

## CHAPTER 5

# Improving Economic Efficiency: Environmental and Health Issues

THE U.S. ECONOMY RELIES PRIMARILY on market forces and price signals to allocate economic resources efficiently. Economists have long recognized that a system of decentralized, competitive markets in which businesses and households act in their own best interest promotes economic growth and well-being. Market prices signal how resources should be used to produce goods and services of the highest value, and facilitate the distribution of these goods and services to those willing and able to pay the most for them. In a well-functioning market the price of a good or service reflects both its marginal value to the consumer and its marginal cost to the producer. So long as there is no divergence between the private and the social values and costs of these goods and services, the market system is likely to bring about the most efficient allocation of economic resources. Although economic efficiency is not the only concern of policymakers, it is important because it largely determines the total quantity of goods and services available. However, economists also recognize that sometimes prices might be distorted and that a market economy may fail to allocate resources efficiently. When market failures occur, appropriate government action may be able to improve upon market performance and enhance overall economic well-being. Examples of such action include protecting the environment, promoting health and safety, providing intellectual and physical infrastructure, and promoting competition.

Potential sources of market failure are:

- *Externalities.* An externality arises when production or consumption by one person or group provides a benefit to others (for example, by revealing a useful scientific discovery) without receiving compensation equal to the benefit, or imposes a cost on others (for example, by polluting the environment) without paying compensation for the full cost.
- *Incomplete or asymmetric information.* When two parties to an economic transaction do not have complete information, or do not have the same information, about the goods or services being exchanged, they may face distorted incentives that prevent markets from supplying the amount or the type of products most

desired. These information problems are especially prevalent in the market for health care, where incomplete or asymmetric information about a patient's health status or the value of a provider's services can adversely affect the decisions of both provider and consumer.

- *Public goods.* A public good is one that many people can use simultaneously without reducing its availability to others, and whose benefits are such that one person cannot exclude others from enjoying them. An example of a public good is national security, which, once provided, cannot be denied to anyone residing in the protected nation.
- *Imperfect competition.* Imperfect competition may result when a few suppliers or buyers can exercise market power to limit supply, keep prices high, and prevent new competitors from entering the market.

Economics provides important insights into the circumstances in which governments can act to improve upon market performance, how they can do so in a cost-effective manner, and how the costs and benefits of such actions are likely to be distributed. Economics has shown that market mechanisms can be a powerful instrument for achieving desired policy outcomes without incurring unnecessary costs. A prime example is the use of tradable pollution permits in environmental policy, described in detail later in this chapter.

This chapter presents several examples of market failures in the areas of environmental protection and health care and discusses new approaches to addressing them. Recent environmental initiatives include policies to improve air quality, address global climate change, and reduce non-point source water pollution from agriculture. These policies are designed to build upon the considerable success of past efforts in improving the quality of our environmental resources. In the domain of health care and consumer safety, rules governing health insurance and drug approval have been reformed, and new policies are being proposed to improve the performance of health maintenance organizations and reduce teenage smoking. These policies are intended to further enhance the health and well-being of our Nation's people. Recent antitrust reforms designed to increase market competition are discussed in Chapter 6.

## COST-EFFECTIVE ENVIRONMENTAL PROTECTION

Achieving environmental targets at the lowest possible cost is an important policy objective. The President's Executive Order 12866, issued in 1993, directs Federal agencies to design regulations in the most cost-effective manner to achieve the regulatory objective and to propose or adopt a regulation only upon a reasoned determination

that its benefits justify its costs. Further, the 1995 Unfunded Mandates Reform Act requires agencies either to certify that the regulatory approaches they adopt to achieve policy goals are the least burdensome, the most cost-effective, or the least costly among available alternatives, or to state the reasons for choosing an alternative approach.

## TRADABLE EMISSIONS PERMITS

In implementing environmental policy, economists often advocate the use of market-based mechanisms such as tradable emissions permits for environmental pollutants, to encourage emissions reduction from those sources where the cost of emissions reduction is lowest and to foster innovation in emissions control technology. Tradable permits can be especially useful in achieving quantitative targets for emissions control or abatement.

Under the traditional regulatory approach to environmental protection, a regulatory agency may specify an allowable emissions level for each firm or facility or require firms to use specific technologies to reduce emissions. This is often inefficient because the cost of reducing emissions by a given amount differs from firm to firm. A tradable permit system instead caps total emissions from all firms but neither places limits on emissions by any one firm nor dictates how the reduction in emissions must be achieved. Instead the regulatory agency issues permits for emissions in a total amount equal to the cap and prohibits emissions without a permit. After their initial allocation (methods for which are discussed below), firms may freely buy and sell permits among themselves. Any firm that can reduce its emissions for less than the going price of a permit has an incentive to do so and then sell its unused permits to other firms for which emissions reduction is more costly. With tradable emissions permits, firms thus have more choices and can meet environmental standards at lower cost than under traditional regulation.

An emission permit trading system also gives firms an incentive to innovate. Firms that develop more effective and cheaper pollution control measures can sell not only their unused permits but the technology itself. Furthermore, trading systems that allow unused permits to be saved, or "banked," for future use encourage the early adoption of unanticipated technological improvements that lower the cost of emissions controls. These features lower the cost of emissions reductions still further.

Economists have identified some other key features of successful emissions permit trading programs. First, firms should perceive that owning a permit is like owning any other asset. A firm will purchase a permit only if it expects that the permit conveys a legitimate right to emit. Similarly, a firm will reduce emissions in order to sell unused permits only if it believes that the permit will be valuable to other firms. Thus, if there is a risk that the right to emit or the right to

trade will be revoked, both the trading price and the volume of permits traded will be depressed, and some of the efficiency gains from permit trading will be lost. Of course, the government retains its authority to restrict or revoke trades for legitimate compliance and enforcement purposes under terms and conditions specified by law.

A second key feature is broad scope: because trading lowers costs, it should be permitted among all sources of emissions that cause the same type of environmental harm. Excluding some sources may raise costs if emissions from these sources can be reduced at relatively low cost. However, including all sources of a pollutant in the emissions cap may not always be practical. For example, emissions from natural sources and from other countries may affect our Nation's environment but be beyond the control of U.S. regulatory authorities. Even within our borders, measuring pollutant discharges from all sources may be prohibitively costly, especially when discharges are dispersed or affected by weather, as is the case with fertilizer and pesticide runoff from cropland. One way to broaden the scope of a program is to offer firms subject to the emissions cap a credit for emissions if they contract with uncapped sources to reduce their emissions. So long as a satisfactory means of measuring and verifying these reductions can be established, this approach can provide further opportunities to lower the cost of meeting environmental objectives.

To ensure the broadest possible scope for permit trading, permits should reflect units of environmental damage from emissions, not necessarily units of emissions. Permit trading then lowers costs by allowing trades in emissions that differ with respect to location, time period, chemical, or pathway (by air or by water, for example). If suitable conversion factors can be devised, trades in different emissions representing equivalent amounts of environmental damage can be made. This approach could also help prevent local environmental "hot spots" from developing. Suppose, for example, emissions from an area far upwind of a heavily polluted area have half the environmental effect there of local emissions of the same quantity of the contaminant. Then 2 tons of upwind emissions could trade for 1 ton of local emissions without changing total effects on the environment. Likewise, to the extent that different chemicals affect the environment similarly (as, for example, both carbon dioxide and methane contribute to the global greenhouse effect), the permit trading system could allow reductions in one pollutant to substitute for reductions in another by an amount that causes equivalent environmental effects. Finally, suppose a certain pollutant causes similar environmental damage whether it is introduced into lakes through the air or by surface water. Then permits for air emissions could be tradable for permits for water discharges, again encouraging reductions from those sources with the least costly control opportunities.

A final key feature of a successful emissions permit trading system is an effective compliance mechanism that ensures the integrity and fairness of the system and at the same time ensures that transaction costs are relatively low. The compliance mechanism will normally include monitoring and reporting requirements as well as enforcement provisions. Transaction costs include the costs of paperwork, recordkeeping, notification, and prior-approval requirements for permit trading. Although some requirements are inevitable in operating a credible trading system, they should be balanced against the need to keep transaction costs low. High transaction costs could discourage trading, thus eroding the potential gains from trade, and may make participation in the program prohibitively expensive for some firms.

