
Globalization, Foreign Direct Investment, and the Environment

Many of those who demonstrated against the Multilateral Agreement on Investment outside the OECD's Paris headquarters in the fall of 1998 were members of, or sympathetic to the causes of, environmentally oriented NGOs. Environmental activists were present in still greater numbers one year later outside the World Trade Organization's ministerial meeting in Seattle. The reason for their presence was a passionate belief, held by many (but not all) environmentalists, that expanded international trade and investment will lead to further degradation of the natural environment. And of those environmentalists who are not categorically opposed to growing international trade and investment, many nonetheless believe that the current multilateral rules governing global commerce act against, or at least are highly insensitive to, environmental interests.

A substantial majority of the environmental community also believe that new rules on investment such as those that the MAI would have embodied would act to increase environmental degradation. As discussed in some detail in chapter 2, some specific provisions of the MAI, notably those on definition of investment, expropriation, and dispute resolution that might have been applied to regulatory takings, especially upset the environmental community.

However, the even larger presence of environmental protesters in Seattle, almost a year after the demise of the MAI, illustrates that the concerns of this community with multilateral trade and investment rules go well beyond the specific issue of regulatory takings. One reason the WTO has become the target of environmental activism is that some recent WTO

panel rulings (and some earlier rulings by dispute panels convened under its predecessor, the General Agreement on Tariffs and Trade) were perceived by the environmental community as threatening to the environment.¹ Most of the recent decisions have involved cases brought against the United States. One of these was a 1996 WTO panel ruling on US Environmental Protection Agency rules pertaining to imported gasoline. In this case, a WTO panel found that certain provisions of the US Clean Air Act pertaining to reformulation of gasoline to produce less pollutants were applied on a basis that discriminated against imported gasoline, and hence contrary to GATT Article III, part 4. This article states that “national treatment” be applied to imports, i.e., that imports be granted treatment under domestic law and policy that is “no less favourable than that accorded to like products of national origin. . . .” The panel ruled that the discriminatory treatment was not justified under a defense argued by the United States based on GATT Article XX, part g, which states that a WTO member can apply measures “relating to conservation of exhaustible natural resources. . .” providing that these measures do not “constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade. . . .” The finding was largely upheld by the WTO Appellate Body.² It is noteworthy that the panel and the Appellate Body did find that the United States could impose measures to ensure that gasoline was reformulated to reduce emissions and, in particular, that clean air is an “exhaustible resource” in the meaning of GATT Article XX(g). What the panel found at fault was that imported gasoline was held to somewhat different and, in its view, discriminatory standards.

This case, as do other cases with environmental overtones that have come before the WTO, raises issues that can be difficult to balance. Environmentalists have maintained that the somewhat different standards were in fact required to ensure that the imported gasoline was as clean as the domestic product. Trade experts might counter that the United States could have met its WTO obligations by imposing restrictions on domestic gasoline as strict as those imposed on imported gasoline and that to have

1. Wallach and Sforza (1999) offer a full litany of WTO and GATT panel decisions that have gone against environmentalist concerns. Their list also indicates why environmentalists disapprove of each of these decisions. However, the reader is warned that Wallach and Sforza treat these cases as might a lawyer presenting evidence in a trial. That is, they present those facts that support the point they want to make, but omit other important facts that do not. (The next footnote provides an example.) Fortunately, all the facts and considerations that bore on these decisions are public information. The full texts of the WTO panel and appellate body reports pertaining to the turtles case and the gasoline case mentioned below, as well as other cases, are published on the WTO web site, at <http://www.wto.org/wto/dispute/distab.htm>.

2. The combined texts of the panel report and the Appellate Body report on this case are available on-line from WTO at <http://www.wto.org>.

done so would “have raised the bar” with respect to environmental standards, not lowered it.

Another such case was a 1998 WTO ruling on US efforts to ban imports of shrimp from countries that do not require shrimp fishermen to use turtle excluder devices, or TEDs. In this case, which has become a cause célèbre among environmentalists, a WTO panel again found that the US ban was in violation of WTO obligations. The main reason for the WTO decision was that the US import bans did not distinguish between shrimp caught by shrimpers who used TEDs and those who did not. Rather, the bans applied to all shrimp imports from countries whose governments did not require use of the devices. Complainant countries were able to show that at least some shrimp subject to sanctions were in fact caught by shrimpers who used TEDs. This fact figured importantly in the decision of the WTO Appellate Body to uphold the panel findings against the United States. The Appellate Body did indicate that, were the US law administered so as to distinguish between shrimp actually caught using TEDs and shrimp not thus caught, it would be WTO-consistent.

This finding so outraged environmentalists that, in Seattle, the sea turtle became an icon of the activists assembled there.³ Indeed, the decision in the turtles case, which seemed to reinforce some of the concerns arising from the earlier GATT decision on tuna imports (see chapter 2), led many environmentalists to conclude that WTO panels would routinely place the interests of international commerce over environmental protection. This doubtless contributed to the intensity of the protest both in Paris in 1998 and in Seattle in 1999.

However, the issues raised by the environmental community go beyond specific WTO panel decisions as well as beyond the specifics of the MAI.⁴ This chapter therefore tries to examine some of the larger issues

3. It also stands as an example of the point made in the previous footnote, namely, that Wallach and Sforza (1999) omit material facts in their treatment of WTO cases. Nowhere do they mention that the main reason the appellate body (rightly or wrongly) ruled as it did was that the US law, as implemented, failed to distinguish between shrimp caught using acceptable and unacceptable means.

4. In what follows, the author has tried to extract from a number of sources the precise nature of the environmental activists' concern over globalization. This is surprisingly difficult, because most of the activist literature is specifically focused on the WTO and the perceived anti-environmental bias of recent cases; almost nowhere is laid out an integrated view of why activists believe that increased international trade and investment inevitably impact negatively on the environment. Thus, for example, absent entirely from Wallach and Sforza (1999) is any discussion of whether increased international trade is, in and of itself, inimical to the goal of environmental preservation. A major exception is a collection of essays edited by Mander and Goldsmith (1996). Several of these are cited in the discussion below. Even so, the reader is cautioned that this discussion represents this author's possibly flawed interpretation of a number of strands of thought found in these works. See also Charnovitz (1994) for a review of the activist literature. For a contrasting view, that liberalized trade and investment are *not* important causal factors of environmental degradation, see OECD (1998, chapter 6).

raised by environmentalists with respect to globalization in general and FDI in particular. It begins by acknowledging that expanded international trade and investment, to the extent that these are associated with greater economic growth, are almost sure to lead to some degree of environmental deterioration in much of the developing world and perhaps in the developed world as well. Such deterioration is particularly predictable during the early phases of rapid development when incomes are rising sharply, as has been happening in a number of large developing countries such as China and, very recently, India.

The good news is that, in the long run, growth in these countries' incomes will almost surely enable measures to be taken to alleviate this environmental distress. The reasons for this are developed later in this chapter. But even so, in much of the world these measures remain in the somewhat uncertain future. An important issue then becomes how to manage the trade-off between the benefits of globalization, which has great potential to raise incomes in regions of the world that remain desperately poor, and the benefits of measures to protect the environment, where these conflict with globalization. Can measures be employed that will both enable real income growth in poor areas of the world and adequately safeguard the environment? Does globalization hinder or advance the rate at which such measures are likely to be implemented? And do multilateral rules (including possible future rules on investment) act, or have the potential to act, to increase the environmental degradation brought about by globalization?

The Environmental Impact of Globalization and Growth

What are the most basic issues that globalization raises for environmentalists? Starkly stated, the principal one comes down to the following: that the economic growth that globalization brings, combined with the consumerism that this growth fosters, puts ever increasing stress on the limited resources of the earth.⁵ For example, one major concern is that an expanding world economy results in the destruction of wildlife habitat. Habitat is certainly being lost from human encroachment of numerous wetlands and tropical rainforests all over the globe, in developing countries and elsewhere. And those habitats that are not actually destroyed may be altered by the encroachment of human beings in ways that threaten their flora and fauna. This can happen even if there is no physical encroachment at all. For example, humans do not actually inhabit the world's oceans, but large areas of the ocean are being polluted by the disposal of effluents in their waters.

5. See the chapters by Korten, Daly (1996a), and Goodland in Mander and Goldsmith (1996).

The main reason for habitat encroachment is that the share of the global biomass appropriated for human activity has expanded considerably over the course of the last two centuries, that is, since the beginning of the industrial age.⁶ According to some environmentalists, further growth in this share would be unsustainable.⁷

However, with respect to both habitat encroachment and human appropriation of the world's biomass, the effects of economic growth are not unequivocally bad. In fact, rising incomes often give countries the wherewithal to preserve more habitat than they could otherwise. For example, it is mostly the relatively rich countries of the world that have been able to designate large tracts of land as national parks or wilderness areas, where development is limited or forbidden so as to preserve natural habitat. By contrast, in the world's poorest countries, habitat is often destroyed as impoverished farmers cut down forests in order to raise crops on land that is, at best, marginal for agriculture. Even where such home-steading is prohibited, natural habitat can be put under stress or destroyed as people who cannot afford other fuels are forced to cut down trees for firewood. Alleviation of poverty in these countries could go a long way toward preserving their wilderness areas and saving their tropical rainforests from destruction.⁸

Perhaps the greatest contribution that income growth makes to preserving habitat is that it seems to put a brake on population growth. In the thirty years from 1970 to 2000, the world's population has grown from about 3.7 billion persons to almost 6 billion.⁹ But in most of the world's richest countries, population growth has stabilized, and in some (e.g., Japan) the population is forecast to decline. (The United States is an exception, but mainly because of continued immigration.) Population growth has been greatest, by contrast, in the world's poorest countries. This growth is doubtless due in large measure to poverty itself (e.g., people living in rural poverty seek to produce numerous offspring simply in order to increase the numbers of workers on the land).

