend to be taught separately: public finance, natural resource economics, and development economics. True to the general theme of this conference, the emphasis will be less on modern and primarily on classical authors, since these authors tended to emphasize the aspect of development in (public) finance.

This paper has nine sections, in addition to this introduction and the conclusion. The paper starts with the discussion of the use of the environment and the natural resource endowment from the point of view of public finance theory. This point of departure is central, as it serves to identify the net product (*le produit net*) of economic activity after full consideration of the use of natural resources in the process of production. From this point of view, the question of what constitutes spillover effects or externalities in a market economy can be seen in the broad public finance perspective. The paper then discusses some standard problems in designing a tax constitution for a third world country, and goes on to explore possibilities for creating a framework in which the sustainable use of the natural resource endowment can take place. Central to the sustainable use is the notion that the environment has to be put to different uses, which raises the issue of the reversal of use. The possibilities of ensuring

reversibility of the use of natural resources is then discussed and a specific procedure is developed which is designed to ensure that reversibility of use can be achieved with simple administrative means, that is, means that are available to third world governing authorities. Finally, the last two sections deal with the issue of institution building. Clearly, the effective use of environmental taxes and charges as a policy instrument requires the availability of the institutions in which such policies can be conducted. Hence, the paper gives an overview of basic institutions of the market economy. The paper draws the implications for an effective use of environmental charges and taxes and ends with some concluding observations.

THE USE OF THE ENVIRONMENT IN PUBLIC FINANCE THEORY: ESTABLISHING THE NET PRODUCT

One of the central issues on which classical public finance theory has focussed is the correct establishment of the net product of a national (or for that matter local) economy. The difference between gross and net social product is the expense necessary to maintain the source of a particular revenue. Adam Smith (1970) states it aptly in chapter II of book II of his *Wealth of Nations*:

“The gross revenue of all the inhabitants of a great country comprehends the whole annual produce of their land and labor; the net revenue, what remains free to them after deducting the expense of maintaining - first, their fixed, and, secondly, their circulating capital; or what, without encroaching upon their capital, they can place in their stock reserved for immediate consumption, or spend upon their subsistence, conveniencies, and amusements. Their real wealth, too, is in proportion, not to their gross, but to their net revenue.”

The simple principle has many implications. One is that taxes can only be levied on (a part of) the net product, if we do not want to risk the availability of the revenue source altogether. Another is, that to the extent natural resources are used in the process of production, their maintenance has to be ensured as well by deducting the expenses to this end from the gross revenue of a particular economy. If these expenses for the maintenance of the endowment with natural resources of a country (a state, a city etc.) are not allowed for, changes in the composition of the capital stock will be taken for net income. The result is that more is spent than earned and the country (state, city, etc.) becomes poorer over time.

Although the principle is straightforward in its simplicity, its implementation is not. When the use of the environment occurs in the form of spillovers, it goes by unaccounted for. When implications of contractual transactions are latent or unforeseeable, they remain likewise unaccounted for. And when liabilities for damages cannot be attributed, the

damages remain where they happen to fall, causing changes in stocks when they should have caused changes in flows. The damages will take the form of windfall losses, unrelated to the economic activities and decisions which had caused them. This lack of accountability results in a welfare loss to society as a result of "normal" economic activity which may go largely unnoticed. The nature and extent of this welfare loss will be discussed in the next section.

WHAT CONSTITUTE SPILLOVER OR EXTERNAL EFFECTS?

In classical public finance theory, taxes have the single purpose of providing revenues for essential governmental expenditures. In modern public finance theory, however, in as much as it follows the Pigouvian tradition, taxes also serve as instruments to correct for market failures. The Pigouvian tradition in public finance represents a departure from classical public finance theory in more than one respect, however. In assigning a regulatory function to the instrument of taxation, Pigouvian taxes no longer conform to the canon of taxation. Secondly, the Pigouvian view implies certain assumptions about the role of governmental authorities in the economic process. The view constitutes a clear departure from the classical Scottish view of governmental restraint. It constitutes a departure from the classical continental view as well, which would have relied on government to correct for market failure either by means of governmental entrepreneurial activity or by using legal instruments. Thirdly, the focus on technical spillover effects, while correct in and by itself, de-emphasizes the question of why the legal order allows for some spillover effects to remain externalized, while others have to be compensated for and thereby will be internalized. This third aspect has important implications for the problem of designing a tax constitution for a third world development scenario,

The presence of externalities by necessity implies a less than judicious use of natural resources. Negative externalities signal an overuse of some input, typically a natural resource, relative to market valuation. In a third world context, when the range of available tax instruments is limited, the Pigouvian tax/subsidy approach to spillovers is less realistic than in developed economies. It is therefore sensible to focus on the more traditional approach to handling spillover activities: the design of a legal system able to cope with such external effects.

In principle, the market economy is supported by three primary legal institutions: private property, freedom of contract and liability. These three fundamental institutions tend to be hampered in their ineffectiveness when confronted with environmental spillovers or externalities such as (a) latent or unforeseeable consequences of contractual exchange

or (b) cases of multiple causation in which liability by any one party cannot be established, if the damaging effect occurred only as several parties acted together without (c) necessarily being able to anticipate the results of this concurrence.

If this constellation is seen as typical for an intractable environmental spillover problem, one might be led to the conclusion that both the common law and the European continental civil law widely applicable in sub-Saharan Africa seem to be out of tune with some of the typical problems posed by the use of the environment. However, it would be premature to jump to the conclusion that regulative, administrative legal approaches under these circumstances deserve priority. Throughout the Middle Ages up until industrial times in Europe, the prudent and sustainable use of the environment was ensured by detailed regulation of the technologies that could be employed. Although it is this developed state of technology which creates new possibilities for sometimes serious environmental damage, regulating technology use can by itself cause at least equally serious environmental damage if it stifles the introduction of new technologies, some of which will burden the environment less than existing ones. Therefore, rather than emphasizing a shift of legal regimes such as leaving the domain of private law and moving into regulatory administrative law, or even a Pigouvian tax/subsidy regime requiring even further informational input, it is desirable to investigate the specific conditions under which a regime of private law can adequately handle the treble problem outlined above. When spillovers elude the demarcation of private property rights, when results of contractual transactions are latent or unforeseeable and when causes of damage cannot be clearly attributed, we face the possibility that the problem may have become intractable because of its decomposition. This possibility will be further considered in the following paragraphs.

In principle, damages will be considered to be correctly assessed if they reflect the harm demonstrably suffered by an individual or a group of individuals. By necessity, the harm has been suffered in the past and may continue through the present into the future, while the damages are assessed retroactively in order to retribute the victim(s). The rule of liability, although applied retroactively, still has effects into the future, to the extent that it is expected to be enforced and therefore deters harmful activities. The prospective deterrence effect is the weaker; the weaker is the link between harmful activities and the assessment of damages for compensation. As we noted in the beginning, in the case of many environmental harms, this link is very weak indeed: it is weak when spillovers evade the rule of property, when the effects of contractual transactions are latent or cannot be foreseen, and when multiple causes make it impossible to establish

strict liability. As we take a dynamic perspective, the link becomes even weaker. In principle, a victim trying to recover damages not only has to prove the extent and cause of the harm, but above all he must have standing. Standing will in general be restricted to members of a particular jurisdiction and to presently living victims, typically cutting off trans-jurisdictional and intergenerational effects. Finally, the harm in general has to be directly suffered. Secondary effects, although not less important for an individual's net welfare, will not be considered. When due to heavy pollution the fruits of the garden taste unappealing, this will generally not constitute sufficient harm for a damage that can be recovered, nor the likely loss in the property value. When asbestos has to be removed from public buildings, the net public (tax/benefit) burden will have increased, yet a compensation will not be available.

The view grounded in the classical public finance tradition explained above yields a completely different picture. From the point of view of a public economy, be this a local, a state or a national economy, the overriding concern with a sustainable use of the environment is the need to keep natural resources intact for the use of future generations and to compensate for any encroachment upon the endowment of natural resources. Explicitly, this principle cannot imply a need to keep the entire endowment with natural resources in a pristine state. On the contrary, the establishment and performance of such institutions as the Kuwait Investment Office illustrates the principle: the extraction and sale of a natural resource (oil) and the re-investment of the proceeds in a widely spread portfolio of earning assets. If prudently managed, the capital stock of a country, of which the natural resources are a part, thus can be increased in its net present value. A harm is done to the economy if this stock is encroached upon and the depletion of one part of it is not offset by the increase in another. Likewise, harm is done to an economy if sustainability of the environment is meant to leave it untouched. Sustainable development has an economic, a socio-political and an environmental dimension. The sustainable and economically efficient use of all the natural resources of a community, including its environment, has to be handled according to the socio-political priorities and conditions prevailing there. At a minimum, any policy of a sustainable use of the natural resource endowment has to be equitable, which, again at a minimum, implies a policy that improves the life chances of the least advantaged (Rawls, 1971).

This broader perspective comprises essentially all the spillover effects discussed separately in the standard environmental economics literature, yet it takes a different approach to their measurement. Instead of trying to establish the technical effects of, for example, asbestos exposure on cancer in human males, the public finance approach emphasizes the

overall financial impact of all conceivably damaging factors on the health state of the working population. Instead of following the chain of causes and effects through from their biological beginning to their financial result, the procedure is reversed. Starting from the revenue sources of a public economy, the principle is to keep these revenue sources intact for the long term. In the example of asbestos, the health state of the working population is the relevant point of departure, since it is part of the endowment with factors of production at the disposal of the public economy. The impact of the various factors on cancer, such as diets, tobacco use, exposure to infections, reproductive and sexual behavior or exposure to occupational hazards to name some of the most important factors determining the health state of the working population with respect to cancer — needs to be assessed and measures have to be designed to keep the revenue source intact. In this particular example, the asbestos problem will be addressed in the context of other occupational hazards, of which it is a part. Instead of linking individual asbestos cases with the producers of asbestos, the entire pool of asbestos cases as part of the entire pool of workers exposed to hazardous materials is linked with the producers of the hazardous materials. This approach does not always assign environmental issues highest priority; the particular order given here indicates that as far as cancer is concerned, reasons other than occupational hazards may have to be addressed with higher priority (Doll and Peto, 1981). The important lesson to be learned from this example is, however, not that environmental issues may not be important after all. The lesson is rather that the different sources of environmental damages have to be grouped together in terms of their combined impact on the revenue base of the particular economy in question, in order to allow for their full assessment. Only once they have been fully accounted for can policies be designed to prevent the depletion of the resource base of an economy.

This principle, again, begs the question of its implementation. Implementation in a third world context requires special attention to the specific conditions of developmental public finance. This is the subject of the following section.

PUBLIC FINANCE AND ECONOMIC DEVELOPMENT

Classical public finance as a separate subdiscipline of economics has its roots in the challenge posed by the disastrous experience of the Thirty Years War in Central Europe. Faced with the urgent need of developing their devastated and depopulated countries, European statesmen on the continent turned to their closest advisers, the cameralists, to design state measures in order to stimulate economic growth. In response, a

voluminous literature developed and formed the basis for classical continental public finance theory.¹ Traditionally then, economic development has been a main focus of public finance theory (Backhaus and Wagner, 1987). A main focus of developmental finance is by necessity on capital formation. Capital formation has to be understood broadly as including all measures of a productivity increasing nature. In order to accomplish this task, state authorities have to create a climate which is conducive to investment. This includes not only the material infrastructure, but also includes the immaterial infrastructure, a predictable and reliable legal order, a clean and efficient civil service and the assured prospect that investments today will actually pay off in the future. While these positive incentives for capital formation provide a substantial agenda for government, disincentives for consumptions (as the reverse program) are more difficult to handle. On the one hand, the tax effort of a developing country has to be much smaller than that of a developed country, since a much larger portion of the disposable income is needed for human reproduction. Only luxury consumption is conceivably amenable to taxation, although the limits have to be drawn sharply here as well, since too heavy a tax burden would create a disincentive for investment. In purely administrative terms, taxation is difficult when taxable entities are small, the activities unstable and the bookkeeping absent. As a matter of principle, parsimony with respect to tax instruments is a prerequisite for prudent developmental finance.

One area of taxation which is fairly insignificant in developed countries stands out as feasible in developing economies: the taxation of natural resources. In this respect, however, care has to be taken. There is general agreement in the literature that with respect to land taxation, the instrument has to be handled prudently. Musgrave and Musgrave (1989, 595) write: "Effective land taxation is difficult when food is home consumed, the agricultural sector is largely nonmonetised, and land surveys are inadequate in providing proper valuations". In addition, land taxes, as every other form of taxation, in order to be effective, have to be levied in line with received customs and convictions prevalent in that particular society. On the whole, there seems to be a consensus in the literature that with respect to land taxation, potential rather than actual income from land should be subject to taxation (Musgrave and Musgrave, 1989, 599). Obviously, and in line with the preceding analysis, only the potential net product of land can be subject to

taxation. Furthermore the term "land" should be regarded as a shorthand for all natural resources available for production.

On the basis of this short summary of principles of developmental finance on the background of received principles of classical public finance, we may now turn to the issue of creating a framework for the sustainable use of the environment.

CREATING A FRAMEWORK FOR THE SUSTAINABLE USE OF THE ENVIRONMENT

In doing so, another short digression into the history of economic thought is necessary, since such a framework has originally been proposed by Henry George.

Henry George (1839-97) was a self-taught American economist and political writer whose name is commonly associated with the notion of a Single Tax on land. George had worked as a sailor, printer and newspaperman when he became fascinated with the rapid and uneven development of California and began to probe the economic causes determining the price of land. This investigation he undertook in order to solve "the great enigma of our times", which he held to be "the association of poverty with progress" (George, 1979, 10). His insights he systematically developed in his *Progress and Poverty*, first published in 1879.² The book began to receive wider attention in Britain in connection with the Irish question and later made George famous in his own country, too. He spent the last part of his life as a public speaker at home and abroad, and it was George himself who made the Single Tax proposal a political issue in his (unsuccessful) bids for the mayoralty of New York first in 1886 and again in 1897.

His place in the history of economic analysis is aptly sketched by Joseph Alois Schumpeter (1954, 865) who writes:

² *Progress and Poverty* was first published by D. Appleton & Co. in New York in January, 1880. However, in his preface, George refers to the November 1890 edition already as the fourth. His account of the editorial history is as follows: "This work was written between August, 1877, and March, 1879, and the plates finished by September of that year. Since that time, new illustrations have been given of the correctness of the views herein indicated [...]. But there has been nothing in the criticisms they have received to induce the change or modification of these views - in fact, I have yet to see an objection not answered in advance in the book itself. And except that some verbal errors have been corrected and a preface added, this edition is the same as previous ones." (1979, xxx). A twenty-fifth anniversary edition with a preface by Henry George jr. was published in 1905. The son explains that the publisher had insisted on George bearing the cost of making the plates, which

¹ For a fuller account see Backhaus and Wagner (1987).

"The points about him that are relevant for a history of analysis are these. He was a self-taught economist, but he was an economist. He acquired most of the knowledge and of the ability to handle an economic argument that he could have acquired by academic training as it then was. In that he differed to his advantage from most men who proffered panaceas. Barring his panacea (the Single Tax) and the phraseology connected with it, he was a very orthodox economist and extremely conservative as to methods. They were those of the English 'classics', A. Smith being his particular favourite. [...] Even the panacea - nationalization not of land but of the rent of land by a confiscatory tax - benefitted by his competence as an economist, for he was careful to frame his 'remedy' in such a manner as to cause the minimum injury to the efficiency of the private-enterprise economy. [...] The proposal itself [...] is not economically unsound, except in that it involves an unwarranted optimism concerning the yield of such a tax. In any case, it should not be put down as nonsense. If Ricardo's vision of economic development had been correct, it would even have been obvious wisdom."

Schumpeter was correct in characterizing George's economic methods as conventional. Yet *Progress and Poverty* is not mainly a work of economic analysis, but a decidedly unorthodox and non-conservative social reformer's treatise. The book was written in order to provide the answer to a practical question of economic policy: How can we design an institutional order in which economic progress goes hand in hand with a reduction of poverty? This sounds almost like a paraphrase of the problem posed in the title of this essay. Schumpeter, like many other critics of George, probably was incorrect in casually dismissing George's assertion about the practical possibilities of George's tax constitution from the standpoint of revenue yield. George may very well have been justified in his optimistic estimate of the yield of his Single Tax. This tax is a far cry from the real estate taxes a superficial reader may associate with the term "tax on land". Rather, as I try to explain on the following pages, George presents us with a comprehensive package of an environmental tax reform which, politically, has teeth. The program is, in fact, a tax constitution so comprehensive and far-reaching that no attribute could be more misleading than the term "conservative".

As this author reads *Progress and Poverty*, George

comes across as a scholar in the best tradition of political economy. His analysis is motivated by a clearly defined social policy problem. George analyzes a problem in order to solve it. He succeeded in designing a solution - his "remedy" - which relies on an institutional reform, that is, George understood the interdependence between economic processes and the institutional order in which they take place. Finally, George went about his analysis in what today would be described as an inter-disciplinary approach, that is, the questions he would consider were forced upon him by the subject matter under consideration and not by some disciplinary boundaries as they might have developed over time. When, for example, he looks at the effects of his "remedy", he takes them up in this order: effects on (1) production, (2) distribution, (3) individuals and classes, and (4) social organization and social life (George, 1979, IX).

The shortest book in *Progress and Poverty*, and at the same time the most important, is book VI in which George spells out his program. The central chapter, entitled "The True Remedy" barely covers two printed pages, and the solution itself is stated in just one sentence: "We must make land common property" (George, 1979, 328).

The explosive potential of his program is wrapped into this rather innocuous sentence. The true extent of the proposal can be discerned by looking at the implementation rule and his concept of land. The implementation rule is stated in equally concise terms: "It is not necessary to confiscate land, it is only necessary to confiscate rent" (George, 1979, 405). Finally, there is an underlying principle also worth reporting: "What is necessary for the use of land is not its private ownership, but the security of improvements" (George, 1979, 398). This quote also points to Henry George's differentiation between improved and unimproved natural resources and the idea of the unearned improvement. The unearned improvement today turns out to be a hindrance to improvements tomorrow, since the possibility of gaining unearned improvements diverts energies from the very process of improving upon natural resources. In contemporary language, one might say that George tried to prevent wasteful rent-seeking activities by insisting on the principle that the benefits from improvements should accrue to whoever made the improvements, whereas unclaimable externalities belong to the common domain.

The purpose of the entire reform program, according to this principle, is to encourage the use of land by designing a structure of property rights which allows individuals to reap the benefits of their labor, namely, the 'improvements' without barring the use of common property resources by others. His definition of 'land', as spelled out in a chapter appropriately entitled "The Meaning of the

George did in the shop of a friend in San Francisco. There, "an 'Author's Proof Edition' of five hundred copies was struck off" (1979: xxiii). A centenary edition prefaced by his granddaughter, Agnes George de Mille, appeared in 1979 in New York, published by the Robert Schalkenbach Foundation. This 1979 edition contains the aforementioned prefaces as well as an extensive index and a glossary of terms. In conclusion, the first edition was San Francisco 1879, the first published edition New York 1880, and the final authorized edition with any changes New York 1890 (4).

Terms” (George, 1979, I 2) is not confined to the surface of the earth. His is an analytical definition based on the concept of factors of production. There are in George’s model two original factors of production, called ‘labor’ and ‘land’. ‘Capital’ is a secondary or derived factor of production, comprising only things “which have resulted from the union of these two original factors of production” (George, 1979, 39). Since ‘labor’ is defined in a more standard way as “all human exertion”, including, by the way, ‘human capital’, because “human powers, whether natural or acquired can never be classed as capital” (George, 1979, 39); this leaves land as the all encompassing category of those original means of production which are not labor. In short, ‘land’ stands for the endowment of natural resources.

Characteristically, George (1979, 38-39) defines land both analytically and by giving a sequence of examples illustrating the basic, comprehensive concept:

“The term land necessarily includes, not merely the surface of the earth as distinguished from the water and the air, but the whole material universe outside of man himself, for it is only by having access to land, from which his very body is drawn, that man can come in contact with or use nature. The term land embraces, in short, all natural materials, forces, and opportunities, and, therefore, nothing that is freely supplied by nature can be properly classed as capital. A fertile field, a rich vein of ore, a falling stream which supplies power, may give to the possessor advantages equivalent to the possession of capital, but to class such things as capital would be to put an end to the distinction between land and capital, and, so far as they relate to each other, to make the two terms meaningless.”

It is obvious that, commensurate with technical progress, the window of opportunities granted by nature is pushed ever more open, and in this way the Georgian term ‘land’ assumes an ever more encompassing meaning. Simultaneously, the tax base of the State entrusted with the power of the Single Tax on the rent of natural resources is also broadening in pace with technical progress. While George defines ‘land’ in exactly the same way as we define natural resources today, George differs from most present-day proponents of environmental tax reform by wishing to encourage the prudent use of natural resources, whereas the standard approach today is to design schemes seeking restriction of such use.

The twin objective to open access to the use of all opportunities provided by the natural environment while, at the same time, granting full security of all improvements made upon the resource as found in the state of nature requires a partitioning of property rights along this distinction. This partitioning³ must have struck many of George’s contemporaries as

unusual or artificial. But, as he tries to show in his long survey of “Property in Land Historically Considered” (George, 1979, VII 4), the partitioning should not be considered that unusual after all. You don’t saw a ship in half if it is owned by two men, is his common sense comment.⁴ The partitioning of property rights is effected through the instruments provided by the modern tax state. Owners retain their property titles, but these titles are re-interpreted as designating the accumulated improvements, while the entire land rent remains in the common property of the state. The tax state, in this way, becomes a partner in the development of the land (country), a residual claimant of all the external benefits not appropriated by the individual owners.

Since this point is very important for understanding the dynamics of the Georgian scheme, let us look at his own statement:

“Every productive enterprise, besides its returns to those who undertake it, yields collateral advantages to others. If a man plant[s] a fruit tree, his gain is that he gathers the fruit in its time and season. But in addition to his gain, there is a gain to the whole community. Others than the owner are benefitted by the increased supply of fruit; the birds which it shelters by far and wide; the rain which it helps to attract falls not alone on his field; and, even to the eye which rests upon it from a distance, it brings a sense of beauty” (George, 1979, 435).

Assigning the unappropriable positive externalities of production to the State implies that George’s concept of common property in natural resources actually goes beyond the original state of nature. It likewise includes the accumulated externalities or, put in more accessible terms, the cultural heritage of a country, its vegetation, climate, architecture and landscape, and so on. And, by virtue of the tax scheme, this cultural heritage also forms the tax base which the state is expected to foster.

“Nature laughs at a miser” (George, 1979, 436), Henry George tells us in characteristic prose, and he certainly laughs at too parsimonious a use of the natural endowment. Not only is the tax scheme designed to minimize disincentives (George, 1979, IX 1); stronger still, it coerces people into either making productive use of the resources they possess or else relinquish them: “If land were taxed to anything near its rental value, no one could afford to hold land that he was not using” (George, 1979, 413).

This growth oriented fiscal constitution, however,

³ For a modern statement see Furubotn (1979).

