
HARD HEADS, *Soft Hearts*

**Tough-Minded Economics
for a Just Society**

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Chapter 5

CLEANING UP THE ENVIRONMENT: SOMETIMES CHEAPER IS BETTER

We cannot give anyone the option of polluting for a fee.

— Senator Edmund Muskie (in Congress, 1971)

We saw in Chapter 4 that economists' nearly unanimous advice has had limited influence on our nation's trade policies. Agreement among economists is just about as strong in the area of environmental policy; but our influence has, if anything, been even more negligible.

Yet the nation has done much to clean up its environment. In the 1960s, satirist Tom Lehrer wrote a hilarious song warning visitors to American cities not to drink the water or breathe the air. Now, after the passage of more than two decades and the expenditure of hundreds of billions of dollars, such warnings are less appropriate — at least on most days! Although the data base on which their estimates rest is shaky, the Environmental Protection Agency (EPA) estimates that the volume of particulate matter suspended in the air (things like smoke and dust particles) fell by half between 1973 and 1983. During this same decade, the volume of sulfur dioxide emissions declined 27 percent and lead emissions declined a stunning 77 percent. Estimated concentrations of other air pollutants also declined. Though we still have some way to go, there

is good reason to believe that our air is cleaner and more healthful than it was in the early 1970s. While the evidence for improved average water quality is less clear (pardon the pun), there have at least been spectacular successes in certain rivers and lakes.¹

All this progress would seem to be cause for celebration. But economists are frowning — and not because they do not prize cleaner air and water, but rather because our current policies make environmental protection far too costly. America can achieve its present levels of air and water quality at far lower cost, economists insist. The nation is, in effect, shopping for cleaner air and water in a high-priced store when a discount house is just around the corner. Being natural cheapskates, economists find this extravagance disconcerting. Besides, if we shopped in the discount store, we would probably buy a higher-quality environment than we do now.

The overwhelming majority of economists believes that a tax on pollution is a better way to protect the environment than the direct controls that society now imposes.² The arguments I will spell out in this chapter convince them that a system of effluent charges or marketable permits would be vastly superior to what two legal scholars call "our extraordinarily crude, costly, litigious and counterproductive system of technology-based environmental controls."³ But the economists have precious few allies. An interview survey of sixty-three environmentalists, congressional staffers, and industry lobbyists — all of whom were intimately involved in environmental policy — found that not one could explain why economists claim that pollution can be reduced at lower cost by emissions fees than by direct controls. Not one! This lack of knowledge, however, was not inhibiting; many of those surveyed opposed the idea anyway.⁴

You might suppose that such abysmal ignorance arises because the economic case for emissions fees is intricate, subtle, and arcane. But, if you did, you would be quite wrong. In fact, the case is disarmingly simple. Unfortunately, many people refuse to hear the arguments — or rather hear them only through distorting ideological earphones. Some conservatives who place great faith in the market instinctively favor pollution fees, though they cannot always explain why. Liberals who distrust the market instinctively oppose fees, though the reasons they give rarely stand up to close scrutiny.

Instincts and hunches, however, are a weak basis for making public-policy decisions on issues as consequential as the quality of the water we drink and the air we breathe. If we are to construct a hard-headed and

soft-hearted policy to protect our environment, the relative merits of pollution fees versus direct controls must be decided on the basis of logic and fact, not ideology and instinct. This chapter is devoted to that end.

IS POLLUTION AN ECONOMIC PROBLEM?

But first I need to clear the intellectual air of a preliminary issue that has polluted the discussion. Economists think of environmental degradation as an economic problem, a consequence of a flaw in the market system that can and should be corrected. That attitude will pervade this chapter. But many environmentalists see the issue differently. To them, pollution is a moral issue that should not, indeed must not, be reduced to the crass dollars-and-cents calculus of the economist. As David Doniger, a lawyer for the National Resources Defense Council put it: "We take the view that there are rights involved here, rights to be protected from threats to your health, regardless of the cost involved."⁵

Because society does not usually put human rights on the auction block, the difference in views is fundamental — and helps explain why economists are frequently at odds with environmental activists. The first question is: Which view is the more appropriate foundation for national environmental policy? Are cleaner air and water just goods to be bought and sold like milk and shoes, or are they rights not to be trifled with?

At first blush, the notion that people have a right to a pollution-free environment has great appeal. Indeed, 53 percent of respondents to a 1978 public-opinion poll agreed that "protecting the environment is so important that requirements and standards cannot be too high, and continuing improvements must be made regardless of cost."⁶ There is that phrase again: "regardless of cost." Think about what that means. Suppose it cost most of the GNP to reduce air and water pollution to the point where all health hazards disappeared — if indeed there is such a point. How many ill-fed, ill-clothed, impoverished Americans would applaud the achievement? Declaring that people have a "right" to clean air and water sounds noble and high-minded. But how many people would want to exercise that right if the cost was sacrificing a decent level of nutrition or adequate medical care or proper housing? It is no accident, I think, that poor countries with inadequate nutrition, appalling health standards, dilapidated housing, and dreadful transportation systems show little concern with cleaning up their (often filthy) environments. Nor did we when we were an industrializing country. There is a message about priorities here.

People rarely speak of the "right" to have the automobile or home that they want. Instead, the provision of cars and houses is left to the market, subject to some government intervention to help house the poor. Why, then, should we suppose that the right to pristine air and water is inalienable? Why must everyone have a Cadillac environment, "regardless of the cost"?

The notion that pollution is an ailment to be treated by an exorcist rather than by an economist is not only economic folly, it also does violence to the laws of nature. An elementary concept from physics called the Law of Conservation of Matter and Energy assures us that nothing simply vanishes. Every raw material used in an industrial process must either be recycled completely (which is often difficult or impossible) or become a waste product on somebody's scrap heap. No one has yet succeeded in harnessing useful energy without creating some type of pollution as an unwanted by-product. Even the horse was a polluting form of transportation, in a particularly unsightly way. A pollution-free society is unattainable, both physically and economically. To think otherwise is not to think.

Even where pollutants can be life-threatening it makes little sense to pursue clean-up "regardless of cost," crass as that may sound. For example, a Harvard physicist estimated that a particular benzene standard proposed by the Occupational Safety and Health Administration (OSHA) might save at most one life every three years, at an annual cost of more than \$100 million per year.⁷ Human life may be sacred, but can society really afford to spend more than \$300 million to save a single life? Wouldn't the same money save many more lives if it were spent on improved highway guard rails, or on organ transplants, or on more policemen?

As soon as we start dealing with pollution control in terms of "more or less" rather than "yes or no," it becomes natural to place clean air and water in the realm of economic goods and services rather than in the realm of inviolable moral rights. Cleaner air and water are things we can and should buy — if the price is right. And public opinion polls consistently show that our wealthy society wants to buy a good deal. But perfection is unattainable and should not be sought.

Nothing in this discussion, however, implies that the appropriate level of environmental quality is a matter for the free market to determine. On the contrary, the market mechanism is ill suited to the task; if left to its own devices, it will certainly produce excessive environmental degrada-

tion. Why? Because users of clean air and water, unlike users of oil and steel, are not normally made to pay for the product.

