PERVERSE SUBSIDIES, INTERNATIONAL TRADE AND THE ENVIRONMENT

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Abstract

The classic economic theory of international trade evaluates free trade favorably as it is considered to make full or optimal use of existing comparative advantages. Another branch of economics, welfare theory, teaches us that international trade governed by prices that do not take external effects into account, will only lead to a suboptimal international allocation of activities and commodities, and an associated suboptimal international income distribution. Against this background the relationship between international trade and environmental policy will be examined in this paper. The discussion whether trade measures can fulfill a useful role as either a replacement of, or a

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complement to, environmental measures has become a fuzzy one as it is very hard to determine what "correct" prices are for two reasons. In the first place, prices of many internationally traded commodities are not correct because external environmental effects are not incorporated. Secondly, many prices are distorted towards the "private market determined competitive price" because of subsidies. In this paper we analyze the relationship between perverse subsidies and international trade and hence on environmental degradation. Many of the global $950 billion in government subsidies work out perversely. In particular producer subsidies turn out trade distorting and environmentally harmful. With the aim to eliminate or at least to reduce these subsidies, some brief policy proposals are presented.

1 Introduction

The relationship between international trade and the natural environment has in till the end of the 1980s, received relatively little attention within both international and environmental economics. Most textbooks in both areas still do not pay much attention to this interface. Still, for several years now there has been a great deal of research on the potential conflict between free trade and environmental regulation, on the impact of environmental regulation on international trade flows and location choices of firms, and on the use of trade measures in environmental policy. Both international as environmental economists have contributed to this. There has been some debate on free trade versus protectionism, and the discussion in the institutional context has been from the beginning whether greening of international trade agreements, notably the WTO is useful and possible. What is accepted by most participants in the debates is that the classic theory of comparative advantage cannot be straightforwardly applied to situations in which significant environmental externalities exist.[1]

In this paper it is argued that the discussion on the relationship between trade and environment is incomplete yet. It appears that comparative advantage patterns are not only disturbed by incorrect prices as a result of market failures but also as a result of policy failures of governments. Market failures mean that comparative advantage patterns are disturbed because prices do not incorporate environmental externalities caused by production or consumption of commodities traded. Policy failures mean that comparative advantage patterns among countries are not optimal as government interventions work out adversely. The most notorious example of policy failures is the huge amount of so-called perverse subsidies in many production and

[1] *The relationship between environment, international trade and policy is extensively discussed in Low (1992) and Anderson and Blackhurst (1992) and a special issue about 'Trade and the Environment', Ecological Economics, vol. 9, January 1994.*

natural resource sectors of the economy. Perverse subsidies distort market prices and it is essential to remove such policy failures first before correcting for market failures.

The next section pays attention to the relationship between trade and environment as evidenced by the existence of market failures. In section 3, it is argued that the comparative advantage patterns are not only disturbed by incorrect pricing due to the absence of incorporating environmental costs in market prices but also by the existence of huge amounts of public subsidies. Section 4 provides estimates about the magnitude of these subsidies. Proposals to eliminate or at least reduce the amount of subsidies are presented in section 5 and in particular the role of the WTO is considered. The final section presents some conclusions.

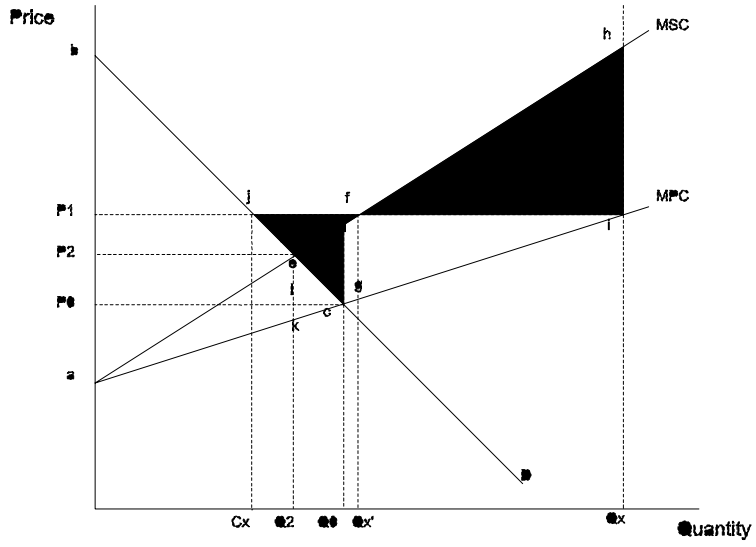
2 The role of international trade in environmental degradation and resource depletion