Thus, many environmentalists acknowledge and accept that the elimination of poverty is wholly compatible with the preservation of wildlife habitats. Indeed, there is a demonstrable positive relationship between a

6. Vitousek et al. (1986). See also French (2000).

7. Daly (1996a).

8. A closely related issue is overpopulation, which in many areas of the world is a major source of environmental stress. A negative relationship can be demonstrated between income per capita and the rate of population growth. Thus, alleviation of poverty should also reduce environmental stress where overpopulation is a major cause of that stress. See WTO (1999). Charnovitz (2000) provides a critical review.

9. Brown, Gardner, and Halweil (1998) discuss population growth and the environmental stress it causes.

country's income level and its environmental performance.¹⁰ But environmentalists also point out that increasing affluence can place mounting stress on habitat, even if rich countries do designate some lands as wildlife preserves and national parks. The filling of coastal wetlands to create new space for urban and suburban expansion is one example.

A second major consequence of economic growth that environmentalists find troubling is the production of ever increasing amounts of waste products from human activity, including toxic wastes, that must be disposed of.

Waste products in turn cause deterioration of air and water quality. To environmentalists, both air and water are scarce resources and ones that the market system undervalues. Many economists would agree. To be sure, rich societies are often able to develop means to dispose of at least some of these wastes without environmental harm, a point to which we return shortly. But some environmentalists maintain that, even so, the production of wastes is growing so rapidly that the planet will soon reach a point where it can no longer absorb additional wastes without suffering irreparable harm. Thus, boiled down to its essence, a basic issue raised by environmentalists is that *both* mass affluence and mass poverty can produce considerable effluence and much destruction of habitat that cannot be sustained without grave consequences.

It is all but self-evident that the emission of a number of types of wastes by affluent societies can lead to significant environmental degradation unless adequate measures are taken to dispose of those wastes. Anyone who has been to Los Angeles on a smoggy day can attest to the fact that such degradation occurs even in the richest of the world's economies. Likewise, it is all but self-evident that the clear-cutting of trees in wilderness areas to meet the burgeoning demand of affluent populations for wood products has the same effect on wildlife habitat as the cutting of the same trees by poor people seeking firewood. If growing numbers of poor people are a threat to environmental preservation, so are growing numbers of rich people.

However, much of the degradation resulting from unchecked emissions can be reduced or even reversed by the application of advanced waste disposal technologies and techniques. Both the development and the deployment of these technologies and techniques are driven at least in part by higher income and wealth. This is simply because an affluent society can better afford to undertake the necessary investments than a poor society can. Further, affluent societies might, for reasons discussed later in this chapter, place a higher relative value on clean air and water than do poorer societies with unmet basic needs, and their greater purchasing power increases the effective demand for environmental improvement. Thus,

10. Dasgupta, Mody, Roy, and Wheeler (1995); see also Lucas, Wheeler, and Hettige (1992).

whereas affluence at least creates a necessary condition for reversal of environmental degradation, albeit not a significant one, poverty does not.

One consequence is that, alas, significant environmental degradation is occurring in some poorer countries today that could easily be reversed or at least alleviated by the application of known technologies. The problem is that these countries cannot afford to make the investments necessary to put these technologies in place. The opportunity costs of using these countries' scarce resources for this purpose are very high, given their other priorities.

These considerations give rise to the possibility that the relationship between a country's income per capita and the pollution it generates follows what economists call a Kuznets curve.¹¹ The Nobel prize-winning economist Simon Kuznets theorized that the relationship between a country's average income per capita and the inequality with which income is distributed in the country would follow an inverted U-curve. Inequality would rise with income at low levels of income, but as income continued to rise, inequality would reverse direction and begin to fall. Analogously, an environmental Kuznets curve (figure 5.1) would predict certain forms of environmental degradation to rise with income per capita in the poorest countries as they industrialize and begin to move up the income scale. Beyond a certain level of income per capita, however, as the effective demand for environmental quality in these countries grows, this upwardly sloping curve would turn and begin to decline. This decline would occur in some cases because of the development and adoption of technologies that curtail or abate discharge of the effluent. But also, in some cases, rising incomes would enable a shift away from products and services that cause environmental harm and toward others that can satisfy the same need but with less environmental damage.¹²

However, environmental economists point out that although certain types of environmental degradation do seem to follow a Kuznets curve, others apparently do not.¹³ One of these is the emission of carbon dioxide and other so-called greenhouse gases believed to cause global warming. Also, in some cases at least, the observation of a Kuznets curve in one country may result simply from the transfer of certain of its polluting activities to other countries. For example, heavily polluting paper mills might be shut down in the United States, but the paper they formerly produced might instead be imported from newly built but equally polluting

11. OECD (1998). See also Selden and Song (1994) and Carson et al. (1997).

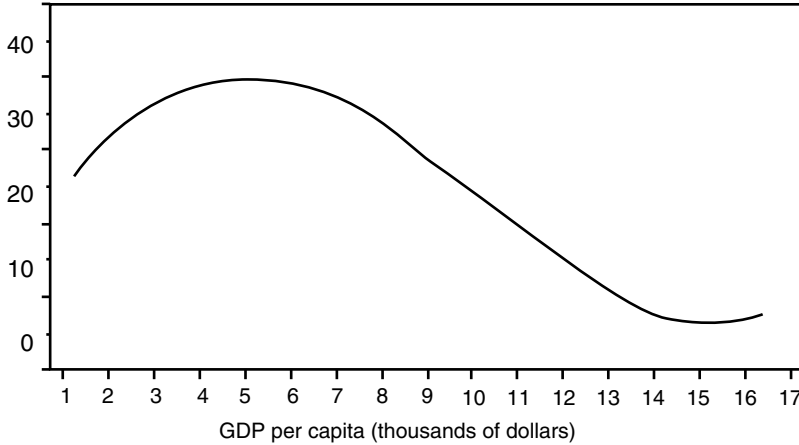
12. In 19th-century and early 20th-century London, for example, the use of untreated coal for home heating and industry produced "black fogs," which caused widespread respiratory problems. With the switchover to the use of cleaner-burning fuels for home heating, however, black fogs are now a thing of the past. This switchover would probably not have been possible had it not been for rising incomes in the United Kingdom.

13. Grossman and Krueger (1993).

Figure 5.1 Income and pollution

Additional units of sulfur dioxide

($\mu\text{g}/\text{m}^3$)



Concentrations of sulfur dioxide rise with income at low levels of per capita GDP, fall with income at middle levels of GDP, and eventually level off in the most advanced economies. The estimated turning point comes at a per capita income level of about \$5,000 (1988 dollars).

Note: $\mu\text{g}/\text{m}^3$ = micrograms per square meter of air.

Source: Grossman and Krueger (1993), MIT Press. Reproduced with permission from the authors and publisher.

paper mills abroad. Arguably, such a transfer might actually be desirable if it improves air quality in a congested region that suffers from especially polluted air, even if it causes some deterioration of air quality in another, less populated region where air pollution is low and the additional emissions can be easily absorbed. Some environmental activists, however, view emissions in any location, populated or not, already polluted or not, as equally bad.

New technology can of course cause environmental damage as well as undo it. For example, agricultural chemicals, including man-made fertilizers, have done such harm. These chemicals have been in widespread use for only about fifty years and have greatly enhanced agricultural productivity, alleviating hunger in many parts of the world where it was once commonplace. But they have also created environmental problems that were largely unknown before their introduction. One major problem is increased contamination of inland and coastal waters by agricultural runoff, as the use of chemicals encourages the expansion of agriculture. Another is that the use of pesticides has fostered the evolution of pesticide-resistant insects, not to mention a range of human health problems where regulation of these toxic substances has been lax. Unfortunately, the United States and other advanced countries where certain pesticides are now

banned nonetheless continue to allow export of these same chemicals to other countries where their use is unregulated.¹⁴

Many environmentalists, while conceding the theoretical existence of Kuznets curves for some types of environmental degradation and the clear environmental benefits of eliminating poverty, argue that in fact the net effect of higher levels of affluence worldwide has been ever increasing environmental harm.¹⁵ The reasons given are twofold. First, despite the introduction of emissions-reducing technologies, economic growth has caused pollution to rise and spread faster than these technologies can contain it. Second, as we have seen, technological advance also creates new types of environmental problems that did not previously exist.