Consider a power plant that uses coal, labor, and other inputs to produce electricity. It buys all these items on markets, paying market prices. But the plant also spews soot, sulfur dioxide, and a variety of other undesirables into the air. In a real sense, it "uses up" clean air — one of those economic goods which people enjoy — without paying a penny. Naturally, such a plant will be sparing in its use of coal and labor, for which it pays, but extravagant in its use of clean air, which is offered for free.

That, in a nutshell, is why the market fails to safeguard the environment. When items of great value, like clean air and water, are offered free of charge it is unsurprising that they are overused, leaving society with a dirtier and less healthful environment than it should have.

This analysis of why the market fails suggests the remedy that economists have advocated for decades: charge polluters for the value of the clean air or water they now take for free.⁸ That will succeed where the market fails because an appropriate fee or tax per unit of emissions will, in effect, put the right price tag on clean air and water — just as the market now puts the right price tag on oil and steel. Once our precious air and water resources are priced correctly, polluters will husband them as carefully as they now husband coal, labor, cement, and steel. Pollution will decline. The environment will become cleaner and more healthful.

There are two basic ways to set up a system of emissions fees, with many variants on each. The government can sell permits that entitle the holder to emit a certain amount of a specified pollutant, just as tennis clubs sell memberships. Or it can monitor several types of emissions and send out tax bills based on meter readings, just as long-distance telephone companies charge for their services. The effect is the same in either case. Clean air and water are sold rather than given away. Those who despoil the environment are forced to compensate society for the muck they spew out. And, most important, with pollution more costly, we may be sure that there will be less pollution than in an unregulated market.⁹

In strictly economic terms, the two methods of controlling pollution are equivalent: each can achieve the same amount of pollution reduction at the same cost. And so, for most of the chapter, I will treat emissions permits and emissions taxes interchangeably. However, some significant political and administrative considerations point to the superiority of permits. These will be discussed toward the end of the chapter.

The Efficiency Argument

It is now time to explain why economists insist that emissions fees can clean up the environment at lower cost than mandatory quantitative controls. The secret is the market's unique ability to accommodate individual differences — in this case, differences among polluters.

Suppose society decides that emissions of sulfur dioxide must decline by 20 percent. One obvious approach is to mandate that every source of sulfur dioxide reduce its emissions by 20 percent. Another option is to levy a fee on discharges that is large enough to reduce emissions by 20 percent. The former is the way our current environmental regulations are often written. The latter is the economist's preferred approach. Both reduce pollution to the same level, but the fee system gets there more cheaply. Why? Because a system of fees assigns most of the job to firms that can reduce emissions easily and cheaply and little to firms that find it onerous and expensive to reduce their emissions.

Let me illustrate how this approach works with a real example. A study in St. Louis found that it cost only \$4 for one paper-products factory to cut particulate emissions from its boiler by a ton, but it cost \$600 to do the same job at a brewery.¹⁰ If the city fathers instructed both the paper plant and the brewery to cut emissions by the same amount, pollution abatement costs would be low at the paper factory but astronomical at the brewery. Imposing a uniform emissions tax is a more cost-conscious strategy. Suppose a \$100/ton tax is announced. The paper company will see an opportunity to save \$100 in taxes by spending \$4 on cleanup, for a \$96 net profit. Similarly, any other firm whose pollution-abatement costs are less than \$100 per ton will find it profitable to cut emissions. But firms like the brewery, where pollution-abatement costs exceed \$100 per ton, will prefer to continue polluting and paying the tax. Thus the profit motive will automatically assign the task of pollution abatement to the low-cost firms — something no regulators can do.

Mandatory proportional reductions have the seductive appearance of "fairness" and so are frequently adopted. But they provide no incentive to minimize the social costs of environmental clean-up. In fact, when the heavy political hand requires equal percentage reductions by every firm (or perhaps from every smokestack), it pretty much guarantees that the social clean-up will be far more costly than it need be. In the previous example, a one-ton reduction in annual emissions by both the paper factory and the brewery would cost \$604 per year. But the same two-ton

annual pollution abatement would cost only \$8 if the paper factory did the whole job. Only by lucky accident will equiproportionate reductions in discharges be efficient.

Studies that I will cite later in the chapter suggest that market-oriented approaches to pollution control can reduce abatement costs by 90 percent in some cases. Why, economists ask, is it more virtuous to make pollution reduction hurt more? They have yet to hear a satisfactory answer and suspect there is none. On the contrary, virtue and efficiency are probably in harmony here. If cleaning up our air and water is made cheaper, it is reasonable to suppose that society will buy more clean-up. We can have a purer environment and pay less, too. The hard-headed economist's crass means may be the surest route to the soft-hearted environmentalist's lofty ends.

The Enforcement Argument

Some critics of emissions fees argue that a system of fees would be hard to enforce. In some cases, they are correct. We obviously cannot use effluent charges to reduce concentrations of the unsightly pollutant glop if engineers have yet to devise an effective and dependable device for measuring how much glop firms are spewing out. If we think glop is harmful, but are unable to monitor it, our only alternative may be to require firms to switch to "cleaner" technologies. Similarly, emissions charges cannot be levied on pollutants that seep unseen — and unmeasured — into groundwater rather than spill out of a pipe.

In many cases, however, those who argue that emissions fees are harder to enforce than direct controls are deceiving themselves. If you cannot measure emissions, you cannot charge a fee, to be sure. But neither can you enforce mandatory standards; you can only delude yourself into thinking you are enforcing them. To a significant extent, that is precisely what the EPA does now. Federal antipollution regulations are poorly policed; the EPA often declares firms in compliance based on nothing more than the firms' self-reporting of their own behavior. When checks are made, noncompliance is frequently uncovered.¹¹ If emissions can be measured accurately enough to enforce a system of quantitative controls, we need only take more frequent measurements to run a system of pollution fees.

Besides, either permits or taxes are much easier to administer than detailed regulations. Under a system of marketable permits, the govern-

ment need only conduct periodic auctions. Under a system of emissions taxes, the enforcement mechanism is the relentless and anonymous tax collector who basically reads your meter like the gas or electric company. No fuss, no muss, no bother — and no need for a big bureaucracy. Just a bill. The only way to escape the pollution tax is to exploit the glaring loophole that the government deliberately provides: reduce your emissions.

Contrast this situation with the difficulties of enforcing the cumbersome command-and-control system we now operate. First, complicated statutes must be passed; and polluting industries will use their considerable political muscle in state legislatures and in Congress to fight for weaker laws. Next, the regulatory agencies must write detailed regulations defining precise standards and often prescribing the "best available technology" to use in reducing emissions. Here again industry will do battle, arguing for looser interpretations of the statutes and often turning the regulations to their own advantage. They are helped in this effort by the sheer magnitude of the information-processing task that the law foists upon the EPA and state agencies, a task that quickly outstrips the capacities of their small staffs.

Once detailed regulations are promulgated, the real problems begin. State and federal agencies with limited budgets must enforce these regulations on thousands, if not millions, of sources of pollution. The task is overwhelming. As one critic of the system put it, each polluter argues:

- (1) he is in compliance with the regulations;
- (2) if not, it is because the regulation is unreasonable as a general rule;
- (3) if not, then the regulation is unreasonable in this specific case;
- (4) if not, then it is up to the regulatory agency to tell him how to comply;
- (5) if forced to take the steps recommended by the agency, he cannot be held responsible for the results; and
- (6) he needs more time.¹²

The result is unimpressive enforcement. Between 1971 and 1974 the State of Connecticut identified 1,469 violations of its air-pollution statutes, but only 16 cases were referred to the attorney general for prosecution. By 1975, the state environmental protection agency had obtained three injunctions, but not a single fine had been imposed.¹³ Virginia did no better. During a thirty-two-month period ending in February 1986, it managed to obtain just one consent order and one court-ordered fine in all cases involving industrial water pollution.¹⁴ Can Virginia's waters really have been that clean?