### *Initial Allocation of Permits*

A tradable permit system achieves its environmental benefit by capping pollutant emissions below the level that would otherwise occur. The costs of reducing emissions are then borne by the firms responsible for the emissions and (through higher prices) those who buy their products, as well as by suppliers of inputs such as labor and capital equipment to these firms. Firms and consumers in related markets, such as those for substitutes and complements of the goods produced by the regulated firms, will also be affected.

The government could arrange the initial allocation of permits in any of a number of ways, for example by auction, by free allocation in proportion to firms' historical emissions ("grandfathering"), or even by lottery. Anyone receiving permits may then sell all or some of them, or use them as needed to keep actual emissions within regulatory requirements. So long as a permit trading system imposes low transaction costs, the choice of allocation system does not generally affect the efficiency with which emissions reductions are achieved; after the permits are first allocated, the trading of permits itself minimizes the cost of pollution reduction. However, the choice of allocation method does have other consequences. If the method chosen yields revenue to the government, the program presents an opportunity to lower taxes, such as those on earnings from labor and investments, without affecting budget balance. Shifting the tax burden in this way, called "revenue recycling," could enhance economic efficiency and growth as lower taxes increase incentives to work and save. These economic benefits can significantly lower the net economic cost of reducing emissions.

The allocation system has further implications for who bears the cost of monitoring and reducing emissions. The extent to which firms can pass on some of the costs to consumers in the form of higher product prices depends on the degree of competition and the price elasticities of supply and demand for goods in the markets affected by the emissions constraint. In some cases, granting free permits to participants in the permit market could go beyond compensating them

for their cost share of emissions reductions, leaving them better off than before the permit system was introduced.

### *Lessons from the Sulfur Dioxide Program*

Practical experience in designing and implementing trading programs for pollution emissions permits is still limited. The highly acclaimed sulfur dioxide (SO<sub>2</sub>) program—also called the acid rain program—administered by the Environmental Protection Agency (EPA) relies on, among other things, a system of tradable permits to reduce emissions of SO<sub>2</sub> from electric utilities. Trading of emissions permits began in 1992, and to date the program is the only emissions permit trading program that is national in scope. The SO<sub>2</sub> program is being implemented in two phases. The first phase covers the 110 most heavily polluting electric generating plants. Phase II, beginning in 2000, will impose a more stringent emissions cap and include a total of more than 2,000 units. The program has been successful in several ways: a large number of utilities engage in trading, SO<sub>2</sub> emissions and ambient concentrations have fallen, and the costs of reducing emissions have been considerably lower than originally forecast.

Why the early cost estimates were higher than the costs actually realized is a matter of considerable discussion. One contributing factor was a greater-than-expected decline in rail freight rates, which made low-sulfur coal from the Powder River Basin of Wyoming more competitive with locally mined, high-sulfur coal in Midwestern markets. Use of low-sulfur coal proved a less costly means of reducing SO<sub>2</sub> emissions than the smokestack scrubbers that utilities had anticipated using. A second factor was lower-than-predicted costs of using scrubbers, in part because of unexpectedly high utilization rates. The average cost of reducing SO<sub>2</sub> emissions using retrofitted smokestack scrubbers was about \$270 per ton in 1995, far below early estimates of around \$450 to \$500 per ton.

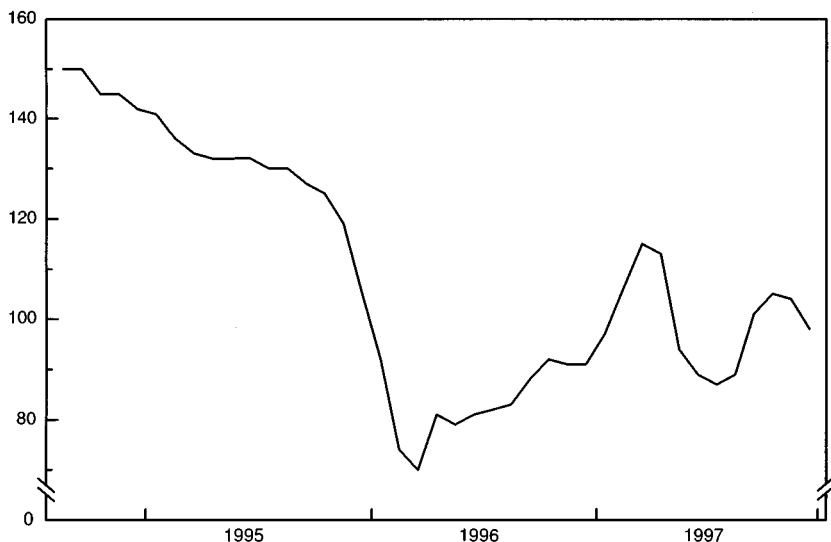
One measure of the decline in cost relative to expectations is the trend in emission permit prices (Chart 5-1). Currently, at approximately \$100 per ton of SO<sub>2</sub>, permit prices are well below earlier estimates of around \$250 to \$400 per ton. These prices reflect the short-run marginal cost of reducing SO<sub>2</sub>. Prices are low partly because firms, believing that permit prices would be much higher, overinvested in scrubbers. Average total control costs are likely to be higher than these short-run marginal costs.

The permit trading program also allows firms to bank unused emissions permits for future use, for example when emissions limits become more stringent in phase II. By banking, utilities can lower costs by timing their reductions according to their projections of emissions control costs and permit prices. If firms expect permit prices or control costs to go up, or if they want to take advantage of newly available control technology, they can adopt measures to reduce emissions sooner than they otherwise might.

#### Chart 5-1 Sulfur Dioxide Emissions Permit Prices

The sulfur dioxide permit price has fluctuated and fallen over time.

Dollars per ton



Note: Trades reported by the Emissions Exchange.  
Source: Environmental Protection Agency.

Trading programs may not always bring cost savings as large as those achieved by the SO<sub>2</sub> program, nor will they always lead to the discovery of much cheaper control strategies. Programs that involve multiple pollutants or international cooperation will necessarily be more complex. However, the SO<sub>2</sub> experience does demonstrate how such programs offer market incentives to find cheaper ways of reducing emissions, and the flexibility to take advantage of them. Had regulators simply required all utilities to install scrubbers, utilities would not have been able to take advantage of the new availability of cheap, low-sulfur coal, and the costs of pollution abatement would have been much higher.

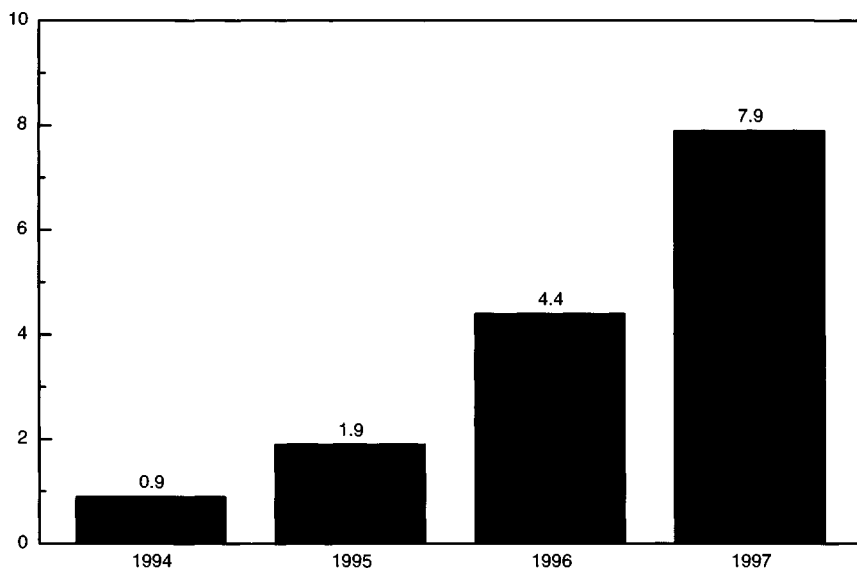
Another important lesson from the SO<sub>2</sub> program is that efforts to minimize transaction costs help ensure the successful operation of markets for pollution permits. But even so, it takes time to develop the institutions needed to facilitate trading and instill confidence in the value of credits so that markets run smoothly. The volume of trade in the market for SO<sub>2</sub> permits, a measure of the potential gains from such trade, started out quite small but has grown rapidly as utilities gained experience with the program. In addition, increased trading volume and the annual public permit auctions tightened the range of market prices for permits. In the program's fifth year about 7.9 million allowances were traded, up from 900,000 allowances in the second year (Chart 5-2).