The interface between international trade and environmental externalities has a number of facets. Trade theory shows that in a static framework specialization of countries along the lines of their comparative advantage is efficient, that is welfare maximizing for the domestic and world economy. This is correct as long as all costs of production and consumption are included in market prices. This situation is shown for a small open economy with perfect competition in figure 1, which is taken from Van Beers and Van den Bergh (1996: p. 153).[2]

[2] *Van Beers and Van den Bergh (1996) extend the situation sketched out by figure 1 also for the case of imperfect competition.*

FIGURE 1

Environmental externalities, production and trade in a small open economy.



MSC = Marginal Social Costs
MPC = Marginal Private Costs

Figure 1 shows the situation of an exportable commodity. In case of autarky without pollution and a pollution tax, OQ_0 and OP_0 are the relevant quantities respectively relative price of the good. Net social welfare (in the absence of externality) equals abc. If there is pollution but no pollution tax net welfare decreases and is: (area abc -/- area ace). Suppose the commodity can be exported because at the world market $P_1 > P_0$. Exports are equal to C_XQ_X. Compared with the autarky situation with pollution but no tax, production has increased from Q_0 to Q_X. The increased production for exports lead to additional pollution which is not taken into account in the price.

A pollution tax of fg will decrease exports to $C_XQ'_X$. Net social welfare is then abjf. Compared with the situation of exports without environmental policy the increase in net social welfare is fhi. This consists of less pollution (fhig) minus loss of producer surplus (fig). Subsequently net social welfare increases. Therefore compared with the autarky situation with environmental policy net social welfare will increase with jfe. In other words with international externalities opening up the closed economy will improve net welfare. Now the effect of exporting the commodity whose production is pollutive gives rise again to ambiguous conclusions regarding welfare increase or decrease. Therefore, in spite of increased pollution as a result of export, it is still possible that net social welfare increases compared with the situation of autarky. The ultimate outcome depends, among others, on the steepness of the demand and supply curves. It is not possible to draw general conclusions.

The framework sketched out is a static one. In a dynamic world international trade can affect the natural environment along a number of channels. First, international trade shows a strong correlation with economic growth. Two opposite effects can be noted. On the one hand, trade leads via economic growth to a larger use of natural resources and more pollution. Pollutive or resource-intensive intermediate sectors may deliver to export sectors. A notable example is transport, especially via roads and air. When adopting a very long-run perspective, one can foresee that increased environmental damage and resource depletion will harm regional or national capacities for certain economic activities and generate related trade flows. Although in the short run trade may seem beneficial to a region, trade may thus set in motion a direction of change which ultimately may leave the region at an unsustainable path. On the other hand, more financial (public) budget is generated which can be used for supporting environmental policy, and generating technology which may curb environmental pressure per unit of GDP. In general, it is not clear which of these opposite effects at what time in the process of economic development of a country will dominate.

Second, trade flows can directly be associated with waste that can damage the natural environment but also with non-renewable resources and natural materials that are essential for an ecologically sustainable system. Examples are well-known: chemical and nuclear waste, tropical hardwood, ivory, animal skins or even complete dead or living entities of threatened species. Pollution, health risks, depletion of resources, and damage to ecosystems are the result.

3 The role of subsidies in environmental degradation and resource depletion

In the previous section, we argued that international trade may have positive but also negative environmental effects. The key factor in channeling these effects is whether market prices reflect environmental externalities; if they do not, the outcome will only be suboptimal. However, it may also be that observable market prices (without environmental externalities) themselves are incorrect. Government subsidies may create such distortions by sending out false price signals and, as a result, actually contribute to further environmental degradation. Generally, two main types of subsidies can be distinguished, that is support to consumption or to production. By intervening in market prices of goods and services and setting them below market level, governments are subsidizing consumers. This underpricing is typical and quite common in developing countries, where the consumer prices of water, energy or food are kept low. Subsidies to production, on the other hand, imply a transfer of resources to producers by guaranteeing minimum prices above market level or through purchase obligations. Such producer subsidies are quite common in the developed OECD countries.[3] Consumer and

[3] *In De Moor and Calamai (1997), subsidies are defined as comprising all measures that keep prices for consumers below market level or keep prices for producers above market level or that reduce costs for consumers and producers by giving direct or indirect support. This subsidy concept hence comprises far more than the traditional money handouts from the government but it also includes transfers through the tax system and different types of off-budget subsidies, such as soft loans, minimum prices and local purchase obligations.*

producer subsidies hence both affect market prices but their full economic impact may be quite different.