Those few violators unlucky enough to be caught must be taken to court, where a few poorly paid but dedicated government lawyers find themselves face to face with teams of well-paid and equally dedicated lawyers representing big corporations. Given the high costs of compliance and the excellent chances of prevailing in the courts, many firms find it more profitable to invest in litigation than in pollution abatement equipment.¹⁵ That's good news for the lawyers, but bad news for the environment.

Even when prosecutions are successful, the fines imposed by the courts are typically so small that they are beneath the notice of a corporate executive. A New Jersey company convicted in 1980 of discharging hydrofluoric acid into a parking lot, from where it could seep into groundwater, was fined a paltry \$2,125.¹⁶ The total of air-pollution fines collected by the EPA during the four fiscal years 1977-1980 amounted to merely \$27 million — less than 1/100th of 1 percent of what firms spent during those years to comply with environmental regulations.¹⁷ Many more examples like these could be listed, for small penalties are the norm. And no wonder. Where the law prescribes really severe penalties, such as plant shut-downs or monumental fines, the authorities are loath to invoke them for fear that jobs will be lost — with devastating effects on the local economy and the political popularity of incumbents.

It seems a fair guess that America's labyrinthian environmental regulations are enforced about as rigorously as the 55 mile per hour speed limit. Pollution fees share some of the above-mentioned problems; they also must be written into law and will surely provoke political fights. But they would almost certainly be enforced better.

Other Reasons to Favor Emissions Fees

Yet other factors argue for market-based approaches to pollution reduction.

One obvious point is that a system of mandatory standards, or one in which a particular technology is prescribed by law, gives a firm that is in compliance with the law no incentive to curtail its emissions any further. If the law says that the firm can emit up to 500 tons of glop per year, it has no reason to spend a penny to reduce its discharges to 499 tons. By contrast, a firm that must pay \$100 per ton per year to emit glop can save money by reducing its annual discharges as long as its pollution-abatement costs are less than \$100 per ton. The financial incentive to reduce pollution remains.

A second, and possibly very important, virtue of pollution fees is that they create incentives for firms to devise or purchase innovative ways to reduce emissions. Under a system of effluent fees, businesses gain if they can find cheaper ways to control emissions because their savings depend on their pollution abatement, not on how they achieve it. Current regulations, by contrast, often dictate the technology. Firms are expected to obey the regulators, not to search for creative ways to reduce pollution at lower cost.

For this and other reasons, our current system of regulations is unnecessarily adversarial. Businesses feel the government is out to harass them — and they act accordingly. Environmental protection agencies lock horns with industry in the courts. The whole enterprise takes on the atmosphere of a bullfight rather than that of a joint venture. A market-based approach, which made clear that the government wanted to minimize the costs it imposed on business, would naturally create a more cooperative spirit. That cannot be bad.

Finally, the appearance of fairness when regulations take the form of uniform percentage reductions in emissions, as they frequently do, is illusory. Suppose Clean Jeans, Inc. has already spent a considerable sum to reduce the amount of muck it spews into the Stench River. Dirty Jeans, Inc., just downriver, has not spent a cent and emits twice as much. Now a law is passed requiring every firm along the Stench to reduce its emissions by 50 percent. That has the appearance of equity but not the substance. For Dirty Jeans, the regulation may be a minor nuisance. To comply, it need only do what Clean Jeans is already doing voluntarily. But the edict may prove onerous to Clean Jeans, which has already exploited all the cheap ways to cut emissions. In this instance, not only is virtue not its own reward — it actually brings a penalty! Such anomalies cannot arise under a system of marketable pollution permits. Clean Jeans would always have to buy fewer permits than Dirty Jeans.

AN ENVIRONMENTAL HORROR STORY: CONTROL OF SULFUR DIOXIDE

I have painted a bleak picture of direct administrative controls, but actually I have been too kind. Sometimes things get much worse than I have indicated. A case in point is the regulation of sulfur dioxide emissions under the 1977 amendments to the Clean Air Act. Unwittingly, Congress has managed to impose enormous costs on society while possibly

increasing rather than decreasing pollution!¹⁸ How Congress pulled off this trick illustrates just how far astray poorly conceived policies can lead us.

As a rule, environmental regulations impose tighter standards on new sources of pollution than on old ones. Given the prevailing strategy of prescribing the appropriate clean-up technology, such differences make good sense because retrofitting a plant is generally much more difficult and expensive than designing a cleaner technology at the start. Fairness thus dictates a double standard on pollution lest excessive costs be imposed on plants built when the rules were different.

In the case of emissions of sulfur dioxide by electrical power plants, two main options are available to reduce emissions. You can either burn low-sulfur coal, which comes mainly from the West, or you can install scrubbers to clean up the dirty gases left over when high-sulfur Eastern and Midwestern coal is burned. For new power plants, the "best available technology" prescribed by EPA is the scrubber — which, unfortunately, ranks high on expense and low on reliability. New plants are required to install stack-gas scrubbers regardless of the coal they burn. Old plants, which face looser standards, can comply with regulations by burning low-sulfur coal.

These regulations have several undesirable side effects. Most obviously, they impose far heavier pollution-abatement costs on new power plants than on old power plants, which impedes modernization. Furthermore, because new power plants are saddled with higher costs than necessary, they must charge higher prices. So cost-conscious customers have an incentive to shift their business to older, dirtier plants. That is one major reason why experts think the regulations may actually increase the amount of sulfur dioxide in the atmosphere. Another is that scrubbers frequently break down. While they are being repaired, the gases that result from burning high-sulfur coal escape into the atmosphere unscrubbed.

Why would such a zany program ever be enacted? It will not surprise you to find politics figuring prominently in the answer. Requiring new plants, which are often built in the West and South, to use scrubbers despite the ready availability of low-sulfur coal does two very pleasant things for the older industrial areas of the East and Midwest. It raises electricity costs in the West and South, which retards the shift of industry to the Sun Belt. And it helps protect the market for high-sulfur Eastern and Midwestern coal, which might otherwise be displaced by low-sulfur

Western coal. No wonder Frost Belt congressmen and senators showed so much concern for environmental quality in the Sun Belt!¹⁹

OBJECTIONS TO "LICENSES TO POLLUTE"

Despite the many powerful arguments in favor of effluent taxes or marketable emissions permits, many people have an instinctively negative reaction to the whole idea. Some environmentalists, in particular, rebel at economists' advocacy of market-based approaches to pollution control — which they label "licenses to pollute," a term not meant to sound complimentary. Former Senator Muskie's dictum, quoted at the beginning of this chapter, is an example. The question is: Are the objections to "licenses to pollute" based on coherent arguments that should sway policy, or are they knee-jerk reactions best suited to T-shirts? My own view is that there is little of the former and much of the latter. Let me explain.