We now turn to three other areas where the Administration is seeking to improve the environment in a cost-effective manner:

### Chart 5-2 Volume of Sulfur Dioxide Emissions Permit Trades

Permit trading increased considerably after the first few years of the acid rain program.

Million tons traded



Note: Data show the volume of trades among firms.  
Source: Environmental Protection Agency.

attainment of the new air quality standards, policies to address global climate change, and programs to reduce water pollution from agriculture.

## AIR QUALITY STANDARDS

Air pollution has been linked to a variety of health problems ranging from decreased lung function to increased mortality risk. These adverse health effects are a classic externality: the emitter does not bear the full cost of its actions. Under the Clean Air Act, the EPA must periodically review, and may revise as appropriate, national air quality standards for pollutants. State agencies are largely responsible for developing programs (subject to EPA approval) to meet these standards. In July 1997 the EPA issued a more stringent standard for ground-level ozone and a new standard for fine airborne particulate matter. Under the act, these standards must be set so as to protect public health, with an adequate margin of safety. Courts have confirmed the EPA's interpretation of this to mean that consideration of costs or feasibility is excluded in setting the standard. However, under the President's policy the EPA is to implement these health-based standards cost-effectively.

Efforts to meet air quality standards have traditionally focused on controlling emissions within "nonattainment areas"—mostly urban areas where concentrations of pollutants exceed the standard. Although some States—California, for example—have set up trading



programs or used other market mechanisms to reduce the costs of compliance with air quality standards, most rely on traditional prescriptive approaches to controlling pollution. The Administration's plan for achieving the new air quality standards departs from these traditional approaches by designing regional strategies to complement local efforts, and by encouraging the development of nitrogen oxides (NO<sub>x</sub>) trading programs among sources in different States.

### *Regional Strategies and Market-Based Approaches*

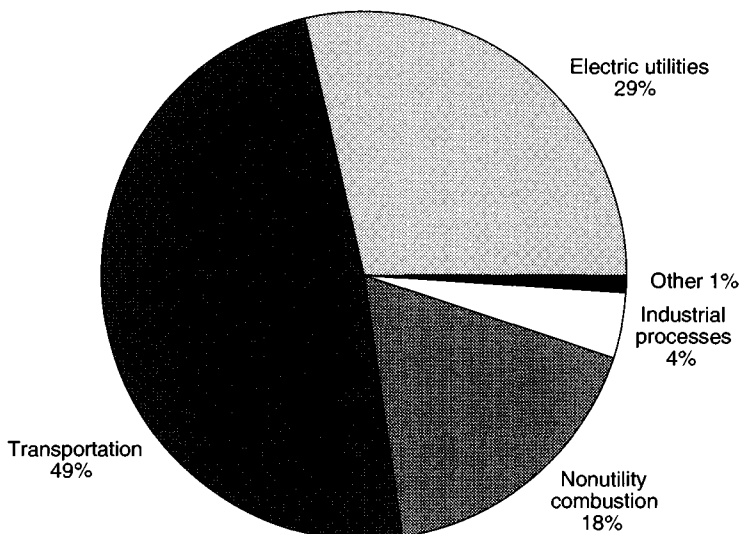
Studies of air quality have found that high ground-level ozone concentrations are not just a local problem: under certain weather conditions, ozone and NO<sub>x</sub> can travel hundreds of miles and contribute to nonattainment of standards in downwind areas. Under traditional regulatory approaches, nonattainment areas would have to make costly emissions reductions within their borders even if upwind reductions that would have similar environmental impact were available at lower cost. To address this problem, the plan for implementing the new standards will expand the geographic scope of the program. Under the Clean Air Act the EPA has the authority to require emissions reductions in any State that significantly contributes to nonattainment outside its borders. In November 1997 the EPA proposed a regional strategy that would require 22 Eastern States and the District of Columbia to reduce NO<sub>x</sub> emissions by an average of 35 percent during May through September (when ozone levels are highest) by 2007. Reductions in NO<sub>x</sub> emissions, apart from reducing ground-level ozone, may also reduce excess nutrients in waterways and the formation of airborne particles linked to adverse health effects. The design of a cost-effective regional strategy that contributes to attaining and maintaining the new standards will require careful attention to the effects of emissions on air quality. Later this year the EPA will also propose a rule to facilitate trading of NO<sub>x</sub> emissions reductions among the States covered by the regional program.

### *Designing a Trading Program for Nitrogen Oxides*

In designing a trading program for NO<sub>x</sub>, the EPA faces a number of challenges. These include ensuring adequate scope for the trading program, ensuring that trading does not adversely affect the environment, and providing for necessary accountability and compliance.

As discussed above, the scope of trading programs like the NO<sub>x</sub> program is an important determinant of their cost-effectiveness. As more emissions sources are included in the program, the increased opportunity to trade emissions permits tends to lower the cost of achieving a given level of emissions reduction. Utilities currently account for only about 30 percent of NO<sub>x</sub> emissions, compared with about 65 percent of SO<sub>2</sub> emissions (Chart 5-3). Transportation accounts for 49 percent and nonutility combustion for 18 percent of NO<sub>x</sub> emissions.

**Chart 5-3 Sources of Nitrogen Oxides Emissions in 1995**  
Vehicles are the principal source of nitrogen oxides emissions.



Note: Nonutility combustion includes residential and commercial heating.  
Source: Environmental Protection Agency.

Thus, extending  $\text{NO}_x$  trading to nonutility sources could reduce costs. However, the scope of the program may be limited by the need to ensure accountability. For example, some smaller sources have considerably lower control costs than electric utilities, but their claimed emissions reductions may be more costly to monitor.

Including more sources from different sectors in the trading program may also have desirable distributional effects. Utilities are likely to pass the cost of compliance on to consumers in the form of higher electricity prices, and low-income households spend a higher share of their income on electricity bills than do households near the median income. Moreover, broader scope can decrease the average cost of pollution abatement, reducing the burden on all parties, including the poor.

Another challenge in designing a trading program for  $\text{NO}_x$  within the context of the regional ozone reduction strategy is to maintain broad geographic scope while ensuring that trading does not result in significant adverse environmental effects. The goal of this strategy is to improve air quality in nonattainment areas cost-effectively. In its simplest form, the problem of pollution transport can be thought of in terms of a single downwind nonattainment area that is affected by a number of upwind pollution sources located at varying distances from it along a line indicating wind direction. In this case, sources that are farther upwind will have less impact on the air quality of the area than sources that are closer, all other things being equal, and such differences may be as large as 10 to 1. It might then appear that emis-

sions trading could undercut the effectiveness of pollution controls if it resulted in shifting emission reductions farther upwind. Trading ratios that weight the reductions made at different sources according to their distance from the downwind nonattainment area might be considered to address this problem. In reality, however, there are a large number of nonattainment areas spread out over the region, and several different weather patterns and wind conditions characterize the ozone pollution episodes that the program is trying to remedy. Sources affect multiple nonattainment areas in a variety of directions from them, and it affects any single nonattainment area differently under different weather conditions. The polycentric nature of this problem complicates the identification of a unique and stable set of trading ratios that would work for all relevant cases. Thus, striking the proper balance between achieving the cost savings from larger geographic scope and limiting the potentially significant adverse environmental effects of trading is an ongoing challenge.

Like most air pollution control programs, NO<sub>x</sub> trading programs would require an estimate of emissions from each regulated source in order to ensure compliance. The estimation method can have significant implications for cost-effectiveness, both directly, through the cost of performing the estimate, and indirectly. One indirect implication is that more costly requirements may limit the number of sources that could meet the estimation requirements and participate in trading, and thereby raise costs. On the other hand, a more reliable estimation method may offer regulators and sources greater confidence in the permits, and thereby increase the willingness of sources to buy them or offer them for sale. For example, the SO<sub>2</sub> program requires continuous emissions monitoring to provide precise information on emissions. Such monitoring is expensive and impractical for many smaller sources and thus may effectively exclude such sources from participating. But such precise monitoring may not always be necessary. Methods for estimating emissions that provide unbiased, although less precise, estimates of emissions may be accurate enough to ensure accountability.