⁴ A reader has pointed to the difficulty of measuring what part of the “unearned” increment is due to nature, what part due to society, and what part due to entrepreneurship or effort. The late Dr. Krabbe and I have dealt with this issue elsewhere and at length. (Backhaus and Krabbe, 1990).

has a clever check on public sector growth built into it. It is here where the seemingly ideological and often misunderstood insistence on the Single Tax assumes importance. This feature of the Georgian proposal has always bewildered so many commentators, including the public finance expert⁵ Schumpeter. The explanation lies in the systematic unity of George's proposal. George suggested a tax constitution which defines incentives faced by the tax collecting authorities. George wanted to foster progress by using the power to tax in a very specific way, but he was also suspicious of government bureaucracies (George, 1979, VIII 3). By designating a broad tax base but limiting the power to tax to just one tax, the up to 100 per cent tax on the rent of natural resources, he hoped to find the proper balance. On the one hand, the Georgian tax constitution creates incentives for those in public office to support equitable economic development, which flushes ever increasing tax revenues into public coffers. The State can grow unimpeded by any pre-conceived restrictions, as long as this public sector growth is financed from the increasing rental value of natural resources. On the other hand, as soon as the value of these rents stagnates or even declines, the state has to curtail its own expenditures. By virtue of the Single Tax constitution⁶, the State is harnessed into prudent, long term natural resource use, just as the private sector is coerced into attaining the production possibility frontier. Built into George's reform is a 'tax constitution for Leviathan', to use Buchanan's term, a public choice approach *avant-la-lettre*. In one

respect, however, George's tax constitution is different from the typical Leviathan tax constitutions which we owe to the modern public choice school. The limits on the size of the state budget are not predetermined, but determined according to the tasks the state may face. For instance, as natural resource use creates negative externalities, to the same extent it also increases the claim of the state on financial resources to mitigate these effects. On the other hand, if nature is left in a pristine state, the state's claim on financial resources is very limited indeed; but so are the state's tasks in such an economy.

Even more surprisingly, this growth-oriented tax constitution clearly deserves the label "environmental" due to its built-in dynamic structure. By an "environmental" or "ecological" tax scheme one understands a fiscal constitution which induces economic agents to make optimal use of the environmental resources, neither squandering nor oversparing them. This is precisely what the Georgian system is designed to accomplish. The clue to the conservational feature of the Georgian tax constitution, again, lies in the partitioning of property into (internalizable) improvements (private ownership) and the rent of the resource as such (public ownership). The size of this rent is a positive function of the state of economic development of the surrounding economy and a negative function of the exhaustion of the natural resource.

Obviously⁷, the rent on resource use is paid exclusively for the use of the natural endowment and not for its abuse. Depletion of a natural resource requires an additional compensation owed to the community which, in the Georgian model, is represented by the Tax State. The State is thereby entitled to two streams of revenues, namely, the rent collected from the use of its natural resources and, more generally, the environment; and the compensations for the abuse of those resources. Clearly, George was not a strict conservationist in the sense of sparing nature from any form of depletion. He wanted the ore to be mined and not to be left in the ground (George, 1979, 38). Yet, at the same time, he wanted the community to extract a fair compensation for this impairment. While the guarantee of improvements is the core of the State guarantee of private property rights, impairments of common property resources require a compensation. The State

⁵ This attribute might surprise the American reader. Yet, before coming to the United States, Schumpeter had distinguished himself in public finance. Schumpeter not only served as the first Secretary of the Treasury in the Austrian Republic precisely because he was considered a public finance expert; in this capacity he drafted a stabilization plan which could not come to fruition for reasons unrelated to the budget. He also held the chairs in public finance at the universities of Graz and Bonn. He did not receive a chair at the University of Berlin to which he had aspired, because the faculty felt that they did not need another public finance expert (next to Popitz).

⁶ This modern language should not lead the reader to suspect that the single tax might be without problems. It is conceivable that the single tax might not be Pareto optimal, notably because of effects on the timing of development. But one should keep in mind that George was making a contribution to economic policy, and not to the theory of optimal taxation. Even in the case of suboptimality just mentioned, one has to keep in mind that these cases require resort to second best analysis, and that it is by no means inconceivable that the least distorting tax regime in the world of second best remains the single tax.

⁷ The following paragraphs are not literally grounded in Henry George's *Progress and Poverty*; they rather follow directly from his definition of land as including all natural resources and his definition of improvements. But he did not himself spell out these implications, nor did he spell out details of the requisite implementation rule.

thereby can plan the inter-temporal use of the natural resource endowment in the interest of overall fiscal concerns. We can conclude that George is fully in line with the classical principle of conserving the value of the natural resource endowment spelled out above.

The operational coherence and conclusivity of the abuse correction mechanism, of course, needs to be spelled out in institutional detail. Much will depend on the particular tax administration a country has set up. Such an administration would have to be backed by a system of tax courts in such matters as when judgement is required as to when an action constitutes an abuse or not.⁸ Yet the principle is simple enough to be of use even in the third world case of minimal administrative facilities.

REVERSAL OF USE

This inter-temporal dimension embedded into Henry George's tax constitution assumes additional importance when we consider the change or reversal of uses environmental resources may be put to. Keeping the door to change and, notably, changes in resource use wide open is vital for preventing the rise and persistence of monopolies, including the state monopolies characteristic of many third world countries. The Georgian scheme, of course, requires that every resource be put to its most productive use. Again, the dynamic adjustment process is carefully conceived. The most productive use determines the rent of the resource, irrespective of whether the owner operates at the production possibility frontier or not. The automatic adjustment of rents, as a consequence of technical progress, constantly pushes economic agents to make the most judicious use of environmental resources. This implies that the Georgian system actually encourages the reversal and change of production methods involving natural resources. Unlike the present system of private property in land (George, 1979, VII 5), the scheme does not favor the first user at all, since a more valuable use makes it too expensive to continue the first use. The opportunity costs of natural resource use, by virtue of the land rent tax, enter into the present user's cost function.

Reversal of use can be more vexing a problem if natural resources are irretrievably devoted to some

production (or consumption) process. The safeguard provided by the Georgian system is not a perfect one, since George opposed the conservation of natural resources for their own sake. Yet, George provided for two checks. The irreversible use of an environmental resource is checked on the one hand by the compensation payment required for abuse. The amount of this payment, in turn, will increase with the introduction of competing, more valuable uses as a consequence of technical progress. The second check lies in the communal nature of environmental resources. Since the environment is in the common property, that is, in the State domain, a political decision can override private commercial concerns. The political decision will be informed, above all, by the revenue consequences for the Single Tax State, a State which George has placed in the position of guardian of the environment in order to ensure its own fiscal survival.

Having explored George's tax constitution, we can finally integrate his contribution into the solution to our question.

ENSURING REVERSAL USE FOR SUSTAINABLE DEVELOPMENT

Ensuring reversability of resource use is again above all a matter of constitutional design. A political institution has to be found which is closely associated with the particular natural resource in question. Very often, the political boundaries co-incide poorly with natural environments. The case of the pollution of the river Rhine, the North Sea or the Baltic Sea point to vivid examples. But the same case of the Rhine also points to viable legal solutions. Since 1919, shipping on the Rhine is an international affair. The Rhine flows through the Lake of Constance, which is a condominium or jointly held property of Austria, Switzerland, and the two German states of Bavaria and Baden-Württemberg. However, both the Rhine and the Lake of Constance still lack their own legal identity which would make it possible to make a prudent and sustainable use of the natural resource in question. As we move down from the international to national and local jurisdictions, the problem becomes less and less intricate. A particular city, for example, has its clearly circumscribed original endowment of resources of which its inhabitants and its politicians tend to be quite aware. The country we are currently meeting in, Kenya, underscores the extent to which pristine wilderness made accessible is part of the natural resource endowment, as is the architectural and cultural heritage as part of the natural resource endowment we are elsewhere confronted with in Africa, which implies that the ancient architectural treasures have to be counted as belonging to the capital stock which to maintain is the purpose of the entire Georgian proposal.

⁸ For the United States, one can start thinking about such procedures by looking at the reclamation of land used for surface strip mining. See United States Surface Mining Control and Reclamation Act of 1977, (P.L. 95-87). This law calls for bonding and specifies landscape contours, vegetation, etc. For Germany, an actionable procedure has been described in Backhaus (1988).

The first step in constitutional design then is to identify the correct political jurisdiction to which a particular natural or cultural resource belongs.⁹ This is done by making an inventory of the natural resources and their use in a particular country, state or city, and in cases of dispute assign the rights of use accordingly to the different public bodies in question. The licence to operate a business next to a National Park obviously carries a different rental value from one to operate in a more prosaic environment. Once the inventory has been arrived at and the uses established, the third step is to estimate the benefit levels associated with the uses accruing to the public authority in question. In the original Georgian proposal, these benefits are handled in terms of tax revenues exclusively. In terms of post-Keynesian public finance, this would be an unrealistic approach. Even local governments, and much more so state and federal or national governments have more than revenue seeking objectives. In the simplest of cases, we can postulate that governments will be interested in revenues and jobs. Very often, one translates into the other, at least in the mind of the treasurer who knows how much is needed in subsidies in order to attract additional employment.¹⁰ These objectives have to be combined into a particular index, which can be a given sum expressing, for example, units of employment equivalents in monetary terms. The intensity of environmental use is then correlated with the current performance of the user of the environmental resource in terms of this monetary equivalent. We

⁹ This insight is by no means original with me. See Webb and Webb (1920).

¹⁰ A typical example, in this case taken from the First World, may illustrate the point. According to the Wall Street Journal's Asra Q. Nomani, Minnesota Gov. Arne Carlson signed a bill that gives NWA Inc.'s Northwest Airlines \$740 million in financial assistance, including \$320 million of direct loans for the carrier's operations. In addition, Minnesota lawmakers voted an estimated \$40 million in tax incentives to entice Northwest to build two maintenance facilities in the state, expected to employ 2,000 new workers. \$320 million of direct loans (part of the \$740 million financial assistance package) will be used to accelerate options on new jets made by Airbus Industrie, a European consortium. (*The Wall Street Journal Europe*, Monday June 3, 1991, 4). By implication, the state of Minnesota values an additional maintenance job at the facility at \$20,000 in direct tax incentives and an additional \$370,000 in financial assistance. The second figure also reflects the state's desire to prevent the loss of jobs in the state that might occur if Northwest Airlines had to follow the example of Eastern Airlines. Such assistance packages are by no means unique to the state of Minnesota. Many similar examples could be quoted involving similar figures.

can, for example, determine how many employment equivalents a business next to a National Park or a romantic bridge over a river generates. Each resource use next to this location has to be assessed such a monetary equivalent. This is the rent to be collected from the resource user. If a business with heavy resource use generates comparatively low revenues or comparatively little employment, there is a strong incentive for it to move to a less desirable location and give way to a more productive resource use in terms of the policy objectives expressed in the monetary equivalents.

This system creates dynamic pressure by itself; yet the tax instrument can be combined with the typical licensing instrument used in traditional environmental regulation by again assigning monetary equivalents to the exercise of a licence granted. In order to avoid grandfathering of resource use which typically is at the source of environmental waste, the successful new applicant has to prove that his intended resource use will yield a higher number of monetary equivalents than the present resource use. If the new licence is to be granted, the current licence holder has to be given adequate notice that the licence will be revoked unless he can improve his own performance up to the standard of the new intended use. At this juncture, there is an important role for either a developmental agency or an insurance company to play.

The authorities of any country or city, but even more so the authorities of a third world country or city face enormous difficulties in assessing the reliability and trustworthiness of different applicants. A country or city revoking one licence in order to grant it to another user, for reasons of credibility and for reasons of sound fiscal budgeting has to be assured that the new licence will actually produce a higher yield than the old one. Therefore, one viable strategy might be to insist that a bid for relicensing can only be successful if the performance of the applicant has been insured for the duration of the licence applied for by either a private insurance company or some publicly backed developmental agency. Preventing imprudent or uncaredful use of environmental resources by way of this procedure becomes a prime objective of the insurance company or developmental agency involved in writing insurance for these applications.

The infinitely more complicated issue of use reversal, again, cannot be handled without introducing an insurance solution. A basic distinction has to be made between current uses of the environment and new applications for environmental resource use. Current uses have to be dealt with in terms of creating the pre-conditions necessary for the reversal of use over a period of time. New applications can be dealt with in stricter terms. After a period of transition from one regime to the other, both forms of resource use, traditional and new ones

have to be treated on an equal basis in order to avoid undue grandfathering. Again, international developmental agencies or insurance companies can play an important role.

SKETCH OF A PROCEDURE

New applications are relatively simpler than the continuation of old uses. Consider the application for establishing an airport. In terms of the scheme outlined above, the application will indicate the number of monetary job equivalents expected to be generated by the airport. A certain amount of land will have to be claimed, and if for converting it to the airport use it need be covered with concrete; original natural environments will thereby be destroyed. The application also states the expected costs of reconverting the airport to its original state, with the cost estimates being based on bids by qualified bidders to carry out the work. The bids have to be insured or guaranteed and are thereby rendered qualified. The insurer or guarantor thereby assumes responsibility for the accuracy of the bids. The application further includes notice of insurance of the proposed number of monetary job equivalents effective upon granting the licence. This insurance policy covers the revenue base for the jurisdiction in charge of issuing the licence. Should the airport venture fail to generate the expected benefit in either revenues or employment opportunities, reversal of use is ensured and can be carried out after the proper notice has been given.

As far as traditional uses are concerned, the difficulty is to establish to what state the used natural resources would have to be reverted. That state of nature has to be described in a proper zoning decision, whereupon granting of the licence can be effected in the same way as described beforehand, involving again two insurance contracts. The basic rationale of this procedure is not dissimilar to current American practice. The novel aspect consists in the heavy use of insurance or guaranteeing relationships in order to contain the risk of damaging the environment by making improper licencing decisions. The sustainable use of environmental resources is made difficult by the presence of risk and uncertainty about the consequences of decisions separately but simultaneously taken by different actors. Without amendment, the private law system based on private property, freedom of contract and individual liability cannot effectively deal with environmental spillovers, latent or unpredictable consequences of contractual exchange and high transactions costs in attributing causes to effects, in particular if multiple causes bring about effects only when individual actors take their decisions separately but simultaneously.

BASIC INSTITUTIONS OF THE MARKET ECONOMY

The division of labour is limited by the extent of the market. This basic dictum sharply expressed by Adam Smith focuses our attention on those factors which are responsible for limiting the extent of the market, thereby limiting depth and breadth of the division of labour in the economy and, by implication, the creation of wealth.

One can identify eight basic institutions which must be present and workable in order for any market economy to function well, irrespective of the specific style of that economy. Hence, these institutions must be present in an unfettered free market economy, in a socialist market economy, in a co-operative market economy, in a market economy with syndicalist elements or variously in one with strong state market participation. All these forms — and many more — are potentially feasible, provided these basic institutions are firmly in place and can fulfil their functions well.

If these institutions are weakened and impaired, such as when property rights are being diluted, this market will work with high transaction costs and only to the extent that the gains from market exchange outweigh those transaction costs.

Basic Rights

Freedom of contract

From an economic point of view, freedom of contract is an important guarantee because it ensures as a necessary condition that all the information available in a society enters economically relevant decisions and all the resources available in a society will be put to their most efficient use. This implies that every infringement of freedom of contract has to be judged in terms of the losses imposed on society due to ignorance and wasted resources. From an economic point of view, it is not sufficient to weigh freedom of contract against some other guarantee such as the principle of equality as such, without paying attention to the full consequences of the trade-off. If for instance it is observed that in a certain society members of a minority are not represented in a particular profession according to their numeric share in that society, from an economic point of view it is not justified to pit the observed end-state inequality against the guarantee of freedom of contract, since a rational choice in the interest of all parties concerned may have led to the unequal outcome. An economic analysis would have to inquire into the reasons for the observed inequality, and it would lay the foundation for assessing the trade-off between the social (opportunity) costs of constraining freedom of contract on the one hand, and the gains in terms of

economic equality on the other. Based on the inquiry into the causes of the observed inequalities, an alternative strategy to improve the chances of the minority in question can in all likelihood be derived. It is at this instance that the economic analysis of constitutional guarantees can have implications for constitutional law. Many constitutions require that basic rights can only be curtailed if less onerous measures are not available. To the extent that economic analysis can yield the design of such less onerous measures, it changes the constitutionality of particular policies.

Private property

The guarantee of private property is often thought to be the most important with respect to the means of production. Again, from an economic point of view, the guarantee goes far beyond the protection of people's possessions of goods and services. The reason for this wider scope is fairly straightforward. In economics, property rights define and circumscribe alternatives for meaningful actions. Hence, the mere property title to some commodity, such as land, is meaningless if it does not imply discretionary alternatives and options that can be exercised.

In particular, the guarantee of private property rights implies the right to exercise private property prerogatives within workable institutions. The guarantee is violated if, for instance, the contractual forms in which a property right can be exercised are unworkable or impractical, thereby destroying the value of the property right or seriously reducing it. The institutions in which private property rights can be exercised have to provide for the possibility that the four standard options of economic conduct¹¹ remain open. These options include:

- exit, the right to end an economic relationship;
- voice, the option to meaningfully improve upon a relationship by changing it through negotiations;
- loyalty, the ability to foster the growth of trust and goodwill in a relationship even in the face of serious problems, and
- avoidance, the option to ignore a particular relationship altogether without facing sanctions.

Liability

The two basic rights of freedom of contract and private property need to be complemented by the institution of liability in order to be meaningful at all. The faithful observance of contractual terms requires

the protection of a shield of liability for failure of living up to contractual terms just as much as the respective private property rights require the need to make the intruder liable. Although this principle is straightforward, from an economic point of view the implications can be far reaching. In particular, liability can only be assigned if the agent to be held liable was indeed in control of events that led to the liability. If this is not the case, the claim has to be followed through all the way to those who were either in control or created the situation that made control impossible. If for instance a patient suffers a serious injury because a doctor did not administer the necessary treatment, which he failed to do because, in order to administer the treatment, according to state regulations he needed the written consent of two colleagues whom he could not reach because they were tied up in meetings, this doctor is not liable for the injury imposed on the patient; nor is the full damage to remain with the patient; rather, the principle of synchronizing control and liability requires to make those jointly and severally liable who contributed to passing the regulations causing the problem — tying up doctors in meetings and requiring written consent to engage in professional activities — in the first place.

Stable legal environment

The following three basic guarantees are more or less ancillary to the first three, the classical three-some of economic basic rights. Constancy and predictability of economic policy is required in order to be able to enter contracts covering not only the present but also the future. The same is true with respect to the exercise of property rights with consequences in the future, notably investment decisions. For private property rights, however, the predictability of economic policy, is crucial because it affects the adjustment costs necessarily borne by the private sector and falling onto property, conceivably reducing its value. This requirement does not affect the range and domain of economic policy, but only the time horizon within which it can be carried out. The more predictable economic policies are, the smaller the adjustment costs. The corollary statement requires, that the more drastic a policy change, the longer its implementation has to be delayed and the more carefully the precise contours of the new policy have to be explained in order to allow for smooth adjustments in the private sector. A policy may be unconstitutional simply because the legislature did not take the requisite care in spelling it out in time and providing for reasonable adjustment periods before implementation.

Stable currency

Contractual relationships that are entered into for longer periods of time typically require for some kind of payment to be made by one or the other party. The

¹¹ For an analysis of the importance of the first three options see Hirschman (1970).

benefits from contractual relationships can be seriously impaired if there is no common language in which to express the duties of the different parties. The problem is most serious in the case of payments, if there is no stable unit in which to express the size of payments to be made and received. The more uncertainty there is, the smaller can be the gains from trade and consequently the smaller is the potential for economic progress in that society. This is why, from an economic point of view, the guarantee of a stable currency is important as an ancillary right. Again, what is really required is not one particular monetary policy, but rather an institutional arrangement which stabilizes the unit of account. It should be noted here that this requirement does not prescribe any particular monetary policy for a central bank, such as a European Central Bank; nor does it require only one currency to circulate in a particular market. Leading monetary theorists have shown that a variety of currencies circulating may not only be compatible with the principle of keeping the unit of account stable; it may even be in the interest of enforcing this principle.¹²

Open markets

Finally, access to markets has to remain open in order to allow for other basic human rights to be exercised in a meaningful way. This is obvious for the right of freedom of contract, but also extends into such classical basic rights as the freedom of the press, freedom of political expression, freedom of exercising the religion of one's choice, freedom of exercising the profession of one's choice, the academic privileges of freedom of instruction and research, etc. The problem is, by the way, most serious if a particular government or some private agents suppress the existence of a market altogether. The guarantee of freedom of access to markets obviously includes the guarantee to have such markets established, which does not predetermine the shape such markets take, as long as they provide for an open forum to communicate and exchange, which is what a market basically is about.¹³

Procedural Guarantees

Basic rights and procedural guarantees are equally important, since basic rights can only be exercised if certain procedural guarantees are observed. The importance of procedural guarantees is not reflected in the amount of space they receive in this essay, due to space limitations. Essentially, there are

two types of procedural guarantees: guarantees regulating the relationship between public bodies; and guarantees regulating the relationship between public bodies and citizens.

The relationship between public bodies

The procedural principles regulating the relationships between public bodies consist of at least three groups. They include all those rules regulating the domains of competence of the various public bodies with respect to each other, including the areas of co-operation, mutual consent or hierarchical control. A second group consists of principles of budgeting such as the principles of timeliness, completeness of budgets etc. A third involves principles of legislation. One is that legislation always has to be of a general character, and that acts are invalid if they address one case only. Another economically relevant principle involves the requirement that legislation which has turned out to be faulty, unjust or seriously impractical and thereby has turned out to be in violation of basic rights needs to be corrected.

The relationships between public bodies and citizens

The second set of procedural rules typically found in constitutions involve the question of how the private citizen or other legal entity relate to public bodies. Into this category fall essentially two sets of rules. One set again governs the separation of the domains of competence. A typical example is the separation of church and state. But here, again, forms of co-operation, of mutual consent or of hierarchical orderings are clearly available. The second set of rules, generally described by the extremely comprehensive term of due process, lays down the rules of the game between public bodies and private citizens or legal entities. These include information rights, notification rights, and the right to have access to courts and bodies of appeal in meaningful ways that go beyond merely procedural ceremonies without content, since the important benchmark is the effectiveness of these procedures in safeguarding the six basic economic rights outlined above.

A Concise Summary

In the preceding analysis, we have identified constitutional guarantees with respect to basic rights on the one hand and procedural rules on the other. There are three basic rights the guarantee of which has to be considered as central from an economic point of view. These guarantees protect the right of freedom of contract, the institution of liability in the sense that those responsible for actions or a lack thereof can be held responsible for the effects of their activities or the lack thereof; and the institution of private property in the sense that clearly specified

¹² See, for instance, Yeager (1985) with further references.

¹³ See Schwartz (1990).

and meaningful alternatives become available for economic agents to dispose with goods and services. These basic economic rights are supported by three ancillary economic rights, guaranteeing a stable legal environment, a stable currency providing for a common language of contractual relationships, and open markets which include the right to establish such markets in areas where they do not exist.