In a static framework as sketched out in figure 1, it is not difficult to see that consumer subsidies may cause further environmental degradation. If the government sets the domestic price below the market level OP_0 in autarky, domestic demand will be larger than the optimal market outcome Q_0. This overconsumption obviously implies further environmental degradation and resource depletion. Indeed, the country experiences an increase in imports to be able to fulfill its excessive domestic demand. Consumer subsidies may therefore lead to or aggravate the trade deficit.

Now consider producer subsidies. In figure 1, the government may set producer prices above the market level OP_0 or in case of exportables, higher than the world market price OP_1. This will encourage producers to boost production, which will lead to a further depletion of resources and environmental degradation. However, contrary to underpricing, producer subsidies create a vicious cycle of more support. The production surpluses need to be transported and stored in warehouses which require further subsidies. Additional public support is necessary to export these subsidized surpluses which can only be done with the help of export subsidies since the commodities can not be sold at the prices of production or at world market prices. Finally, subsidized producer prices require protection of the domestic market since domestic producers would not be able to compete with cheaper imports. In the end, producer subsidies distort both exports and imports and lead to serious trade imbalances.

Many government subsidies are hidden and in some way linked to prices, inputs or income.[4] Such “coupled” subsidies are particularly distortionary because by lowering the costs for consumers and users or increasing the returns to producers,

[4] *For example, tax subsidies directly affect (net) income of subsidy recipients while minimum price guarantees benefits producers and hence affects production.*

they lead to rent-seeking behavior and encourage excessive consumption or production. The consequences for the environment are negative, through more pollution, more waste and more degradation. However, since producer subsidies affect supply and induce overproduction, they impact on the early chains of economic processes and hence may have more far-reaching implications than consumer subsidies which are at the end of the economic chain. Additionally, since producer subsidies boost production over domestic consumption, it will also encourage exports and hence affect international trade. Considering that producer subsidies are dominant in OECD countries while consumer subsidies in developing countries, subsidies do have serious implications for international trade as we will see in the next paragraph.

4 Perverse subsidies affect trade patterns and their environmental impact

Recent empirical evidence shows that the issue of (perverse) subsidies merits further attention only because of their sheer magnitude. Worldwide, governments are heavily engaged in providing subsidies and it is in fact such a persistent and widespread phenomenon that one can easily talk of a serious addiction. The costs associated with public support policies are huge. A recent review estimates the costs of global subsidies at $950 billion *a year* (see table 1). It also demonstrates that many government subsidies do indeed provide false price signals and hence undermine sound economic structures.[5]

[5] *Compare De Moor and Van Beers (forthcoming), De Moor and Calamai (1997), OECD (1998) and (1997a) and Myers (1998).*

TABLE 1

The global costs of subsidies, mid 1990s (in US$ bln)

	subsidies	
Agriculture	325	
Automobile	225	
Energy	205	
Water	60	
Manufacturing industry	55	
Forestry	35	
Mining	25	
Fisheries	20	
Total (in % GDP)	950	3.6%
Subtotal OECD (in % GDP)	690	3.3%
Subtotal non-OECD (in % GDP)	260	4.6%

Source: De Moor and Van Beers (forthcoming)

The largest subsidies in absolute terms can be found in OECD countries, nearly $700 billion a year, or three-quarters of all subsidies. Governments in non-OECD countries, however, dispense more support in relative terms: 4,6% of GDP compared with 3,3% in OECD countries. What is common though in both developed and developing countries, is that governments tend to subsidize economic activity in natural resource sectors and hence actively foster resource depletion and environmental degradation.

The most heavily subsidized sector in the world is agriculture. Governments in OECD countries dispense $300 billion worth of transfers to support agriculture and in particular production by offering farmers minimum prices above world market level (see table 2).[6] The EU, Japan and the USA together account

[6] *There are many more types of support but producer price support is most typical for OECD countries, as for instance in the Common Agricultural Policy of the EU.*

for 90% of all OECD transfers. Agricultural support runs up to $334 per capita or over $1330 for a family of four. The amount of support is even more staggering per farmer; subsidies amount to nearly $15,000 for a full-time farmer in a OECD country. For individual countries, and in particular Japan, the results are simply bewildering and out of any reasonable proportions.