## CLIMATE CHANGE

Climate change is a global environmental externality: warming of the earth's surface results from the accumulation of greenhouse gases from myriad sources worldwide, none of which presently pay the cost to others of warming's ill effects. The Intergovernmental Panel on Climate Change, jointly established by the World Meteorological Organization and the United Nations Environment Programme, concluded in 1995 that "the balance of evidence suggests that there is a discernible human influence on global climate." Current concentrations of carbon dioxide (SO<sub>2</sub>), methane, nitrous oxide (N<sub>2</sub>O), and other so-called greenhouse gases have reached levels well above those of

preindustrial times. Of these, CO<sub>2</sub> is the most important: net cumulative CO<sub>2</sub> emissions resulting from the burning of fossil fuels and deforestation account for about two-thirds of potential warming from changes in greenhouse gas concentrations related to human activity. If growth in global emissions continues unabated, the atmospheric concentration of CO<sub>2</sub> will likely double, relative to its preindustrial level, midway through the next century.

The accumulation of greenhouse gases poses significant risks to the world's climate and to human well-being. Potential impacts include a rise in sea levels, greater frequency of severe weather events, shifts in agricultural growing conditions from changing weather patterns, threats to human health from increased range and incidence of diseases, changes in availability of freshwater supplies, and damage to ecosystems and biodiversity.

Climate change is a complex, long-term problem requiring global cooperation and a long-term solution. No single country has an incentive to reduce emissions sufficiently to protect the global environment against climate change. Even if the United States sharply reduced its emissions unilaterally, greenhouse gas emissions from all other countries would continue to grow, and the risks posed by climate change would not be significantly abated. Since many of these gases remain in the atmosphere for a century or more, the climatic effects of actions taken today will primarily benefit future generations. But delaying action to reduce greenhouse gas emissions until the disruptive effects of climate change become widespread will considerably reduce the options for remedial or preventive measures.

### *The Framework Convention on Climate Change*

The threat of disruptive climate change has led to coordinated international efforts to reduce the risks of global warming by reducing emissions of greenhouse gases. The first international agreement to address global warming was the Framework Convention on Climate Change signed during the Earth Summit in Rio de Janeiro in 1992. This convention established a long-term objective of limiting greenhouse gas concentrations and encouraged the established industrial countries to return their emissions to 1990 levels by 2000. Since then it has become clear that the United States and many other participating countries will not meet this goal.

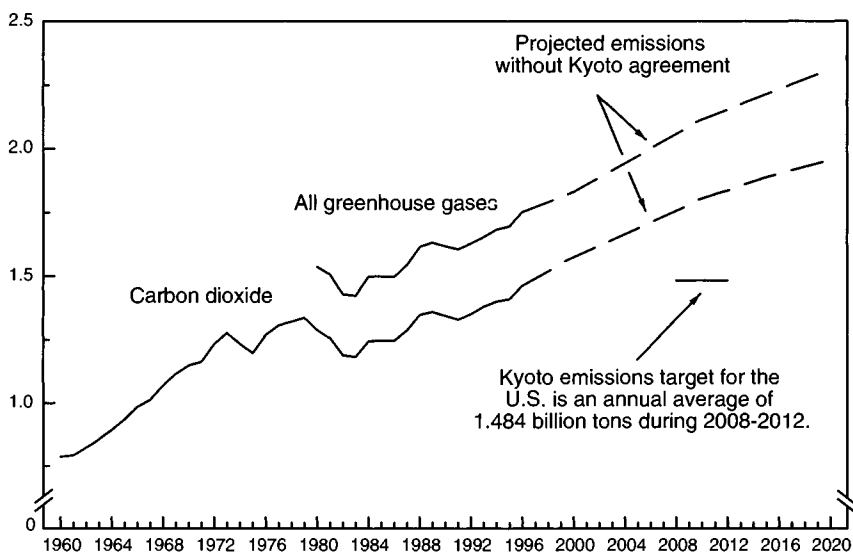
To address the lack of progress among many industrial countries toward meeting this first target, the United States and approximately 159 other nations, in negotiations held in Kyoto, Japan, last December, agreed to take substantial steps to stabilize atmospheric concentrations of greenhouse gases. The Kyoto agreement, which requires the advice and consent of the Senate, would place binding limits on industrial countries' emissions of the six principal categories of greenhouse gases: CO<sub>2</sub>, methane, N<sub>2</sub>O, sulfur hexafluoride, perfluorocarbons, and hydrofluorocarbons. Each industrial country's "1990

baseline” is actually based on its 1990 emissions of CO<sub>2</sub>, methane, and N<sub>2</sub>O and its choice of 1990 or 1995 levels of the other three categories of gases. The United States agreed to a target of 7 percent below 1990 levels over 2008-2012. To meet that target, net U.S. emissions of greenhouse gases—all emissions minus removals of CO<sub>2</sub> by certain forest activities such as planting trees—must average no more than 1,484 million metric tons of carbon equivalent per year during that period (Chart 5-4). The targets for the European Union and Japan are 8 percent and 6 percent below 1990 levels, respectively. Australia, New Zealand, Norway, Russia, and Ukraine all have less stringent limits. In sum, over the period from 2008 to 2012, the industrial countries are

#### Chart 5-4 U.S. Greenhouse Gas Emissions, Actual and Projected

The U.S. emissions target under the Kyoto agreement is about 25 percent below current projections in 2008-2012.

Billion tons of carbon equivalent



Notes: All greenhouse gases include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Carbon equivalence is calculated assuming a global warming potential over a 100-year time horizon. Targets can be met through forest activities that remove carbon from the atmosphere and international permit purchases and credits in addition to domestic emissions reductions.

Sources: Department of Energy, United Nations Framework Convention on Climate Change, and U.S. Climate Action Report 1997.

expected to reduce their average emissions of greenhouse gases to about 5 percent below their 1990 levels.

The Kyoto agreement provides opportunities for the industrial countries to trade rights to emit greenhouse gases with each other. They may also invest in “clean development” projects in the developing world and use these projects’ certified emissions reductions toward meeting their targets. Both of these mechanisms allow for emissions reductions to occur where they are least expensive. Many of the details of these provisions will be worked out in subsequent negotiations.

## *Emissions Permit Trading for Greenhouse Gases*

One component of the Administration's climate change proposal, announced last October by the President, is a domestic emissions permit trading program for greenhouse gases starting in 2008. As in the similar program for SO<sub>2</sub>, permit trading would allow emissions targets to be met at a lower cost than under a traditional regulatory approach that sets fixed limits on individual firms' emissions.

As previously discussed, one consideration in designing an emissions permit trading program for greenhouse gases is how initially to distribute permits. The method of initial allocation would not generally affect the efficiency with which emissions reductions are achieved, but would have significant distributional implications. Another issue is where, in the marketing chain of products responsible for greenhouse gas emissions, permits would be required. One approach, called the permit-to-market approach, would impose the emissions limits at the point of first sale of the commodities responsible for greenhouse gases. In the case of SO<sub>2</sub> emissions, permits would be required for the sale of fossil fuels and specified in terms of the amount of SO<sub>2</sub> released in their combustion. The requirement would be imposed at the wellhead or the refinery (in the case of oil or natural gas), at the mine (in the case of coal), or at the port of entry (in the case of imported fossil fuels). Alternatively, a permit-to-emit approach would issue permits to consume these fuels or to sell products, such as automobiles, that do so. A hybrid of the two approaches may also be possible.

The design of an effective greenhouse gas permit system needs to take several other issues into account. First, a sufficient number of participants must be included in the domestic permit market to ensure that the market is competitive and efficient.

Second, the system should include a monitoring mechanism that assesses compliance in the most cost-effective manner possible. In the case of a permit-to-market system, since the amount of SO<sub>2</sub> emitted per barrel of oil or ton of coal consumed is relatively fixed, the task of measuring SO<sub>2</sub> emissions is straightforward. Moreover, for accounting purposes firms already collect information and keep records about their fuel transactions. Under the permit-to-emit approach, monitoring would likely involve a more complex combination of emissions calculation and measurement for all regulated greenhouse gas emitters.

Third, a permit system that would allow trades across all sectors of the economy would minimize total cost. If, for example, the incremental cost of reducing emissions is much lower in electric power generation than in transportation, one could reduce the cost of meeting the reduction target by allowing permit trading between the two sectors. The permit-to-market approach would generally allow trades across sectors. The permit-to-emit approach could also yield the same result, depending on how it is implemented.

### *Timing Flexibility in Meeting Emissions Reductions*

Flexibility about *when* emissions reductions take place can further lower the cost of reducing greenhouse gas emissions. A system that allows participants to borrow emissions permits from the future or to save unused permits for future use would take advantage of differences in cost abatement opportunities across time.