Some of the invective heaped upon the idea of selling the privilege to pollute stems from an ideologically based distrust of markets. Someone who does not think the market a particularly desirable way to organize the production of automobiles, shirts, and soybeans is unlikely to trust the market to protect the environment. As one congressional staff aide put it: "The philosophical assumption that proponents of [emissions] charges make is that there is a free-market system that responds to . . . relative costs. . . . I reject that assumption."²⁰ This remarkably fatuous statement ignores mountains of evidence accumulated over centuries. Fortunately, it is a minority view in America. Were it the majority view, our economic problems would be too severe to leave much time for worry about pollution.

Some of the criticisms of pollution fees are based on ignorance of the arguments or elementary errors in logic. As mentioned earlier, few opponents of market-based approaches can even explain why economists insist that emissions fees will get the job done more cheaply.

One commonly heard objection is that a rich corporation confronted with a pollution tax will pay the tax rather than reduce its pollution. That belief shows an astonishing lack of respect for avarice. Sure, an obstinate but profitable company *could* pay the fees rather than reduce emissions. But it would do that only if the marginal costs of pollution abatement exceed the fee. Otherwise, its obduracy reduces its profits. Most corporate executives faced with a pollution tax will improve their bottom lines by cutting their emissions, not by flouting the government's intent. To be

sure, it is self-interest, not the public interest, that motivates the companies to clean up their acts. But that's exactly the idea behind pollution fees.

Another fallacious argument holds that emissions fees are unworkable because we cannot accurately measure the benefits of a cleaner environment, much less put a price tag on them. Measurement problems of this sort are indeed common. But the argument is devoid of logic nonetheless. That we often cannot accurately assess the benefits of reducing a particular pollutant is a shame, for it limits our ability to make intelligent social judgments. In our ignorance, we may reduce pollution too little or too much. But such ignorance is as problematic for direct controls as for pollution fees. Inability to measure benefits in no way undercuts the economist's argument that pollution fees can achieve *any given amount of pollution abatement* more cheaply.

A host of other objections revolves around the idea that clean air and water are inalienable rights, not to be bought and sold.²¹ This is the argument we encountered — and dismissed — earlier in the chapter. But it dies hard. Some people argue that putting price tags on clean air and water "cheapens" these things, that is, makes people think them less valuable. I don't suppose they apply the same reasoning to mink coats or Rolls Royces. But, for some reason, we are to believe that a clean environment will be thought worthless if it proves costly.

Similarly, critics of the economist's approach argue that by taxing or licensing pollution we legitimize and sanction it — conveniently ignoring the fact that we tax or license many things which society holds in low esteem (like cigarettes, liquor, and gambling). Indeed, high sin taxes are commonly regarded as signals of society's disapproval.

Some environmental activists think it important to stigmatize the act of pollution. They want polluters to be criminals in the eyes of the law. And they want businesses to reduce pollution because it is the "right thing to do," not because it is in their financial interest. Clean-up should be considered virtuous, not profitable.

To economists, these are not very useful attitudes. We think society will fare better by using the invisible hand to goad self-interested companies into socially responsible behavior than by using the visible hand of the criminal justice system to slap polluters across the knuckles. And economists care more about results — in this case, a cleaner environment — than about motives. If corporate greed can be harnessed to halt environmental degradation, that's just fine with economists. In fact, it's won-

derful. Some environmentalists, however, find the prospect distinctly unappealing.

One final point should lay the moral issue to rest. Mandatory quantitative standards for emissions are also licenses to pollute — just licenses of a strange sort. They give away, with neither financial charge nor moral condemnation, the right to spew a specified amount of pollution into the air or water. Then they absolutely prohibit any further emissions. Why is such a license morally superior to a uniform tax penalty on all pollution? Why is a business virtuous if it emits 500 tons of glop per year but sinful if it emits 501? Economists make no claim to be arbiters of public morality. But I doubt that these questions have satisfactory answers.

The choice between direct controls and effluent fees, then, is not a moral issue. It is an efficiency issue. About that, economists know a thing or two.

Having made my pitch, I must confess that there are circumstances under which market-based solutions are inappropriate and quantitative standards are better. One obvious instance is the case of a deadly poison. If the socially desirable level of a toxin is zero, there is no point in imposing an emissions fee. An outright ban makes more sense.

Another case is a sudden health emergency. When, for example, a summertime air inversion raises air pollution in Los Angeles or New York to hazardous levels, it makes perfect sense for the mayors of those cities to place legal limits on driving, on industrial discharges, or on both. There is simply no time to install a system of pollution permits.

A final obvious case is when no adequate monitoring device exists, as in the case of runoff from soil pollution. Then a system of emissions fees is out of the question. But so also is a system of direct quantitative controls on emissions. The only viable way to control such pollution may be to mandate that cleaner technologies be used.

But each of these is a minor, and well recognized, exception to an overwhelming presumption in the opposite direction. No sane person has ever proposed selling permits to spill arsenic into water supplies. None has suggested that the mayor of New York set the effluent tax on carbon monoxide anew after hearing the weather forecast each morning. And no one has insisted that we must meter what cannot be measured. Each of these objections is a debater's point, not a serious challenge to the basic case for market-oriented approaches to environmental protection.

POLITICS VERSUS ECONOMICS AGAIN

Now comes the big question. If the case for market-based approaches is so overwhelming, why does the political system reject them? Why is good economics once again bad politics? The answer to this question is complex, for politically telling objections come from every quarter — from the left, the right, and the center; from environmentalists, industrialists, and the bureaucracy.

The bureaucratic objections are the easiest to understand — and to dispose of. Any organized interest group has a stake in preserving the status quo. And so it is only natural that the congressmen and their staffs, the environmental activists, and the federal and state regulators who have worked hard to create the present system have a vested interest in preserving it.

Most of the objections they raise to moving to a system of emissions taxes or permits have been dealt with already. But one has not: bureaucratic inertia. The current system “works” while the alternative is untested, critics argue, so let’s not rock the boat. Unfortunately, the facts are otherwise. The current system does not work. It is ponderous, adversarial, and litigious. It is extremely costly. It is inadequately monitored and poorly enforced. And it may not even reduce pollution much. Furthermore, as we shall see shortly, effluent fees and marketable pollution permits are not as untested as their critics suggest. I am a big believer in the “If it ain’t broke, don’t fix it” principle. But the bureaucratic-inertia argument is simply unpersuasive in this context. The system is both “broke” and easy to fix.

Somewhat surprisingly, industry groups also favor maintenance of the status quo over innovative market-based approaches to environmental protection. Despite the conflict with their alleged free-enterprise ideology, industry seems to prefer the apparent straitjacket of direct controls to the comparative freedom of effluent charges. Why?

Part of the answer is the reason Houdini felt so at home in a straitjacket: he knew he could always escape. Strong industries can use their muscle in Congress and in state legislatures to obtain weak laws. Then they can try to turn the regulatory system to their own advantage — for example, by using clean air statutes to keep new competitors out of the industry. At a minimum, they can ensure that enforcement will be lax. Finally, if caught violating the law, they can fight the decision in the courts — where fines are small, even if they lose. All in all, polluting industries probably have less to fear from the legal sanctions of direct

controls than from the economic sanctions of effluent charges. Industrialists understand what some environmentalists do not — that the tax collector can be a more formidable adversary than the police officer.