TABLE 2

Transfers from OECD agricultural policies (in US$ bln), 1996

	OECD	USA	EU	Japan
total subsidies	297	69	120	77
idem, in % of GDP	1.3	0.9	1.1	1.7
idem, US$ per capita	334	259	322	617
idem, US$ per full-time farmer	14,493	27,240	17,473	30,091
idem, US$ per hectare	254	161	825	15,107

Source: OECD (1997a), OECD (1997b), Van Beers and De Moor (1998).

These massive amounts of subsidies are not only disruptive because of their size, but also because they induce farmers to overutilize their lands and to maximize production by applying more fertilizers, pesticides and inputs. This overproduction leads to land degradation and environmental pollution. Additionally, as we have argued in the previous paragraph, producer subsidies typically creates a further cycle of more support, subsidies to transport and store the surpluses and, since they can not be sold at the prices of production, export subsidies to dump the surpluses on the world market. As a result, world market prices are depressed which further increases the OECD price subsidies, hence a full circle.

Table 2 only reflects the cost of support policies. But besides being very expensive, OECD agricultural support policies are also ineffective. Only 20% ends up as additional farm income;

the remaining leaks away, mainly as a result of using more inputs as fertilizer, pesticides and water, and through inefficiencies in production. If maintaining farm income is the primary goal, the effectiveness of OECD subsidies is extremely poor.

The trade-distorting implications of OECD agricultural subsidies are enormous. Exports are subsidized and cheaper imports need to be barred from OECD markets. As a result, developing agricultural economies suffer twice, first from the depressed world market prices and second, from the access barriers to OECD markets. At the same time, developing countries are also guilty as charged but of a far more minor offense. It is estimated that developing countries spend about $25 billion a year on subsidizing water, fertilizer and pesticides. Nonetheless, these subsidies exert a very negative impact on domestic agricultural production and the environment.

Energy is also heavily subsidized, both in developed and developing countries. Global energy subsidies currently run up to $205 billion each year. The common feature in energy support policy across the world is that subsidies flow to fossil fuels. Subsidies for coal, oil and gas run up to $150 billion, or 70% of total energy support, and this increases to a further $180 billion, or 90%, when we include subsidies for fossil fuel based electricity generation.[7] Bluntly put, the energy policies of governments end up subsidizing pollution and global warming.

OECD countries spend $85 billion on subsidizing energy. That is nearly $100 per person or $400 for an average family of four. In Europe, coal is heavily supported through policies as price support and purchase obligations, while in North America, oil and gas industries are subsidized through tax breaks and capital subsidies. Former socialist countries spend some $80 billion on subsidizing energy consumption

[7] *At the opposite, subsidies for renewable energy or energy conservation accounts for only 4%.*

by keeping user prices below market level.[8] This subsidy of $200 per person is a firm reduction since the early 1990s when energy prices were sometimes below 10% and consumer subsidies ran up to $250 billion annually.[9] In the remaining developing countries, energy subsidies run to nearly $40 billion a year, a modest $9 per person. Again, subsidies flow to fossil fuels, either directly or indirectly through electricity.

Subsidies to energy provide disincentives for energy use and conservation. Quite the contrary, the underpricing of energy provides consumers no incentive whatsoever to save on their energy bill and hence energy consumption will be higher than necessary. Since energy (or electricity) is mostly generated from burning fossil fuels, particularly in non-OECD countries, the impact on the environment is double negative; first through an excessive level of energy use and second, through environmentally malign energy sources. Although the ultimate impact on the environment is similarly negative, subsidies to energy producers affect energy patterns in a somewhat different way. In this case, the higher price of energy induces overproduction and since most support is directed to fossil fuels, this turns out ecologically malign as well. Additionally, since energy is an important input in production processes, their harmful impact may spread throughout the economy by promoting energy-intensive production and hence trade patterns .