Three features of the Kyoto agreement contribute to timing flexibility. First, the target for emissions reductions is based on a 5-year commitment period. For example, the target set for the United States of a 7-percent reduction in emissions below 1990 levels is specified as an annual average over 2008-2012. By averaging over 5 years instead of requiring the United States to meet the 7-percent target each year, the agreement provides flexibility in the timing of reductions that can lower costs, especially given an uncertain future. Averaging can smooth out the effects of short-term events such as fluctuations in the business cycle and energy demand. It can also lessen the impact of a year with a hard winter, when energy demand, and thus emissions, would increase. Further, if firms anticipate that a new technology will soon be available that lowers the cost of reducing emissions, they could emit more greenhouse gases in the early years of the period and less after the technology becomes available. Another advantage of this approach is that it may avoid forcing a costly rapid turnover of capital stock for electricity generation.

The Kyoto agreement allows countries to bank unused emissions rights from one commitment period for use in the next. Should investments in research and development yield some pleasant surprises in the form of cleaner and more efficient technologies, banking will encourage the early adoption of these technologies in order to save unused emissions permits for future periods when the costs of emissions abatement may be higher.

In addition to banking across commitment periods, countries may bank certified emissions reductions obtained through the "clean development mechanism" discussed below. Countries may use emissions reductions achieved through this mechanism over the 2000-2007 period to assist in complying with their targets in the first commitment period. This provides an incentive for firms in industrial countries to begin investing in energy-efficient technologies in developing countries before 2008.

### *International Trading in Greenhouse Gas Emissions*

Building on the benefits of the domestic trading program just described, the Administration proposed in Kyoto an international trading program for greenhouse gas emissions permits. The Kyoto agreement established the right of countries assigned emissions targets to meet their commitments by trading among themselves. This establishment of the right to trade provides the foundation for a trad-

ing regime among industrial countries, but leaves the details to be agreed upon later. Since it is easier to reduce emissions in some countries than others, and given that greenhouse gas emissions have equivalent climate effects regardless of their location, allowing global trading would achieve climate change objectives at lower cost. Such a global approach would ideally allow trading among all sources of greenhouse gases in participating countries and could incorporate opportunities to *remove* greenhouse gases from the atmosphere, for example by issuing emissions credits (which could then be sold to other firms) for reforestation projects.

International trading could take place among firms that have been allocated permits through domestic trading programs. For countries that have no domestically tradable permits because they have opted for a command-and-control or a tax approach to controlling emissions, it may still be possible instead to arrange exchanges on a government-to-firm or government-to-government basis.

The setting of binding targets among all countries, together with international trade in permits, could in principle result in a global market price for permits for greenhouse gas emissions. For example, the permit price could be expressed in terms of dollars per ton of carbon equivalent emitted. Firms in all countries would reduce their emissions until the cost of further reductions exceeded this price, at which point they would buy additional permits. Large differences in both the patterns of energy use and the efficiency of energy technologies among countries imply that the cost savings from international permit trading would be large compared with a system without international trading. Put differently, even in comparison with a system with full domestic trading of emissions permits, international trading could substantially lower costs. Some models predict that the incremental cost of reducing CO<sub>2</sub> emissions may be as little as one-seventh of the cost of reductions from domestic trading alone. The gains from international trade in permits would be particularly large if developing countries were to participate.

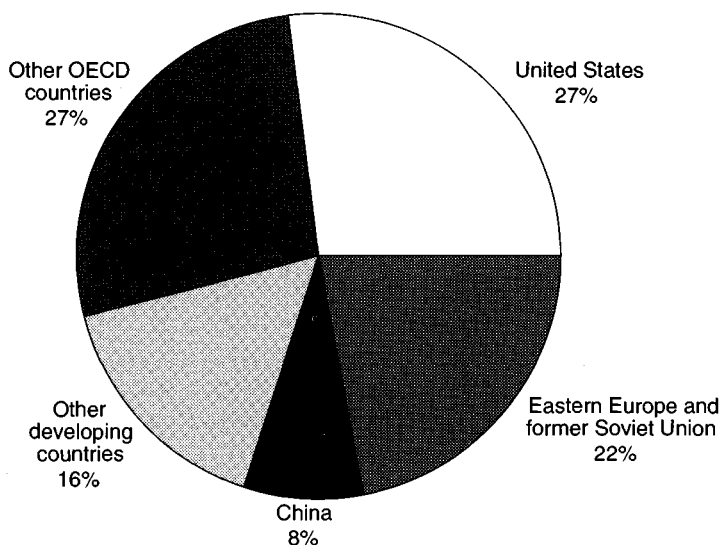
### *The Importance of Developing-Country Participation*

Negotiations leading up to the Kyoto agreement sought binding limits on greenhouse gas emissions among industrial nations. Developing countries have resisted committing themselves to binding limits on their emissions because of concern that to do so would severely constrain their economic growth, and because by far the greater part of accumulated greenhouse gases in the atmosphere is the result of past economic activity in the industrial countries (Chart 5-5). However, current forecasts project that greenhouse gas emissions from developing countries will surpass those from industrial countries around 2030, and even sooner if industrial countries are successful in limiting their emissions (Chart 5-6). Thus, eventual curbs on emissions from developing countries are essential in order to



**Chart 5-5 Cumulative World Emissions of Carbon Dioxide, 1950-95**

Industrial countries are responsible for the vast majority of accumulated carbon dioxide in the atmosphere.



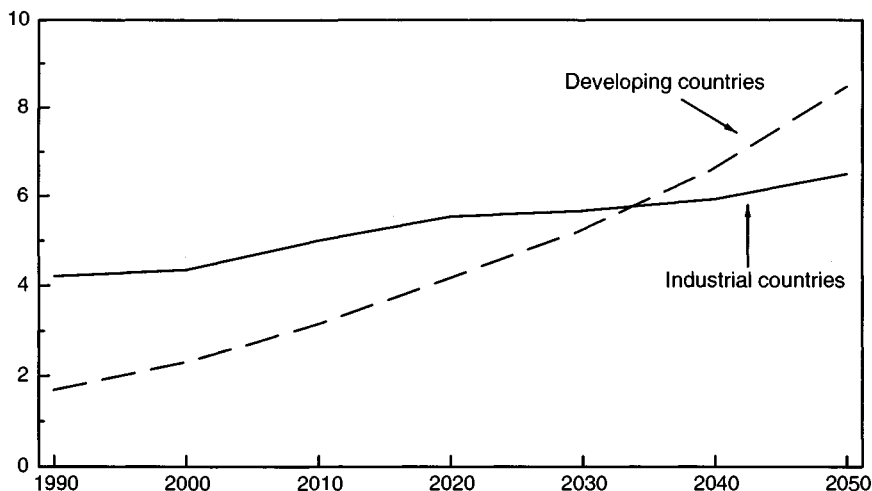
Note: Other OECD countries include the countries of the European Union, Australia, Canada, Iceland, Japan, New Zealand, Norway, Switzerland.

Source: Department of Energy.

**Chart 5-6 Projected World Carbon Dioxide Emissions Without Kyoto Agreement**

Around 2030, annual carbon dioxide emissions from developing countries are expected to surpass industrial countries' emissions.

Billion tons of carbon equivalent per year



Note: These projections are consistent with the Intergovernmental Panel on Climate Change IS92A global projection through 2100.

Source: Unpublished calculations by A. Manne, Stanford University and R. Richels, Electric Power Research Institute.

stabilize the amount of greenhouse gases in the atmosphere. Moreover, some of the least cost opportunities for reducing greenhouse gas emissions are in developing countries, because those countries now use energy relatively inefficiently. Moreover, those that are industrializing rapidly have greater scope to build their industry around cleaner and more efficient energy technologies and fuels than do mature economies whose capital stock is already in place.

Failure to involve developing countries in an international agreement limiting greenhouse gas emissions could lead to a more rapid rate of increase in emissions in those countries than would occur without any agreement at all. This "leakage" effect of emissions reductions could come about in any of several ways. As industrial countries reduce their use of fossil fuels in response to emissions controls, future world oil and coal prices are likely to be lower than they would be otherwise. This is likely to increase energy consumption in countries not bound to limit their emissions. U.S. industries are also concerned about their international competitiveness if some countries remain outside an international agreement, since factories in those countries will face lower costs for producing goods that take relatively large amounts of energy to manufacture. Some may be concerned that energy-intensive industries might choose to relocate to countries not subject to emissions constraints, although there is little evidence to suggest that this would pose a significant problem in most industries. For example, energy costs for manufacturing industries average just 2.2 percent of total costs.