Procedural guarantees cover either the relationship between public bodies, or the relationship between public bodies and private citizens or other legal entities. The principle of due process requires in this context that citizens and legal persons have access to courts and bodies of appeal in meaningful ways, barring purely ceremonial procedures.

The economic analysis of constitutional rights can, obviously, not substitute for constitutional jurisprudence. But economic analysis can substantially enhance the sharpness of jurisprudential analysis by spelling out the consequences of particular constitutional provisions (or the lack thereof) and the systematic interconnections between basic legal institutions such as property, contract, and liability, as well as legal procedures. In this sense, the economic analysis can be integrated into jurisprudential analysis and by being embodied into the interpretation of constitutional provisions, economic analysis can become an integral part of constitutional scholarship.

REQUIREMENTS

The environmental charges and taxes described in this essay all require a functioning market economy. However, it is also important to emphasize their fit with the traditional principles of public finance. We can distinguish five principles, and those should be briefly addressed.

Firstly, at the heart of economic analysis, we obviously strive for efficient solutions. That is those solutions which cannot be improved upon without compromising any other goal or objective. The approach suggested here fits this bill, and this is important in that efforts at siphoning off public revenues for private purposes will immediately show up as patent inefficiencies in a system that at least fulfills the basic eight requirements listed earlier. Secondly, a tax regime should be administratively feasible. In the case at hand, since natural resources can be readily identified and an owner can be assigned, if none exists or has existed before, the tax administration has an immediate addressee with whom to deal in a straight forward manner. This allows for a fairly lean administrative structure to achieve far reaching purposes.

Thirdly, taxes should be flexible in the sense that the tax assessment varies with the value of the tax resource. The assessment procedure described above clearly ensures that this requirement can be met.

Fourthly, taxes should fit the political system so as to help making it more transparent. Many sub-Saharan countries have only natural resources to show for. These are extremely visible, and a tax regime focusing on the sustainable use of those resources with a view to developing the entire country through an optimal use of the resource can be certain to be in the focus of even a rudimentary public society. Hence, this particular proposal fits the criterion well.

Fifthly, and finally, taxes should be considered equitable. Many sub-Saharan countries rely on taxes that both hamper economic growth and are exceedingly inequitable. Think of the export trading monopolies, which are essentially a tax on agricultural labour and economic innovation, thus artificially keeping economies agriculture bound and technologically lagging. A tax regime focusing on the natural resources of a particular country, be this oil, diamonds or landscape amenable to tourism will not only burden the working population when the other factors of production may be exempt, but it also pushes the entire system into economic progress, which typically benefits the smallest earners relatively the most.

CONCLUSIONS

There is a widespread tendency to move to regulatory regimes in order to alleviate these problems. Yet regulatory regimes by themselves do not have a better track record in containing environmental waste. The present paper explores the extent to which environmental damages can be insured, thereby creating prospective incentives in addition to the retro-active incentives present in the regime of private property. A procedure is outlined which, derived from classical principles of public finance, combines taxing and licensing decisions with insured bids on the strength of which decisions can be taken by necessarily underinformed public authorities.

The solution is meant to respond to the special needs of developing countries. The solution requires only a simple administrative infrastructure, and it allows international developmental agencies and large multinational corporations to play a role in the implementation. Natural resources are emphasized as the single most taxable assets of developing countries, and a tax constitution built on simple principles of classical public finance is described. This constitution is a self-enforcing one in stimulating sustainable growth through incentive taxation. ■

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PROMOTING PRIVATE SECTOR PARTICIPATION IN THE FINANCING OF SUSTAINABLE DEVELOPMENT

*Anil Markandya
with P. Francis**

EXECUTIVE SUMMARY

Hardly anyone would disagree with the proposition that the private sector has a major role to play in financing sustainable development. The questions are about how this role should be exercised; which are the areas where it can be effective and where is it less likely to make a contribution? In evaluating the actual and potential contributions of the private sector we must look at all dimensions of sustainability – not just the environmental, which has been the focus of previous work in this area. Hence a social and economic assessment is also required.

The paper reviews general trends in private sector finance over the last 10-15 years and analyzes specific trends in private sector finance, beginning with privatisation and infrastructure investment. Privatisation is an important potential source of finance for sustainable development, although it is rarely the main source of provision of key infrastructure services. The experience with private provision of what were previously public sector activities has generally been good with respect to economic sustainability. On the environmental and social dimensions the evidence is less clear but the few examples provided point to some progress on both these fronts. More systematic evidence is needed, however, and there is a concern that mainly the “good side” is documented, often because it relates to the activities of the multilateral institutions.

The second specific trend relates to the financing of global environmental protection. Here much has been promised for some time but relatively little has been delivered. This will change in the next decade, especially if the flexibility mechanisms of the Kyoto Protocol are implemented. It is noteworthy that there is a great deal of interest in the private sector even at this early stage. Other initiatives, such as bio-prospecting, and certification of forest products remain small and are unlikely to become major areas of activity. Nevertheless they may provide important services to some communities and certain niche markets.

The third area relates to the impacts of privatisation on the local environment, where the picture is mixed. Positive aspects include improved incentives for efficient environmental protection through economic instruments and reductions in environmentally damaging subsidies. Standards for the appraisal of investments have also risen, with stricter environmental norms and a more careful assessment of social impacts. The situation has not improved appreciably in developing countries, however, when it comes to capacity for regulating the environment and ensuring compliance. Furthermore, most sustainability indicators have yet to be made operational so that investments can be evaluated with respect to such criteria. Finally, the picture is worse when we look at the growth of private transport and the increased exploitation of renewable natural resources. In both cases the private sector is responsible for much of the investment but it is not responding to indicators of unsustainability.

From this review of the performance of the private sector, a number of obstacles and opportunities have been identified. These are: weak enforcement of environmental regulations; weak economic and regulatory incentives; problems with meeting environmental and social objectives in privatisation schemes; unstable macro-economic conditions and an uncertain regulatory environment; low support for environmental protection; inequity, lack of transparency and political acceptance; and, equity concerns and international political acceptance.

* Anil Markandya is Professor of Economics, University of Bath, United Kingdom and P. Francis is a doctoral candidate in economics, University of Bath, United Kingdom. The authors would like to thank Alistair Hunt for contributing material on case studies referred to in the paper, and to Nick Dale for reading the draft and commenting on it. Thanks are also due to the participants of the workshop in Nairobi, especially Carl Greenidge who commented on the paper. Responsibility for any remaining errors in the text, however, is ours.

On the enforcement of regulations more resources are needed, especially through external assistance. But this will not be enough; the whole system of regulation, monitoring and compliance has to be changed, with greater use of informal methods and greater involvement of civil society.

On weak economic and regulatory incentives the continued reductions in non-targeted subsidies for resource use need to be maintained. Economic instruments need to be applied at more stringent levels if they are to have an incentive effect. This can only be achieved by example, by showing how such schemes have worked elsewhere and how adverse social and economic impacts can be mitigated.

On the problems of meeting environmental and social objectives in privatisation, the regulatory framework can respond to meet these challenges, as the success stories show. The reasons why other cases have been less successful need to be analysed further. Reviews of programmes indicate that public-private partnerships may work better in meeting broader sustainability goals but they have to be structured in a very precise way if they are to succeed.

The uncertainty issue is a key one for private sector involvement in infrastructure and environmental projects. Unless the level of uncertainty is reduced, private sector involvement will not be forthcoming. In some cases this reduction cannot be made without excessive cost; those are situations where the private sector should perhaps not be involved. In others, a combination of support for a careful appraisal of the projects, clear and declared government policies, and selective government and multilateral/export credit agency risk guarantees are required.

In some countries the level of support for environmental protection is low and the private sector cannot be persuaded to provide the investments for that reason. Where the level of interest is too low because vulnerable groups are being excluded from the polity and individuals are unaware of the effects of the degradation that they are experiencing, the international community can assist in providing the necessary information and in supporting the civil groups that are seeking to bring the issue onto the national agenda. The danger to be avoided in the latter case is being accused of external interference and undermining the efforts to strengthen governmental institutions.

On the lack of transparency and equity the principles are clear. Governments cannot act without some democratic agreement in the area of privatisation. The selection of parties to deliver the services must be undertaken through some kind of competitive process and they must not be seen to be excessively rewarded for their services. Failure to observe these conditions results in lack of success for the projects itself and has ramifications for other privatisation programmes.

Finally, there are equity concerns for acceptance of regulatory measures at the international level. The way to overcome this, and to take advantage of the huge opportunities available for sustainable development as a result of the global treaties is to show, by example, that the schemes can work to everyone's benefit. That implies a gradual process, but one that has started with some optimism in the last few years.

In the end, promoting private sector participation is not mainly about financial resources. It is about attitudes and ways of thinking about the provision of key services. This takes time but the process has started.

INTRODUCTION

THE role of the private sector in financing, and otherwise promoting, progress toward sustainable development has attracted considerable attention in recent years. The body of writing on the subject has grown substantially, particularly since the 1992 "Earth Summit" in Rio de Janeiro, with various researchers and practitioners contributing to our understanding of the subject area. The role of the private sector has featured prominently in the work of the United Nations Expert Group on Financial Issues of Agenda 21, as evidenced in the agendas and associated proceedings. A review of the key papers reveals, however, a lack of a unifying framework that brings together the wide range of experiences into:

- Guidelines by which one might evaluate the contribution of a particular private sector project or programme to sustainable development indicators; and
- Methods by which policy-makers can compare alternative methods of finance for the same project or programme and rank them with respect to their contributions to sustainable development.

The literature to date, while useful and enlightening, is largely anecdotal in nature, reporting on success stories and failures with, as is common in such cases, more successes than failures. Moreover it focuses on the contribution of private sector finance to the environmental dimension of sustainability. To be sure, there are partial exceptions. At the 1997 Ex-

Table 1. Likely Impacts of Increased Private Sector Finance on Different Dimensions of Sustainable Development

	<i>Possible Positive Impacts</i>	<i>Data</i>	<i>Possible Negative Impacts</i>	<i>Data</i>
<i>Environment</i>	Increased overall investment in environmental protection	Anecdotal	Lower environmental standards adopted Increase in environmental degradation	Some studies
<i>Economic</i>	Increased growth in GDP	Some studies	More unsustainable use of natural resources	Anecdotal
	Increased accumulation of human capital	Anecdotal		
	Sustainable use of natural resources	Anecdotal		
<i>Social</i>	Increased employment	Anecdotal	Reduced social provision for key goods and services	Anecdotal

pert Group Meeting, Jun and Brewer (1997) presented a paper that attempted a review of foreign private capital flows with respect to the economic and social dimensions of sustainability. It noted several problems, such as establishing causation in the correlation between economic performance and foreign direct investment (FDI). These and several other key issues in evaluating the role of the private sector's contribution to sustainable development remain unresolved. The gap is greatest when it comes to the social dimension of sustainability (Gentry, 1998). When does private sector finance promote such sustainability and when does it retard progress in that direction? This question is hardly ever asked, let alone answered.

Before this paper can address the issue in its title, it has to set out some general criteria for assessing the contribution of private sector finance to sustainable development. The next section reviews, in the light of these criteria, the contribution that private sector financing has made in the last ten years or so. The penultimate section focuses on ways in which the role of the private sector could be increased, and channelled, so that it contributes most effectively to sustainable development. Both the opportunities and the obstacles to such a contribution are discussed. The paper concludes with some suggestions for further research that should help formulate better policies in this area.

SUSTAINABLE DEVELOPMENT AND THE PRIVATE SECTOR

It is widely accepted that there is no single measure that captures all three dimensions of the concept of sustainability (environmental, economic and social). Furthermore, there is no consensus on how any measures that do exist should be used in an operational context (Bartelmus, 1999). There are, however,

useful indicators for each of the three dimensions (Adriaanse, 1993; World Bank, 1997). Environmental indicators of sustainability include measures of pressure on the environment, the ambient state of the environment and the extent of the response to the pressures. Economic indicators include extended measures of capital, encompassing the environmental, physical, human and social. Social indicators seek to measure social capital, as well as inequality, poverty and social exclusion.

The role of the private sector in financing sustainable development has to be seen in relation to all three dimensions. Table 1 summarises the likely impacts of different programmes and projects when undertaken using private sector finance as opposed to public sector finance. It also indicates the extent to which information is available in the literature on each of these impacts.

On the environment side private sector financed projects can provide additional resources for investment in environmental protection (Gentry, 1998; Hamilton, 1996) and for investment in products that are more environmentally friendly (Steele and Pearce, 1996). Evidence on the extent to which the increased level of private finance has contributed to these goals is, however, only anecdotal. A formal analysis would require a comparison between investment levels in these areas with and without some measures that increased private sector involvement and would need some formal statistical analysis. This is not available. Informal evidence provides a number of cases where private sector projects have adopted higher environmental standards than prevailed in that sector generally, and where such finance has contributed to opening up markets for environmentally friendly goods, such as eco-tourism, bio-prospecting etc. By and large the claim that such projects could not have been financed by the public sector is correct, although that does not tell us what

Table 2. Gross Domestic Investment and Gross Domestic Savings

<i>Group/Region</i>	<i>GDI as percentage of GDP</i>		<i>GDS as percentage of GDP</i>		<i>Deficit as percentage of GDP</i>	
	1980	1997	1980	1997	1980	1997
Low Income	20	22	15	17	5	5
Middle Income	27	26	27	26	0	0
High Income	25	21	24	22	1	-1
<i>Low and Middle Income:</i>						
East Asia	32	36	33	38	-1	-2
Latin America and Caribbean	24	22	22	20	2	2
Middle East and North Africa	27	24	38	25	-11	-1
South Asia	21	23	15	18	6	5
Sub-Saharan Africa	24	18	26	17	-2	1

Source: World Bank (1999a), Table 4.9 and author's calculations

Note: GDI = gross domestic investment; GDS = gross domestic savings; Deficit = GDI minus GDS

Table 3. Composition of capital expenditure in low and middle-income selected countries

<i>Country/Region</i>	<i>Government expenditure as per cent of GDP</i>		<i>Government capital expenditure as per cent of Government expenditure.</i>		<i>Gross domestic investment as per cent of GDP</i>		<i>Government capital expenditure as per cent of GDP</i>		<i>Non-Govt. capital expenditure as per cent of GDP.</i>	
	1980	1996	1980	1996	1980	1996	1980	1996	1980	1996
<i>East Asia</i>										
Korea	17.20	18.60	14.00	23.00	32.00	35.00	2.41	4.28	29.59	30.72
Malaysia	28.50	21.90	35.00	19.00	30.00	43.00	9.98	4.16	20.03	38.84
Thailand	18.80	16.50	23.00	36.00	29.00	35.00	4.32	5.94	24.68	29.06
<i>Europe and Central Asia</i>										
Hungary	56.20	43.20	13.00	9.00	31.00	27.00	7.31	3.89	23.69	23.11
Romania	44.80	31.40	33.00	11.00	40.00	21.00	14.78	3.45	25.22	17.55
<i>Latin America and Caribbean</i>										
Brazil	20.20	33.80	8.00	3.00	23.00	21.00	1.62	1.01	21.38	19.99
Chile	28.00	21.00	10.00	17.00	21.00	27.00	2.80	3.57	18.20	23.43
Trinidad & Tobago	30.90	28.30	39.00	10.00	31.00	22.00	12.05	2.83	18.95	19.17
<i>Middle East and North Africa</i>										
Egypt	50.30	34.30	21.00	19.00	28.00	18.00	10.56	6.52	17.44	11.48
Tunisia	31.60	32.60	30.00	21.00	29.00	17.00	9.48	6.85	19.52	10.15
<i>South Asia</i>										
India	13.30	15.80	12.00	11.00	21.00	24.00	1.60	1.74	19.40	22.26
Pakistan	17.50	23.80	18.00	13.00	18.00	15.00	3.15	3.09	14.85	11.91
<i>Sub-Saharan Africa</i>										
Botswana	31.80	39.40	32.00	19.00	35.00	26.00	10.18	7.49	24.82	18.51
Kenya	25.30	28.90	23.00	12.00	29.00	19.00	5.82	3.47	23.18	15.53
Zambia	37.10	21.40	11.00	33.00	23.00	15.00	4.08	7.06	18.92	7.94

Source: World Bank (1999a); table 4.9 and author's calculations based on tables 4.13 and 4.14

Table 4. Private capital flows to developing countries

Group/Region	1990				1997			
	Value		Of which shares were		Value		Of which shares were	
	\$ Million	FDI	Portfolio: Equity & Bond	Bank Finance	\$ Million	FDI	Portfolio: Equity & Bond	Bank Finance
Low Income	3,502	32.6	6.3	61.1	17,023	62.6	27.3	10.1
Middle Income	38,398	58.7	7.9	33.4	268,863	55.8	23.9	20.4
Low and Middle Income:								
East Asia	17,664	58.6	0.6	40.9	91,188	67.4	23.3	9.3
Europe and C.Asia	7,695	14.3	27.0	58.7	49,875	44.7	27.0	28.3
Latin America and Caribbean	12,411	66.0	8.0	26.0	118,918	51.8	19.1	29.1
Middle East and N. Africa	668	412.7	-22.2	-290.6	8,120	66.1	47.8	-13.9
South Asia	2,174	21.3	11.6	67.1	11,110	42.0	43.4	14.6
Sub-Saharan Africa	1,288	64.8	-2.4	37.7	6,674	78.2	40.5	-18.7

Source: World Bank (1999a), table 6.7

measures would lead to the level of finance in these areas increasing to its optimal level. The criteria, therefore, for environmental sustainability should be the increase in environmental quality resulting from the increase in private sector finance relative to a plausible alternative. The latter could be (a) no investment in the sector or product or (b) investment by a less environmentally oriented private or public sector entity.

Similar arguments apply to the possible negative impacts of private sector finance. There are some studies on whether increased foreign investment in developing countries has been motivated by lower environmental standards (Jun and Brewer, 1997; Jha, Markandya and Vossenaar, 1999). Less is known about whether the overall increase in private sector capital investment has resulted in an increase in environmental degradation, or indeed what the appropriate point of comparison should be.

On the economic dimension, increased foreign direct investment (FDI) is correlated with increased levels of growth but the causation is disputed (FDI may be attracted to countries where growth is high in the first place) and there are indications that domestic investment falls in compensation (UNCTAD, 1996; Caves, 1996). At the same time, stories are recounted about the valuable technology transfer and human skill development associated with the increase in FDI. On the impacts of private investment on natural resource exploitation, there are examples

of actions that have promoted sustainable use (Steele and Pearce, 1996; Hamilton, 1996), but there are also cases where investors have extracted resources with less care for sustainability and environmental protection (French, 1998). The criteria for assessing the economic dimension should be the increase in output, valued at social prices, resulting from the shift in the investment regime or from the increase in private sector investment relative to some baseline. In doing this, possible changes in other investments as well as the effects of the investment on social and human capital must be taken into account.

Finally, there are the social criteria. Arguably, sustainability is as much about inter- and intra-generational social equity as it is about environmental protection. Yet the case for private sector finance in terms of increased employment or reduced provision of public goods is very sketchy.¹ Infrastructure projects funded by the private sector require higher returns to induce the investment (Haarmeyer and Mody, 1998). This in turn may raise prices and limit coverage, which could affect the well-being of

¹ Major studies on this topic explicitly exclude the social dimension. Thus Serageldin and Sfeir-Younis (1996) finesse the issue by titling their study "The Effective Financing of Environmentally Sustainable Development". The discussion of the social dimension is, consequently, very limited.

the poor, or other vulnerable groups, and exclude them from the provision of the services provided by the infrastructure. The extent to which this has happened as the public sector has given way to the private is not well documented. One viewpoint is that there is no real alternative to the (at least partial) provision of services such as electricity, water and sanitation. Hence the social impacts are secondary. But this is not an appropriate position to take. If the services are not affordable and the programmes leave large sections of society unprovided for, their rating in terms of social sustainability will be low. This need not be the case, however, and there are some projects (described below) which have addressed this issue while maintaining the private sector's participation in the finance of key services. Thus, projects should be judged with respect to the social criteria, with no prior view of what extent they have complied with it.

ASSESSMENT OF THE CONTRIBUTION OF PRIVATE SECTOR FINANCE TO SUSTAINABLE DEVELOPMENT

General Trends in Private Sector Investment

There is evidence from which one can analyse the changes in the level of private sector finance of investment in developing and developed countries. Tables 2 and 3 provide some relevant data. Table 2 shows the difference between gross domestic investment and gross domestic savings for different regions. The difference between the two is attributable to external resources. Interestingly, as a percentage of GDP, the deficit has not increased in low and middle-income regions between 1980 and 1997. The high-income countries have moved from having net resource inflows to having net resource outflows.

While each group is large enough to mask considerable internal flows, the overall picture does not point to a structural shift in the financing of gross domestic investment. This may be thought to be at odds with the data that private foreign direct investment has increased noticeably, at least over the last decade. However, the amounts of FDI are not large compared to these gross resource flows. For example, gross domestic investment in all low and middle income countries was one quarter of their collective GDP in 1997, or about \$1.5 trillion. By contrast FDI in 1996 was \$110 billion or about 7 per cent of the total. Hence, the largest part of investment by far has come from domestic resources and continues to do so. Regionally, East Asia became a larger net provider of investment resources (reflecting the role of Korea?) and the Middle East became a much smaller net investor outside the region. Other changes are too small to interpret.

The breakdown of investment between the private and public sectors is provided in Table 3. This exer-

cise could not be carried out at the regional level, as data were not available for enough countries. Hence, information has been reported for selected countries. Of the 15 countries looked at, government capital expenditure as a share of GDP rose between 1980 and 1996 for four of them (Korea, Thailand, Chile and Zambia), remained more or less constant in India and Pakistan and fell in the other 9 countries. Non-government capital expenditure rose as a share of GDP in all three East Asian countries, as well as Chile and India. It fell in nine of the countries and remained more or less constant in one (Trinidad and Tobago). This reflects the fact that private sector investment has boomed in selected countries only, a point that has been noted by other commentators. As a share of total investment, the private sector has increased in nine of the 15 countries, fallen in five and remained more or less constant in two (Chile and Botswana). There is no clear pattern to these share changes, except that the transition economies show a major shift to the private sector.²

Previous studies have focussed on the enhanced role of foreign capital flows in promoting investment, particularly FDI. As noted above, the amount of FDI is small relative to total investment, though its share has increased over time. In the low-income countries, the World Bank estimates that FDI increased from virtually zero in 1980, to around 8.5 per cent of total private sector investment in 1997. In middle income countries the share has risen even more, again from zero to about 15 per cent. Interestingly, the increase is found in all regions; in 1997, FDI amounted to 20 per cent of private sector investment in East Asia, 11 per cent in Central Europe and Asia (transition countries), 16 per cent in Latin America and the Caribbean, 5 per cent in South Asia and 11 per cent in Sub-Saharan Africa.