Are these environmental pessimists correct? Some authors have argued, with evidence to back their case, that the converse is true: that prosperity and technology will increasingly lead to a cleaner, not a dirtier, environment.¹⁶ In this view there is, as it were, an aggregate Kuznets curve that governs the sum total of environmental degradation. Most of the evidence supporting this argument comes from the United States. Goklany (1999), for example, shows that the United States has witnessed an overall decline in the emission of five major air pollutants: particulates, sulfur dioxide, volatile organic compounds (and the ozone that these create when airborne), carbon monoxide, and nitrous oxide.¹⁷ These declines can largely be attributed to the introduction of new technologies to control pollution, or to the substitution of cleaner fuels such as oil or gas for dirtier ones such as coal. Somewhat controversially, Goklany argues that these substitutions and introductions of technology have occurred largely

14. French (2000, chapter 5). But is the answer to this problem for countries to ban the export of pesticides if their use is banned at home? Or should there be a worldwide ban on their use? There is no easy answer. Defenders of open trade might argue that, as a means of regulating these substances, use of the multilateral trade rules is a poor substitute for sound domestic environmental policy. Without effective domestic bans on the use of pesticides, an export ban would likely only result in local production being substituted for imports of the pesticide. But environmentalists might counter that, even if the first-best solution, a ban on usage in all countries, cannot be achieved, a trade ban would be better than no action at all. In other words, a trade ban would be an acceptable second-best solution.

15. See Daly (1996a) and Goodland (1996) for arguments that economic growth places stresses on the planet that will ultimately prove unsustainable.

16. One problem that bedevils this debate is that data on, for example, the atmospheric concentration of many classes of pollutants do not go back very far. Systematic collection of data began only during the 1970s. And since then, changes in the way air quality is measured and monitored have resulted in some time series being inconsistent, so that what was being measured in 1979 might not be exactly the same as what is being measured today. This makes it hard to establish empirically whether Kuznets curves actually exist.

17. These downward trends would appear to exist even after accounting for discrepancies in the data, as described in the previous note.

in response to local initiatives rather than federally mandated pollution abatement programs.

But Goklany also notes that the data for airborne lead contamination do not indicate a downward time trend as clearly as for the five pollutants listed above.¹⁸ Thus, the empirical studies he cites offer both good news and bad news (but mostly good) with respect to the long-term trend of environmental degradation in the United States. Furthermore, environmentalists argue, even if there has been a net improvement in air and water quality nationally, the same is not true for all regions. In the Los Angeles Basin, for example, where automotive emissions are the main cause of air pollution, increased use of pollution abatement technology has failed to hold the line against an overall deterioration of air quality. The main reason is that a reduction in emissions per vehicle has been more than offset by an increase in the use of vehicles. The deterioration would have been far worse, of course, had the technologies not been employed. And it is possible that further advances in clean car technology ultimately will enable the deterioration of air quality in places such as Los Angeles to be reversed. But, or so argue environmentalists, this has not happened yet.

A definitive answer to the question of whether growth in developed countries will lead to net environmental degradation or net environmental improvement may depend in large part on scientific evidence not yet at our disposal. For example, it may depend on the determination of whether global warming from increased carbon dioxide emissions will create irreversible net damage to the planet.

How do globalization in general, and FDI in particular, fit into this picture? The basic link is that globalization and FDI are drivers of economic growth.¹⁹ Thus, if growth is responsible for increasing environmental

18. Goklany's finding however does not seem consistent with information presented in the Economic Report of the President 1999 (Executive Office of the President of the United States 1999, 197), indicating that lead emission has fallen faster than all other automotive emissions, due to the phasing out of the use of leaded gasoline. The apparent inconsistency might be resolved if (1) there is a significant time lag between reduction of lead emission and its disappearance from the air, such that Goklany's data do not reflect recent reduction of emission or (2) there is some significant source of airborne lead contamination other than automotive emission that Goklany's data pick up. It is not clear which, if either, of these explanations is correct.

19. As reported in chapter 4, Borzenstein et al. (1998) find that FDI does contribute to increased growth in countries that exceed a certain human capital threshold. Substantial evidence also links a greater volume of international trade with positive income growth (see, e.g., Frankel and Romer 1998). But whether or not open trade *policy* is associated positively with income growth is another matter. A number of recent empirical studies tend to confirm this relationship (e.g., Dollar 1992, Ben-David 1993, Sachs and Warner 1995, Edwards 1998). However, a recent study by Rodriguez and Rodrik (1999) suggests that this apparent positive relationship may be spurious, because factors other than trade policy might so dominate the trade policy variable that no significant relationship between this variable and income growth can be ascertained. But even the evidence in Rodriguez and Rodrik (1999) does not

degradation, then trade and FDI must be counted among the underlying causes of that degradation.

Further, even for those types of degradation that are subject to Kuznets curves, if trade and FDI do significantly contribute to growth in the world's poor countries, the *initial* effect is almost sure to be greater, not lesser, environmental degradation. Many of these countries are still on the uphill side of the curve and may take years or decades to reach the income threshold beyond which higher income leads to reduced degradation. Likewise, only with time will income levels reach the thresholds where rising incomes lead to stabilization of population growth.

On the other hand, for some types of environmental degradation subject to Kuznets curves, FDI may in some cases actually reduce the income level at which the turning point occurs. This would happen to the extent that multinational firms transfer their latest, best, and cleanest technologies to their operations in developing countries.²⁰

Environmentalists might nonetheless argue that, even if some such technology transfer is achieved, it will be insufficient to prevent net environmental degradation in the affected areas. The degradation of air and water quality along the US-Mexican border, where many US firms have located *maquiladora* operations just inside Mexico, is often cited as an example. One reason is that environmental regulation in some countries is lax or even nonexistent. Indeed, environmentalists argue that some countries go so far as to offer lax environmental regulation as an incentive to attract foreign investors. This, it is argued, is leading countries into a "race to the bottom" in terms of environmental regulation, as countries eager to attract or retain investment lower their environmental standards in response to other countries doing so.²¹ The worst fear is that such a "race to the bottom" would undo much existing environmental regulation even in high-income countries as well as create a major disincentive for countries, especially poorer ones, to pass and enforce new regulation.

However, although the specter of a "race to the bottom" runs deep in the environmental activists' opposition to globalization, there is very little evidence that any such race is under way. Chapter 4 showed that the vast majority of FDI worldwide flows into developed countries, which

point to a negative relationship; rather, their results suggest simply that no relationship exists. This last point notwithstanding, it is clear that many countries have experienced faster growth following implementation of policy packages that contain trade and investment liberalization (Krueger 1998). What is at issue is whether, at the margin, the trade liberalization portion of these packages significantly affects the outcome.

20. Dua and Esty (1997).

21. If this is true, one solution would be for countries to negotiate international rules to forbid the use of lax environmental regulation as an incentive. Ironically, although the issue was unsettled at the time the MAI negotiations came to a halt, there was a serious proposal to include in the MAI certain provisions that would do just that. This matter is discussed further below.

have on the books (and actively enforce) laws and regulations to protect the environment. No one has uncovered evidence that these nations have lowered their standards to attract this investment.²² It is in general the world's poorest countries that have the weakest environmental regulation, but a very small fraction of recent FDI goes to these countries. This suggests in fact that there is not a strong incentive for multinational firms to locate activities in countries with lax environmental standards. And if no such incentive exists, it is difficult to imagine why countries that do currently apply high standards would seek to lower them to attract investment.

Why do lax environmental standards seem to be so ineffective as investment incentives? Almost surely, the main reason is that, in most instances, there is very little cost saving to be achieved by relocating an activity from a country where environmental standards are high to one where they are low.²³ Many of today's product and process technologies have been developed or refined to meet environmental standards in the developed countries; their environmentally friendly features are thus embodied in the current technology and cannot be stripped away.

The technology of a modern automobile, and especially its engine, serves as an example. Large, multinational automaking firms typically produce their product in many countries and, indeed, the automobile industry is one of the most "global" of all industries. Also, worldwide, automobiles have been one of the major sources of air contamination. In response to societal pressure to reduce automotive emissions, since the 1970s the basic design of automobile engines has been extensively modified to reduce the volume of pollutants in the exhaust. In most engines this reduction is achieved mostly by means of a catalytic converter. Of course, a catalytic converter can be uncoupled from the engine, but the engine runs well only when the converter is in place. Moreover, state-of-the-art engines are designed to run on unleaded fuel, both because catalytic converters require unleaded fuel and because regulatory mandates exist in developed countries to reduce lead emissions. Indeed, it would be difficult to run most modern automobile engines so as to produce the same levels of pollution as the typical engine of the 1960s—and it would actually be costly to modify them to pollute. Cars using these engines will produce much less pollution than cars of older design, and this is true irrespective of whether local air quality standards are lax.²⁴

In fact, automotive manufacturers seek air quality standards (and, importantly, standards for formulation of automotive fuel) that are consis-

22. See Eskeland and Harrison (1997) for an effort to try to find such evidence; they find little.

23. See Lucas et al. (1992) and Oman (2000).

24. At least this is true if the car is run on gasoline formulated for the engine. One problem in some developing countries is that such gasoline is not available, and locally available gasoline causes even modern engines to produce a dirty exhaust.

tent across nations. And the standards that are sought by multinational firms are at the high end. Thus, for example, automotive manufacturers joined environmentalists in seeking a ban on the use of MMT in gasoline in Canada on grounds that MMT might interfere with emissions control devices (see chapter 2). In Indonesia, gasoline still contains lead, which raises costs of imported cars because they must be modified to use leaded gasoline. Representatives of several firms interviewed by this author indicated that their interests would be served by Indonesia raising air quality standards and requiring use of unleaded gasoline. Indonesia has been reluctant to do so, apparently, because higher air quality standards would put domestically owned manufacturers of vehicles at a disadvantage relative to importers or local subsidiaries of multinational firms.²⁵

Much the same can be said about many process technologies often thought of as “dirty.” For example, state-of-the-art petrochemical processing equipment inherently does not emit nearly as large a volume of organic pollutants as does equipment of older design. There is no cost saving to be had by placing the new equipment in locations with lax pollution standards.²⁶ Nor is it often cost-effective to transfer an older, more-polluting facility to a country with lax standards; rather, it is usually more economic to build a modern facility. In some process industries, as for multinational car companies, costs are actually raised by lack of clean air standards, e.g., if process equipment must be modified to accept locally produced “dirty” feedstock.