Given the projected growth of developing countries' emissions, the Administration's position is to seek meaningful participation by key developing countries in the reduction of greenhouse gas emissions as a condition for the United States taking on binding emissions reductions. The President has indicated he will not submit the Kyoto agreement for Senate ratification until there is meaningful participation by key developing countries.

### *Joint Implementation and the Clean Development Mechanism*

To encourage participation by developing countries in the climate change initiative even before they formally sign on for binding emissions limits, the President has proposed a program known as joint implementation. This program would provide incentives to developing countries to reduce their emissions of CO<sub>2</sub> and other greenhouse gases. The Kyoto agreement embraces the President's proposal in its designation of a "clean development mechanism" (CDM): U.S. companies that undertake projects that reduce greenhouse gas emissions in developing countries could count those reductions to meet their commitments. Institutionalizing key elements of joint implementation through this mechanism would encourage firms in the United States to transfer a larger volume of cleaner and more energy-efficient technology to developing countries, especially in the electric power

generating industry, while providing substantial cost savings to U.S. firms. It would also provide incentives to expand forests, which absorb CO<sub>2</sub>. In addition to the CDM, the agreement allows industrial countries to undertake joint implementation projects with each other.

A key issue is how to ensure that credits are awarded for actual, additional emissions reductions, and not simply for projects that would have been carried out anyway. The Kyoto agreement requires that emissions reductions occurring through the CDM be certified to provide real, measurable, and long-term benefits related to the mitigation of climate change, and that the emissions reductions achieved are additional to any that would occur in the absence of these projects. Future negotiations will focus on developing the rules for certifying and enforcing projects undertaken through the CDM.

### *Promoting Clean and Efficient Energy Technology*

The President's plan to reduce greenhouse gases commits new resources to energy research and programs to promote the wider use of cleaner and more energy-efficient technologies in the U.S. economy. The emissions permit trading system for greenhouse gases is also likely to encourage more private research and innovation, as companies seek to lower the cost of meeting environmental targets.

Government support for science and technology in general addresses an important market failure. Promising new technologies often fail to attract sufficient private sector interest if their technical risk is high and if they create economic and social benefits beyond what the investing firms can capture for themselves. Economic studies have shown that private firms, despite intellectual property protection, are able to appropriate only about half of the total economic benefits from their own research. This gap between social and private returns may be particularly large for research on cleaner and more efficient energy technology, when the environmental externalities associated with energy use have not been fully addressed by environmental and other regulatory policies.

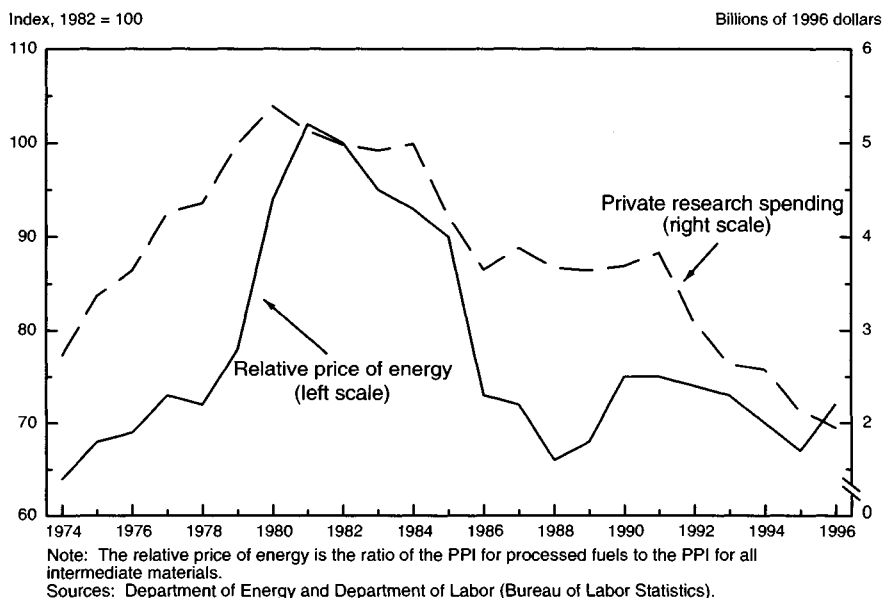
The appropriability problem is not limited to basic research but frequently extends to precommercial research as well. Precommercial research is research that is close to yielding new products or processes, but still far enough away from commercialization that further development poses a substantial financial risk. New renewable energy industries (wind power, solar energy, and biomass energy, for example) may face particularly formidable constraints to commercialization. First-of-a-kind products often have high unit costs. High-volume production provides economies of scale, generates experience in manufacturing and operation, and opens new opportunities for incremental technological improvements—all of which may lead to lower costs.

The President's commitment to increase Federal support for new energy technology seeks to reverse a trend of declining national

investment in energy research (Chart 5-7). One reason investment in energy research has declined since the late 1970s is falling or stagnant energy prices, which reduced the economic incentive to develop new sources of energy and improve efficiency. In the 1990s it is primarily private sector energy research that has declined. Increasing government investment in energy research is likely to be complemented by more private research: public research on longer term, basic scientific studies can open up new, profitable opportunities for applied research and commercial development by the private sector. An increase in support for research that raises the rate of progress in developing cleaner and more efficient technologies would lower the costs of reducing greenhouse gas emissions.

#### Chart 5-7 Energy Prices and Private Energy Research

Energy prices and private investment in energy research have followed similar trends since the 1970s.



The President's proposal also includes programs and tax incentives to encourage the wider adoption of existing technologies that can decrease greenhouse gas emissions. Of particular importance are technologies that reduce consumption of fossil fuels. In addition to encouraging clean and renewable energy sources, these programs will provide economic incentives and other forms of assistance (such as better information) for improving energy efficiency in industry, transportation, and homes. The President's plan to use Federal procurement policy to reduce greenhouse gas emissions is another way to increase market penetration of these technologies.

Until an emissions cap and trading system are in place, however, the economic incentive to use these technologies may be low, because at present the price of energy does not reflect the environmental cost of

CO<sub>2</sub> emissions. This environmental externality results in a market failure to make the most efficient use of new technologies that lower emissions. Many of these technologies are expected to be more profitable once a CO<sub>2</sub> emissions cap is in place and the environmental costs associated with energy use are more fully reflected in energy prices.

There is also evidence that many households and businesses fail to invest in some home and building improvements that appear profitable even at today's energy prices. More efficient home refrigerators and air conditioners, fluorescent lighting, and "low-E" glass for windows, for example, are available on the market and, by some accounts, offer potentially large energy and cost savings. By spending money now on these more efficient technologies, proponents argue, many consumers could quickly recoup their investments in the form of lower energy bills. But if such investments are in consumers' own economic interest, why don't they invest in them on their own? Insufficient knowledge and information may be a key factor: consumers may not be aware of new technologies that could reduce CO<sub>2</sub> emissions and save them money on energy bills, or may not be convinced of the economic benefits that could be realized from adopting them. Lack of up-to-date information on recent technological developments may also lead people to overestimate technical risks—they may doubt whether a new technology is as reliable as current methods, particularly if the new technology is not yet widely used.

On the other hand, even if a new technology is beneficial for many users, it may not be so for everyone. People differ in their willingness and ability to make investments today in order to realize savings in the future, especially if the initial expense is relatively large. In addition, some consumers may value a product for attributes other than its energy efficiency—for example, its convenience, size, or design. And not all consumers may achieve all of the promised energy savings, depending on the climate of the region where they live. These considerations reflect the great diversity of needs and preferences among businesses and households and help explain why new technologies may diffuse slowly over time.

Better information about the potential cost savings from improving energy efficiency may increase the use of technologies that already meet the market test—that is, that meet consumer standards for quality and dependability and offer real economic benefits. The Federal Government is working with the private sector to promote wider use of such technologies. For example, through the Green Lights program, the EPA provides technical information to private companies on the economic and environmental benefits of switching to new, fluorescent lighting systems. Energy Star is another EPA program, in which innovative products that use significantly less energy than older generation products are allowed to bear a special, readily identifiable label. More rapid diffusion of new emissions-saving technologies would make an important contribution toward meeting the goals of the Kyoto agreement.