In addition to FDI, financial flows to developing countries relevant to investment also include portfolio investment and bank-related finance. Table 4 summarises the changes in all financial flows from 1990 to 1997. Across all developing countries total flows increased nearly seven-fold during this period, with the largest increases in Latin America and the Caribbean (nearly ten-fold) and the smallest increases in East and South Asia (five-fold). The structure of financial flows has also been changing. With the exception of Latin America and the Caribbean, the share of bank finance has fallen substantially and that of FDI and portfolio investment has increased.

² The calculation of the share of the non-government investment is taken as the difference between the total and the government investment. Separate data are given from private sector investment for selected countries and periods. Although the actual percentages come out differently in a number of cases, the broad picture of a varied trend in the share of the private sector remains.

Table 5. Changes in economic activity for state-owned enterprises (1985-1996)

<i>Country</i>	<i>Share of economic activity by state-owned enterprises as percentage of GDP</i>	
	<i>1985-1990</i>	<i>1990-1996</i>
East Asia		
Philippines	2.3	2.2
Latin America and Caribbean		
Argentina	2.7	1.3
Bolivia	13.9	13.8
Brazil	7.6	8.0
Chile	14.4	8.1
Mexico	6.7	4.9
Panama	7.6	7.6
Paraguay	4.8	4.5
Peru	6.4	5.7
South Asia		
India	13.4	13.4
Sub-Saharan Africa		
Botswana	5.6	5.6
Zimbabwe	10.8	11.3
High Income		
United Kingdom	3.6	2.8

Source: World Bank (1999a), table 5.8.

The shift to FDI has been strongest in relative terms in Eastern Europe, where portfolio investment's share has remained constant, and weakest in Latin America, where the share of FDI has fallen by about 15 per cent. Portfolio investment has gone up most in relative terms in East Asia, Sub-Saharan Africa and South Asia. The composition of financial flows has considerable significance for sustainable development in these countries, as discussed below.³

Overall, we conclude that the picture of the trends in private sector investment is more complex than is sometimes portrayed. Over the last decade or so, the role of the private sector has not increased in relative terms in all countries. Moreover, the trends in public/private sector changes cannot be classified by region or level of development. There has been a substantial growth in private foreign flows but they are still a minor part of total investment or even private investment. However, increases in FDI as a share of the total private capital flows have been observed in all regions, as has the sum of financial flows (FDI, portfolio and bank finance). The structure of finan-

cial flows generally has been towards FDI and portfolio investment and away from bank finance, but Latin America and the Caribbean are exceptions to this pattern.

Specific Trends in Private Sector Finance

In this section we look at specific trends in the role of the private sector, covering privatisation and infrastructure investment, investments related to global environmental protection and investments related to improving or sustainably using the local environment.

Privatisation and infrastructure investment

The changing role of the private sector in economic activity can be seen in table 5, which provides the share of economic activity by state owned enterprises for all countries for which data could be obtained. The years of comparison are averages for 1985-1990, and 1990-1996.

The share of state-owned activities has fallen in a number of countries in Latin America and the Caribbean, notably Argentina, Chile, Mexico and Peru. It has risen, or not fallen appreciably, in all the other developing countries. The picture is substantially incomplete, as data are missing for all other countries for one or other of the two periods. It is certain, for example, that the share in economies in transition has fallen substantially, although there are significant differences between countries in this group. Nev-

³ FDI has been claimed to be superior to equity and portfolio investment because it is less volatile. However, this is not an easy position to sustain. Poor economic policies, which result in an outflow of equity and portfolio investment will also cause a fall in future FDI; the effect of the change in the latter will be more pronounced in the long term.

ertheless, the data are revealing enough to show that in several major countries in the world the share of state-owned activity has not declined in the last 15 years.

The economic case for privatisation has been made for some time and is largely valid. A shift in economic activity from the public to the private sector results in a reduction in the costs of providing the service and an increase in the resources available for investment, without drawing on scarce public funds. A World Bank study of 60 privatised companies quoted in Panayotou (1998) found that privatisation had resulted in an improvement of 11 per cent in efficiency, 44 per cent in investment and 45 per cent in profitability.

While this may be too enthusiastic a picture—similar performance gains are certainly not universal in transition economies, Auty (2000)—improved economic performance is generally expected from privatisation. The concerns are more on the environmental and social sides. It is interesting that the World Bank study referred to above does not address either of these concerns. The environmental fears are clearly stated by French (1998, 32): “When it is done wrong, privatisation leaves environmental degradation and social disruption in its wake.” The incentives for a less than acceptable environmental performance are clear. Governments are keen to attract private capital, which tends to demand higher rates of return on its investment than the public sector. This raises the price of the services, although some of the return comes from an improvement in efficiency as well. In the face of such pressures, and given limited environmental management capacity in the government anyway, the authorities may be willing to overlook environmental norms, as these will further raise the costs of provision of the services, or make the projects unacceptable to the private sector.

French (1998) provides examples of private sector projects with potential serious environmental consequences that include power stations with high pollution levels, water supply projects that pay little attention to conservation, hydro-electric projects with large displacement of populations, and gas and mineral development projects that cause environmental damages which would be unacceptable in the high income countries.⁴ The World Bank and other multilateral institutions would claim that projects financed with their involvement have to meet strict environmental standards, and that such impacts are not possible. In this they are broadly correct, although some private sector projects, especially in the transport

and water sectors, have been subject to criticism. What they cannot do, however, is to influence all privatisation-related activities and, since funds are fungible, countries may go to the multilateral institutions for the “cleaner” projects and to other private sector sources for the less “clean” ones. There is no study that has investigated whether this is true or to what extent it is true.

This raises the question of how the private sector takes account of the environmental dimension. There is conflicting evidence on this. Gentry (1998) notes that the traditional view has been that environmental factors have little impact on corporate valuation and the environment is considered a liability, cost or risk. Against this, some recent work has shown a positive link between environmental and financial performance. Earle (1998) reviewed 70 studies in this area and concluded that companies with best environmental practices had a 2 per cent higher stock market return than other companies. World Bank (1999b) reports on a study of stock market prices in Argentina, Chile, Mexico and the Philippines. It finds that when good environmental performance is publicly recognised the share price rises by an average of 20 per cent, while a publicised complaint about pollution results in a fall of 4-15 per cent. If these studies are correct, and if the causation is indeed from better environmental performance to higher share price (which it may not be), then the private sector has some degree of self regulation of the environment. How much this works to protect the environment is, however, still an open question.

On the social side, the concerns about privatisation are that it will result in higher charges and a lack of social provision of the service to poor and vulnerable groups. The fact that private sector enterprises require higher returns is partly due to the higher perceived risk of such investments. Haarmeyer and Mody (1998) note that the equity return on a sample of private power projects is 18-25 per cent and for a sample of private road projects it is 15-30 per cent. These are considerably higher than the returns for public investments, which tend to be around the 10-12 per cent mark. How much of the returns are generated by increased efficiency and how much by higher prices is not answered in the literature but some increase in prices is often expected (although there have been several privatisations where prices have fallen).⁵

The way to protect the low-income groups and others who would lose out in the face of such changes is through the regulatory framework. Much has been written about how this should be structured, for ex-

⁴ Private sector investment in mining and extraction of natural resources is particularly large as a share of total investment in Africa.

⁵ The higher rate of return may be justified when the alternative is public sector funds. The literature on the marginal cost of public funds (Ballard, Shoven and Whalley, 1985) notes that a dol-

ample, Brook-Cowen 1997). Generally speaking, the more control one seeks over social provision, the more power the regulator needs and the greater the capacity needed to ensure compliance. Tariff determination, including possible cross-subsidisation of rates for low level/low-income users, has successfully been achieved in a number of cases of privatisation. A number of cases are described in Gentry and Fernandez (1998), French (1998) and Johnstone, Wood and Hearre (1999). These suggest that projects have had some success in meeting all three criteria of sustainability and indeed the social dimension has been given considerable thought in the design of the privatisation. This does not mean, however, that all privatisations have had the same success in social terms – again there is a tendency to pick out the “good cases”. Furthermore, there have been some problems; the case studies in the literature indicate that difficulties arise with respect to:

- Trade-offs between lower average tariffs for the poor who are provided the service and expansion of the service to more poor households;
- Lack of clarity in the agreement about how increased costs of unforeseen environmental regulations will be passed on;
- Difficulties in applying metered tariffs;
- Difficulty in getting political agreement on large-scale concessions for privatisation of public services. Transparency in the arrangements for such contracts and ensuring competitive bidding is essential for the long-term success of the project (Gentry and Fernandez, 1998);⁶
- Given the long term nature of the agreement, it is more effective when the contracts are based on performance indicators rather than on process indicators which specify how standards are met (Gentry and Fernandez, 1998);
- The terms of private sector provision of water and sanitation often ignore the impacts on those outside the scheme — other users of ground and surface water which is drawn for the project or those receiving untreated waste water resulting from the project (Johnstone, Wood and Hearne, 1999);
- As noted earlier, there are several levels and

forms of privatisation. Brook-Cowen (1997) describes them as follows, in increasing order of private sector responsibility: service contract, management contract, lease, build-operate-transfer, concession and divestiture. Apart from divestiture, most involve some form of public-private partnership. Although there are papers describing the merits and de-merits of each, a detailed evaluation of the relative performance of different forms is lacking. We discuss when one form is to be promoted in favour of another, in the next section of this paper.

To sum up, privatisation is an important potential source of finance for sustainable development and is growing in popularity, although it is by no means the main source of provision of key infrastructure services and, indeed, the share of state activity has not fallen in many countries. The experience with private provision of what was previously a public sector activity has generally been good with respect to the economic dimension of sustainability. On the environmental and social dimensions the evidence is less clear, but the few examples we have point to some progress on both these fronts. We need more systematic evidence, however, and there is a concern that what is documented is the “good side,” often because it relates to the activities of the multilateral institutions, which are under more careful scrutiny than other private sector initiatives. Furthermore, some sceptics argue that, given poor monitoring capacity in most developing countries, can the privatised companies be expected to continue to provide the services in a way that maintains progress toward sustainability?

Investments related to global environmental protection

Following the emergence of the major global environmental issues of stratospheric ozone depletion, climate change and biodiversity loss, nations have recognised the importance of international measures to protect the environment against losses arising from such changes. This requires changes in policy as well as allocations of resources for investment to mitigate the negative impacts and prevent further damage. The ground relating to these issues was well covered in the earlier papers on the financing of sustainable development (Markandya, 1994; Steele and Pearce, 1996; Hamilton, 1996; Panayotou, 1998). The basic messages emerging from that literature are as follows:

- Substantial financial resources are required to initiate actions to achieve targets for environmental protection that must be seen as essential for sustainable development;
- The level of resources is not independent of the policy framework; generally the more market-

lar of public investment costs society more than one dollar because of the distortions it creates in the process of collecting the revenue. Hence if the private sector demands a rate of return of X per cent on its investment, the social cost of provision may be lower than with a public sector that asks for a lower rate, but that imposes a welfare cost on society in raising the revenue.

⁶ The failure of the Malaysian Indah Water Konsortium sewerage project and the Pakistan Hub River Power project have been attributed to the lack of transparency and suspicion of corruption.

based the policy framework, the less are the costs of achieving any given global environmental target;

- National governments are not always, or even most frequently, the best agents to implement the programmes for global environmental protection. There is a key role for the private sector;
- Much of the action has to be implemented in developing countries which lack both the public and the private sector capacity and financial resources to undertake the actions.

As a result, a number of initiatives have been developed over the last 5 years or so. The Global Environment Facility (GEF) was set up in 1990 with the specific purpose of providing financial support to initiatives to protect the global environment in developing countries. It has a budget of around \$2 billion over three years. Likewise, the Multilateral Fund was established in 1990 (initially as an Interim Fund) with the objective of assisting developing countries to phase out the use of ozone-depleting substances. It has a triennial budget of around \$500 million.

The basic principle of support for both is that they fund the "incremental cost" in any project arising from the increased level of environmental protection (amounting to anything from 7 to 65 per cent of total cost). Although the GEF has always provided significant private sector support, latterly this has increased. The idea is that, with GEF support the private sector is able to leverage funds from other sources. Most such projects go through the International Finance Corporation (IFC), the private sector arm of the World Bank. Some examples of these projects include:

- Small and medium enterprise (SME) sector production of efficient lighting in Poland, whereby intermediary institutions receive low cost loans from the GEF, who then provides debt and equity financing for SMEs. The leveraging of the original loan is more than 100 per cent;
- A biodiversity enterprise fund that will invest in sustainable exploitation of natural resources through agriculture, aquaculture, ecotourism and recycling. GEF and IFC could together put up about \$10 million in a fund of \$20-50 million. The fund will invest in projects with a capitalisation of \$40-100 million;
- A \$100-\$200 million Global Renewable Energy Fund to finance projects of less than 20MW. The Fund will start by exploring how concessional finance can be combined with commercial funding to support projects that would otherwise be so small that the transaction costs would exclude them from mainstream finance.

These are only a few of the initiatives that IFC is

working on with GEF. The overall contribution to this area of private sector finance remains to be determined, as does the efficiency of the investments – how much additional contribution does the programme make to global targets, and what is the cost per unit of the target? It should be noted that these initiatives were on the agenda three years ago (Hamilton, 1996) and still appeared as proposed projects on the IFC Web Site in 1999.

Other initiatives that involve the private sector include private bio-prospecting programmes, under which pharmaceutical companies pay for the rights for such prospecting in exchange for limitations on development in the areas concerned. In 1991 the well-known deal between Merck and INBio in Costa Rica was signed. The payment amounted to \$1.35 million, as well as royalty deals on any discoveries. Since then, however, the number of new agreements has been rather limited. Steele and Pearce (1996) and Simpson, Sedjo and Reid (1996) noted the difficulties in this area. The need for a strong scientific base and political stability are necessary precursors. Also, expectations of high receipts for the host country are unrealistic given the nature of the market. In any event, we have not been overwhelmed with new bio-prospecting programmes. There are only a handful referred to in the literature – one or two in Brazil and Argentina and one in Suriname.⁷

Other developments in the private sector finance of global environmental problems include:

- Growth in investment in eco-tourism. No reliable estimate of the potential of this market is available. Currently there are many programmes that label themselves as eco-tourism but their contribution to conservation ranges from negative to possibly large and positive. In most cases the impacts are unknown;
- Various debt-for-nature swaps where NGOs "buy" the right to undertake conservation from a national government in exchange for retiring some of its debt from the secondary market;
- Programmes for labelling and certifying forestry products as consistent with sustainable use of forests, through the Forest Stewardship Council. Similar programmes exist through the Marine Stewardship Council for sustainable exploitation of fisheries.

With respect to climate change there have been several initiatives and the situation is evolving rapidly. The Kyoto Protocol in 1997 agreed on three "flexibility mechanisms" for meeting the target reduc-

⁷ Steele and Pearce (1996) suggest that the overall revenue to developing countries could be as much as \$1 billion annually. If so, we are less than one per cent of the way there.

tions in Green House Gases (GHGs) and in moving developing countries onto greater efficiency in economic activity with respect to GHGs. Countries are divided broadly into two groups: Annex I Parties, almost all of whom have binding commitments to make reductions for the period 2008-2012; and Annex II Parties that do not have such commitments.⁸ Annex I countries can acquire or transfer emissions among themselves. The instrument for such transfers is called Joint Implementation (JI). The main features of JI are its restriction to Annex I countries with commitments, the inclusion of sinks and the lack of a start date from which projects will be accepted. In addition, these countries can trade emissions rights among themselves although the details of such trading arrangements have not been established. The third mechanism is the Clean Development Mechanism (CDM). This will permit any legal entity in an Annex I country investing in GHG reductions projects in developing countries, and getting credit from some or all of the reductions. The reductions will need to be certified and can be banked from 2000 onwards for the first commitment period. It is unlikely that sinks will be included in the permitted reductions. The full details still need to be worked out, and there are some proposals to limit how much any one country can “buy” in GHG reductions.

All three mechanisms will work substantially through private sector involvement in GHG reduction. Estimates of the cost of all the reductions are uncertain but range widely, from \$22.5 to \$31.6 billion for the year 2010. The share of CDM projects ranges from \$7.5 billion to \$17.4 billion for 2010 or \$25-85 billion for the whole period (Austin and Faeth, 2000). This compares, for example, with current FDI to developing countries in 1996 of \$110 billion and would represent a major increase in such flows. The contribution they would make to sustainable development, however, remains to be seen. The idea behind CDM is that such investment should support “sustainable development” but that is not made operational. It is clear that, in selecting projects for implementation, countries should look to broader indicators than simply the revenue for the sale of GHG emissions. These include ancillary benefits, reductions in unemployment and poverty, and increases in sustainable use of energy. A discussion of criteria for evaluating such projects can be found in Austin and Faeth (2000) and Markandya (1998).

Many institutions are making moves to operationalise the flexibility mechanisms and to develop certi-

fication protocols and provide brokerage or “clearing house” facilities for projects.⁹ One example is the Prototype Carbon Fund (PCF) by the World Bank that is already looking for investors in a pioneering scheme to trade emissions. The World Bank has opened it to a select group of investors in industrialised countries and raised sufficient capital in January 2000 to get the scheme up and running. The PCF will operate like a mutual fund, except that the securities traded will be tons of carbon. Investors will finance mitigation activities in LDCs (as JI or CDM). Potential projects, subject to investors' approval, include those in the portfolio of the Bank and the IFC, as well as other agencies. Eligible investments will include promotion of renewable energy, energy efficiency improvement or replacement of “dirty” technologies. The PCF's maximum capacity has been set at \$150 million and officials expect to attract \$75-\$100 million during the first opening. The governments of Finland, the Netherlands, Norway and Sweden have agreed to participate, although none has made a binding commitment to invest. Eighteen corporations have also agreed to sign on including British Petroleum, utilities in Denmark, Finland, Norway and Sweden and major Japanese firms, including Mitsubishi. The World Bank, which has sunk \$3 million into the scheme, expects to recover about 80 per cent of its costs through commissions charged on transactions, by its own estimates, trading could reach \$150 billion per year by the year 2020.

Investments related to sustainable use of the local environment

As noted earlier, the annual level of investment in developing countries is huge. Most of this has to come from domestic resources, and most of the domestic resources have to come from the private sector. The sustainability implications of the investments can range from positive and benign to extremely negative. There is no overall appraisal of trends in these investments, whether they are getting more or less economically efficient, or more or less environmentally and socially desirable. There are, however, some indirect indicators which suggest that the situation should be improving, some that indicate no change for the better and point in the opposite direction. The positive indicators are the following:

⁸ Strictly speaking not all Annex I countries have undertaken commitments. The exceptions are Turkey and Belarus, who are not Parties to the Convention, plus Croatia, Liechtenstein, Monaco and Slovenia.

⁹ Earlier papers in the CSD series on this topic refer to Activities Implemented Jointly (AIJ) and Carbon Offset schemes. These were actions undertaken pre-emptively, in the expectation of the flexibility mechanisms under the Kyoto Protocol. AIJs typically involved Annex I and Annex II countries and will not be permitted under the Kyoto Protocol as certified reductions. The amounts involved were, in any event, small compared to the trades expected under the flexibility mechanisms.

- The increased use of economic and fiscal instruments, especially the creation of property rights, tradable permits and markets for resources and pollution, pollution and product charges and bonds and deposit refund schemes. In many cases, the shift to such instruments results in enhanced economic sustainability as the costs of given levels of environmental protection decrease (Panayotou, 1999). Furthermore, they encourage enterprises to invest in cleaner technology and to reduce pollution, hence resulting in environmental gains. The impacts in terms of social indicators can be negative, but this can be addressed with relatively easy adjustments to the structure of the economic instrument (Markandya, 2000). There is no overall assessment about the extent to which economic instruments have been adopted, let alone an evaluation of their impacts on the nature of private sector investment and on sustainability indicators. Nevertheless, the trend towards adopting such instruments is encouraging and personal experience indicates that even those countries that were sceptical some years ago have started to look seriously into the use of such instruments;
- The reductions in environmentally damaging subsidies. Again there are only illustrative figures on trends. Gandhi, Gray and McMorran (1997) estimate subsidies to energy, water, transport and agriculture at around \$870 billion for 1995. Pearce and Von Finckenstein (1999) estimate world subsidies at between \$655-786 billion for 1995/96. It is generally believed that they have fallen since then, and Pearce and Von Finckenstein (1999) provide an estimate of a fall of 51 per cent since 1990. Interestingly, the smallest falls have been in the OECD countries (21 per cent), while China and other developing countries have reduced subsidies by 58 per cent. The reductions encourage the shift to less resource intensive methods of production which, in turn, imply that investment made by the private and public sectors will generally be more consistent with the goals of economic and environmental sustainability. Some subsidies, however, such as those on kerosene and gas in rural areas, will encourage the supply of such energy and thereby reduce the environmental damage associated with alternative fuels. Hence, not all subsidy reduction is desirable from a sustainable development viewpoint, although one needs to bear in mind the economic cost of providing the subsidy and whether that is economically sustainable. The impact of subsidy reduction on the poor and socially excluded has long been a matter of debate. These resource subsidies largely benefit the better off, but that does not mean that their removal will not hurt some vulnerable groups. Targeted subsidies, such as those offered

through rising block tariffs for water and energy, offer one solution. Another is to use innovative instruments such as tradable rights, where reductions in subsidies are accompanied by an allocation of rights to use resources in a way that favours the poor. An example would be a reduction in water subsidies being accompanied by an allocation of water rights (which were previously with the state) to user groups;

- The more careful appraisal of investments from an environmental perspective. As noted, multilateral institutions and international banks are moving toward stricter environmental standards in appraising investment projects. IFC (1999) provides an up-to-date description of what environmental due diligence is practised by the World Bank in its private sector lending. National authorities are also getting stricter, although they are frequently not as demanding as the international institutions. Hence, investments made nationally, especially by SMEs, receive less scrutiny than the high profile projects, yet their impact on the environment could well be greater.

The areas where the last ten years have seen little change in developing countries are:

- The capacity to design, manage and ensure compliance with environmental norms. This remains a major obstacle to achieving sustainable development through the private sector. Although governments have increased their budgetary allocations for environmental protection, the issues to be addressed have gone up enormously, and the net resources remain inadequate. Furthermore, the incorporation of economic decision-making in environmental ministries is still very limited. The consequence is that enterprises are able to ignore compliance, and get approval for investments that should be subject to greater environmental safeguards. One way around this problem is to use NGOs and civil society groups to assist in the monitoring. Another is to obtain voluntary agreements with industry, through a covenant that requires greater self-policing. Some success stories such as the Pollution Control Evaluation and Rating (PROPER) programme in Indonesia are discussed further below;
- The use of operational sustainability indicators in investment appraisal. One would not expect the private sector to take much account of sustainability in making their investments, unless there are direct requirements or indirect incentives to do so. While the theoretical literature on such indicators has proliferated, national authorities still make little use of them in regulating how the private sector allocates its investment resources. The same also applies to the appraisal of sectoral policies, such as investment incentives and subsidies

to agricultural processing, mechanisation, etc. A proper consideration of the environmental social impacts has not advanced much in the last decade.