Subsidies to fisheries is an example to illustrate that not only the size of the subsidy matters. Total subsidies amount to

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[8] *The 1995 subsidy estimates for the socialist countries have been derived from earlier World Bank (1992) calculations by using the percentage reduction in subsidy rates and the (negative) growth rate of commercial energy use. Expressed as a percentage of GDP, subsidies have remained fairly constant. This outcome corresponds to the OECD (1997a) update for energy subsidies in Russia of $52 billion, or 8.4% of GDP, exactly similar to the early 1990s.*

[9] *In 1995, energy prices are generally at 70% of world market level.*

"only" $20 billion per year, through a variety of measures,[10] but they do exert a highly negative influence on production, fishing stocks and trade. With the help of massive subsidies, fishing vessels have grown larger and larger; over the past 20 years, the fishing fleet has grown at a rate twice the global catch. Additionally, fisheries subsidies also allow loss-making fishing firms to survive. The overcapacity of the fishing fleet has now led to severely depleted and overfished stocks; about 70% of the world's fishing stocks is fully exploited, overexploited, depleted or recovering. Fishing stocks are not allowed to recover and ultimately, the result will be the biological extinction of species.

Introduced to maintain fishermen's income and employment, subsidies to the fisheries sector have served their purpose only in the short run. In the longer run, however, the impact of fisheries subsidies on income and employment turns out quite perverse. Because they have induced overfishing and severely depleted fishing stocks, the subsidies are now threatening the same employment they intended to preserve. Evidence suggests that this situation is already occurring. Fishing grounds off the coast of Newfoundland and New England had to be closed in 1992 because the fleets continued their fishing efforts and severely overfished the waters. The costs have been enormous: 42,000 jobs were lost and resulted in an additional $8 billion in unemployment benefits.

A typical example of a harmful subsidy are foreign access payments, that is subsidies for the distant water fleets in developed countries to access foreign fishing grounds. These distant water fleets have enormous capacities, not only because of the number of fishing vessels but also of their size

[10] *For example, expenses for fleet renewal and modernization, port facilities, withdrawal of excess supplies from the markets due to minimum prices, foreign access payment, subsidized interest rates, loan guarantees, exemptions from fuel taxes for the fleet, accelerated depreciation of fisher boats, deferral of income taxes for fisherman.*

and technological sophistication.[11] By accessing the fishing grounds of developing countries, the fish catch of distant water fleets seriously reduce the fishing stock in developing countries' waters and threatens the employment opportunities of local fishermen. In other words, foreign access payments may save jobs in the rich countries but at high cost and only at the expense of jobs in the developing countries.

Finally, consider subsidies to OECD manufacturing industries. Currently, public support runs up to at least $55 billion but it may well be several times larger.[12] From 1989, OECD industry subsidies have grown by at least 26% in nominal terms, a rate of 6% a year. Although the ratio of support to manufacturing GDP fluctuates between 1.2% and 1.4%, this stability is more the result of the growth in GDP than of collective policy efforts to reduce industrial support. Only 4% of all OECD industry subsidies are targeted at environmentally benign industries. Most subsidies are directed to investment or production and hence reduce capital costs or increases the profits of companies. Both policies alter economic signals and will very likely lead to an increase in industrial production capacity. They will also have direct and immediate trade- and competition-distorting impacts. Therefore, the impact on the environment is likely to be negative, leading to more industrial waste and pollution.

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[11] *A typical trawl net is now one kilometer long, big enough to hold 12 jumbo jets, and able to catch 400 tons of fish in one go.*

[12] *Not included are subsidies through procurement policies for which only a small percentage could make procurement by far the biggest subsidy to industry. Studies suggest that one-half of the $600 to $900 billion in public procurement involve non-competitive goods and services with a typical price subsidy of 30%. This would bring the subsidy from public procurement at $90 to $135 billion a year.*

5 Policy Options for reducing perverse subsidies: the role of the WTO.

The obvious conclusion from the foregoing is that perverse subsidies need to be eliminated or at least reformed and de-coupled from production or consumption. One important barrier is that many perverse subsidies - once provided - change behavior of people and firms. A typical feature is their long history and soon, support becomes an integral part of everyday life and gets enshrined in human behavior and business decision making processes. Subsidy recipients get used to support and grow dependent on them. In particular when subsidies are linked to economic activities, subsidy recipients get addicted. Removing subsidies would raise fierceful opposition because recipient groups fear to lose their competitiveness. In fact, at the country level, this fear is recognized as a prisoners= dilemma; governments that may wish to pursue subsidy reform, will hesitate to move first because they fear to be confronted with (only) negative economic effects if they act alone.

One of the two main strategies suggested by De Moor and Calamai (1997) is to initiate and stimulate an internationally coordinated policy move towards subsidy reform. The ideal forum to negotiate such an international policy effort would be the WTO. Besides being the only, truly recognized international platform, the WTO has proved its usefulness on various trade issues. Nevertheless, the OECD countries are in the most comfortable position to lead such an initiative. They have more to benefit from subsidy reform; first, because OECD subsidies are the largest in the world, at least in absolute terms, and second, they are economically the most distorting.