Businesses also oppose pollution fees because they worry, not without cause, that emissions permits or taxes may increase costs to *them* while they decrease costs to society as a whole. Under current environmental regulations, polluters are allowed to spew forth a specified volume of emissions free of charge. Under a system of effluent charges, they might have to pay for every ton they emit. The potential extra costs are enormous. For example, a study of the use of price incentives to reduce halo-carbon emissions to appropriate levels estimated that an emissions fee would cost firms six times as much as they were paying to comply with mandatory controls.²² Given the ease with which pocketbook issues overwhelm ideology, this may be the crucial factor accounting for business opposition.

But, if fear of high costs is the source of the opposition, there is a simple way out. If pollution taxes are used, firms can be offered a “tax exemption,” similar to the exemption in the individual income tax, which would allow them to emit a certain volume of pollutant free of charge. If marketable permits are used instead of taxes, some of these permits could be given away rather than sold at auction. The tax exemptions or free allocations of pollution permits would presumably be based on the amounts of “free pollution” now allowed under the command-and-control system. That way, firms would not be penalized financially for the efficiency gains reaped by society.²³ Indeed, the possibility of arranging things in this way springs directly from the definition of efficiency given in Chapter 1: no one need lose when an inefficient system is replaced by an efficient one.²⁴

Some environmentalists oppose effluent fees for quite different reasons. They are concerned that fees take the problem of environmental protection out of the realm of rights into the realm of the market, out of the criminal-justice system into the tax system. To many environmental activists, a polluter is an immoral outlaw who is violating the rights of innocent people and should be punished accordingly. The head of Environmental Action defended his use of the term “industrial criminal” to a House hearing thus: “As I was using the term, a criminal is a person or institution who robs others of their rights to an ecologically balanced world.”²⁵ People who hold such attitudes bridle at the economist’s bland view of polluters as individuals or business managers responding rationally to skewed incentives.

In the clash between the environmentalists and the economists, it is

blind ideology and T-shirt sloganeering, not greedy self-interest or bureaucratic inertia, which interfere with the hard-headed solution. Ironically, the ends that environmentalists seek might be better served if they would jettison their unwieldy means — and much of their unyielding rhetoric. But clean air and water are motherhood issues, and environmentalists play the mass media like Rubinstein plays the piano. Words like “criminal,” “robs,” and “rights” suggest little room for compromise. And they sound so good on the 7 o'clock news! One predictable result of the public-relations mismatch is that environmentalists have more influence on public policy than do economists. The environmental activists win the battle of the slogans. The economy and the environment pay the price.

And the price is extremely steep, amounting to many billions of dollars per year.

The main reason why direct controls cost society so much more than pollution fees, you will recall, is that there are disparities from firm to firm in the marginal costs of pollution abatement. If all companies had roughly equal costs for abatement, then the potential cost savings from adopting the economist's approach would be minor. If a ton of pollution reduction by firm A costs about as much as a ton by firm B, it matters little to society whether firm A or firm B does the clean-up. Social costs will be essentially the same. But if cost differentials across firms are large, society has much to gain by assigning the clean-up job to the firms best equipped to do it.

Hence it is difficult to generalize about cost savings. There are doubtless cases in which the potential savings are monumental and others in which they are trivial. The only way to assess the potential benefits to society as a whole is to do a variety of detailed studies of particular pollutants in particular areas. Fortunately, environmental economists have been busy and a number of such studies have been produced. A recent book by economist Thomas Tietenberg summarizes the results of eleven case studies on air pollution and six case studies on water pollution.²⁶ In each case, the costs of complying with current regulations were compared to the least-cost method of reducing pollution by an equal amount. The results were striking, especially where air pollution is concerned. With one exception²⁷ the savings ranged from 42 percent of abatement costs (for airport noise in the whole United States) to 93 percent (for nitrogen dioxide emissions in Chicago). For water pollution, the potential gains were smaller, ranging from 11 percent (in the Willamette River) to 68 percent (in the Delaware Estuary).

The overall conclusion is clear. Despite vast differences from case to case, a change from a system of command and control to either effluent fees or marketable pollution permits would reap a huge social dividend. A very conservative estimate, based on these studies, is that the nationwide costs for pollution abatement would be reduced by one-third with no increase in pollution. Larger savings are likely. In fact one expert has speculated that cost savings might run as high as 80 percent once the profit motive had led to cheaper pollution-control technologies.²⁸ Since the nation now spends more than \$70 billion per year on reducing pollution, the potential savings are perhaps \$23 billion per year — and could run as high as \$50 billion. That sum ought to be enough to get someone's attention.

And these are only the *direct* cost savings — the ones we can easily quantify and estimate. Other potential cost savings are more elusive, though perhaps just as important.

As the case of sulfur dioxide standards illustrates, our current system of environmental controls tends to favor established firms, traditional industries, and the old industrial heartland over new firms, new industries, and the Sun Belt, thereby hampering economic growth and innovation. Why? Because regulators, understanding that retrofitting is much more difficult and expensive than building a cleaner plant from scratch and not wanting to drive companies bankrupt, set stricter emissions standards for new plants than for existing plants. Thus, a steel company deciding whether to expand its obsolete steel mill in Ohio or build an up-to-date minimill in Arizona will face lower costs for pollution abatement if it stays in Ohio.

In effect, environmental regulations act as a perversely discriminatory tax that deters innovation and favors outmoded plants with low productivity. Here is reverse supply-side economics with a vengeance. No one can estimate the magnitude of this unintended effect of current environmental programs on the economy's overall growth rate. But even a small decrease in economic growth, if maintained for many years, imposes an enormous loss on society. In addition, needlessly high costs of pollution abatement place U.S. manufacturers at a competitive disadvantage in international markets.

It is not only the economy that suffers from our current web of environmental regulations. The environment may, too. Regulators charged with running a detailed system of direct controls based on prescribing the best available technology find themselves awash in a sea of engineering

studies, fact-finding missions, protests from companies, and legal challenges for every regulation they issue. It is no wonder that the EPA has failed to revise most of its ambient air-quality standards for almost ten years. The agency is up to its ears in paperwork defending what it has already done.

Furthermore, state and federal agencies are kept so busy managing the small list of pollutants for which they have promulgated standards and regulations that they hesitate to extend their reach to new pollutants. That would not be a major problem if scientists still held the 1970s view that environmental decay is primarily attributable to a few major pollutants, which must therefore be controlled with great care. Unfortunately, years of research and experience now suggest that the environmental protection problem is a good deal more complicated than that. Literally thousands of substances pose actual or potential health hazards, and it is far from clear that the EPA is concentrating its energies on the right ones.²⁹ In effect, our current policies amount to defending a massive and expensive environmental Maginot line against a guerrilla army.

RAYS OF HOPE: EMISSIONS TRADING AND BUBBLES

There are signs, however, that environmental policy may be changing for the better. The EPA seems to be drifting slowly, and not always surely, away from technology-driven direct controls toward more market-oriented approaches. But not because the agency has been convinced by the logic of economists' arguments. Rather, it was driven into a corner by the inexorable illogic of its own procedures. Necessity proved to be the midwife of common sense.

The story begins in the 1970s, when it became apparent that many regions of the country could not meet the air quality standards prescribed by the Clean Air Act. Under the law, the prospective penalty for violating of the standards was Draconian: no new sources of pollution would be permitted in these regions and existing sources would not be allowed to increase their emissions, implying a virtual halt to local economic growth. The EPA avoided the impending clash between the economy and the environment by creating its "emissions-offsets" program in 1976. Under the new rules, companies were allowed to create new sources of pollution in areas with substandard air quality as long as they reduced their pollution elsewhere by greater amounts. Thus was emissions trading born.