Areas where indicators point to a worsening impact of investment on sustainability are:

- Increased investment in private transport, with growing pollution and congestion problems. Almost universally, the indicators in this area are deteriorating and yet there is little progress in providing enough incentives for the private sector (producers as well as users) to re-orient their activities toward a more sustainable policy;
- Use of key renewable resources at rates that are not sustainable. This applies particularly to groundwater, forests and fisheries (Brown and Flavin, 1999). Despite all the fine words at Rio, depletion of these stocks continue at more or less the same rate and the situation has become critical in some regions. Investors continue to exploit them without taking enough account of the implications for the environment and for sustainability.

Conclusions on private sector investment and sustainability

This section has looked at the linkages between private sector finance and sustainability under three headings: privatisation, global environmental protection and local environmental protection.

On privatisation, which is increasingly being used to finance infrastructure provision, case studies point to improvements in environmental indicators and attempts to address the social problems, with some success. On the economic front the case studies also indicate increased efficiency, but they do not cover the full range of experience. In transition economies, in particular, there have been less positive examples. In the future we need more systematic data. We also need to monitor the progress of these enterprises over a longer period, to be certain that the changes are indeed sustainable.

On global provision, the implementation will be very much in the future. The GEF, through the IFC, has contributed to a growing level of private sector participation in energy efficiency and other areas where there is a global environmental impact. The overall contribution to the environmental targets remains small, however, and information on the efficiency of such investments has not been systematically analysed. Other initiatives, such as bio-prospecting, and certification of forest products remain small in terms of their overall impact. The greatest potential for private sector involvement in financing solutions to global environmental problems lies in the flexibility mechanisms of the Kyoto Protocol, especially through the CDM, but this is yet to be realised. It is noteworthy, however, that there is a

great deal of interest in the private sector even at this early stage.

On the influence of the private sector on the local environment, the picture is mixed. It is positive with respect to improved incentives for efficient environmental protection through the use of economic instruments and reductions in environmentally damaging subsidies. Standards for the appraisal of investments have also risen and now include stricter environmental norms and a more careful assessment of social impacts. The situation has not improved appreciably in developing countries, however, when it comes to capacity for regulating the environment and ensuring compliance. Furthermore, most sustainability indicators have yet to be made operational, so that investments can indeed be evaluated with respect to such criteria. Finally the picture is worse when we look at the growth of private transport and the increased rate of exploitation of renewable natural resources. In both cases the private sector is responsible for much of the investment but it is not responding to signals that the development is unsustainable.

OBSTACLES TO AND OPPORTUNITIES FOR GREATER PRIVATE SECTOR PARTICIPATION IN THE FINANCING OF SUSTAINABLE DEVELOPMENT

In this section we look at the obstacles and opportunities for private sector financing of sustainable development. It is important to begin by noting that not all increases in private sector finance will contribute to sustainable development. Examples have already been given of projects that have seriously damaged the environment, contributed negatively to social sustainability and cost much more in resources than the value of what they produced. Thus, what we are looking for is obstacles to private sector projects that are structured in a way that is consistent with the goals of sustainable development.

From the discussion of the linkages between private sector finance and sustainable development, the following obstacles and opportunities have been identified.

Weak Enforcement of Environmental Regulations

The enforcement of environmental laws and regulations remains a major weak point in the environmental protection systems of many developing and transition economy countries. Some regulations are unrealistically strict and impossible to meet, others are outdated, while the enforcement agencies often lack the resources and political support necessary to do their jobs properly. The capacity to identify, prepare and package environmental investments for financing is under-developed and as a result viable projects go unimplemented. Especially in short sup-

ply are people with the economic/financial skills and expertise needed to undertake cost-effectiveness analysis, business planning and financial/credit analysis.

These factors can be an obstacle to effective privatisation and to adequate local protection of the environment. They can also make it difficult for countries to meet international environmental obligations. These difficulties have been noted in discussion of all these areas of private sector activity.

To overcome the problem, developing countries need much more assistance in capacity building and technical support than they now receive. Multilateral institutions are aware of this and are responding but much remains to be done. Personal experience with Ministries of Environment in many countries reveals chronic under-funding, low morale and inadequate staffing. In addition, the authorities have to depend much more on civil society to ensure compliance. The PROPER programme in Indonesia is an excellent example. Degree of compliance is rated on a colour scheme, which is made public. Information is widely available and local communities discuss and negotiate on poor performance with polluters. The impact on compliance has been substantial and the government plans to extend it from the present 400 factories to 2000 by next year. Following from this, authorities in Colombia, Mexico and the Philippines are starting their own public disclosure programmes (World Bank, 1999b). This is part of a general trend toward informal regulation, which include voluntary agreements as well as eco-labelling and certification schemes (Hafkamp, 1995; Zarrilli, Jha and Vossenaar, 1997).

Weak Economic and Regulatory Incentives

A number of economic and regulatory incentives, which could and should encourage environmental investments are simply not as effective as they should be. Despite the reductions in resource use subsidies noted earlier, they remain substantial, and hence a disincentive to efficient resource use. Additionally, economic instruments such as pollution charges and fines, which should serve as incentives for enterprises to invest in pollution reduction, fulfil this function poorly because the base rates are usually very low. While such charges and fines do generate revenues which are often used for environmental protection purposes (that is, through environmental funds), the charge and fine levels are generally so minimal that it is less expensive for the polluting enterprises to simply continue paying them rather than to make investments which would eliminate or reduce emissions. Moreover, some enterprises do not pay charges or fines at all due to financial insolvency, privileged status vis-à-vis regulators, simple non-compliance, etc. This is particularly true in the economies in transition, but applies more generally as well.¹⁰

The reforms needed for accelerated removal of subsidies are discussed elsewhere in this volume. On pollution charges and other economic instruments, there is little movement toward more realistic charges (there are exceptions, such as China). The situation can only be changed by example, by workshops and training seminars showing how actual cases have worked effectively and how adverse social and economic impacts have been avoided. Technical assistance in Ministries of Environment and Finance are a necessary complement to any capacity building programme.

Problems with Meeting Environmental and Social Objectives in Privatisation Schemes

We noted how privatisation programmes face problems to ensure coverage of the service to poor and vulnerable groups, and how they can ignore the environmental impacts on those outside the scheme. These issues can be tackled through the use of regulatory arrangements, such as "lifeline rates" and cross subsidisation. The consensus appears to be that where there are substantial social objectives, public-private partnerships are a better vehicle than pure private sector operations such as exclusive build-operate-transfer, concession and divestiture. Hart (1998) notes that such schemes can also be the appropriate vehicle when:

- The state needs to share in the rents that cannot be collected through taxation;
- It is a step to full privatisation, which may need some monitoring of private sector performance and when the full value of the privatised entity is hard to determine (in which case there is danger that state assets will be undersold); and
- The projects are too risky for the private sector to take them on alone.

Successful public-private partnerships require mutually agreed objectives and targets, clearly defined roles and responsibilities and "dominant partner management" (one of the two parties retains exclusive operational control) and a sharing of asset ownership so that both parties seek to gain appreciation of their assets and protect them from downside risk.

Unstable Macro-economic Conditions and an Uncertain Regulatory Environment

In many developing and some transition countries, macro-economic conditions are still unstable.

¹⁰ For the Asian experience on economic instruments see Markandya, 1999.

Under such conditions investors of all types tend to be very wary given the high risks involved. Moreover, serious economic fluctuations or high inflation can easily undermine investment incentives which might have been created by positive reforms in environmental policy or improvements in institutional arrangements.

Even in countries where macro-economic conditions have stabilised, there often remains considerable uncertainty with regard to future environmental standards. The environmental regulatory systems are evolving rapidly in many countries, with old laws being reformed or sometimes entirely replaced. The pace of evolution varies considerably from country to country and even within countries according to specific law or environmental sector. Generally, markets are developing more quickly than regulatory regimes, resulting in pressures on governments and enterprises to act (that is make investments) often without sufficient knowledge as to what standards they will be required to enforce or comply with in the future. While new regulations may be coming down the pipe to replace the old, how do enterprises know what actions to take and investments to make, in order to be “in compliance”? For those Central and East European (CEE) countries in the process of acceding to the EU, standards provide the benchmarks for future environmental regulations. Nevertheless, the accession process, even for the earliest entrants, is expected to last a few (or more) years and the uncertainty will continue for some time to come.

Measures to reduce uncertainty of investments have been discussed extensively in the literature. Whereas in countries with high sovereign credit ratings it is possible for commercial banks to bear the risk, this is not possible in many developing countries and most transition economies. The banking sectors of many developing and CEE countries are still under-developed and under-capitalised, unable or unwilling to extend medium to long-term loans at affordable rates (if at all), inexperienced with environmental investments and unwilling to assume the perceived risks associated with such investments. The result is that commercial capital is often not available for environmental investments which often require longer pay-back periods than other types of investments and have lower rates of return, or are prohibitively expensive for potential borrowers. In these circumstances, opportunities for private sector investment can be created through:

- International institutions reducing investment risk by a careful appraisal of the prospects;
- Multilateral and export credit agencies underwriting political and regulatory risk;
- The central government underwriting risk of default by the local authorities; and
- The government declaring its environmental intentions clearly in advance and sticking to them.

Ideally, any remaining risk should be borne by someone who has an incentive to minimise his impacts on the project. The danger of moral hazard arises if that is not the case, so that if political risk is subsidised to the investors, they will invest more than would be justified if they had to take account of the risk.

Low Support for Environmental Protection

Public and political support for environmental protection activities, and the expenditures they necessitate, is often not strong enough to compel or stimulate investment. Public pressure for strengthened environmental protection is weak in many countries and this translates into low interest and support among politicians and other influential decision-makers. A lack of information and understanding about the true costs and benefits related to environmental protection can lead to other, seemingly more immediate priorities (e.g. meeting basic subsistence needs, paying the rent, maintaining or finding jobs) superseding the relative “luxury” of improving environmental conditions. Environment lobbies in these countries, while gradually becoming more professional and effective, especially as public participation in decision-making becomes more of a reality than a catchy phrase, remain weak compared to other social and commercial interest groups. Until this situation changes significantly, the policy and institutional framework necessary to generate substantially increased environmental investments will be slow in developing.

To some extent these problems reflect the realities of the situation — there are indeed more important issues whose call on scarce resources should come first. It would be wrong to “force” an environmental agenda on such countries through conditionalities that reflect priorities in the North. Where, however, there are genuine national interests of which people are not informed, or where vulnerable groups are being marginalised, the international community can serve the cause of sustainable development by making this information available to the affected parties. It can also support the civil groups that are seeking to bring the issue onto the national agenda. The danger to be avoided in the latter case is being accused of external interference and undermining the efforts to strengthen governmental institutions such as the Ministries mentioned above.

Equity, Lack of Transparency and Political Acceptance

The privatisation discussion noted the difficulties of political acceptance when privatisation is undertaken without transparency or when it is seen to benefit a few people disproportionately. This has been the experience in Russia with much of the state

sell-off, especially in the area of natural resources (Markandya and Averchenkova, 2000), in Malaysia with a national sewerage scheme (Gentry and Fernandez, 1998), and in Pakistan with the Hub River Power project (Financial Times, 1998). In many countries the process of privatisation has meant that great wealth was being accumulated at the same time that many people were facing increasingly desperate poverty. This has become a major source of social conflict and a number of researchers have drawn attention to the importance of this phenomenon in explaining the poor growth performance of several countries (Aslund, Boone and Johnson, 1996; Rodrik, 1998). As Rodrik (1998) notes,

“When social divisions run deep and the institutions of conflict management are weak, the economic costs of exogenous shocks...are magnified by the distributional conflict triggered. Such conflicts diminish the productivity with which a society’s resources are utilized in a number of ways: by delaying needed adjustments in fiscal policies and key relative prices, by generating uncertainty in the economic environment, and by diverting activities from the productive sphere to the redistributive one.”

Another way of looking at the problem is in terms of social capital. As Knack and Keefer (1997) note, where social capital is high, there is less resort to litigation and/or criminal racketeering to enforce contracts. Building up such capital means ensuring that the process is not only transparent, but also that it is equitable and does not result in substantial social exclusion. That in turn depends on the creation of strong democratic institutions and open government.

Equity Concerns and International Political Acceptance

The above concerns at the national level are echoed at the international level, where the acceptance of regulatory measures depends not only on their economic efficiency but also on their perceived equity. The Kyoto Protocol is an important case in point. If the flexibility mechanisms are to work, and indeed if the Protocol is to be ratified and implemented, all Parties have to feel that the arrangements are equitable. Presently, some in the United States take the view that developing countries should make some commitment to GHG reductions. The EU's position, and that of many of the G77 countries, is that no party should be able to “buy” themselves out of their commitment, by purchasing from another country its excess emissions reductions. Other developing countries are apprehensive about the implications of CDM deals in which the rich countries will dictate terms through controlling certification and having power over the financial institutions.

All these are driven in part by equity concerns. The solution has to be through negotiation and seeing

both sides of the case. The imperative of the global problems facing the planet should concentrate the minds of the negotiators and it is encouraging that this complex issue has made as much progress as it has. But much needs to be done. The opportunities for all parties to gain from actions that protect the global environment are great; it will take a strong “demonstration effect” of successful projects from which all Parties emerge satisfied, for the process to gather momentum.

CONCLUSIONS

That the private sector has a major role to play in financing sustainable development is something no one would argue with. The questions are about how this role should be exercised; which are the areas where it can be effective and where is it less likely to make a contribution? In evaluating the actual and potential contributions of the private sector we must look at all dimensions of sustainability, not just the environmental, which has been the focus of previous work in this area. Hence a social and economic assessment is also required.

In the enthusiasm to promote the private sector, writers sometimes give the impression that its role vis-à-vis the public-sector has expanded enormously. Likewise, the trends in globalisation create the impression of a major change in the share of FDI in total investment. Both are only partially true. The public sector has not contracted as a provider of economic goods and services in many developing countries and has only contracted a little in others. FDI accounts for around 7 per cent of total investment although its share has been growing throughout the developing world. The other components of financial flows to developing countries have also increased, and the structure has changed substantially. Bank lending is a smaller share in general (Latin America is an exception) and equity and bond finance has risen in some regions and declined in others.

The paper goes on to look at specific trends in private sector finance, beginning with privatisation and infrastructure investment. Privatisation is an important potential source of finance for sustainable development and is growing in popularity, although it is rarely the main source of provision of key infrastructure services. The experience with private provision of what was previously a public sector activity has generally been good with respect to the economic dimension of sustainability. On the environmental and social dimensions the evidence is less clear but the few examples provided point to some progress on both these fronts. More systematic evidence is needed, however, and there is a concern that what is documented is the “good side,” often because it relates to the activities of the multilateral institutions. Furthermore, some sceptics argue that, given poor monitoring capacity in most developing countries, can the

privatised companies be expected to continue to provide the services in a way that maintains progress toward sustainability?

The second specific trend relates to the financing of global environmental protection. Here much has been promised for some time but little has been delivered so far. The expectation is that this will change in the next decade, especially with the flexibility mechanisms of the Kyoto Protocol. It is noteworthy, however, that there is a great deal of interest in the private sector even at this early stage. Other initiatives, such as bio-prospecting, and certification of forest products remain small in terms of their overall impact, and are unlikely to become major areas of activity. Nevertheless they may provide important services to some communities and certain niche markets.

The third area of change for the private sector has been with respect to its impacts on the local environment. Here the picture is mixed. Positive aspects include improved incentives for efficient environmental protection through the use of economic instruments and reductions in environmentally damaging subsidies. Standards for the appraisal of investments have also risen, with stricter environmental norms and a more careful assessment of social impacts. The situation has not improved appreciably in developing countries, however, when it comes to capacity for regulating the environment and ensuring compliance. Furthermore, most sustainability indicators have yet to be made operational, so that investments can indeed be evaluated with respect to such criteria. Finally, the picture is worse when we look at the growth of private transport and the increased rate of exploitation of renewable natural resources. In both cases the private sector is responsible for much of the investment but it is not responding to signals that the development is unsustainable.

From this review of the performance of the private sector, a number of obstacles and opportunities have been identified. These are:

- Weak enforcement of environmental regulations;
- Weak economic and regulatory incentives;
- Problems with meeting environmental and social objectives in privatisation schemes;
- Unstable macro-economic conditions and an uncertain regulatory environment;
- Weak support for environmental protection;
- Lack of equity transparency and political acceptance; and
- Equity concerns and international political acceptance.

For each of these, actions are proposed to overcome the obstacles and exploit the opportunities.

On the enforcement of regulations, more resources, especially external assistance, are needed. But this will not be enough; the whole system of regu-

lation, monitoring and compliance has to be changed, with greater use of informal methods and greater involvement of civil society.

On weak economic and regulatory incentives, the continued reductions in non-targeted subsidies for resource use need to be maintained. Economic instruments need to be applied at more stringent levels if they are to have an incentive effect. This can only be achieved by example, by showing how such schemes have worked elsewhere and how adverse social and economic impacts can be mitigated.

On the problems of meeting environmental and social objectives in privatisation, the regulatory framework can respond to meet these challenges, as the success stories show. The reasons why other cases have been less successful need to be analysed further. Reviews of programmes indicate that public-private partnerships may work better in meeting broader sustainability goals but they have to be structured in a very precise way if they are to succeed.

The uncertainty issue is a key one for private sector involvement in infrastructure and environmental projects. Unless the level of uncertainty is reduced, private sector involvement will not be forthcoming. In some cases this reduction cannot be made without excessive cost; these are situations where the private sector should, perhaps not be involved. In others, a combination of support for a careful appraisal of the projects, clear and declared government policies, and selective government and multilateral/export credit agency risk guarantees are required.

In some countries support for environmental protection is weak and the private sector cannot be persuaded to provide the investments for that reason. To some extent this may be a reasonable ordering of priorities and it would be wrong to "force" an environmental agenda on such countries through conditionalities that reflect priorities in the North. In other cases, however, the level of interest is too low because vulnerable groups are being excluded from the polity and individuals are unaware of the effects of the degradation that they are experiencing. In such case the international community can assist in providing the necessary information and in supporting the civil groups that are seeking to bring the issue onto the national agenda. The danger to be avoided in the latter case is being accused of external interference and undermining the efforts to strengthen governmental institutions.

On the lack of transparency and equity the principles are clear. Governments cannot act without some democratic agreement in the area of privatisation. The selection of parties to deliver the services must take place through some kind of competitive process and they must not be seen to be excessively rewarded for their services. Failure to observe these conditions results in lack of success for the project itself and has ramifications for other privatisation programmes.

Finally, there are equity concerns for acceptance of regulatory measures at the international level. This applies to all parties, not just the developing countries. The way to overcome this, and to take advantage of the huge opportunities available for sustainable development as a result of the global treaties, is to show, by example, that the schemes can work to everyone's benefit. That implies a gradual process, but one that has started with some optimism in the last few years. ■

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THE GREENING OF FINANCIAL MARKETS

*Carlos Joly**

EXECUTIVE SUMMARY

Since the 1970s, public awareness of environmental problems has led to environmental laws based on command and control regulations. Another important development which harnesses market forces efficiently has been the development of environmental liability legislation. Environmental liability has made risks real for companies and investors. Although it has made for losses, it has also created significant business opportunities for innovative companies with good management. Hence the emergence of corporate environmentalism. Leading corporations are adopting environmentalism and corporate social responsibility as drivers of brand differentiation, product development and competitive advantage.

Though the financial community has been a laggard, particularly as regards investment portfolios, some major banks, insurers and investment managers are now at the point of making the further business link from corporate environmentalism to sustainable finance. Sustainable finance will mean not only that investors will disinvest in some stocks they would otherwise hold but also that they will seek out and be overweight in firms which are eco-efficient and gain competitive advantages through good environmental and social practices and image.

This process is being accelerated by government acting in creative ways. One way is demand creation through reporting legislation which obliges pension funds to state their policy on socially responsible investment; for example, recent UK legislation. Another way is the application of environmental screening to government-controlled funds, for example, as being considered by the Ministry of Finance for the Norwegian Petroleum Fund.

In short, in the US and Europe we are beginning to see the outlines of a virtuous circle, connecting public concerns, environmental legislation, corporate environmentalism and financial markets. The concept of fiduciary responsibility is in the process of being expanded to include the broader interests of the owners of capital, beyond short term profit maximization at any social or environmental cost.

This paper describes this process, identifies particular barriers to sustainable finance in developing markets, and on this basis proposes policies and instruments for surmounting these barriers, including the introduction of appropriate liability legislation; the adoption of environmental reporting requirements for initial public offerings and listed companies; the introduction of expanded fiduciary responsibility for pension funds; the introduction of environmental and social screening for government funds; and the creation of investment objects designed for international investors which satisfy certain sustainable finance criteria.

* Carlos Joly is Senior Vice-President and Head, International Investment Management and Pensions, Storebrand ASA, Norway.

INTRODUCTION: CORPORATE ENVIRONMENTALISM AND FINANCIAL CONSERVATISM

THE dangers of environmental degradation have been recognized throughout history and in different cultures.¹ Concern for nature has been reflected in Western philosophies in different ways, whether nature is seen as independently valuable in itself or as a resource which is instrumentally valuable for mankind.² But it is only during the past 25 years that the importance of the environment has gained prominence as a political and economic issue. In North America, Northern Europe and Australia, we have seen a dramatic change in corporate environmentalism.³ This change follows from two important developments.

First, there is the issue of public concern. Books like the Club of Rome's *Limits to Growth* (Meadows, Meadows and Randers, 1972), Schumacher's *Small is Beautiful* (1973), and Carson's *Silent Spring* (1962) galvanized growing public awareness. During this decade, several catastrophic events were widely publicized and became engraved in public conscience: Three Mile Island (1979, USA, cost \$2 billion), the Sandoz chemical spill (1986, Basle, cost \$50 million)⁴ Chernobyl (1986, Ukraine, cost \$14 billion), Exxon Valdez (1989, Alaska, cost \$7 billion), brought to life the potential risks (Business and Environment Programme, 1997).

Second, in connection with the growing importance of the environment in local and national politics, governments enacted legislation which linked

environmental risk to financial risk. The social and political context determining the environment issue became significantly broader and itself an important factor in bringing about corporate policy change. Hoffman (1997, 197) states that "Evolving perspectives of what constitutes heresy and dogma in a given industry depend not just on costs and regulation but on the full social, political, and economic system of which the industry is a part."

The first industries to embark in large scale environmental overhaul were the heavily polluting industries which bear the brunt of pollution laws and regulations: chemicals, manufacturing, the smokestack process industries, oil refiners and car makers. This trend began in the eighties and continues today. Food manufacturers, electronics and a variety of manufacturing and service sectors, including hotels⁵ and restaurant chains,⁶ have started changing their approach to environmental action in the course of this decade. Many companies have responded forcefully and with remarkable creativity—IBM, Novartis, 3M, SAS, Skandia Hotels, Cellulosa de Aracruz, Electrolux, and the company I work for, Storebrand, to name a few. A number of business associations were formed to address the needs of information exchange and development of best practices and standards, such as the International Chamber of Commerce's International Environmental Bureau (IEB), the World Environment Council (WEC), and the World Business Council for Sustainable Development (WBCSD). In the UK, organizations like Business in the Environment and The Prince of Wales' Business and Environment Programme at Cambridge have served to educate and mobilize executives. And annual Environmental Reports have become standard issue for multinational companies wanting to develop a socially responsible brand image.⁷

In short, corporate environmentalism is becoming mainstream practice. Environmental policies, in accordance with regulations and beyond it, are no longer an exception. They have become standard practice in many key industries.