Also, it can actually raise a firm’s indirect as well as direct costs to relocate highly polluting activities to areas where environmental standards are lax. For example, because such pollution worsens health and living conditions in the surrounding area, the pollution can add to the cost of production by reducing worker productivity. Even if some firms might be tempted to relocate polluting activities to countries that have low pollution standards today, they face the risk that standards in those countries might later be raised, after they have made the investment. They would then have to retrofit their polluting operations to meet the new standards, which might be more costly than if they had built clean facilities to begin with, and they might even be held liable for health hazards created by these activities or for past environmental damages.²⁷

25. This could change soon. A “national car project” that was promoted under ex-President Suharto has been scuttled, and the Indonesian government is under pressure from domestic NGOs (and some of its own ministries) to take measures to improve the quality of air, which is rapidly deteriorating in some parts of the nation, especially the capital city of Jakarta.

26. See Oman (2000). Some environmental activists (e.g., French 2000) nonetheless worry that if a multinational firm does locate a plant in a country with lax standards, the firm will find ways to take advantage of these low standards once there. Examples in the text, however, suggest that the opposite can be true, i.e., that these firms can have reason to push for higher standards.

27. These arguments are further developed in Schmidheiny (1992).

To be sure, while the remarks of the past several paragraphs apply to many activities, they do not apply to all. In some activities and industries there are indeed cost savings to be gained from operating in a country with lax environmental standards. One such sector is mining. Most mining operations do create serious environmental problems, and fixing them can be quite costly. Mines must often be located in ecologically fragile areas such as mountainous regions, where measures to prevent environmental damage are extremely costly. Environmentalists are quick (and correct) to point out that, in many such cases, the outcome has been environmental damage of almost immeasurable magnitude. An example of a particularly dirty large-scale mining operation in the Indonesian province of Papua (formerly Irian Jaya) was reported in the normally probusiness *Wall Street Journal*.²⁸ The environmental damage caused by this mine figures in the fact that Papua has become one of several provinces in Indonesia seeking autonomy or independence from the Indonesian state.

But perhaps the extreme case is logging. Here the potential for environmental damage is so great that, in some cases, the only acceptable solution may be to ban the practice altogether. The cutting of forests, especially old-growth forests, reduces biodiversity, leads to soil erosion and flooding, and, by destroying a major absorber of carbon dioxide (trees), contributes to global climate change. Commercial logging, however, is not the largest contributor to loss of the world's forests; the cutting of trees to create new agricultural land and to provide firewood, activities largely associated with population growth in the poorest countries, are more important factors (French 2000). But commercial logging is nonetheless an important factor, and the industry has expanded significantly worldwide during the past thirty or so years.

Even so, the importance of these industries for economic globalization must be put in perspective. Mining and logging operations account for only a minuscule share of international trade and investment. Mining, for example, accounts for less than 1.4 percent of the total stock of US direct investment abroad, and logging for less than 0.2 percent. Abuses in these sectors (and, indeed, abuses wherever they occur) that have adverse impact on the environment should be curtailed. But, as with abusive labor practices (see chapter 4) that affect only a small fraction of globalized economic activity, these should not become reasons to "throw the baby out with the bathwater." It would not make sense to forgo the benefits of globalization in order to curtail the abuses, given that the magnitude of the former are very much larger than of the latter, and that the latter can, at any rate, be curtailed without loss of the former.

Moreover, it is not clear that globalization is the primary culprit in the loss of forestland worldwide, or even for that portion of the problem cre-

28. Peter Waldman, "Hand in Glove: How Suharto's Circle and a Mining Firm Did So Well Together," *The Wall Street Journal*, 29 September 1998, A1.

ated by commercial logging. Here French (2000), speaking for the environmentalist cause, seems to commit a logical error. She notes that world trade in forest products has grown much faster over the last twenty years than world production of such products, which is true. But she then implies that expanded world trade therefore is responsible for a growing part of the problem of lost forests. This conclusion does not necessarily follow; indeed, growing world trade in these products might have reduced rather than increased the loss of forestland. This is because trade can create efficiencies that would likely not otherwise exist.

For example, suppose that in country A there are substantial supplies of hardwood, and in country B substantial supplies of softwood, but that each country lacks the other type of wood. Without trade, country A might choose to make from hardwood certain products that are more efficiently made from softwood, so that more trees are consumed than would be the case if softwood were available. Likewise, country B might overconsume hardwood because it is forced to use it for products better made from softwood. If instead country A were to export some of its hardwood to, and import softwood from, country B, these inefficiencies would be eliminated, and trees would be saved. If complementarities of this type are widespread, increased trade in forest products likely would result in less, rather than more, cutting of trees to make wood products than would have been the case in the absence of trade.²⁹

Although globalization of activities such as mining and logging does clearly have an environmental impact, other activities that figure prominently in globalization have little or none at all. Many service operations, for example, create few if any environmental problems, and indeed services now account for about 60 percent of US outward FDI flows. Thus, although environmentalists are correct to worry about the problems created by international trade and investment in mining and logging operations, they should also recognize that most of the problems they cause are peculiar to those activities. Again, it does not seem appropriate to lump these problem sectors together with other sectors that do not create environmental problems.

There also are some cases where environmental regulation might have the effect, intended or unintended, of sheltering domestic activities from international competition, even where such competition would have desirable environmental consequences. For example, in the Ethyl Corporation's dispute against the government of Canada (see chapter 2), one reason for Canada's imposition of regulation may have been to protect Canadian ethanol producers against competition from Ethyl's additive

29. In any case, trade of softwood for hardwood between these countries would create gains for consumers even if it resulted in no net reduction in cutting of trees. Also, the opening of trade would likely not produce any increase in logging. Thus the net effect of trade would be that the same numbers of trees are cut but that better use is made of them.

MMT. The ethanol producers claimed that their product was less environmentally harmful than MMT, but this is not wholly clear. The two substances both have adverse, albeit quite different, specific impacts on air quality. The question of which is the less desirable is open to debate, because the answer depends upon which impacts are judged to be the more harmful. What is clear in the MMT case in Canada is that ethanol producers' claim that their product was an environmentally friendly alternative to MMT should have been treated more skeptically than it was by environmental advocates (Soloway 1999). How widespread such regulatory sheltering might be is not known, but a number of cases can be identified.³⁰

Despite these arguments, for some environmental extremists the ultimate answer to all these issues is simply to stop globalization in its tracks.³¹ After all, if globalization creates environmental problems in the first place, putting an end to globalization must surely be the answer. And if international trade and FDI are the major drivers of globalization, the curtailment of international trade and investment would be to the benefit of the environment.³² The obvious problem, however, is that this alternative would almost surely leave most of the world's poor people—that is, most of the world's people—mired in poverty.

Unfortunately, although this dilemma, like the problem of environmental degradation itself, is all but self-evident, many environmental activists have yet to show a willingness to confront or even acknowledge it. Instead, many environmental activists line up behind the proposition

30. See Rugman and Soloway (1998).

31. This seems to be, implicitly at least, the solution favored by many, if not most, of the contributors to Mander and Goldsmith (1996).

32. Whatever the views of the Mander and Goldsmith (1996) contributors on economic growth generally, they are explicitly in favor of curtailing international trade and investment. See in particular the chapters by Morris (1996), Daly (1996b), Norberg-Hodge (1996), and Hines and Lang (1996). Some of these authors attack trade and international investment precisely because of the greater efficiency in production to which they lead. This is a curious position for self-professed conservationists to take, for greater efficiency, in the end, means nothing more nor less than the elimination of waste in the use of inputs. To the extent environmental degradation is caused by the overuse of inputs (including natural resources) and the greater volume of waste products generated by this overuse, environmentalists should applaud, indeed demand, greater efficiency. Unfortunately, none of the Mander and Goldsmith authors ever clearly explain why they perceive a conflict between greater efficiency and environmental preservation. On the other hand, at least one of them (Morris) seems to recognize the logical inconsistency, because he seeks to resolve it by claiming that international economic activity does *not* in fact enhance efficiency. But if so, why do profit-seeking companies engage in this activity? Alas, no answer is given. In fact, the propositions that greater efficiency is one outcome of expanded trade, and that this creates potential complementarities between trade and environmental policies, have long been accepted by economists working both on the environmental (e.g., Repetto et al. 1993) and on the trade side of the street (e.g., Anderson and Blackhurst 1992).

that, if only globalization could be done away with, the world could somehow eliminate both third world poverty and environmental degradation. After all, if globalization benefits only that portion of the world's population that is already rich, and works to further impoverish, if not enslave, the rest, then abolishing globalization would cause economic harm only to those wealthy few. And who but they could object?