The next important step was invention of the "bubble" concept in 1979. Under this concept, all sources of pollution from a single plant or firm are imagined to be encased in a mythical bubble. The EPA then tells the company that it cares only about total emissions into the bubble. How these emissions are parceled out among the many sources of pollution under the bubble is no concern of the EPA. But it is vital to the firm, which can save money by cutting emissions in the least costly way. A striking example occurred in 1981 when a DuPont plant in New Jersey was ordered to reduce its emissions from 119 sources by 85 percent. Operating under a state bubble program, company engineers proposed instead that emissions from seven large stacks be reduced by 99 percent. The result? Pollution reduction exceeded the state's requirement by 2,300 tons per year and DuPont saved \$12 million in capital costs and \$3 million per year in operating costs.³⁰

Partly because it was hampered by the courts, the bubble concept was little used at first. But bubbles have been growing rapidly since a crucial 1984 judicial decision. By October 1984, about seventy-five bubbles had been approved by the EPA and state authorities and hundreds more were under review or in various stages of development. The EPA estimated the cost savings from all these bubbles to be about \$800 million per year.³¹ That may seem a small sum compared to the more than \$70 billion we now spend on environmental protection. But remember that the whole program was still in the experimental stage, and these bubbles covered only a tiny fraction of the thousands of industrial plants in the United States.

The bubble program was made permanent only when EPA pronounced the experiment a success and issued final guidelines in November 1986. Economists greeted this announcement with joy. Environmentalist David Doniger, whom we have met before, complained that, "The bubble concept is one of the most destructive impediments to the cleanup of unhealthy air."³² By now, many more bubbles have been approved or are in the works. Time will tell who was right.

The final step in the logical progression toward the economist's approach would be to make these "licenses to pollute" fully marketable so that firms best able to reduce emissions could sell their excess abatement to firms for which pollution abatement is too expensive. Little trading has taken place to date, though the EPA's November 1986 guidelines may encourage it. But at least one innovative state program is worth mentioning.

The state of Wisconsin found itself unable to achieve EPA-mandated levels of water quality along the polluted Fox and Wisconsin Rivers, even when it employed the prescribed technology. A team of engineers and economists then devised a sophisticated system of transferable discharge permits. Firms were issued an initial allocation of pollution permits (at no charge), based on historical levels of discharges. In total, these permits allow no more pollution than is consistent with EPA standards for water quality. But firms are allowed to trade pollution permits freely in the open market. Thus, in stark contrast to the standard regulatory approach, the Wisconsin system lets the firms along the river — not the regulators — decide how to reduce discharges. Little emissions trading has taken place to date because the entire scheme has been tied up in litigation. But one study estimated that pollution-control costs might eventually fall by as much as 80 percent compared to the alternative of ordering all firms along the river to reduce their discharges by a uniform percentage.³³

The state of Wisconsin thus came to the conclusion that economists have maintained all along: that applying a little economic horse sense makes it possible to clean up polluted rivers and reduce costs at the same time — a good bargain. That same bargain is available to the nation for the asking.

TO AUCTION OR TO TAX? THAT IS THE QUESTION

Thus far, I have minimized the distinction between effluent taxes and emission permits that can be bought and sold on the open market, treating them as interchangeable examples of the market-based approach. But political and administrative considerations make a strong case that marketable permits are a better idea than effluent taxes.³⁴

First, the authorities can meet their goals for air and water quality more reliably by issuing permits. If they wish to reduce the amount of glop spewed into the atmosphere from 4.8 million tons per year to no more than 2.7 million tons, they need only auction off the rights to emit exactly 2.7 million tons per year. That decision fixes the quantity of pollutant with precision; the market is then left to determine the appropriate price. Under a system of emissions taxes, by contrast, the same result can be obtained only by trial and error. The authorities must first estimate the tax they think will reduce emissions to 2.7 million tons. Then they must watch how firms behave. Based on these observations, they must then raise or lower the tax accordingly until the desired level of pollution is

attained. In the end, the same result is achieved. But not before some costly false starts.

A second advantage, related to the first, is the relative ease of adjusting pollution charges to changing economic circumstances. Both inflation and industrial growth can be expected to raise the money value of any given "license to pollute." But it is not easy to know by how much. If marketable permits are traded freely, this incipient price variability poses no problem for the authorities. The market will simply reprice the rights all the time, just as it reprices shares on the New York Stock Exchange. By contrast, pollution taxes would presumably be set by Congress or by state legislatures and written into law. There are bound to be delays, arguments, and political interventions whenever tax rates must be changed.

Third, marketable permits represent a smaller departure from current practices than do effluent fees. This greater familiarity makes them easier to sell politically and easier to administer. As I pointed out earlier, our current regulatory system already gives away "licenses to pollute" routinely, and the EPA's offsets and bubble programs have established the practice of trading emissions rights. Both polluters and regulators understand these concepts. From where we are now, giving away some pollution rights explicitly, selling the rest at auction, and making them all tradable would not be such big steps. All the parties involved would face a far more radical change in procedures if we adopted effluent taxes. Environmentalists' fears that standards might be loosened may also be assuaged if congressional responsibility for the environment remains where it is rather than being turned over to the tax-writing committees of the House and Senate, where the environmental movement has fewer friends.

Fourth, auctioning off pollution permits might prove to be a powerful money raiser for the EPA and state environmental agencies. Under our current legal system, pollution taxes would probably be levied and collected by the IRS and state tax departments. Congress and state legislatures might or might not earmark some of the funds for monitoring emissions and enforcing environmental regulations. Auctions of pollution rights, on the other hand, would probably be run by EPA and state environmental agencies, just as the Interior Department now auctions off oil leases. According to one educated guess, such auctions might bring in a minimum of \$6-\$10 billion per year.³⁵ If Congress let EPA keep even a fraction of this amount, the EPA's operating budget — which is now \$1.3 billion — would be doubled or tripled, leading to far more rigorous mon-

itoring and enforcement than we have now — and therefore to a cleaner environment.

And finally, marketable permits would give the EPA an obvious and natural way to monitor its own performance as an enforcer of the law (or for Congress to check up on them). With a free market in pollution rights, lax enforcement would quickly reduce the market prices of the permits. After all, companies that do not fear detection will not be willing to pay much to legalize their pollution. Similarly, tougher enforcement would push the prices of pollution permits higher. Thus the same system that creates better incentives for pollution control by businesses also creates better incentives for enforcement by the regulatory agencies.

An economist can only smile ironically at the image of Sierra Club leaders checking up on the EPA's performance by reading the latest price quotations for pollution permits in *The Wall Street Journal*.

A HARD-HEADED, SOFT-HEARTED ENVIRONMENTAL POLICY

Economists who specialize in environmental policy must occasionally harbor self-doubts. They find themselves lined up almost unanimously in favor of market-based approaches to pollution control with seemingly everyone else lined up on the other side. Are economists crazy or is everyone else wrong?