However, the financial sector has not kept up with these changes in corporate environmental policies. Most banks, insurers and pension funds have been slow to acknowledge and respond to environmental risks as potential financial risk. We have been dogged by myopia and scepticism, as well as a genuine lack

¹The Cherokee, for example, believed in the Seventh Generation Principle, namely, that whatever decisions or actions affected the tribe as a whole should be taken with a view towards their consequences on seven future generations. This principle applied directly to how to live with and treat the environment. Oehl (1972).

²For a review of environmental ethics and philosophies of nature, see Attfield (1994) and Zimmerman and others (1993).

³For a good history of corporate environmentalism see Hoffman (1997).

⁴The Basle fire is a particularly interesting case as it has practically all the elements to illustrate what moves a corporation to really change. Basle is a small town but it is home to major chemical companies. These giant companies (Sandoz, Ciba, Hoffman) stem from silk dyeing centuries ago, in the days of the silk trade with the East. They located in Basle because of its location on the trade routes and its river, which provided a natural and easy waste dump. Progress, prosperity and pollution went hand in hand for centuries. The chemical fire at Sandoz shocked the city and its people, because the plants are in the city, where the senior managers, scientists, workers, all live. This immediacy is probably an important reason why these companies developed such a proactive approach to accident prevention and pollution prevention ever since, often going beyond the requirements laid down by regulations.

⁵Most notably the Scandic hotel chain, based in Sweden.

⁶McDonalds has gone from styrofoam to paper packaging, mostly in response to activist demands.

⁷Whereas in 1990 only a handful of companies issued environmental reports, in 1998 and 1999 over 2000 companies are issuing them.

of analytic tools, comparable data, and the absence of environmentally-trained investment analysts.

Most professional investors believe that environmental and social concerns are irrelevant or detrimental to generating good investment performance. Very few actually read corporate Environmental Reports. As the *Tomorrow* magazine (No. 4, 1999, p. 24) summarily states in their recent issue on finance and the environment, "financial research analysts remain sceptical about the value of strong environmental performance."

Most pension fund managers and trustees of charitable foundations have claimed that they cannot change their investment policies to integrate environmental and social dimensions without at least a three year track record of investment performance to prove that it will not impact returns negatively.

The lack of databases, measurement tools, commonly accepted standards and benchmarks has been a real problem. For those of us who have experimented and developed prototypes, it has been an additional cost factor. Today, however, this is less of an impediment, as a number of environmental and social rating providers are now vying for business in this field, and are offering rating systems based on eco-efficiency and other indicators. Saracin Bank, Innovest, Eiris, SERM, IRRIC, Sustainable Asset Management (SAM), Storebrand and others have developed systems and applications that work. Now that various environmentally-screened funds have achieved competitive three-year track records, it is becoming clear these results are not just luck but are systematic, measurable and sustainable. The beginnings of financial environmentalism are in sight.

This paper outlines the evolution from grass roots environmental awareness to the emergence of capital market environmentalism in developed markets. The purpose is to describe this process in order to derive lessons which might be applied to emerging economies. My aim is to identify action-oriented policies and instruments which could help speed up the process in emerging markets. The pace of environmental devastation in developing countries requires reforms that will help business leapfrog over stages that have taken twenty to thirty years in developed markets. Can we build on existing mechanisms to accelerate the necessary changes? Which reforms and practices would be most effective? What should be emphasized?

LIABILITY LEGISLATION AS A CATALYST FOR SUSTAINABLE FINANCE

In the past five years a few major financial corporations, banks, such as SBC, NatWest, Bank of America, insurers, such as General Accident, Swiss Re, and money managers, such as Salomon, Skandia, Storebrand, as well as some Swiss private banks have begun to internalise the fact that environmental matters are money matters. A noteworthy and prom-

ising development are the two voluntary initiatives of banks and insurance companies, the UNEP Banking Initiative and the UNEP Insurance Industry Initiative, which have gained over 200 signatories worldwide.⁸ These initiatives have served as catalysts for the exchange of experiences and ideas.

What is really behind this change? Why is it happening? First we must acknowledge the role of legislation in creating the conditions for market demand. In what follows, I show how legislation can serve as a catalyst for change in financial markets, how bankers, insurers and investors respond, what it means to do environmental screening of investment portfolios, and point out two innovative actions by government that will, in my view, serve to change investment practice significantly.

Legislation and Response

The importance of legislation in controlling pollution by requiring industrial remediation or imposing fines is broadly recognized. But beyond the command and control aspects of legislation there is a less acknowledged force: the power of liability. Financial liability is created when environmental legislation identifies a responsible party who must pay for an environmental harm, and defines a cost or an indemnification to be made. A crucial extension is when legislation makes a lender or owner co-responsible. When environmental legislation makes the link between an environmental harm, an economic activity, and the financiers to that activity, there is then financial motivation for the financial sector to act responsibly. The first step, the *sine qua non*, is therefore to put laws in place that make the link. Once the conditions are defined in legislation, then the financial risk to lenders, insurers, and investors is actualised and begins to be accounted for. Capital will seek to avoid the risk, will reflect it by discounting the price of assets at risk, or will increase the cost of capital. Pollution may just become too expensive.

Superfund legislation in the US, which penalizes owners, lenders and insurers of contaminated land, does just that. When laws effectively put a cost on pollution and identify a responsible party, this is a very powerful tool in a marketplace economy, through both its direct and its ripple effects.

To understand the environmental importance of this link, simply think of all the instances where environmental harms, like global warming, overfishing, or deforestation, are not internalised by legislation in the cost of a product or production process. Market

⁸ See UNEP website for text of Declarations, list of signatories, and other news. Also see Joly (1997).

forces need governmental action because markets alone do not reflect or internalise environmental costs and risks into the economy.

To understand the financial importance of this link, think of anti-pollution legislation such as the Clean Air Act, Superfund, and asbestos remediation and the financial liabilities in the billions of dollars that these pieces of legislation have given rise to. These ongoing systemic liabilities, including taxes on air and water emissions, leakage from pipelines, underground gasoline storage tanks and toxic waste dumps, are in addition to, and distinguishable from, the single-event liabilities emerging from major events of accidental pollution, such as oil spills from shipping accidents. Environmentally risky financial engagements (be they loans, asset purchases, asset sales, insurance coverage, or stock purchases) suddenly needed to be carefully qualified or even avoided, on purely financial grounds, to avoid losses. Thus, many banks in the US, for example, stopped making loans to gasoline stations at risk from leaky underground storage tanks and stopped making mortgages against real estate assets at risk from ground pollution which occurred through the actions of earlier owners. Current owners became responsible for pollution under earlier owners, and made lenders, under certain conditions, co-responsible for clean-up liabilities. In some cases, the costs of cleanup exceeded the value of the asset, leaving the lender with a double hit. Such risks have caused buyers to get an expert opinion as to existing or potential pollution liabilities in connection with asset or company acquisitions; in certain cases deals have had to be renegotiated or cancelled.

Leading insurance companies took notice of the implications. In 1995, at a meeting of CEOs of multinationals who are members of the WBCSD, Åge Korsvold, CEO of Storebrand, said: "Existing environmental risks translate into direct financial risks as a result of legislative requirements. For example, remediation of underground fuel tanks, oil and chemical spills at sea or on land, contaminated ground associated with real estate, investments in plant and equipment to resolve soot and sulphuric acid air problems, investments in technology to avoid or preclude toxic emissions from process industries, the viability of fertilizer and pesticide industry products, and how we can best manage our own sizable forestry holdings in Norway; all these items can and do have direct financial impact to our portfolios and our bottom line. In addition, since businesses and consumers are increasingly looking at the eco-efficiency aspects of products as they make purchase decisions, we as investors have to track how this affects the competitive strength of companies we invest in or lend to."

The following year, in 1996, Storebrand put in place its Environmental Action Plan and justified it on three grounds. For one, the company built on its recognition that environmental risk is financial risk,

particularly in property and casualty insurance, and particularly in the areas of storm damages, flooding, toxic releases, ship insurance. This resulted in adjustments to insurance underwriting and investments in accident and pollution prevention. The idea, simply stated, is that loss prevention increases profits, and so we invested in various environmental loss prevention programs to teach our industrial clients how to be more careful.

Second, we wished to be more responsive to our customers' wishes and increase their loyalty by strengthening our brand image. We did a survey among our customers and found that over 40 per cent felt strongly that insurance companies should engage in socially responsible activities like environmental improvement, loss prevention and violence prevention. We put an action plan in place for this.

Third, we wanted to try to devise a way to reflect environmental considerations in fund management, without sacrifice to financial performance.

If one side of the equation is risk, the other side is opportunity. Along with the recognition that environmental risk entails financial risk came the realization that environmental risk can also create financial opportunity. Innovative investment managers decided to explore how they could improve the financial performance of their portfolios by eliminating risky enterprises and including those that gained competitive advantage by having better control over environmental risks by being more eco-efficient and by creating product advantages, companies such as Michelin, Volvo, Electrolux, and Scandic Hotels.

Thus was born environmental screening in investment management, which is addressed in more detail below.

Environmental Screening of Investment Portfolios

If pollution, be it accidental or systematic, affects the balance sheet by creating liabilities, it perforce has to affect, sooner or later, company valuations. This realization has given rise to a new class of mutual funds, eco-efficiency funds or sustainable development funds which seek to invest in companies that meet certain well-defined sustainable development criteria. The first two funds of this kind in Europe, which seek to apply positive screening criteria rather than negative screening, were Bank Saracin's Environmental Fund, created in 1995 and Storebrand's Environmental Value Fund, created by the author in 1996. In 1998 SBC and Credit Suisse began to implement sustainable development criteria into some client portfolios. Around the same time, two Swedish banks also launched environment funds (SEB and Foreningsbanken). Today, banks and insurance companies in Germany, France and the UK are racing to copy the idea. Why? Because mainstream banks are sensing that pension funds and individual investors

may become interested in sustainable development as an investment theme.

Let us consider how environmental issues can affect stock price and then see how one can operationalize this in practice to do actual stock picking for investment portfolios. How does stock price respond to environmental issues?

If investors perceive a company to be environmentally at risk, then its stock price will be negatively affected, other things being equal.⁹ The investor's perception as to whether a company is at environmental risk depends itself on a wide variety of elements:¹⁰

- the realities of its pollution emissions and direct costs associated with their remediation or control (e.g. costs of plant retrofitting);
- the life cycle pollution impacts of its products and their associated costs or the extent to which they create competitive advantage or disadvantage (e.g. relative advantage of manufacturing fuel-efficient cars—the Japanese strategy in the seventies, or energy-efficient appliances—Electrolux);
- the competitive advantage of certain products (e.g. recycled paper that handles better in copy machines, plastics that can be recycled, non-toxic anti-fouling paints for ship hulls, etc.)
- what the environmental NGOs believe on specific single issues and how powerfully they can mobilize public opinion (e.g. what Friends of the Earth thinks about PVC, what Greenpeace thinks about sinking an oil platform, what the Greens think about GMOs, what Naturvernforbundet thinks about herbicides, etc.);
- what the general press writes about and what the financial press picks up;
- the extent to which investors think negative NGO comments and negative press on a specific issue will affect a company's market share, marketing costs, product development pipeline, client or supplier relations, or general reputation;
- the impact of class action suits or of retroactive government actions;
- the impact of existing and new environmental regulations or treaties;
- the extent to which an investor thinks other investors will act or not on available information. This is the magnification effect of marketplace behaviour. If I think an issue/risk is really not an issue/risk but think other investors will react as if it

were a real issue/risk, and if I can act in anticipation of their reactions and profit thereby, then my investment style might lead me to act, even though I think the issue at stake is without merit. Most portfolio managers don't care whether environmentalists are correct on a particular issue. They just want to be under-or-over-weighted in the right stocks. Being "in the market" and having to deliver competitive returns means that managers of ethical or environmental funds find themselves acting from time to time much more in line with the public's perception of risk than with objective risks as such. (Whether this form of political correctness is ethically sound makes for an interesting but separate discussion.)

Needless to say, the extent to which a company's environmental image and risk can become an important element in its stock price varies from industry to industry. In insurance underwriting, for example, the stock price of several British insurers practically halved as the extent of their Superfund liabilities became known. In biotechnology, Monsanto's stock currently trades at a discount of about 25 per cent due to public worries about how the company is handling the GMO issue, and we find numerous examples in the shipping and construction industries. Other industries are perceived, rightfully or not, as low polluters and at low image risk, an example being the high tech industry. This notwithstanding, there are on the whole, in several important sectors, a variety of negative and positive items that are factoring into the image and environmental risk assessment of a company, and that hence determine their pollution discount or environmental premium, (De Simone and Popoff, 1997).

Let me now explain how environmental screening can work, by illustrating with the Storebrand Environmental Value Fund, which I created several years ago.

The point of departure is the concept of eco-efficiency. This concept was formulated by the WBCSD in 1995 and is defined as follows: "the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life cycle, to a level at least in line with the earth's carrying capacity" (Joly, 1990).

We took this definition and operationalized it by focusing on eight criteria, as follows:

- Intensity of energy use;
- Intensity of water use;
- Environmental management quality;
- Global warming;
- Ozone depletion;
- Material intensity;
- Toxic releases;

⁹ See discussion and literature review in Joly, Knecht and Ross (1997).

¹⁰ For a good comprehensive overview of environmental factors in industry, see Fussler (1996).

Figure 1

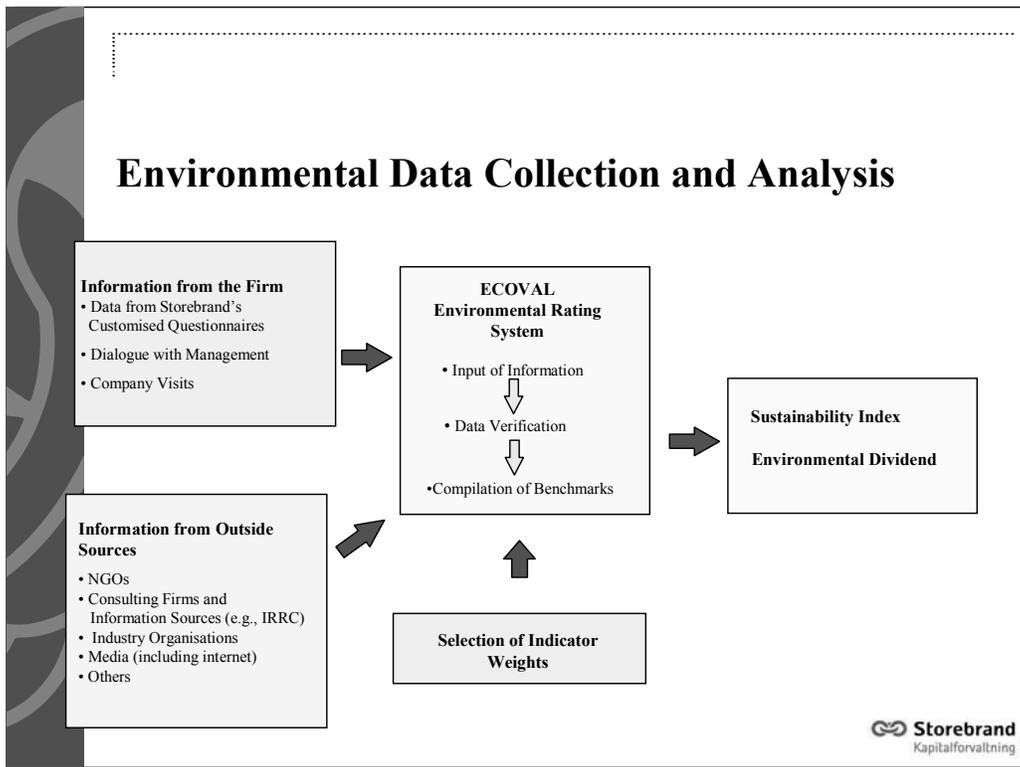
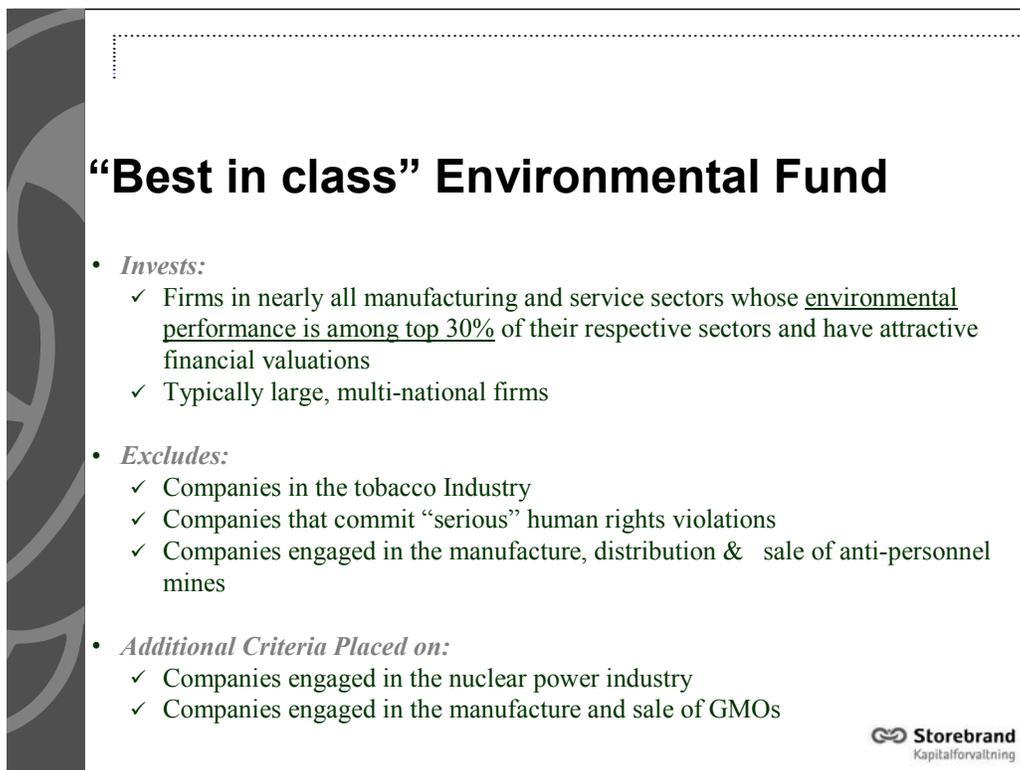


Figure 2



- Environmental liabilities.

We collect data from companies about their performance along these eight criteria of eco-efficiency, relative to company size. Tons of toxic releases, energy and water use, etc., are reviewed relative to sales volume. The important thing is to compare how a company measures up relative to its competitors in a particular industry, so as to be able to create a comparable ranking to select best-in-class companies (figures 1 and 2).

Environmental and some social information on companies is collected through a variety of ways, principally through our detailed questionnaires, but also from company reports, NGO reports, specialist studies, and conversations with management (figure 1).

Our analytic procedure is aimed at constructing benchmark indicators within each industry for each of the eight eco-efficiency criteria we focus on, which then allows us to see how each company ranks relative to its competitors in an industry. Each industry has its own factor weightings, thus reflecting the greater importance of some criteria over others in given industries, for example, toxic emissions are critical for the chemical industry, while environmental lending risk analysis is critical for banks.

This procedure gives us the ability to reach our goal: the construction of a globally diversified portfolio of best-in-class stocks, representing most industrial sectors (figure 2).

The purpose of the analysis is to be able to identify what we call “sustainable winners”, companies that are eco-efficient and have environmentally sustainable products (figure 3).

In addition to being environmentally sustainable, the companies we select must be financially attractive and fulfil our expectations for stock price appreciation. The point is to create a portfolio that reflects good environmental performance and at the same time achieves competitive investment returns.

What kind of investment results does this procedure yield? Consider figures 4 and 5 which show the fund’s performance since inception three years ago, relative to the Morgan Stanley World Index which tracks performance of stock markets worldwide. This is the benchmark against which we measure our fund. In the three years since its inception, the Storebrand Environmental Value Fund has delivered over 60 per cent return on investment, after deducting all fees and costs (figure 4). How does this compare relative to global equity funds that do not undertake environmental and social screening? Figure 5 shows two things:

- the Storebrand Environmental Value Fund outperforms most traditional global equity funds; and
- most environment funds underperform normal global equity funds.