But as chapter 4 argued, the proposition that globalization benefits only the rich is simply wrong on the facts. Rather, the hard evidence suggests that workers in developing countries who are employed by local affiliates of multinational firms tend to be paid more than other workers in the same countries. Thus, to reverse the trend toward globalization would condemn much of the world's poor to continuing poverty.

Indeed, for many of the world's poor, globalization represents the best way, if not the only way, out of their poverty. The alternative advanced by antiglobal activists, stripped to its essence, amounts to a move to autarky. Indeed, Hines and Lang (1996) openly call for a "new protectionism." But the world has seen any number of "new protectionisms" in the past, all of which have been tried and failed. In some countries, "new protectionism" has taken the form of import substitution policies (see chapter 4), which failed dismally as a means of alleviating poverty.³³ And for decades the most autarkic, inward-looking countries in the world were the Soviet Union, its Eastern European allies, and China under Mao. In all these countries, autarkic policies not only failed to eliminate poverty but proved disastrous for the environment as well. The experience of China, in particular, showed that, from an environmental perspective, small is not necessarily beautiful. During China's "Great Leap Forward" of the 1950s and 1960s, for example, that country learned that letting tens of thousands of small blast furnaces bloom in an equal number of villages produced a lot of toxic fumes but not a lot of usable steel.

Thus, the antiglobalist position that globalization causes both global environmental degradation and worldwide impoverishment is contradicted by the facts, and the antiglobalist solution—autarky—is both simplistic and counterproductive. If they want to both eradicate poverty and protect the environment, antiglobal advocates must present an effective alternative to globalization as a means to achieve the former. Absent such an alternative, they must acknowledge that there is an unavoidable trade-off between globalization and growth in developing countries, on one hand, and some measure of environmental degradation on the other. Many environmentalists do accept that this trade-off exists and must be addressed. But unfortunately, many others maintain, despite all the evidence, the chimerical view that somehow autarky can both lead the world to prosperity and save the earth.

33. This is a point stressed in WTO (1999) and Organization for Economic Cooperation and Development (1998). See also Burtless et al. (1998).

The questions that remain even after one has accepted this trade-off are many, and difficult in their own right. Can, for example, globalization be made more environmentally friendly without destroying the benefits that it brings, especially to the world's poorer countries?³⁴ Could the multilateral rules governing international trade and investment be revamped in a way that achieves greater global environmental protection without stifling the income growth that developing countries so desperately need? Can FDI be made part of the solution to the problem of environmental degradation? In the next section we start with the last of these questions and work our way backward.

Foreign Investment: Can It Be Made Part of the Solution to the Environmental Problem?

It would be useless to pretend that FDI has never been part of the problem. In many instances the operations of multinational firms have indeed been guilty of serious environmental damage. The worst of these, as already noted, have tended to be found in activities related to natural resource extraction, such as copper mining, smelting, and logging. But at least some foreign manufacturing operations are represented in the hall of environmental shame as well. In some such cases, lax management has led to local environmental and human disaster. For example, at Bhopal, India, in 1986, a facility controlled by the US firm Union Carbide accidentally released methyl cyanate gas into the air, killing as many as 6,000 people. Arguably, this accident would not have happened had the plant been held to the same standards of industrial safety as the US facilities of the same firm.³⁵ Fortunately, such disasters are rare. But surely significant environmental damage in the aggregate results from the day-to-day activities of many foreign-owned facilities, for instance through lax control of routine waste disposal. Examples include mining operations that dump unprocessed tailings into wilderness (or even agricultural) areas, and smelters that emit untreated waste gas. Often these problems could be rectified using technologies and managerial practices already in use in other countries or other industries.

The reader should note that these statements do not contradict earlier ones that lax environmental regulation in developing nations is not leading to large-scale relocation of production facilities in these nations by firms wishing to take advantage of lax regulation. The earlier statement still holds. Nonetheless, it can be true that those facilities that are located

34. Encouragingly, alone among the Mander and Goldsmith contributors, Daly (1996a) at least considers this alternative, but in the end concludes that the answer is no.

35. Khor (1996).

in countries with lax standards do not embody those levels of emissions control that might be sought by domestic residents in these countries. This can be true because of some combination of the following. Governments might not be representative, so that domestic preferences of ordinary citizens are not embodied in law and policy. Plants might be old, such that they do not embody current process technologies, which as noted earlier tend to be cleaner than older-vintage technologies. In some cases, old-vintage plants might indeed have been transferred to these countries under misguided policies of protection for the establishment of local industry. Such programs have enabled multinational firms to hold domestic monopoly positions in local markets for certain products. With no need to be internationally competitive, such plants often have embodied old technologies that in some cases are quite dirty. These policies are not generally in favor in current times and, indeed, economic reform in many developing nations has entailed getting rid of these policies, in part because they failed to bring significant development to these nations. However, the legacy of such policies does persist.

Why do developing countries often have more lax environmental standards than more advanced countries? Economists often answer this question by arguing that the populations of poorer countries prefer a different point on the trade-off between additional income and a cleaner local environment than do those of richer countries. Given its many unmet needs, a dollar (or rupee or peso) of additional income is worth more to a poor society than the amount of environmental improvement that it would achieve by forgoing that income. The conclusion is that poor countries tend to be willing to accept dirtier types of activity than rich countries are, if these activities generate additional income. But although this trade-off doubtless does exist, at least to some extent and in certain situations (this is discussed further later in this section), appeal to it to justify dirtier-than-necessary operations being located in developing countries is fallacious. Even if the residents of a developing country are willing to accept dirtier activities than the residents of a developed country would tolerate, they might still want these activities to be as clean as possible. This might be true even if there is some price to pay in terms of income forgone. Why, then, would plants built and operated by foreign investors (or, indeed, by any investor) fail to adopt what local residents regard as the optimal level of control of emissions?

There is no contradiction between the point made here—that firms may have incentives to put fewer resources into pollution abatement technologies than is socially optimal—and the earlier assertion that firms may have little incentive to locate economic activity where environmental standards are lax. The main reason why the latter is true is that much modern process technology embodies pollution abatement technology, which itself has been developed in response to demand for a cleaner environment. In such cases, transfer of this technology in response to lax environmental

standards simply does not make economic sense. The present argument deals with why, once an operation is in place in a particular location, the optimal level of pollution abatement might not be implemented.

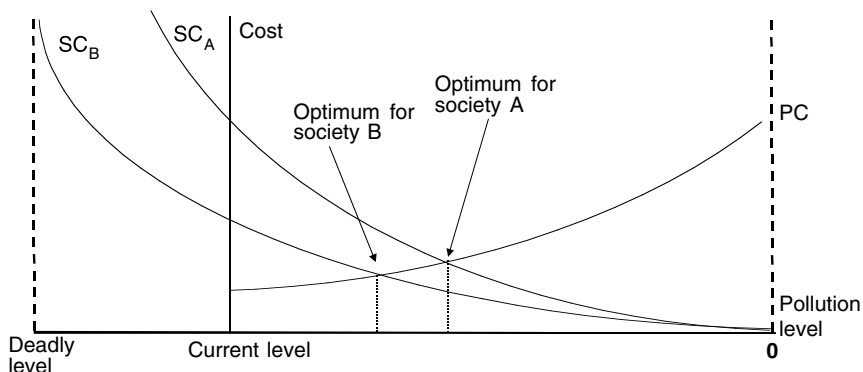
One reason can be market failure. The market in which the firm purchases its inputs may fail in the sense that the firm does not bear the full costs, including the environmental cost, of its activity. That cost is instead shifted to those in surrounding areas who suffer from the resulting environmental degradation. This cost not borne by the firm is termed an “external cost” or an “externality.”

For example, suppose that a firm generates waste gas that is emitted into the air, and that these emissions create health problems for those who must breathe the contaminated air. These health problems in turn create real costs for the local community, both in the form of additional health care expenses and in the form of lost output from workers who become ill from the polluted air. (The increased risk of a Bhopal-like disaster might be another uncompensated cost.) If the firm does not have to pay these costs (that is, if the costs are not “internalized”), it is likely to underemploy pollution abatement techniques and technologies that would serve to curtail these costs. In this context, “underemploy” means that the community affected by the pollution would choose to have the firm use these techniques and technologies even if it had to pay some price to enable the firm to do so. The costs to the local community might not be direct. For example, the community might be willing to accept some reduction of employment opportunities, and hence some reduction of wages, in exchange for increased deployment of pollution control. This might not necessarily reduce the community’s overall economic welfare; for example, if public health were to improve as the result of less pollution, there would be offsetting gains from lower costs of health care.