In this chapter I have argued the seemingly implausible proposition that environmental economists are right and everyone else really is wrong. I have tried to convey a sense of the frustration economists feel when they see obviously superior policies routinely spurned. By replacing our current command-and-control system with either marketable pollution permits or taxes on emissions, our environment can be made cleaner while the burden on industry is reduced. That is about as close to a free lunch as we are likely to encounter. And yet economists' recommendations are overwhelmed by an unholy alliance of ignorance, ideology, and self-interest.

This is a familiar story. The one novel aspect in the sphere of environmental policy is that the usual heavy hitter of this triumvirate — self-interest — is less powerful here than in many other contexts. To be sure, self-interested business lobbies oppose pollution fees. But, as I pointed out, they can be bought off by allowing some pollution free of charge. Doing so may outrage environmental purists, but it is precisely what we do now.

It is the possibility of finessing vested financial interests that holds out the hope that good environmental policy might one day drive out the bad. For we need only overcome ignorance and ideology, not avarice.

Ignorance is normally beaten by knowledge. Few Americans now realize that practical reforms of our environmental policies can reduce the national clean-up bill from more than \$70 billion per year to less than \$50 billion, and probably to much less. Even fewer understand the reasons why. If the case for market-based policies were better known, more and more people might ask the obvious question: Why is it better to pay more for something we can get for less? Environmental policy may be one area where William Blake's optimistic dictum — "Truth can never be told so as to be understood and not believed" — is germane.

Ideology is less easily rooted out, for it rarely succumbs to rational argument. Some environmentalists support the economist's case. Others understand it well and yet oppose it for what they perceive as moral reasons. I have argued at length that here, as elsewhere, thinking with the heart is less effective than thinking with the head; that the economist's case does not occupy the moral low ground; and that the environment is likely to be cleaner if we offer society clean-up at more reasonable cost. As more environmentalists come to realize that T-shirt slogans are retarding, not hastening, progress toward their goals, their objections may melt away.

The economist's approach to environmental protection is no panacea. It requires an investment in monitoring equipment that society has not yet made. It cannot work in cases where the sources of pollution are not readily identifiable, such as seepage into groundwater. And it will remain an imperfect antidote for environmental hazards until we know a great deal more than we do now about the diffusion of pollutants and the harm they cause.

But perfection is hardly the appropriate standard. As things stand now, our environmental policy may be a bigger mess than our environment. Market-based approaches that join the hard head of the accountant to the soft heart of the environmentalist offer the prospect of genuine improvement: more clean-up for less money. It is an offer society should not refuse.

43. Quoted in Greider, "The Education of David Stockman," p. 54.
44. According to George Gilder, a writer who helped popularize supply-side ideas, "The supply-sider, however, denies that a tax cut can have any immediate effect on total disposable income or real aggregate demand." (See his "Inside the Supply Side," *The New York Times*, November 23, 1980, p. F3.) Gilder may deny it, but the evidence is overwhelming that it does.
45. John Maynard Keynes, *Tract on Monetary Reform* (New York: Harcourt, Brace, 1924), p. 88.

CHAPTER FOUR

1. Representative James Weaver of Oregon, as quoted in a *Wall Street Journal* editorial, May 29, 1986. The Smoot-Hawley tariff was one of the stiffest in U.S. history and is blamed by some for the severity of the Great Depression.
2. Gary C. Hufbauer, Diane T. Berliner, and Kimberly A. Elliott, *Trade Protection in the United States: 31 Case Studies* (Washington, D.C.: Institute for International Economics, 1986), Table 1.4, p. 21; Murray Weidenbaum, "A 'Dutch Uncle' Talk on Foreign Trade," Center for the Study of American Business, October 1985.
3. Adam Smith, *The Wealth of Nations* (Modern Library Edition, 1937), p. 422.
4. Hufbauer et al., *Trade Protection in the United States*, pp. 14-15.
5. Import shares are from the Motor Vehicle Manufacturers Association. Employment data are from the United Auto Workers. Profits data are from Robert W. Crandall, "Import Quotas and the Automobile Industry: The Costs of Protectionism," *The Brookings Review* (Summer 1984).
6. Robert W. Crandall, "Assessing the Impacts of the Automobile Voluntary Export Restraints upon U.S. Automobile Prices," mimeo., Brookings Institution, December 1985.
7. Hufbauer et al., *Trade Protection in the United States*. Murray Weidenbaum and Michael C. Munger, "Protection at Any Price?" *Regulation* (July-August 1983) offer a similar estimate for 1980. Corresponding numbers for 1987 might be about 25-30 percent higher.
8. Weidenbaum, "A 'Dutch Uncle' Talk," p. 1.
9. This illustrates a general problem with trade protection. By granting protection to one industry, you sow the seeds of a case for protecting the industries that buy its products.
10. For China: Weidenbaum, "A 'Dutch Uncle' Talk," p. 8; for Europe: *The New York Times*, January 12, 1984, p. D1; for Canada: *The New York Times*, October 9, 1986.
11. As quoted in *The Wall Street Journal*, November 1, 1985, p. 1.
12. Robert Z. Lawrence and Robert E. Litan, *Saving Free Trade* (Washington, D.C.: Brookings Institution, 1986), pp. 71-72.
13. Adam Smith, *The Wealth of Nations*, p. 461.
14. This conventional wisdom is supported by Robert E. Baldwin, *The Political Economy of U.S. Import Policy* (Cambridge, Mass.: MIT Press, 1985).
15. For more details and further evidence, see Lawrence and Litan, *Saving Free Trade*, pp. 51-57.
16. Robert Z. Lawrence and Robert E. Litan, "Living with the Trade Deficit: Adjustment

- Strategies to Preserve Free Trade," *The Brookings Review* (Fall 1985,) Figure 2 and Table 1.
17. Lawrence and Litan, *Saving Free Trade*, pp. 112-122.
18. Actually, auctioned quotas do the job better than a tariff. The price of an auctioned import permit would be expected to change frequently and automatically to reflect the vicissitudes of supply and demand — something a tariff, being fixed legislatively, cannot do.
19. For further arguments in favor of auctioning, see my "U.S. Import Rights: Going Once, Going Twice . . ." *Business Week* (March 9, 1987), p. 27.
20. *Brief by the Federal Trade Commission on Section 201 Investigation Regarding Imports of Nonrubber Footwear*, July 15, 1985.
21. Weidenbaum, "A 'Dutch Uncle' Talk," p. 5.
22. As quoted by Hobart Rowen in *The Washington Post*, February 16, 1986, p. G1.
23. There is nothing special, in this context, about structural change that happens to be attributable to changing patterns of world trade. All structural change is facilitated by full employment and made more painful by high unemployment.
24. My Princeton colleague Avinash Dixit reaches this conclusion for more or less the reasons given above. His insightful analysis appears in his paper "How Should the U.S. Respond to Other Countries' Trade Policies?" in Robert M. Stern (ed.), *U.S. Trade Policies in a Changing World Economy* (Cambridge, Mass.: MIT Press), 1987.