How should we interpret these finding? First, I believe part of the reported underperformance of most

Figure 3

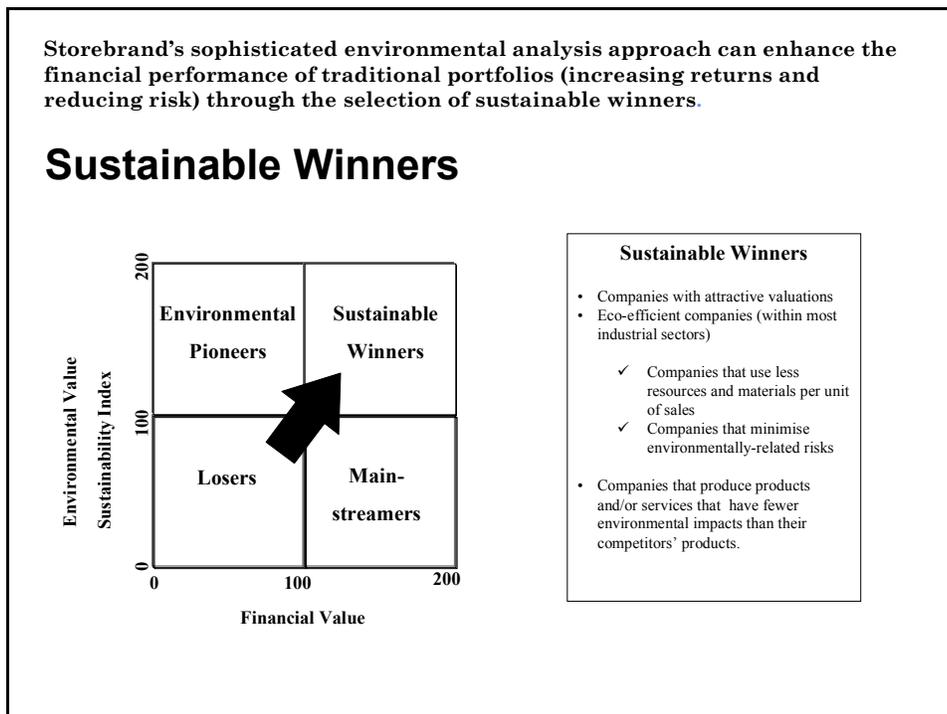


Figure 4

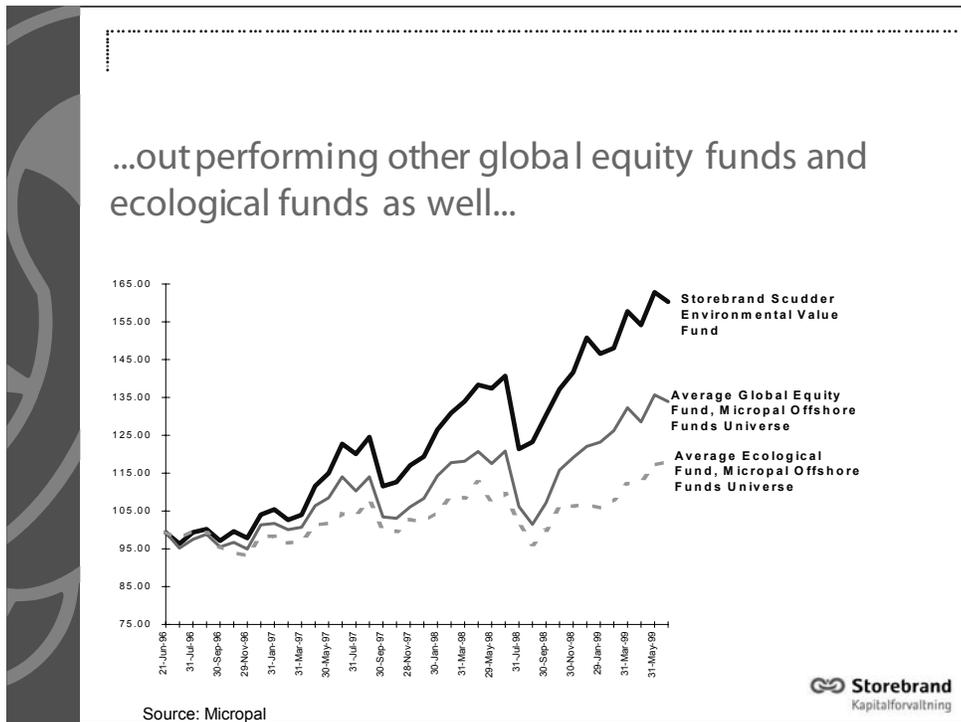


Figure 5

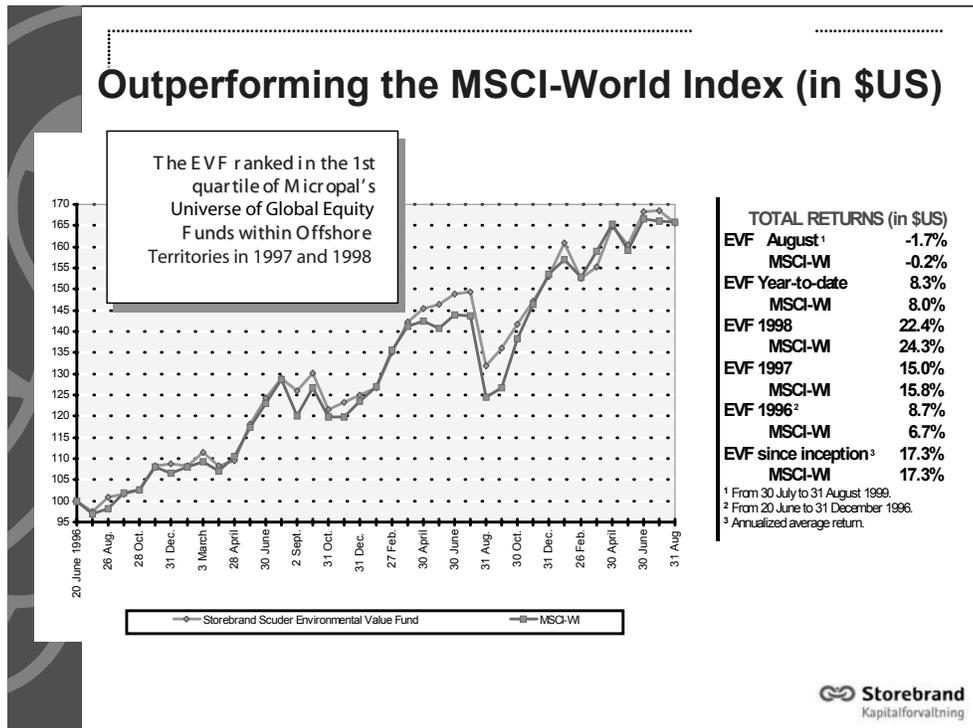
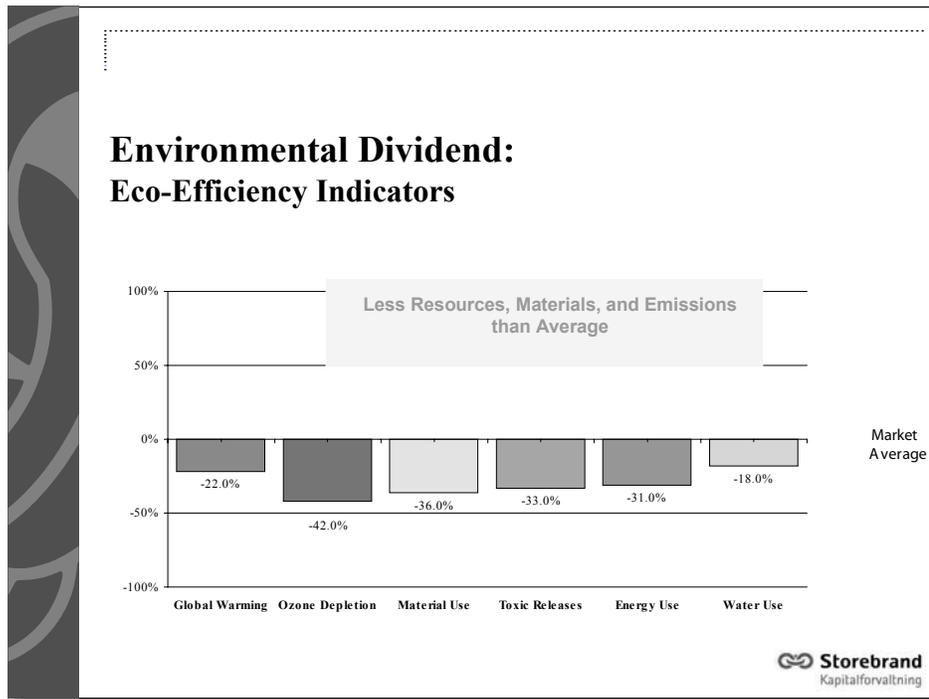


Figure 6



environmental funds is due to the fact that the Micro-pal universe of ecological funds is heavily weighted with green funds which have performed less well and that the performance of the eco-efficiency/ sustainable development funds tend to do relatively better. Second, few environmental screening methods are well-integrated with sophisticated stock-picking or stock index-tracking methods. I believe there is nothing inherent in environmental screening itself that tends to lead to financial underperformance, but rather that environmental screening needs to be operationalized correctly and connected with the best modern portfolio construction techniques. When this occurs, as in the case of Storebrand's fund, the synergistic effect of good eco-efficiency screening and good portfolio construction and stock-picking creates over-performance. When it does not occur, the underperformance can be explained equally well by the mediocrity of the investment manager's financial analysis and portfolio construction.

A relevant question is whether an environmental fund of this nature is good for the environment and not just good for its investors. As part of our analytics and reporting, and given the robustness of our database which comprises over 800 companies, we are able to demonstrate the extent to which the investments in the fund pollute less than a traditional global equity portfolio typically, does. We call this report the Environmental Dividend (figure 6).

To the best of my knowledge, Storebrand's Envi-

ronmental Value Fund is the first of its kind to have the capability to report, quantitatively, its environmental performance along with its financial performance.

What we see, then, is that some investment managers have developed tools and techniques for incorporating environmental considerations into investment portfolios, but that the large pools of money in pension funds and life insurance rarely seek to utilize these tools and techniques. This is unfortunate because corporate environmentalism and its virtues will not become truly sustainable until capital markets recognize and reward its value-enhancing aspects. What will bring this change about? As I indicate below, reporting requirements initiated by the UK government are one way of making change happen.

Private Sector Innovation and Public Sector Demand Creation

The private sector has created the environmental screening products. But pension funds have not taken them up, due to their conservatism and other reasons. Two recent developments, one in the UK and the other in Norway, indicate how governments can change this attitude and act as a market catalyst by creating demand pull.

The Norwegian Petroleum Fund was created by the Norway two years ago to manage the surplus

from exploitation of the country's vast oil and gas reserves. It is being put aside to fund future social security pension shortfalls and is invested in its entirety in foreign stock and bond markets. The current government wishes to integrate environmental and, if possible, social values into how these funds are invested. To this it is in the process of creating a \$150 million Environment Fund to test the concept. Since the Petroleum Fund will total \$30 billion in the year 2000, this test, if positive, has the potential to lead the way.

The UK government is also acting in an innovative fashion. Acting through the Pension Act (1995), it will require that from July, 2000 all private sector occupational pension schemes consider social investment within their Statement of Investment Principles. I believe this will prove to be a watershed event, even though it has received relatively little public notice, even within the UK. A number of the larger UK banks and investment managers are moving to develop environmentally and socially-screened fund products to meet the market need which this legislation is expected to create.¹¹

There are three main reasons, under this new requirement, why pension schemes may adopt a social investment policy. First, to reflect an employer's own values on the environment or social concerns. Second, because they see ways in which ethical, social and environmental factors can affect risk or return—as discussed above. Third, to reflect what they understand to be the views of scheme members.

The regulation requires occupational schemes to disclose two things: the extent to which social, environmental or ethical considerations are taken into account, and the policy directing the exercise of rights (including voting rights). Trustees are likely to be given a year in which to produce their ethical statements.¹²

Unlike the private sector, public sector investment is not governed by the Pensions Act (1995) but by secondary legislation and the Superannuation Act (1972). Therefore the Public Sector was not required to publish a SIP on Social, Environmental or Ethical issues. However the Government has gone into consultation (ended on 20th August, 1999) to amend the Superannuation Act (1972) which will require the

public sector to fall in line with the private sector on SIPs.

A number of the key councils have already implemented social investment policies. A good example is Nottinghamshire County Council which has just awarded £50 million to a City investment manager for Social Investment Purposes. Many other councils are actively looking to implement a social investment policy, although, at present, only between 15-25 have actually taken steps towards implementation. Most councils are, in the main, waiting to see what happens and are letting others take the first step. In this they are in line with many in the private sector.

The UK Social Investment Forum, which has strong Parliamentary links, has acted as a pioneer in this field and has drawn up guidelines for the creation of a social investment policy for its members which include a number of the key local authorities. These guidelines include provisions to:

- Develop a policy for integrating the ethical, social and environmental dimension into the investment strategy;
- Assess your investment managers on their ability to take social and environmental performance into account in stock selection and to influence companies towards best practice; ensure that they don't act counter to long-term corporate social responsibility. When you consider changing investment managers, include these aspects in your criteria. Ensure that your professional advisers can make informed recommendations on social investment;
- Exercise your voting power to encourage responsible behaviour;
- Review the portfolio for unacceptable stocks and exclude the very worst, or invest just a small percentage of the fund socially and assess the resulting performance;
- Integrate the social investment dimension into your venture capital and property investments as well as your equities and bonds.

From an ethical point of view, it is interesting to note the reasons allowing pension schemes to take social responsibility, environmental and ethical criteria into consideration as well as consistency with employer values, financial reasons, and consistency with employee values. Furthermore, it is worth noting, from an ethical point of view, that the requirement is to consider, not to implement. Permission is given, action is not imposed. One should put oneself in the position of a trustee and consider whether and who to give priority to the explicit and implied best interests of the pension scheme participants. As boards discuss whether and how to consider social investment, they will inevitably discuss various normative claims as regards the fiduciary responsibility of a trustee, of a principal, and of the investment manager as agent.

¹¹ I am grateful to John Gummer, former Secretary of State and Cabinet Minister of the UK, and currently Member of the European Parliament, for information herein concerning this legislation and its implementation, in conversation and correspondence with the author.

¹² At present less than a handful of company pension schemes consider social investment in their Statement of Investment Principles, and include Sainsbury, Body Shop, and British Coal.

SURMOUNTING BARRIERS TO ENVIRONMENTAL SCREENING AND SOCIALLY RESPONSIBLE INVESTING

I have argued above that environmental screening is sound practice because good environmental performance reduces financial risk and may enhance overall corporate competitiveness. But there are additional difficulties and factors to be considered beyond those already noted.

The investment community has generally resisted environmental and social screening or socially responsible investing (SRI) on ideological, financial, legal, and operational grounds as follows:

- Capital should have only one goal, yield maximization. In this view, propagated for instance by Chicago economist Milton Friedman, SRI conflates capitalism with socialism;
- Fiduciary responsibility means maximizing profit within the extent of the law and acting as a “prudent man” (as interpreted by US law); it does not mean being a good Samaritan. Any considerations that lower returns are inappropriate. (This is what I call the traditional or narrow view of fiduciary responsibility.) SRI means restricting the universe of investment choice which means less diversification with higher risk. Too strict screening leads to too little diversification. That is why SRI generally lowers returns; and
- SRI is at worst impossible to do in practice, because it involves too much subjective value judgment, there are no standards, there is no way of knowing where to draw the line on what is ethical or not. It is impossible to do with index-tracking investment. Even if it were possible, it would require lots of extra time, manpower and other costs, which makes it expensive relative to traditional investment practice.

These seem like rather strong arguments and many people believe them. Are they wrong? I do not want to spend time on the more extreme version of free market capitalism, other than to point out that whatever merits it might have as dogma, it is not true in reality. Companies that act following this prescription end up hurting themselves in public opinion, antagonize suppliers and customers, attract NGO attention and animosity and end up with less profits than if they acted somewhat responsibly, even when it means taking on some additional costs near term. Short-term profits today can mean long-term losses tomorrow, particularly if it means ignoring environmental liabilities. In today’s world, the only way a major corporation can make long-term profits is by understanding social forces and working at maintaining a positive reputation, and that is acquired only by behaving as a responsible corporation. The age of legitimacy for the sweat shop is over. The risks and

costs of an environmentally and socially ignorant corporate policy are just too high. The socially ignorant corporation antagonizes consumer organizations and consumers, is persecuted by the press, draws the attention of regulators, and misses out on sustainable market opportunities. It becomes its own worst enemy.¹³

However, the second issue, the issue of the fiduciary reservations about SRI, ought to be taken seriously. As shown above, the performance of the Store-brand Environmental Value Fund is within the top quartile among global equity funds. Other similarly constructed funds, like KLD’s US funds, also perform in line with or better than the indices. But it is also the case that quite a few SRI funds do not perform well.¹⁴ The real question is to understand why. I suggest the reason they do not perform well is not because they do SRI screening per se but rather because they either fail at tying SRI screening in with good portfolio construction and good stock-picking or have SRI screens that are too restrictive. We are just at the start of developing cleverly engineered SRI funds. That does not mean the category is flawed, just that some of the early experiments were not as well-designed as others. It is too early to expect broad empirical competitive performance from the SRI category, and it is likely the category will, in the next 5 years, evolve to average returns in line with traditional equity fund average returns. In the meantime, investors in SRI funds will have to very carefully consider the nature of the screen and the quality of portfolio construction and stock picking. But if they are willing to do so, they will find and be rewarded by funds that meet their financial targets even taking into account the additional charge for the cost of doing SRI work. The moral benefit of doing well while investing for good comes as an important added value.

In practice, on a cost-benefit basis, it is possible for investors who do their homework to invest in SRI portfolios without undue risk of losing money as compared to average fund performance.

What about the third issue, the question of the subjectivity of SRI evaluations? Does not the indeterminacy of ethical debate and the difficulty of knowing where to draw the line vitiate the attempt? Subjectiv-

¹³ Brent Spar, Terminator Gene, and Shell in Nigeria are symptomatic of the harm that can be done by pressure groups to corporations who fail to understand the social psychology surrounding their actions.

¹⁴ See comparison table in *Tomorrow Magazine*, No. 4 Volume 9 July-August 1999, p. 17, which shows that among the top ten US SRI funds in terms of size, eight did worse than the S&P 500, while two did better.

ity ought not be seen as the decisive issue here, because as investment analysts we are not afraid to make subjective judgments about the quality of a company's management, the competitiveness of its products or the likelihood of it being taken over at a premium. We know full well that beyond the financial reports, which after all communicate the past and not the company's future, we make stock picking decisions often based on our informed subjective assessments. In this sense, making informed subjective assessments about a company's labour relations, its community affairs programs, its minority employment and promotion practices, its subcontractor criteria, its potential environmental liabilities, the legitimacy of its dialogue process with NGOs, the way it tackles corruption, and the like, these judgments are subjective in the same sense and as valid.

So let us focus on what is really at issue, whether it is appropriate for a pension fund or other institutional investor who acts on behalf of the owners of money (the employee or the citizen in the case of a pension fund, the long-term saver in the case of an insurance company or mutual fund) to pay attention to the interests of the owner in a wider perspective. In other words, is it appropriate to include considerations of value to owners beyond the attainment of a market return on investment?

In the case of long-term savings and pension funds, the interests of owners could, without too much imagination, be understood to include their social and environmental interests in addition to their purely financial interests, insofar as the purpose of money is instrumental rather than an end in itself and if and when the process of creation of wealth is contradictory to the eventual enjoyment of such wealth. This point of view is captured by two rather commonsensical rhetorical questions: what good is money if it causes harm to its owners? What good are competitive returns in collective investment instruments like insurance policies and pension annuities if the underlying companies do things that significantly deteriorate public health or degrades the quality of life of the public?¹⁵

Money is an instrumental. It is simply a means of exchange to acquire things or experiences that fulfil needs or satisfy psychological wants, including aesthetic pleasure. In this sense, money is the medium for acquiring those aspects of quality of life that can be bought. (As we all know, there are many aspects of quality of life that are literally without price or pur-

chase.) How absurd then to accept that your money is invested in something that decreases your own quality of life.

Going beyond the aspects of quality of life that are self-centred, one can furthermore include among the interests of owners some of their broadly-held values, such as the belief that poor children should not be forced into slave labour or the belief that companies should really work for environmentally sustainable products and production processes. I do not see that it becomes necessary to include all possible issues under this rubric, because for an investment policy to be socially responsible should not mean that it must pay attention to all public concerns, but it should sensitively and pragmatically reflect those social values that most owners actively care about.

Who is to determine whether the pension fund or insurance company has picked the right values to attend to? Why some issues and not others? The beauty of the market system is that it is very sensitive to feedback from customers. In that sense it is very democratic. Given the chance, customers would decide which pension fund best satisfied their sense of values, and would use this as an element in choosing a provider. The success of the Coop Bank in the UK shows that people actually do take ethics into account in choice of bank when given the option and when the offer is marketed well. In the future, providers could supply various options of SRI, just as they today provide various options of coverage for life or health insurance. Another way of adding quality to the process is to have an advisory board that is able to help the investment manager make informed judgments and design a representative SRI offer. These are some suggestions how the interests of owners can be responded to. And, as explained above, it need not imply any systematic sacrifice of financial performance if it is done right.

Reforming Fiduciary Responsibility

This leads us to the matter of fiduciary responsibility. I believe that the concept of fiduciary responsibility needs to be reformed, particularly with a view to update how it is reflected in US and UK investment law, because investment managers tend to believe that their fiduciary responsibility to seek prudent returns is antithetical to attending to social and environmental considerations. In what follows, I argue this is fundamentally wrong. It needs to be made right by expanding fiduciary legislation to include sustainable development criteria within the concept of prudent money management.

Fiduciary responsibility is a concept which covers the duties of care, honesty and professionalism that investment managers should obey. In the US, fiduciary duties are legal duties of investment managers (IM) as agents and owners can seek recourse and compensation when an investment manager fails to

¹⁵ Even though I do not believe it is necessary to go so far in practice, this argument could be taken further to say that it is reasonable and prudent to accept some degree of sacrifice in financial performance in exchange for better health and quality of life.

perform his fiduciary obligation.¹⁶

IMs thus have a fiduciary duty to their investor, to protect their money from harm, to manage it prudently, and to do so consistent with generally accepted principles that put their investors' monetary interests ahead of their own. In the investment community, the prevailing view is that as long as IMs pursue yield maximization within defined financial risk parameters, and operate within legal and regulatory boundaries, they are discharging their fiduciary responsibilities well (Elton and Gruber, 1991; Copeland, 1994).

This explains why IMs typically make decisions solely on financial criteria, and do not pay attention to environmental risk when evaluating portfolio risk, nor do they usually attend to broader welfare interests of their principals. If we give credence to the larger interests of owners, an expanded interpretation of fiduciary prudence merits consideration. Public policies already incorporate the precautionary principle in industrial production (substance and emission controls) and in product and packaging requirements (EU packaging and recycling laws). But environmental precaution is not built into investment management and this is a principal reason why capital flows have not really moved in the direction of sustainable development. While OECD nations have subscribed to the precautionary principle, they have not taken real steps to operationalize it in the functioning of their capital markets.

In the eighties, US labour unions became aware how their own pension funds were investing in projects that were directly contrary to their own interests. For example, they found themselves financing projects like the non-union construction of the National Right to Work Committee headquarters, a notorious anti-union lobbying organization. Congressional Hearings documented how pension funds were actively investing in firms with poor records in occupational safety and health, or that failed to meet equal employment opportunity guidelines. As a response to this, labour union pension funds began to implement positive screening programs whose purpose was to create portfolios that protect their members' broad welfare interests while also providing a prudent return. Housing loans, health care delivery services, new industries that may create new jobs, and projects that employ union labour are examples of positive screening. However, during the Reagan administration, officials in the Labour Department responsible for ERISA pension plan supervision, discouraged such investments on the grounds that they

might compromise their investment performance.

It becomes clear that there is a contradiction between a fiduciary being expected to attend to the best interests of owners but only being able to focus on narrow traditional financial return criteria. Something is amiss. I submit that pension fund laws and fiduciary statutes define the interests of owners too narrowly and thereby create a situation in which the broader quality of life interests of owners are being compromised. These laws were formulated before society understood the urgency of sustainable development, before UNEP was created, before the precautionary principle was introduced into international treaties, and at a time when the prevailing ideology about corporate purpose was Friedman's formulation. Times have changed and it is time for pension fund law and fiduciary law to adjust.

Hence, reforming fiduciary law to also include the non-economic interests of the investor is one way of speeding up the process of moving towards sustainable finance. In addition, the EU ought to enact laws like the UK's, making it compulsory for pension funds to state their policy on SRI, thereby encouraging rather than impeding them from doing so. If this occurred on a pan-European basis, it would have real impact on capital markets. I would also suggest that the European Commission could explore how the broader social interests which are reflected in EU environmental and social legislation can be accommodated in European regulations concerning pension fund investments and the duties of fiduciaries.

Another way forward is for government-controlled funds to be mandated to place a portion of their assets in portfolios that develop SRI investing, as Norway is in the process of doing by creating an Environment Fund portfolio within the Petroleum Fund.

The evolution of society's actions from pollution abatement towards Sustainable Development can be summarized by figure 7.