If one could accurately measure both the full costs of pollution (including the external costs) and the costs of cleaning it up, one could, in principle, arrive at a level of pollution that is optimal. (“Optimal” here means that this level attains the country’s preferred trade-off between more income and more environmental preservation; figure 5.2). As suggested earlier, this level might vary from country to country, such that higher levels are tolerated in poor nations. But, although the optimum for a low-income society might allow for more pollution than that for a high-income society, even in the former case the result is not likely to be a total absence of pollution abatement. Likewise, even in the high-income society, the optimum likely will not be to remove all pollution. In both cases, in fact, the optimum occurs where the marginal cost of further pollution abatement equals the marginal social gain from this abatement. The marginal social gain is then exactly equal to the net reduction in total costs to society of the pollution that is removed.

Some environmentalists will argue that the only good level of pollution is no pollution. But this is again to deny the existence of a trade-off be-

Figure 5.2 The optimum level of pollution control



Curved SC_A represents the total social costs, including external costs, of pollution for society A, and curve SC_B that the society B. The curves are convex with respect to the origin because these costs increase at an increasing rate as pollution itself rises. The two curves differ in steepness because of differing preferences in the two societies—society B places a lower value on health per capita than society A—but the costs for both societies approach infinity as pollution becomes so high as to be deadly to human life. Curve PC represents the total cost of bringing pollution down to the indicated level. It, too, is convex because, in general, the cost of abating still more of the pollution rises as the remaining pollution falls to low levels. But it is less convex than the SC curves because the cost of abatement is always finite. At no point are abatement costs zero, because some costs (e.g., the cost of developing cleanup technologies) are large and fixed. The intersection of a society's SC curve with the PC curve represents the optimal level of pollution, which will always be greater than zero, and the optimum level of pollution control. The cost of additional abatement (to the right of the intersection) would exceed the cost imposed by the pollution that would be removed. This suggests that the optimum amount of abatement is lower (and the amount of pollution tolerated higher) for society B than for society A.

tween economic benefits and environmental benefits. But, even acknowledging that a tradeoff does exist, many environmentalists argue that it is not actually achieved and that activities are dirtier than society would choose.

In theory, an optimal level of pollution abatement can be achieved in either of two ways. First, the community could charge the polluting firm for all the external costs that its pollution creates. This would give the company an incentive to install appropriate pollution abatement devices. If the cost of doing so is less than the cost of continuing to pollute, the company will install the equipment. If not, the community will be compensated for the costs it is forced to bear. This approach is sometimes termed the “polluter pays” approach.

Suppose that a spectrum of abatement technologies were available, so that the firm could choose (on a rising scale of cost) anything from zero abatement to full abatement. Suppose also that the “pollution tax” is graded such that the additional tax assessed per unit of additional pollution

is exactly equal to the marginal cost of that pollution to the community, taking into account the total level of pollution. Then the company would choose a level of abatement that was optimal, in the sense that the marginal cost of abatement exactly equaled the marginal savings to the community from eliminating the additional pollution. As a practical matter, however, pollution abatement technologies do not generally come so finely tuned, nor is it generally possible to establish a schedule of pollution taxes that exactly reflects the cost to the community of additional pollution.

But should the polluter be charged the marginal external cost associated with its pollution or some other measure of the cost (e.g., the average cost)? This matters because the external costs of the pollution created by any one firm are a function of the total amount of pollution generated by all firms. For example, if levels of pollution are already high, the marginal cost to society of an additional unit of pollution may be higher than it would be in an area where total pollution is currently low. This issue is discussed further below.

The alternative would be for the community to offer to pay the polluter a sum equal to the total external costs that would be eliminated by deploying the abatement technology, provided the firm actually deploys the technology. Again, if the sum offered exceeds the cost of deployment, the firm will choose to deploy the technology. But if it does not, it will not deploy the technology (and will refuse the payment).

It should be clear that the environmental result is the same under either alternative: each achieves the point on the community's income-environment trade-off that it seeks. This result, in fact, is an illustration of a well-known economic theorem called Coase's theorem, named after another Nobel prize-winning economist, Ronald Coase. (This theorem was introduced in Coase 1961.) According to this theorem, an optimal level of pollution abatement can be achieved whether the polluter or the affected community pays the costs of abatement, provided the sum paid (or received) by the firm is exactly equal to the external cost created by the pollution. What is different about the two alternatives is, of course, who pays.

A large literature has grown up, based on Coase's theorem, on how to achieve this optimum balance between clean air (for example) and the cost of cleaning up activities that cause air pollution, where the costs of pollution are external to the activities that create it. It should be obvious from this description, however, that many practical obstacles exist to the application of Coase's theorem, not the least of which is that it is difficult at best to determine the true external costs of pollution.

One approach is for the public authorities to forbid all of a given type of pollution beyond the amount that achieves the optimum balance, and then issue quantitative licenses that in total would allow just that amount of pollution. If this optimum cannot be determined, maximum allowances could be set at or below some level determined by experts on health and environment to be acceptable; with luck, that level would be close to the

theoretical optimum. In practice, different licenses would have to be created for different types of pollution. A business that produced more than one category of pollutant would have to hold licenses for each category. Firms would then be allowed to bid for the licenses; in effect, they would be auctioned to users.

Alternatively, the licenses could simply be issued on a first-come, first-served basis until they were depleted. Thereafter, firms wishing to enter the market (or to retain their existing operations, if licenses have been depleted before all incumbent firms have obtained them) would have to bid to buy licenses already held by other firms. This would set up the dynamic described below. Licenses could also be assigned to certain final-use products, such as automobiles. The idea is essentially the same. Cars that produce emissions would have to be licensed to do so, and the cost of the license would be passed on to the owner in the form of higher prices. Clean cars then would cost less than dirty ones, giving the consumer an incentive to buy the former.

The bidding (either in an initial auction or in a secondary market) would establish a price that a firm would have to pay to emit a certain amount of effluent. Those firms that could clean up their unlicensed emissions at a cost below the price of an additional license would do so. But those for which the cleanup cost exceeds the price of a license would be forced to pay the price of an additional license.

This scheme, in fact, automatically takes care of the issue of who exactly is the marginal polluter. All firms must bid for the licenses, and hence the price of a license is driven up to the level that the marginal polluter would just be willing to pay to acquire a license. If the total amount of pollution created by license holders were less than the total allowable amount, the price of a license would be low (or zero). This reflects the fact that, at overall low levels of pollution, the external costs associated with a marginal amount of pollution are also low. But when total pollution began to approach allowable levels, the price would rise to the point where highly polluting firms could not afford to buy licenses. They would be forced either to clean their operations or to shut them down.

But what about a firm that was a new entrant to a market? To enter, this firm would have to buy unused licenses from other firms; indeed, the ability to trade licenses is at the heart of this scheme, and the reason these licenses are commonly called “tradable pollution rights.” Trading of pollution rights is a concept that some environmentalists find offensive, but in fact such trading would create incentives for especially dirty operations to shut down and for their licenses to be acquired by less polluting activities. If the price of a license were to rise, so that the cost of a license exceeded the value of staying in business, the owner would be better off selling the license. Having done so, the owner would then have no choice but to either shut down the business or install pollution abatement equipment so that the business no longer pollutes (and hence no longer requires

a license). A third alternative might be to relocate the business to an area where licenses were cheaper, but the lower price would signal that, in this area, the pollution does less damage.

One attractive feature of this system is that, as the price of a license rises, it becomes increasingly possible for a business to finance the installation of pollution abatement equipment through the sale of at least some of its tradable pollution rights.

Also, the dirtier an operation, the higher would be the total price of the licenses required for that operation to stay in business. Likewise, were the price of a license to rise, the total value to an owner of a business from selling its licenses would be higher for a dirty business than for a clean one. This is simply because the relatively dirty business must hold more licenses to emit pollutants than the relatively clean one as a condition of being in business. If, say, the former business has license to emit fifteen million units of a pollutant per day and the latter has license to emit two million units per day, and if then the price of a license to emit one million units per day rises by \$100,000, then the value of closing the operation and selling the license rises by \$1.5 million dollars for the dirty business but only \$200,000 for the clean business. The incentive for the dirty operation to shut down is therefore higher than for the clean business to do so.

Such a scheme also creates an incentive for firms to deploy clean technologies when establishing a new facility, because the less pollution the new facility creates, the fewer licenses it must purchase. In the limiting case, of course, a facility that does not pollute at all requires no license.

Any scheme of tradable pollution rights of course requires adequate monitoring, to ensure that firms actually comply (i.e., that they do not emit more pollutants than they have licenses for). Firms found polluting without a license should be subject to fines, set to approximate the full cost of the additional externality. This would give a firm in violation a strong incentive to correct the violation. Fines collected from violators could be used to offset the cost of monitoring.