The most successful strategy would be to aim for a phased-in reform of subsidies, gradually decreasing the level of support. This approach could well be differentiated in time and by income level, for example OECD countries could commit themselves on a complete elimination of subsidies within a

period of 5 years, middle-income countries within 10 years and low-income countries could target for a 50% reduction within 10 years.

What kind of incentive would OECD countries have to abolish or reduce their 'own' subsidies? None, as long as the cost implications for the economy and the environment are not clear. That is the reason why another key strategy is of importance, i.e., creating transparency. Making clear how much support costs and how it affects the economy and the environment, will reveal more clearly the often implicit choices and priorities. If the huge amount of costs for the economies of the OECD countries which are the result of subsidies, will be clearly revealed, OECD governments will definitively get an incentive to reduce them. An example is the reduction of agricultural subsidies of the European Union (EU) as a result of the Agreement on Agriculture in the Uruguay Round. This negotiation result would never have been achieved if it had not been made clear that agricultural policies and subsidies in the EU were so highly expensive.

The WTO may be well suited to introduce common standards for subsidy reporting and subsequently monitor subsidy performance. Such standards could for instance, comprise common tax benchmarks.

Domestically, creating more transparency would also allow for a better and more sound assessment of objectives and alternatives and enhances control of government policies. More transparency also increases the political costs of irresponsible policies and hence provides incentives for policy makers to act responsibly. To control the addiction on the long run, subsidy providers and recipients should be placed under regular and strict scrutiny. This would require institutional reform. Subsidies should be bound to a time-horizon, say for a maximum of 5 years; after that, support should be gradually reduced. Subsidies should also be restricted to a maximum support level and policy measures with an open end should be avoided. One may consider

introducing a burden of proof for subsidy policies and require that governments actually proof why support is necessary and why in that particular format.

Future international trade negotiations should pay more attention to subsidies in both developed and developing countries. In the next Round on agriculture which starts in 1999, the line of reducing export subsidies as agreed upon in the Agriculture Agreement of the Uruguay Round should be continued and extended with subsidies that are not only directly related to trade but affect trade flows and natural environment indirectly. Especially producer and input subsidies should be taken into account.

Finally, we also believe that OECD countries can do more and play an important active role in the elimination of subsidies in developing countries. It is recommendable that the OECD countries reduce their barriers against imports from developing countries which would permit the latter to eliminate or at least to reduce substantially domestic perverse subsidies. The advantage of such a deal for the OECD-countries is that environmental damage done to the environment in developing countries but with a global impact (e.g. deforestation causing changes in the world climate) can be reduced. In practice, we think this is a politically to be negotiated exchange that is practically achievable.

6 Conclusions

So far, the debate on international trade and environment has been rather incomplete. Before discussing the incorporation of environmental externalities in prices, which assumes correct market prices, the debate should focus first on the existence and impact of perverse subsidies on international trade and the environment. Currently, most of the massive amount of $950 billion in government subsidies provides false price signals and hence undermine sound economic structures. Many subsidies are directed to support economic activity in natural resource sectors and the active

subsidization of production or consumption in these sectors causes further resource depletion and environmental degradation. In particular, producer subsidies are distortionary by affecting trade patterns and causing trade imbalances.

Reform of subsidies should take place within an internationally coordinate policy effort within the framework of the WTO and led by the OECD countries. The best strategy would be a phased-in reform of subsidies which leads to a gradually decrease of support. The incentive for the OECD countries to do so should be the high economic and environmental costs involved in providing subsidies. Particularly the economic costs should be revealed as most of them are hidden. Hence, our proposal to create more transparency which makes clear the high costs in foregone alternatives (i.e., what else could have been done with billions of dollars of perverse subsidies). This leads to a better and more sound assessment of objectives and alternatives and enhances control of government policies. More transparency also increases the political costs of irresponsible policies and hence provides incentives for policy makers to act responsibly. A credible, international organization as the WTO could play a key role in this process of desubsidization.

In trade negotiations in the WTO-framework, OECD countries can offer additional market access for developing countries in exchange for elimination of those subsidies in developing countries that create global environmental damage. This initiative could also be taken by the developing nations. Additional market access for exports of developing countries in the domestic markets of the OECD countries provides the developing nations with means that allow them to fulfill their obligation to eliminate or reduce the most important perverse subsidies.

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