## NON-POINT SOURCE WATER POLLUTION

Protecting the quality of the Nation's water resources has been a major component of U.S. environmental policy since passage of the Clean Water Act in 1972. The act regulates water pollution from point sources—discrete, concentrated sources such as the discharge from factories and municipal sewage treatment plants—but not from non-point sources. Non-point source water pollution is the entry of pollutants into a body of water from a broad area, such as a cultivated field or the streets and lawns of a city. In recent years attention has increasingly turned to pollution from these non-point sources, especially runoff from agricultural operations. Since environmental regulation has already led to extensive control of point sources of water pollution, further improvements in water quality are likely to be less expensive if they address non-point sources. Recently, the Administration has given renewed emphasis to non-point source water pollution (Box 5-1).

Agriculture is one of the principal sources of non-point source pollution. The environmental problems caused by agriculture stem

### **Box 5-1.—The Clean Water Initiative**

On the 25th anniversary of the passage of the Clean Water Act, in October 1997, the Vice President called for a new set of initiatives to further improve the quality of the Nation's water resources. These initiatives will address the principal remaining challenges, especially public health protection, polluted runoff, and community-based watershed management. Agencies will emphasize innovative approaches to control pollution, including the use of incentives and market-based mechanisms. The EPA and NOAA are directed to expedite the full implementation of the Coastal Zone Reauthorization Act Amendments. The Administration also challenged the Congress to help strengthen the Clean Water Act, especially for the control of non-point sources of water pollution.

mainly from the runoff of soil, agricultural chemicals, and livestock waste into lakes, rivers, and estuaries. These pollutants may cause undesirable algal blooms, impair recreation and fishing, and adversely affect wildlife. Pesticides and nutrients can also leach into groundwater, threatening drinking water supplies. Soil erosion from U.S. farmland raises the cost of municipal and industrial water use, shortens the life span of dams and hydroelectric projects, damages aquatic habitat, and can contribute to flooding. These off-farm damages from soil erosion have been estimated at \$7 billion to \$25 billion

per year. In 1994 the EPA estimated that at least 6 percent of all U.S. river miles and 21 percent of lake surface areas were water-quality impaired (that is, unsuitable for their designated uses). The same study identified agriculture as a major contributor to impairment in about 60 percent of those river miles and 50 percent of those lakes and reservoirs.

Since these environmental effects are largely imposed on other users of the water resources, and not on the farms that caused them, agricultural non-point source water pollution is another example of an environmental externality that market forces alone are unlikely to solve. In a world of perfect and costless information, the efficient policy response would be to monitor the erosion and runoff from each farm and reduce it to the point at which the incremental cost of further reduction equals the incremental benefit to the environment. This textbook approach, however, is often unworkable because the cost of assessing the pollution caused by each farm can be prohibitive. Instead, public policies to address non-point source pollution from agriculture tend to focus on farmers' choice of farming practices, which is much more easily observed.

Non-point source pollution from agriculture, like many other environmental problems, raises the policy question of whether and how to encourage the adoption of environmentally friendly technologies. Examples of such practices include conservation tillage, integrated pest and nutrient management, precision farming, and buffer zones along waterways. These practices may actually be profitable for some farmers to adopt. As discussed above in the context of energy technology, direct subsidies for the adoption of existing technology improve economic efficiency when the benefits to society at least equal the costs, including the social cost of subsidies. This section examines three policy approaches that have been used to encourage the adoption of farming practices that reduce non-point source pollution: incentive programs, regulations, and emissions trading programs.

### *Incentive Programs*

The U.S. Government has implemented several programs that provide incentives to farmers and ranchers to limit their impacts on the environment. These include support for State programs through Section 319 of the Clean Water Act and several important components of the 1996 Federal Agriculture Improvement and Reform (FAIR) Act. Three programs account for the bulk of Federal spending on environmental incentive programs for agriculture: the Conservation Reserve Program (CRP), begun in 1985; the Wetland Reserve Program (WRP), initiated in 1990; and the Environmental Quality Incentives Program (EQIP), established by the FAIR act. The CRP and the WRP (both of which were reauthorized by the FAIR act) establish voluntary contracts with producers in which they agree to adopt certain practices

on their land, including establishing long-term conservation easements and taking it out of production for a period of years. In return, the government provides incentive payments, subsidies for the cost of the practices, and technical assistance as needed. EQIP provides assistance for environmental and conservation improvements on the farm. The FAIR act requires new acres enrolled in the CRP to meet higher environmental and conservation criteria than land enrolled under earlier versions of the program, and funds for EQIP are intended to maximize the environmental benefits per dollar expended and help farmers and ranchers meet national, State, and local environmental standards. Other program provisions, such as Conservation Compliance, require farmers who cultivate highly erodible land to adopt conservation practices or else forgo benefits from other agricultural programs. All these programs differ significantly from traditional regulation in that they are voluntary: no requirements apply to producers who do not wish to participate.

Efforts to remove environmentally sensitive land from agricultural production and encourage the adoption of resource-conserving farming practices have met with much success in reducing soil erosion from cropland. Between 1982 and 1992, erosion from cropland is estimated to have declined by about one-third.

### *Regulatory Control of Agricultural Pollution*

The Coastal Zone Act Reauthorization Amendments (CZARA) authorized the first federally mandated program requiring specific measures to address agricultural runoff as well as four other major non-point sources of water pollution. The EPA and the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) issued Federal guidelines for implementing CZARA in 1993. The guidelines set out certain requirements that State coastal non-point source pollution control programs must meet, but they allow States to tailor their programs to their own environmental concerns, geographic conditions, site characteristics, and farmer preferences. These programs, currently in the approval process, identify the set of management measures that may be required of individual farms in the State. This process is designed to provide enough flexibility to allow farmers and technical assistance providers to select the practices appropriate for a given farming operation, and to help keep farm compliance costs low. Existing sources of pollution, such as most agricultural sources, will have 3 to 8 years to comply from the time their State program is approved, adding further flexibility and cost-saving opportunities in the timing of implementation.

### *Trading Water Pollution Credits*

To achieve water quality standards cost-effectively, several State and local governments have experimented with programs that are



similar in principle to the air pollution trading programs discussed earlier, but do not involve marketed permits as such. Much like the joint implementation projects discussed in the context of climate change above, these programs allow point sources of pollution to meet environmental standards by paying non-point sources (such as farms) to adopt practices to reduce pollution. As already noted, it may be considerably less expensive to attain the same environmental outcome by reducing pollution from non-point sources than from point sources. But because verifying pollution reduction from farms is prohibitively expensive, the agencies administering these programs rely on verifying that farmers have adopted land management practices that are linked with pollution reduction, assessing credits based on the estimated amount of pollution reduced, and certifying the "trades." Most of these programs focus on fertilizer and animal waste pollution, including nitrogen and phosphorus compounds.

Cost savings from such exchanges, if fully implemented, could reach several billion dollars annually. But few trades have occurred to date. For example, the Dillon Reservoir program in Colorado provides opportunities for trading between point and non-point sources. Early estimates expected significant cost savings from trading for the four municipal sewage treatment facilities, but few trades between a point source and a non-point source have occurred since 1984.

The Tar-Pamlico Basin program, implemented in North Carolina in 1989, is not strictly a trading program. Rather, it allows an association of 14 point sources to average all of the members' nutrient discharges under one cap. Then, if total discharges exceed the cap, the association must contribute to a State program that subsidizes management practices on farmland to reduce non-point source pollution. To date, the association has not exceeded its cap, so no contributions to the non-point program have been required.

Trading has been limited both because the scope of trading opportunities has been constrained and because transaction costs have been high. To ensure that all sections of water bodies meet environmental standards, trading is often restricted to a local watershed or certain stretches of a river. Other policy constraints on trades may further limit the potential gains from discharge credit trading. For example, point sources are often required to adopt specific pollution control technologies before they may consider trading. This may limit the discharge reductions that they buy from other sources and reduce the potential gains from trading. In the Tar-Pamlico program, point sources receive only one unit of pollution credit for every two units of pollution reduction they buy from non-point sources. By explicitly requiring nonequivalent emissions to be traded, the program increases the cost of participation. Moreover, these point sources must pay a 10-percent administrative surcharge for every pollution credit they purchase. Finally, programs have often failed to provide assurances

that the credits will continue to be honored in the future. This reduces the economic value of the credits and is another impediment to trading.