Can such schemes work in practice? The most extensive experiment to date to implement such a scheme has been a scheme allowing emitters of sulfur dioxide to trade pollution rights enacted as part of the Acid Rain Program of the US Clean Air Act of 1990. Sulfur dioxide emission resulting from the burning of coal to generate electrical power is believed to be the main agent responsible for "acid rain" that has adversely affected forestland throughout the world. In North America the areas worst affected by acid rain have been in the eastern parts of the United States and Canada, and large coal-fired power plants in the US middle west are believed largely responsible. Thus, the Acid Rain Program has implemented a cap on sulfur dioxide emission and a program of allowed trading in emissions rights that operates along the lines of the tradable pollution rights scheme just outlined. The Acid Rain Program was much criticized by some environmentalists both on ethical grounds (the pro-

gram created pollution entitlements and linked these to a right to trade, which were seen by some environmentalists as effectively creating rewards for polluters) and practical grounds (environmentalists worried that the program would not prove effective to reduce emissions, or that it would create so-called “hot spots,” i.e., zones where emissions actually increased).

However, after five years of operation, the Acid Rain Program appears to be a major success. There is no evidence that “hot spots” have been created (Swift 2000) and, furthermore, there has been achieved a 25 percent reduction in acid deposition in the heavily affected eastern states. Also, the price of emission allowances has averaged in the range of \$150 per unit of emission, far below initial estimates of \$250 per unit and up, indicating that emissions abatement has been achieved at lower costs than originally expected (US Environmental Protection Agency 1999). A comprehensive evaluation of the Acid Rain Program and the role of tradable pollution rights is contained in Ellerman et al. (2000).

An even bigger experiment in tradable pollution rights is envisaged in the 1997 Kyoto Protocol to control emissions of greenhouse gases. In this scheme, pollution rights would be traded among countries, not among firms. As of this writing, the Kyoto Protocol has been ratified by only a handful of countries, and the scheme has not yet been implemented. Also, a number of problems have emerged, the principal one being how to determine the initial allotments of rights. These allotments are meant to result in a net worldwide reduction of carbon dioxide emissions by 8 percent from the baseline year. One problem is that the baseline year (established not at Kyoto but rather at the 1992 Rio Earth Summit) is 1990, and since that time, the economic collapse in the former Soviet bloc has caused greenhouse gas emissions in certain former Soviet countries to drop, giving them a windfall in terms of allotments in excess of current emission. Similarly, the European Union has experienced a net reduction of emissions since 1990, in part because of the absorption of the former East Germany and the replacement of highly inefficient thermal power generating facilities there with more efficient ones.

The second and bigger problem is that, under the protocol, developing countries would be given very low initial allotments, or at least so if initial allotments were to be based on historical emissions. As a result, these countries might have to buy a large number of emissions rights in order to sustain high growth rates. They would also be competing in the market for emissions rights with rich countries such as the United States, which has so far not been able (or, perhaps more accurately stated, has not been willing) to reduce its carbon dioxide emissions. Indeed, US emissions have grown significantly since 1990. Developing countries see the initial allotments as imposing an unfair restraint on their development, and the sense of unfairness is heightened by the fact that these countries have not been a principal cause of the problem—in 1990, developing

countries collectively accounted for only a small fraction of total greenhouse gas emissions.

Despite these problems, there is in principle no reason why the Kyoto Protocol should not work. The main obstacle is, at root, political in nature. For example, will the United States be willing to impose some sort of discipline on itself to reduce its emissions, so as to free up some allotments for developing countries?

Can tradable pollution rights schemes be implemented at the national level in developing countries? Given many of the obstacles to effective environmental regulation in these countries, such schemes might work relatively better there than any other form of regulation. For example, in many developing countries, strong environmental regulations do exist but corruption is widespread so that officials can be easily bribed to overlook violations. Arguably, a licensing scheme would make it somewhat harder for a corrupt official to look the other way. This would be especially so if effluents were to be monitored by international agencies. If these agencies were to find unacceptably high levels of pollution, but that licenses traded at low prices, this would indicate that something was amiss. It would then be hard for local officials simply to ignore the situation.

Whatever the merits of tradable rights schemes as a means of controlling pollution, the main point is that externalities do exist and do bear upon foreign direct investors as well as upon local entrepreneurs. In other words, foreign direct investors do face incentives not to abate pollution, even where it is economically feasible to do so, if they do not internalize the costs associated with the pollution. This, of course, applies to all classes of investors and not just foreign investors.

However, it is worth asking whether foreign direct investors face incentives not to abate pollution that are stronger or weaker than those faced by domestic investors. For reasons already touched upon, foreign direct investors might very well face weaker incentives. As discussed in chapter 4, one of the competitive advantages that foreign direct investors typically have over domestic rivals is better technology. "Better technology" here does not necessarily mean better pollution abatement technology, although this might often be the case. Rather, often the foreign investor's production or process technology is better in the sense that it is more efficient. And a more efficient technology, virtually by definition, is one that uses less input per unit of output. As we have seen, greater efficiency itself generally implies a favorable environmental outcome.

China, for example, sorely needs to curtail its emissions of sulfur dioxide. The major source of this sulfur dioxide in China, as well as in the US, is waste gas from electrical power generation. The problem is most intense in older-generation, coal-fired facilities. Since the early 1990s, China has invested heavily in new generating facilities, most of which do embody modern technology. However, given the growth of demand for electrical power in China during that decade, the new facilities have largely

augmented capacity rather than replaced old capacity. These facilities are, for the most part, technologically antiquated and hence less efficient than they could be.

Replacement of current facilities with more modern ones—an endeavor in which China is seeking foreign investor participation—could therefore result in as much as a 50 percent reduction in emissions of sulfur dioxide. At the same time, reductions could also be achieved in the emission of carbon dioxide, associated with global warming. All this could be achieved with no decrease in the amount of electricity supplied.

Further reductions in sulfur dioxide, but not carbon dioxide, could be achieved through deployment of such devices as flue gas scrubbers.³⁶ But significant reductions can be achieved even without any such deployment, simply through increased efficiency of the primary production technology. And, again, foreign firms often possess the most efficient technology.

There is a second reason multinational firms might have some advantages over domestic rivals in the deployment of pollution abatement technologies. This is that multinational firms operating in developing countries can transfer their own experience from their home operations to their own affiliates at lower cost than could be achieved were the same transfer attempted in a manner external to the firm. Thus, a multinational firm often can transfer pollution abatement technology at lower cost than can a nonmultinational rival. Or, put slightly differently, even if substantially the same technology is available to both the multinational and the domestically owned firm, the former might be able to deploy it more economically than the latter if the former has experience in its home country with the use of the technology.

This ability to transfer a technology within a firm at lower cost than could be achieved via an external transfer, termed by economists an economy of internalization, is not trivial. Indeed, it has long been postulated that economies of internalization are absolutely vital to explain the very existence of multinational firms.³⁷ One of the reasons China, in the example above, is seeking foreign participation in efforts to modernize and clean up its electrical power generation sector is to take advantage of such economies.

Environmentalists thus have recognized that multinational firms can have advantages over domestic rivals in the ability to deploy pollution abatement techniques effectively (e.g., Dua and Esty 1997). Specialists in economic development have recognized it as well (see UNCTAD 1994). Indeed, for the developing countries of the Asia-Pacific area, Esty and

36. The 50 percent reduction would require, however, that steam created by the plant also be used for space heating. See Zhang et al. (2000) and references therein.

37. The classic work on this subject is Buckley and Casson (1976), who borrow extensively from Coase (1937).

Gentry (1997) conclude that only foreign direct investment can meet the need for environmental infrastructure.

Indeed, one quandary for developing nations is that possession of superior environmentally friendly technologies by multinational firms can give these firms advantages over domestically owned firms over and above those advantages that multinationals already possess. Further, implementation of domestic environmental regulation accentuates this advantage of multinationals.

One response by developing nations has been to renew calls for technology transfer on terms favorable to developing nations, e.g., that multinational firms be required to license their environmental technologies at rates favorable to local rivals. However, multinationals are likely to resist such a requirement for obvious reasons; after all, the firms might argue, why should they give away an asset that was costly to develop in order to benefit a potential rival firm? This resistance will be magnified by the fact that, as already developed, the environmentally friendly component of new process and product technologies is often deeply embedded in those technologies such that it cannot be separated. It would thus often be difficult or impossible for a multinational firm to license to a local rival in a developing country just its emission abatement technology without licensing (or at least revealing) other technology as well. Thus, developing-nation policymakers might be faced with a politically difficult choice: either to implement measures to improve environmental quality, knowing that these will impart additional advantages to foreign-owned versus domestically owned firms, or to promote domestic firms at the expense of environmental quality.

With respect to this issue, it can be argued that the best choice of governments is to take the steps necessary to achieve the level of environmental quality demanded by its citizens and not to be upset by the possibility that these will impart advantages to foreign-owned firms. After all, the objective of the government should be to enhance the welfare of its people, and if this implies foreign ownership of economic activity (and all of the benefits this brings), so be it. However, it is clear that governments face intense political pressures not to enact measures that favor foreign-owned enterprises over domestically owned ones.

Toward Global Rules That Are Environmentally Friendly

Environmental activists sought to block the MAI because they felt that, if implemented, the agreement would have diminished, rather than enhanced, the ability of societies to regulate against activities that damage the environment. Later, having succeeded in halting the MAI negotiations, activists vowed to defeat any new rules on investment that might be negotiated in the WTO.