We have been describing how public awareness of environmental problems led to environmental laws which created command and control regulations but also liability mechanisms. Liability made risks real for companies, and it also created opportunities. All this made for corporate environmentalism. We are now at the point of making the further business link from corporate environmentalism to sustainable finance. Sustainable finance will mean not only that investors will get rid of some stocks they would otherwise hold but also that they will overweight others which are eco-efficient and gain competitive advantages through good social practices and image. Looking forward, one way to speed up the process is to create demand through SRI reporting legislation, as in the UK, and to apply SRI to government-controlled funds, as in the Norwegian Petroleum Fund.

¹⁶ For instance, refer to the prudent-investor rule established in the Harvard College vs. Amory-verdict. For a general discussion of fiduciary prudence, see Kinder, Lydenberg and Domini (1993).

Figure 7

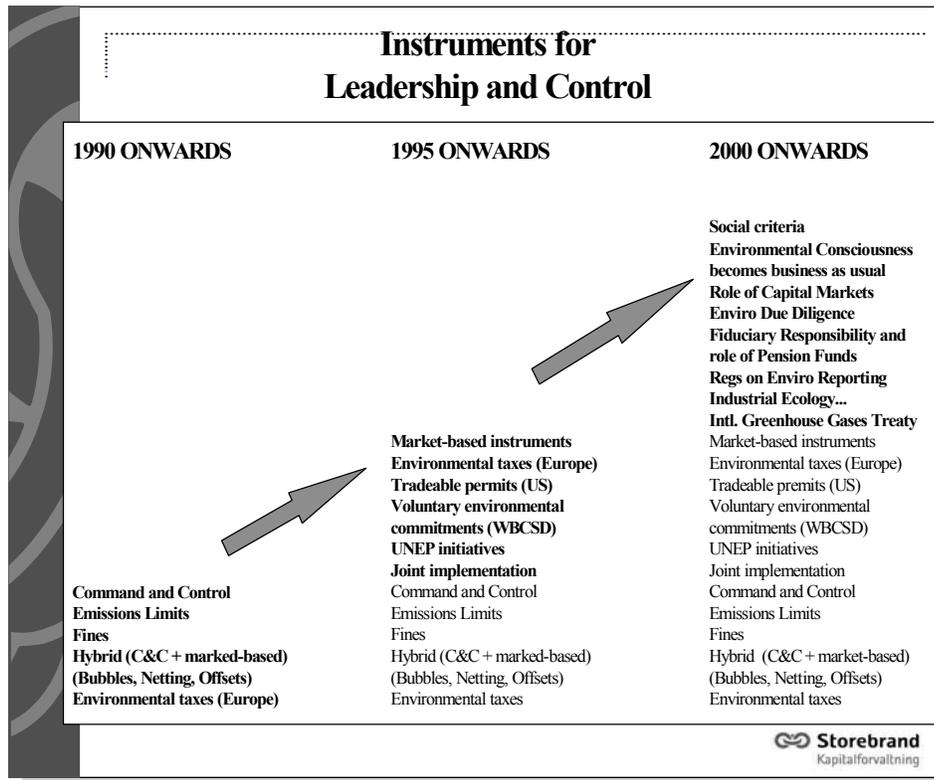
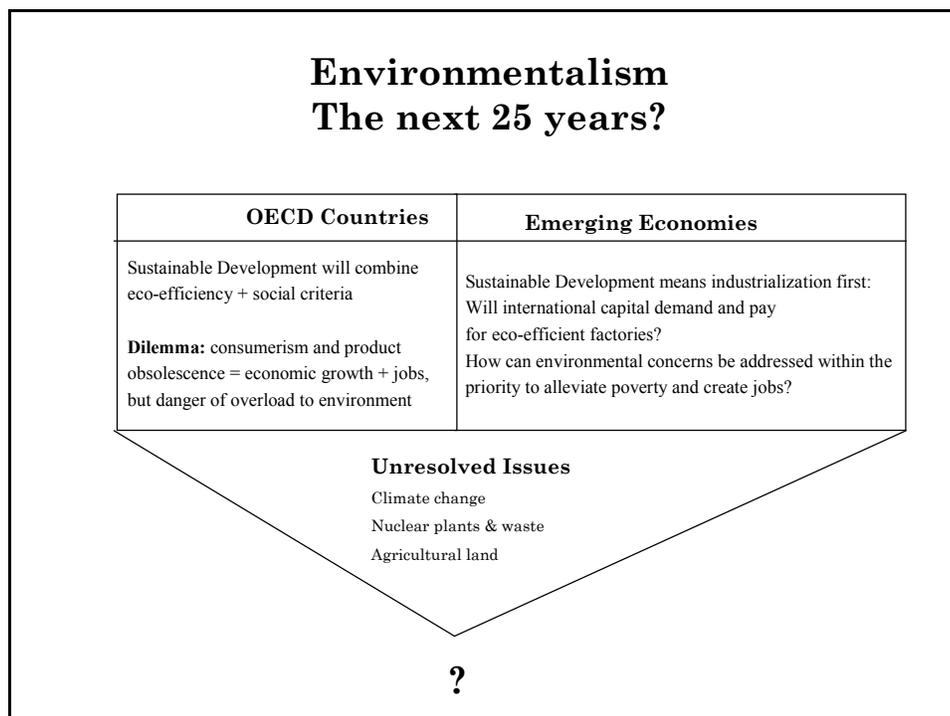


Figure 8



SUSTAINABLE FINANCE AND THE DEVELOPING WORLD

As indicated above, in developed countries we are just beginning to see the outlines of a virtuous circle, connecting public concerns, environmental legislation, corporate environmentalism and financial markets. Also, among the leading companies and in the WBCSD there is a growing recognition that social criteria have to be increasingly taken into account along with eco-efficiency criteria (figure 8). For instance, the concept of the triple bottom line (profits, environment, social concerns) is frequently invoked in planning documents and speeches by business leaders from Shell, DuPont, British Petroleum.

The question, then, as regards the developing world is: will we evolve from "modernization and development" to sustainable development following the same evolutionary pattern as in developed countries? In the first part of this paper I have described how in developed economies it is has taken us thirty years of attitudinal and institutional change to get where we are today, from grass roots public awareness to environmental legislation, environmental liability, and, finally, the beginnings of sustainable investing. Can the world afford another thirty or forty years of the same step-wise evolution and the same pace of change to apply in the developing world? Or is the pace of deforestation, water pollution, urban expansion, air pollution and general resource degradation such that the balance of risks pushes us to accelerate the process and find ways of leapfrogging evolutionary stages?

In the developing world, sustainable development is often understood to mean industrialization first, any kind of industrialization so long as it creates economic growth, alleviates poverty, and creates jobs (figure 8). Will international capital demand and pay for eco-efficient factories? How can environmental concerns be addressed within the priority alleviating poverty and creating jobs with better wages? The challenge of sustainable finance for the developing world is to develop truly innovative solutions.

Is there any way to make this happen, quickly and radically? If there is a way, it will have to engage mechanisms that incorporate eco-efficiency and social criteria into the flows of private capital from developed into emerging markets. In this part of the paper I will first review some of the problems and barriers particular to sustainable finance in underdeveloped markets and then indicate some ideas of how we might move forward in the area of emerging market portfolio investments by insurance companies, mutual funds, and pension funds from developed countries. The ideas I put forth are admittedly very tentative and sketchy but they may prove to be useful because even though there is an abundance of literature on the general issue of finance, globalisation, environment and developing economies, there is practically

nothing on the specific issue of how all this relates to portfolio investment and environmental screening in developing countries. I believe the solution involves a coordinated policy approach with the public sector as catalyst, working together with the private sector. The public sector would have to come up with incentives and sovereign risk guarantees, along with awareness-building and coordinated action in the developing world, to motivate environmental screening of first world investment portfolios invested in the developing world. The process of globalisation of capital markets must be harnessed to the cause of sustainable development and not just applied to the goal of GNP growth.

In developed countries, private rather than public sector financial institutions have led the way towards sustainable finance. In the developing world the situation is the mirror image: public sector multilateral financial institutions have been the leaders. The World Bank, the European Bank for Reconstruction and Development (EBRD), the Inter-American Development Bank (IADB), the Nordic Investment Bank (NIB), and the International Finance Corporation (IFC) have all developed and are implementing environmental criteria in their loans or investment projects. They have also established in-house environmental competence and require expert environmental evaluations when and where environmental risk is considered high. The private sector financial institutions are laggards when it comes to the developing world. The process of awareness, recognition, understanding, and response has not yet reached into Latin America, the Middle East, Asia, or Africa. The stock and bond market's attention to Emerging Markets has been fixated on economic growth but has not been accompanied by concurrent attention to growing environmental problems.

Let me, as a start, note some well-documented and interconnected trends on the present state of finance and emerging markets/developing economies: (1) the globalisation of financial markets and the evolution of market-economies in the developing world (such as in Eastern Europe, China and Latin-America); (2) the steady fall of official development assistance (foreign aid) which makes the issue of private foreign investment acute and the most important focus in regard to third world finance and the environment; (3) the enormous amount of capital needed for developing economies to obtain the growth rates predicted by the World Bank; and (4) the catastrophic consequences were this growth to be conducted in accordance with the unsustainable pattern of industrialization pursued until recently in the West.

The world-wide deregulation of national financial markets plays an important role. According to Schmidheiny and Zorraquin (1996), 63 developing countries have liberalized their trade policy since the Uruguay Round of GATT began in 1985, more than 30 liberalized their foreign direct investment regimes

in 1991 alone and over 50 countries have established capital markets in the 1990s (Schmidheiny and Zorraquin, 1996, 31). The flow of capital to the developing world has increased sharply over the last years. Whereas the total financial flow to the developing countries in 1990 formed a mere \$83.5 billion, in 1995 it had reached \$251.9 billion (Held and others, 1999, 211). And whereas, initially the private share of this flow was largely made up of foreign direct investment, there has recently been a strong growth in foreign portfolio investment and this seems destined to continue in the nearest future.

By far most of the foreign capital needed for the continued economic expansion of developing economies will have to come from the private sector. Since the 1980s the amount of official development assistance (ODA) has steadily fallen to the present level where it constitutes less than 0.3 per cent of the gross national product of OECD member countries, under half of the global target of 0.7 per cent set by United Nations in 1970, (Kaul, 1995, vii). Although the investments of developmental agencies such as the World Bank and first world governments may prove important for the reason that they may "trade" investments for environmental policy reforms (much as the International Monetary Fund and the World Bank do in regard to financial and political reforms in emerging economies), the share amount of capital needed in Asia, Africa and Latin-America suggests that other mechanisms of "greening" must be considered as well. Again, this suggest the need for considering greening of private investments simply because that is where most of the money will come from. Many scholars have argued this point, that since foreign aid is dropping, ways must be found to make sure that private sector capital is not invested in ways that increase pollution, eradicate biodiversity, destroy irreplaceable resources, or undermine the local ability to produce sustainably (Eatwell, 1996; Pearce and Steele, 1996; United Nations, 1997).

According to McKinsey & Co, the developing economies will need to import over \$2 trillion in the decade from 1995 to 2005 (Schmidheiny and Zorraquin, 1996, 33). The globalisation of financial markets and the fast integration of emerging markets into this global system makes it possible that this capital can - and will be - raised. The opening up of markets is making it possible and the promises of high profit in the emerging markets makes it attractive to foreign investors. However, it seems imperative that the growth-rates predicted by the World Bank for newly industrialized economies that underpin the promises of high returns, are achieved in a ecologically sustainable manner.

With these trends in mind, it becomes clear that environmentally-screened investment practices have to play an important role in making sure the capital needed in the developing world is employed in eco-efficient ways. It makes little sense from a global

point of view to pursue environmental screening in the US and Europe but not in emerging markets. Furthermore, environmental screening of multinationals whose home base and listing is in developed markets will need to focus more and more on how well multinationals apply eco-efficiency criteria in their developing country operations.

The most obvious obstacle to environmental screening in emerging markets is the lack of awareness about the environment as a factor in business and investment decisions. The change in corporations' approach to the environment, noted by Hoffman and others, has by and large not occurred in developing countries. There is little awareness that eco-efficiency can be good for profits (by cost reduction, anticipatory compliance, green image and better employee relations). For most, the environment is considered to be a financial burden, not a potential opportunity. This is partly a matter of information and education, partly a lack of managerial creativity, but also, at times, the lamentable reality of lack of funds or cost of capital to replace old technology with new. The issue is often thought to be caused by a lack of environmental legislation; but I do not believe this is the crux of the problem because countries like Mexico, Argentina and Brazil have rather stringent legislation. To some extent the cause may be lax enforcement of the existing legislation. I am convinced, however, that the necessary leverage is to be found elsewhere. If owners and managers of emerging market companies were really expected to be able to raise foreign capital more successfully if they were able to show and document more enlightened environmental practices, they would probably put energy into doing so. It would then be worth their while. The argument concerning attracting foreign capital is probably more efficacious than the threat of local environmental fines or other regulatory action.

The reason why attracting capital rather than regulatory punitive action is key to any solution is that even given the right awareness, many emerging market companies lack the capital resources to exchange their technology for greener production or service technologies, regardless of the pay-off in the mid-term to longer-run. Corporate and political awareness or regulatory punitive action are in themselves not sufficient if the means of acting for the better are not available. Therefore, if our goal is to quicken the process and leapfrog stages, we should attempt to engineer a solution that creates the willingness and the ability at the same time.

Two things have to happen rather simultaneously to make this happen: one, institutional investors (insurance companies, pension funds, mutual funds) from Netherlands, the UK, Germany, France, the US, and Japan have incentives to search for, screen for and invest in environmental leaders in emerging markets. This can be primed through legislation like the UK legislation described in part II above. Two,

companies (both listed and unlisted) in emerging markets have to be made to understand that one way of making themselves more attractive to foreign capital will be to put in place environmental reporting and develop an environmental action plan that shows eco-efficiency gains through savings and/or new markets. We need to create an investment appetite and at the same time create investment objects that can satisfy this investment appetite.

How could this be made to work? Let me mention by way of illustration an investment fund that Storebrand is exploring to create in partnership with a leading local Brazilian corporate bank (hereinafter referred to as BB). Storebrand and BB are interested in creating an investment fund to attract foreign capital into Brazil for socially responsible/environmentally responsible investing. The practical difficulties are considerable and deserve to be pointed out, because they indicate why we came up with an approach that is rather different from what we had initially thought about:

- Portfolio investment in Brazil suffers from what Latin Americans call the “golondrina” effect, capital that flies in and out as unpredictably and quickly as a sparrow. What sustainable development needs is patient capital;
- Benchmarking-based stock-picking cannot be done, as the universe of tradable companies is not large enough to allow for “best in class” environmental or SRI comparisons within industries, as, for example, practiced by Storebrand’s Environmental Value Fund;
- Investing in green technology companies (recycling, clean energy, waste-to-energy, etc.) may be a viable investment proposition for some investors, but it is too narrow a niche investment proposition for most cross-border institutional investors, particularly given its history of volatility in Europe and the United States;
- Too few publicly-listed Brazilian companies publish environmental reports and very few care or are able to answer environmental questionnaires from SRI investors.

In addition to these practical difficulties in trying to structure an environmental fund for foreign investors out of publicly-listed Brazilian equities, there is the additional consideration that even though investing in the larger listed companies helps create liquidity in local capital markets, which is positive, it is arguably more important to put capital to work in viable smaller to medium-sized unlisted companies with growth potential and to move these companies in the direction of socially responsible and environmentally sound practices as they grow and expand.

Multilateral development agencies and governments can play an important role on this regard by tying their aid, lending and investment funds to envi-

ronmental policy or institutional reforms, not only to democratic and financial reforms. Furthermore, they can and ought to contribute by making available or stimulating and paying for the local development of environmental planning, consultancy, accounting and reporting services which would help companies plan for and practice corporate environmentalism and then have it become recognized and rewarded by financial markets. Some emerging market countries have recently made environmental reporting a requirement for Initial Public Offerings (IPOs) and for stock market listing.¹⁷ With further encouragement from multilateral agencies, this phenomenon could be extended to more countries.

Given these considerations, Storebrand and BB have decided to cooperate to try, on a best efforts basis, to create a \$100 million dollars SRI fund to invest in unlisted private Brazilian companies with annual revenues not exceeding \$250 million in which, acting as a responsible owner, we can cause triple-bottom-line practices to take root. Fifty percent of the investment capital would be from Brazilian pension funds and fifty per cent from international institutional investors (e.g. Dutch pension funds, Scandinavian insurance companies, UK pension funds, etc.) who would be acting consciously in line with their SRI policy and their fiduciary responsibility. Storebrand and BB would create a special purpose private equity investment management company in Brazil to select and manage the portfolio of investments. Acting as an active owner, the investment company would ensure that each company invested in would put in place a business-like environmental/SRI action plan as part of its overall business plan. As active owners with board representation and responsibility, the investment company would provide external expertise

¹⁷ Kelly (1999) reports that the UNCTAD/ISAR environmental reporting guidelines: “Thanks to funds from the World Bank and through joining forces with UNEP, and through the Financial Institutions Initiative, the Brazilian National Bank for Economic and Social Development and the Arab Society of Certified Accountants six workshops have so far been held in Thailand, Brazil, and Egypt, Bahrain, Kuala Lumpur and India....In Thailand over 80 high level accounting and financial practitioners attended. The President of the Thai Stock Exchange announced that the exchange would initially adopt the guidelines as part of the listing requirements on a voluntary basis....In Brazil our counterpart was the BNDES which gathered together over 120 specialists from industry, accounting firms and environmental groups. As many of you are aware some Latin CEOs and political leaders see development and environment as tradeoffs. What we tried to show them in the workshop was that through better environmental accounting, this need not be the case. This was welcome news to the audience. We intend to continue our work with the financial institutions of

and SRI talent and give incentive to the management of each company to actively accomplish the stated SRI goals. Since designing and implementing SRI plans for each company invested in would require additional work and costs normally not undertaken by investment companies, Storebrand and BB would seek to obtain grants from development banks for planning, education, facilitation and implementation of the various SRI plans. In addition, Storebrand and BB would make available for coaching sessions, senior executives from their parent companies or from other businesses or organizations with which they have relationships, in order to develop SRI management know-how in Brazil and to publicize the concept. Storebrand would also seek to obtain currency risk guarantees from donor countries for the international institutional investors that would otherwise not be likely to invest without such coverage. In short, this fund will attempt to create a model of responsible ownership, and would seek to engage public sector institutions in support of a private sector model initiative.

This investment fund model would satisfy the need for an SRI investment object for, say, a UK pension fund that needs to practice and show compliance with an SRI policy, and that seeks diversification with low correlation to traditional market indices. Therefore, a new focus of legislators in the EU or the OECD could be to give their institutional investors cause to put SRI/ environmental screening in place for emerging market investments, to provide grants to subsidize the extra costs of doing so, and to provide financial incentives in the form of currency risk coverage (similar to what is available for certain export credits). Correspondingly, a new focus for policymakers and regulators in emerging markets would be to give incentives to local companies to put in place environmental reporting and SR/eco-efficiency action plans. To facilitate the process, the development banks and world development institutions could provide grants or soft loans for consultancy work whose

purpose is to help local companies become responsive to what foreign investors look for from an SRI/ES point of view.

Why is this seemingly complicated mechanism needed? In addition to the difficulties enumerated above, in most emerging markets there are few powerful environmental pressure groups and green consumerism is not a driving force. Also, the danger of being exposed in the media as an environmental sinner is less of a threat. This makes it less likely that companies will commit themselves to extra costs to acquire a green image unless they are propelled to do so through the kind of push-pull strategy just outlined. On the pull side, the greening of consumer markets in Germany, Scandinavia, the US, and elsewhere could be tied to the greening of third world companies seeking to gain a growing market share in developed country green consumer markets as a result of their eco-efficiency practices and products—textiles, agriculture products, meat products, components, local energy-efficiency systems, cleaner transportation, energy-efficient cement-making, etc. In an investment world looking for new “investment themes” or “investment stories”, the greening of emerging market companies to meet the needs of first world green consumerism could then become an investment theme. (Since themes like The ageing Europe and German Corporate Restructuring are currently in vogue on Wall Street, I can see no reason why The Greening of Emerging Markets could not become a theme within global investing.)

Another angle is that there is considerable public relations benefit to be gained at home by multinationals that not only preach but also seek to practice corporate environmentalism in emerging markets. That public relations benefit can be coupled with the effective investor relations threat of disinvestment by their major pension fund and life insurance shareholders. If firms fail to live up to their global corporate responsibility as global corporations, their shareholders with an SRI policy will need to react. Thus, the well-publicized examples of good or bad by major multinationals operating in emerging markets can serve as a proxy for the lack of local environmentalist pressure groups.

CONCLUSIONS AND POLICY OPTIONS

In summary, based on experience with sustainable finance to date in developed markets, the following policy options would seem to hold promise for both developed and emerging markets. The common thread is that public sector actions would serve as a catalyst to unleash and direct private sector commercial initiatives. Once established, these initiatives would become self-regenerating—the market’s invisible hand and the government’s visible hand working together to:

Brazil since they seem to be ahead of the profession and the stock exchange in realising the importance of environmental accounting for making their credit decisions... In Kuala Lumpur in July the President of the Stock Exchange undertook to create an environmental reporting award (alongside the corporate financial reporting award) and together with the Institute of Chartered Accountants to introduce the guideline as a listing requirement...In India later that month the Institute of Chartered Accountants of India introduced the guideline as a recommended procedure to their 95,000 members and added it to the curriculum of their 2,355,000 students...In summary the guideline is gaining acceptance; the current European Union discussion paper on environmental accounting follows the same procedure, and this will be issued as a guidance note in the short term.”

- Introduce liability legislation in emerging markets similar to legislation in developed markets that makes lenders and investors co-responsible for certain environmental harms.
- Promote environmental and socially responsible screening of the investment portfolios of the insurance companies and pension funds of developed nations. Create demand by requiring public sector pension funds to adopt screening in a step-wise fashion. Create demand by instituting reporting requirements concerning SRI policy and practices by pension funds and insurance companies.
- Reform fiduciary legislation to define sustainable development criteria as compatible with prudent money management.
- Provide incentives for the propagation of SRI funds in emerging markets, by making available grants for SRI consultants, for SRI R&D, for the extra costs of implementing SRI action programs in portfolio investments, and direct regional development banks and multilateral financial institutions to co-sponsor SRI funds with private sector funds managers.

Institutional investors in the EU must become motivated to screen companies or at least to demand information on how the companies they are investing in are doing environmentally, or, they must become motivated to become responsible owners. Whether they become responsible investors as a result of being pressured by their stakeholders or by their governments or by international treaties or by their own conception of corporate citizenship is less important than that they do it.

The complexities and difficulties of achieving global environmental agreements are well documented. But recent progress in Bonn in the process of reaching international agreement on greenhouse gas emissions (particularly after the negotiations in Kyoto and Buenos Aires) seems to show that collective rationality is driving political compromises and winning over the will to maximize self-interested free-riding benefits for individual countries. Perhaps this new political attitude will mark progress on environmental matters in the next millennium. The best practical prescription for policymakers and business may be to act as if it indeed will, and to do one's part to help it happen. If this means leapfrogging the evolution of environmentalism as we know it and appropriating the process of globalisation for environmental and social ends, so much the better. ■

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