CHAPTER FIVE

1. The data come from *Statistical Abstract of the United States, 1986*, Table 352. For discussion and evaluation of the evidence, see Robert W. Crandall, *Controlling Industrial Pollution* (Washington, D.C.: Brookings Institution, 1983), Chapter 2.
2. See, for example, J. R. Kearn et al., "A Confusion of Economists?" *American Economic Review*, (May 1979).
3. Bruce A. Ackerman and Richard B. Stewart, "Reforming Environmental Law," *Stanford Law Review*, (May 1985), p. 1333.
4. The interviews are described in Steven Kelman, "Economic Incentives and Environmental Policy: Politics, Ideology, and Philosophy," in T. C. Schelling, ed., *Incentives for Environmental Protection* (Cambridge, Mass.: MIT Press, 1983); and in Kelman, *What Price Incentives? Economists and the Environment* (Boston: Auburn House, 1981).
5. As quoted in *The Wall Street Journal*, January 13, 1986, p. 50.
6. The poll is cited by Steven E. Rhoads, *The Economist's View of the World: Government, Markets, and Public Policy* (New York: Cambridge University Press, 1985), p. 22.
7. Rhoads, *The Economist's View of the World*, p. 18. Rhoads (p. 22) cites an even more extreme EPA standard for benzene that, statistically speaking, would be expected to save its first life after 37,000 years!
8. A minority of economists argues that not even this remedy is necessary. In principle, polluters and victims can voluntarily negotiate mutual agreements according to which either the polluter compensates the victim for the harm done (as your neighbor might if his or her dog dug up your flower bed) or the victim bribes the polluter to reduce his emissions. The classic statement of this position is Ronald Coase, "The

Problem of Social Cost," *Journal of Law and Economics* (1960), pp. 1-44. Most economists, however, feel that such voluntary agreements are impractical when large numbers of people are involved. Who, for example, decides whether the victims bribe the polluters or the polluters compensate the victims? And so they will not be discussed further.

9. That is why I omit the possibility of offering subsidies for pollution abatement. Subsidies for reducing pollution would put in place the correct market incentives for pollution control, so that the amount of pollution per unit of output would decline. But lowering costs for polluting industries in this way would encourage the industries to expand. And so total emissions might not fall.
10. The case is cited by Rhoads, *The Economist's View of the World*, p. 49.
11. See Crandall, *Controlling Industrial Pollution*, Chapter 2.
12. Larry Ruff, "Federal Environmental Regulation," in L. Weiss and M. Klass, eds., *Case Studies in Regulation* (Boston: Little Brown, 1981), p. 246.
13. William Drayton, "Economic Law Enforcement," *Harvard Environmental Law Review* (1980), p. 2.
14. *The Washington Post*, June 1, 1986. The state did a little better in cases involving discharges from municipal sewer plants: eleven consent orders and one case referred to the attorney general for prosecution.
15. Ackerman and Stewart, "Reforming Environmental Law," p. 1337.
16. *The Newark Star Ledger*, October 2, 1980.
17. See Crandall, *Controlling Industrial Pollution*, p. 107, who cites EPA data.
18. The story is told in Robert W. Crandall, "Air Pollution, Environmentalists, and the Coal Lobby," in R. G. Noll and B. M. Owens, eds., *The Political Economy of Deregulation: Interest Groups in the Regulatory Process* (Washington, D.C.: American Enterprise Institute, 1983), pp. 84-95.
19. Robert Crandall, Peter Pashigian, and others argue that congressional voting patterns on environmental issues can be explained by the hypothesis that Frost Belt congressmen are trying to handicap industrial development in the Sun Belt. See Crandall, *Controlling Industrial Pollution*, Chapter 7, and B. Peter Pashigian, "Environmental Regulation: Whose Self-Interests Are Being Protected?" *Economic Inquiry* (October 1985), pp. 551-584.
20. Quoted in Kelman, "Economic Incentives . . ." pp. 305-306.
21. On what follows see Steven Kelman, "Economists and the Environmental Muddle," *The Public Interest* (Summer 1981), pp. 106-123.
22. Wallace E. Oates, "Markets for Pollution Control," *Challenge* (May/June 1984), p. 13.
23. Such a plan is advocated by Robert Crandall, *Controlling Industrial Pollution*, Chapter 10.
24. Not everyone accepts this suggestion. Some hold that our current system is wrong to allow pollution free of charge and would not want to perpetuate this error in a market-based system. They therefore favor taxing all emissions. See, for example, Ackerman and Stewart, "Reforming Environmental Law," p. 1344.
25. Quoted in Kelman, "Economic Incentives . . ." p. 315.
26. Thomas Tietenberg, *Emissions Trading: An Exercise in Reforming Pollution Policy* (Washington, D.C.: Resources for the Future, 1985), Chapter 3.
27. The exceptional case was sulfate emissions in California, where two economists estimated that the state's system of direct controls was only about 7 percent more

costly than the least-cost system. There were two main reasons. One is that California did the job better than most states, largely by not requiring scrubbers, which are very expensive and not terribly reliable. The second is that the California emissions standards were very strict. If regulations require pollution abatement that is near the technological limit, there is little to gain by instituting a system that gives firms greater flexibility. On this subject, see Tietenberg, *Emissions Trading*, p. 45.

28. Oates, "Markets for Pollution Control," p. 12.
29. Ackerman and Stewart, "Reforming Environmental Law," pp. 1359-1360.
30. Michael H. Levin, "Statutes and Stopping Points: Building a Better Bubble at EPA," *Regulation* (March/April 1985), p. 33.
31. Levin, "Statutes and Stopping Points," p. 34.
32. Quoted in *The New York Times*, November 20, 1986, p. A22.
33. Oates, "Markets for Pollution Control," pp. 15-16.
34. See Oates, "Markets for Pollution Control," pp. 12-13 and Ackerman and Stewart, "Reforming Environmental Law," pp. 1343-1346.
35. Ackerman and Stewart, "Reforming Environmental Law," p. 1343.

CHAPTER SIX

1. U.S. Department of the Treasury, *Tax Reform for Fairness, Simplicity, and Economic Growth*, November 1984. Henceforth, this document is referred to as "Treasury I."
2. As quoted in *The New York Times*, November 28, 1984, p. A1.
3. Congressman Fortney Stark of California, as quoted by *The Wall Street Journal*, November 21, 1985, p. 64.
4. As quoted in *The Wall Street Journal*, April 7, 1986, p. 54.
5. Ronald Reagan, message to Congress accompanying *The President's Tax Proposals to the Congress for Fairness, Growth, and Simplicity* (U.S. Government Printing Office, May 1985). This document is hereafter referred to as "Treasury II."
6. This commandment should not be misinterpreted as a call for a balanced budget. Macroeconomic conditions sometimes dictate deficits. My point is only that tax receipts should bear some reasonable long-run relationship to government expenditures.
7. There are ways to raise revenue other than by income taxes. The principal alternative is some sort of broad-based consumption tax or value-added tax. But the tax reform debate of 1984-1986 centered on the income tax. Hence, I deal only with income taxation in this chapter.
8. Arthur M. Okun, *Equality and Efficiency* (Washington, D.C.: Brookings Institution, 1975), p. 97.
9. The investment tax credit, which was abolished by the 1986 tax act, allowed firms that purchased eligible types of investment goods (basically equipment) to deduct a fraction of the purchase price from their tax bills. The credit reduced the after-tax prices of eligible equipment and therefore raised the rate of return on investment, but by amounts that varied greatly from one investment to another. In some cases, it led to negative effective tax rates.
10. Joel Slemrod and Nikki Sorum, "The Compliance Cost of the U.S. Individual Income Tax System," *National Tax Journal* (December 1984), pp. 461-474.
11. Treasury I, p. 16.