However, careful reflection should persuade almost anyone that blocking the negotiation of new investment rules might not move the world at all toward solving the problems of environmental degradation. To begin with, no comprehensive, binding multilateral rules governing investment are currently in place, yet direct investment is burgeoning (see chapter 1).³⁸ Thus, even if it could be proved that this investment is a major cause of environmental degradation (or of world poverty), clearly it is not multilateral investment rules that are creating the problem. Furthermore, and ironically, had the MAI negotiations continued, negotiators from at least some countries, including most importantly the United States, were willing to introduce new measures into the draft agreement to create environmental safeguards (see chapter 2). Thus, by helping to defeat the MAI, the environmental movement might have shot itself in the foot. They halted an exercise that had become an anathema to the movement, but in doing so they blocked what might have become the first multilateral commercial agreement to incorporate a strong environmental safeguard, and one that might have been subject to dispute resolution procedures to enforce that safeguard. To be sure, no one knows quite what sort of safeguard might have been created had the MAI negotiations been carried to completion. But, arguably, any safeguard that might have resulted almost surely would have been better, from the environmentalists' point of view, than nothing at all. Also, by opposing the agreement, the environmental community gave up a chance to play an advisory role in creating these safeguards.

In fact, to the extent that globalization of economic activity through direct investment does create environmental problems, an effective solution requires that multilateral rules be enacted that work to safeguard environmental interests at the local level. Indeed, many environmentalists accept this argument.³⁹ After all, even if environmental problems were to derive from multinational companies evading environmental regulation by locating activities from jurisdictions where regulation is strong to ones where regulation is weak, the only real answer would be to beef up regulation in the weak jurisdictions. In this light, defeat of the MAI does not prevent multinational firms from transferring dirty operations from strong to weak jurisdictions, if that is what these firms are actually inclined to do (we of course have argued that this is in fact a serious problem only in a limited number of sectors). Passage of an environmentally friendly MAI, on the other hand, could have worked to improve regulation where it is lax.

38. The rules on investment within the WTO, in the agreement on trade-related investment measures and the General Agreement on Trade in Services, cover only narrow aspects of investment and, for the most part, have not yet even come into force.

39. See French (2000, chapter 9) and von Moltke (2000).

If global rules pertaining to investment should contain environmental safeguards, what form should these safeguards take? Here negotiators must think both globally and locally. Safeguards are needed both to protect the “global commons,” that is, to protect against pollutants such as greenhouse gases that have global consequences, and to protect the local environments of cities, countries, and regions. (Some environmental ills, of course, such as deforestation of the Amazon basin, have both global and local repercussions.) The most effective approach to the former would be to implement tradable pollution rights on a global scale, as is being attempted under the Kyoto Protocol for greenhouse gas emissions. This is one multilateral endeavor that many environmentalists support.

As noted earlier, tradable pollution rights can also be implemented on a national or a local scale, and in most cases they would be the most desirable way to achieve local environmental protection. Rights would be issued by national authorities, which would also enforce compliance, to ensure that firms not holding such rights do not generate emissions.

However, even at the local level there could be a role for multilateral institutions. For example, a global agency such as the Global Environmental Organization (GEO) advocated by Esty (1994) could play several important roles. It could provide technical assistance, including helping national authorities to set maximum pollution levels against which to issue licenses. It could also help national authorities monitor compliance.

Such a role for an international agency, however, has little to do per se with multilateral trade or investment rules. Such rules could nonetheless serve to ensure that any system of tradable rights is indeed a global system. A WTO investment agreement could oblige countries to require that firms obtain and hold such rights as a condition of doing business in the country. National governments could be given considerable leeway with respect to how much pollution to allow, but they would have to have in place a licensing system to ensure that limits on pollution are met. This does not mean that governments could set limits unreasonably high. The GEO could be authorized (perhaps through a process of negotiation among countries) to set standards for maximum allowable levels of pollution. Governments would then be free to set higher standards than those recommended by the GEO, including higher standards for some regions than others. But they would not be free to set lower standards.

Furthermore, alleged violation of such an obligation might then be subject to dispute settlement procedures. In this matter, however, WTO remedies would not suffice. Rather, a modified version of remedial procedures envisaged under the MAI for violation of an investment obligation would be preferable. Specifically, the government of a country found in violation of its environmental obligations might be given a certain amount of time to correct the violation. But if it failed to do so, it would not be subject to trade sanctions, the remedy of last resort under the WTO. Rather, the gov-

ernment of the country would be subject to fines, assessed to approximate the social costs of the pollution resulting from the violation. Such a fine might induce the government to impose fines against those firms whose activities were causing the problem in the first place. And as noted above, this is exactly how government enforcement agencies should treat individual violators of pollution standards.

Would global implementation of tradable pollution rights satisfy the concerns of the global environmental activist community? Many activists would not be mollified, largely because they are ideologically opposed to the whole idea of such rights. These activists advocate instead an autarkic, “small is beautiful” approach. (See, e.g., the essays in part IV of Mander and Goldsmith 1996.) Such a “solution,” as already argued, might actually do little to preserve the environment. In any case, it simply would not be acceptable to the majority of the world’s population, especially that portion of the population that now lives in poverty. Thus, to advocate a return to rustic living is, for all practical purposes, to advocate something that will not happen. It would serve the activist community far better to open their minds to approaches that properly account and compensate for the social costs of environmental degradation, to give business firms incentives to pursue clean options in pursuing their legitimate activities. And until a better plan is advanced, a system of tradable pollution rights is the only game in town.

Conclusion

The reader will surely have detected that this author is, at root, sympathetic to many of the concerns raised by environmental activists, but not to the solutions that some of them propose. For example, one might note that the population of China is currently about 1.2 billion, and that more than 70 percent of these people live in rural areas. In Korea in the early 1960s, about the same percentage of the population lived in rural areas; today, after less than forty years of rapid economic growth in that country, that share has dropped below 10 percent. If income growth in China results in the same shift from rural to urban areas there over the next forty years, it will mean almost three-quarters of a billion people moving into Chinese cities—even with zero population growth. This would create the equivalent of over 60 new urban complexes, each roughly the same size as Los Angeles or Seoul. If these new complexes were to create the same amount of urban air pollution as do Seoul or Los Angeles today, the environmental damage would be monumental. Environmentalists are right to wonder if the planet, let alone the eastern portion of the Eurasian landmass, could sustain this amount of air contamination and remain fit for human (or animal) habitation.

However, it is equally true that such massive urbanization will have effects that will at least partially offset the rising effluence that results from the increased affluence. Relative energy prices will rise around the world, inducing energy conservation. (Indeed, even Americans might get over the delusion that every household needs at least one large sports utility vehicle that gets only 10 miles to the gallon.) The demand, indeed the necessity, for cars that are clean as well as energy conserving will increase. The resources devoted to developing environmentally friendly technologies will also increase. At the same time, greater affluence will lead to greater demand for wilderness and habitat preservation, even in countries where this is today a low priority.

The problems nonetheless are very real, and environmental activists are right to worry that, even allowing for the positive changes brought about by rising affluence, the coming decades could still see significant net environmental deterioration worldwide. Certainly some major problems with global ramifications exist for which no effective solution is in place. Greenhouse gas emissions, leading possibly to global warming, are one example, given that no one is confident that the Kyoto goals will be met.

However, activists should also realize that the answer offered by certain members of their community—a worldwide return to simple, organic, rural lifestyles—simply is not an answer at all. The nearly three-quarters of China's population that live in rural areas already have this lifestyle, and it is one that most of them are eager, if not desperate, to escape. Globalization of the world's economy provides for these people the beginning of a way out of a life of poverty and deprivation.

Furthermore, to place globalization at the forefront of the causes of the problem, as some environmentalists do, is itself erroneous. Some aspects of globalization might indeed have the effect of worsening environmental problems, or of retarding the implementation of effective solutions. Fixing these problems is a worthy priority. However, much of globalization is far removed from environmental concerns. In India, for example, globalization has enabled the spectacular rise of a local software sector. Some of this activity in India is driven by multinational firms, but even the part that is homegrown depends on a growing global market for software. In either case, it would be difficult indeed to link this activity directly to any form of environmental degradation—programming computers generates little if any pollution. Here the only significant link to environmental problems is through the rising incomes that this industry is generating. And as this chapter has argued, rising incomes are more part of the solution to environmental worries than they are part of the problem.

Furthermore, as emphasized in chapter 2, the environmental activist community missed its best opportunity to date to fix one of their concerns in a multilateral context. This opportunity was the MAI. The negotiating countries, at the time the negotiations were terminated, were quite open to changing the text in response to environmental concerns. But rather

than push for continuation of the negotiations to accomplish these changes, most activists joined in the fray to kill the whole exercise, and then turned to planning for the demonstrations in Seattle. It might have been briefly satisfying to the demonstrators in Paris to know that they had played some role in bringing the MAI negotiations to a halt, and later in delaying the WTO ministerial meeting in Seattle for a day or two. But, in the end, no changes in the multilateral rules that might have worked to meet the goals of these activists were accomplished. This, in the end, may prove to be the real shame of the failure of the MAI.