Although economic theory indicates that the costs of complying with environmental regulation can be significantly reduced through a trading system, the limited experience with water pollution credit trading has not yet provided substantial cost savings. So far the small size of the markets for trades, both geographically and in the number of potential traders, and the regulatory constraints on trades have generated extra costs that make trading less attractive.

## IMPROVING HEALTH CARE AND HEALTH INSURANCE MARKETS

Without regulation, health insurance markets do not function well. A variety of policies have been implemented or proposed to address these shortcomings. This section discusses policy initiatives that this Administration has promoted to help improve the functioning of these markets. The Health Insurance Portability and Accountability Act (HIPAA) of 1996 helps workers maintain continuous insurance coverage by limiting exclusions of preexisting conditions, whereby insurers do not cover previously diagnosed conditions for some period, and by expanding guaranteed issue and renewability requirements, which prohibit insurers from denying coverage or renewal on the basis of health status or claims experience. The President's 1999 budget includes policies that improve access to affordable health insurance for people aged 55-65 and for small businesses. In addition, the Administration and the Congress are considering legislation to help ensure that consumers have enough information about health insurance plans and prescription drugs to make informed decisions. Finally, new initiatives to discourage teenage use of tobacco products are aimed at protecting those who may lack the maturity to make decisions about risky behaviors like smoking.

### IMPROVING ACCESS AND PORTABILITY

#### *Adverse Selection in Health Insurance Markets*

A variety of concerns about health insurance markets relate to the problem of adverse selection, the danger that only those persons most likely to need insurance will purchase it. Adverse selection in insurance markets can arise because of asymmetric information: would-be customers typically know more about their likelihood of incurring high medical costs than do insurers. If insurance is priced to reflect the average risk of a particular population (a practice called community rating), some healthier people may choose to go without. The average risk (or expected medical costs) of the insured pool will then be higher than that for the whole population, and the insurer will lose

money. Insurers will, therefore, seek ways to ensure that they do not attract a group that is particularly unhealthy. For example, they may avoid offering comprehensive coverage (by limiting access to specialists or not covering chronic conditions, for example). They may also engage in targeted marketing or change their health plans to appeal to healthier persons and discourage sicker ones from enrolling, by adding benefits, such as health club discounts or coverage for well-baby care, that are more attractive to persons in good health. In addition, in an unregulated market insurers may explicitly exclude higher risk individuals through exclusions of preexisting conditions or by simply denying coverage. Thus, adverse selection in health insurance markets can result in underinsurance among both younger, healthier individuals and the very sick.

Adverse selection is reduced when insurers can insure large groups of people whose purpose in associating is unrelated to their preferences for health insurance. Insurers can be reasonably sure that the members of such groups are not exceptionally unhealthy on average, and healthy people are not likely to leave the insured pool. Employee groups, particularly those of larger organizations, are a natural pool for spreading risk, and this, in part, explains why employer-based insurance is widespread. The lower premiums offered to such groups, the tax-preferred treatment of employer-provided insurance, employer subsidies, and the difficulty of obtaining coverage on the individual market all encourage healthy workers to purchase insurance through their employers, making adverse selection a much less serious problem.

Small firms might like to pool together to offer insurers larger risk pools and reduce administrative costs, but these pools may fall apart, as firms with healthier employees are likely to want to leave the pool to seek lower premiums on their own. The prevalence of employer-based insurance may also discourage self-employment or employment in smaller firms, where obtaining affordable insurance is more difficult.

Even if one could correct the problem of asymmetric information directly, by giving insurers the same information that their customers have, this may not lead to a better outcome, for two reasons. First, there may be a "missing market" for longer term contracts for health insurance. Most health insurance contracts are for 1 year, but purchasers might prefer to buy long-term insurance to avoid the possibility of high premiums or cancellation should they become sick. In addition, the government cares not only about efficiency and market failures in health insurance markets, but also about improving access to care. If insurers had more information, they could choose not to cover some individuals or could charge higher premiums, which is likely to reduce insurance coverage and access to care.

## *Employer-Based Insurance and "Job Lock"*

Health insurance coverage in the United States is closely tied to employment: about 90 percent of the privately insured have employment-related coverage. Thus, changing jobs often means changing health plans. Before HIPAA, workers starting a new job often had to wait to qualify for coverage of preexisting conditions. In some cases, new hires faced waiting periods for any health insurance. However, one important drawback of employer-based insurance is reduced mobility between jobs, or "job lock." Waiting periods or preexisting condition exclusions make it difficult to ensure continuity of insurance coverage when changing jobs. This can be a barrier to job mobility, particularly for those with chronic conditions. Evidence on the extent of job lock is mixed: some studies find little or no effect, but one study estimates that employer-based health insurance can decrease job turnover rates by up to 25 percent. When a person obtains coverage through a new employer, he or she may be subject to preexisting conditions exclusions or waiting periods under the new plan. In addition to creating costs for individuals, who may stay with a particular employer in order to keep health insurance, job lock may also impose costs on the economy by preventing workers from moving to those jobs where they are most productive. Policies like HIPAA and the proposed Medicare buy-in may help improve mobility between jobs.

## *The Health Insurance Portability and Accountability Act*

HIPAA contains a number of reforms designed to improve the operation of individual and group health insurance markets. It helps ease the transition between jobs and into self-employment and improves access to insurance for those who lack access to employment-based insurance and for small firms.

*Guaranteed issue and renewability.* HIPAA prohibits insurers from declining to cover individuals who were previously covered by a group plan and who have elected and exhausted their eligibility for extended coverage under COBRA (the Consolidated Omnibus Budget Reconciliation Act of 1985), which allows workers to buy into their former employer's plan for up to 18 months. HIPAA also prohibits insurers from refusing to renew coverage on the basis of health status, claims experience, genetic information, or other related factors. These provisions can help improve access to health insurance for small firms and individuals. However, HIPAA imposes no restrictions on the premiums that insurers may charge, so some individuals or firms may still be effectively excluded by prohibitively high premiums. In addition, insurers may try to find other ways to avoid selling insurance policies to high-cost individuals, through more targeted marketing or plan design as described above, for example. Newspaper accounts report that some insurers may even be instructing their agents in how to avoid enrolling higher risk applicants.

*Limiting preexisting condition exclusions.* HIPAA generally limits exclusion periods for preexisting conditions to 12 months. Some exclusions for preexisting conditions are appropriate, because otherwise people would have little incentive to purchase insurance when they are healthy, knowing that they could simply sign up after they get sick. Thus, it is important to design policies that increase accessibility without exacerbating this free-rider problem. HIPAA addresses this problem by requiring that individuals have continuous coverage in order to take full advantage of the limits on preexisting conditions exclusions. If a person was covered for a particular condition at one job and then changes jobs or elects to purchase individual insurance, he or she can “credit” the time covered under the previous plan against the preexisting condition period in the new plan. For example, someone who had 8 months of coverage could be required to wait no more than 4 months for coverage at a new job (assuming the employer offers insurance). In addition, those seeking insurance on the individual market must have 18 months of creditable coverage and must have exhausted coverage under COBRA (if eligible). Insurers offering coverage to these persons may not impose preexisting condition exclusions.

### *Proposals to Improve Access to Health Insurance for 55- to 64-Year-Olds*

Americans aged 55-64 are one of the more difficult-to-insure populations: they have less access to and great risk of losing employer-based health insurance, and they are twice as likely as younger people to have health problems. Many lose their coverage when they lose their jobs as a result of company downsizing or plant closings. Still others lose insurance when their retiree health coverage is dropped unexpectedly.

To address these problems, the Administration has proposed three policies as part of its proposed 1999 budget. First, persons aged 62-64 who lack access to employer-provided insurance would be allowed to buy into Medicare. The premiums, which would be paid in two parts—one contemporaneously, the second after turning 65—would cover the full cost of participation, making the policy self-financing in the long run. Second, displaced workers aged 55 and older who have lost their employer-based insurance as a result of job loss could also buy into Medicare. Third, retirees aged 55 and older whose employer drops their retiree health coverage would be eligible to buy into their former employer’s health insurance through COBRA. Retirees would pay a higher premium than do other COBRA participants, to reflect their higher costs. Each of these options provides a competitive alternative to individual insurance for people in this age group.

## *Voluntary Purchasing Cooperatives for Small Businesses*

As described earlier, small businesses are at a disadvantage in purchasing health insurance. To address this problem the Administration has proposed giving States grants to establish voluntary purchasing cooperatives for small businesses. Small firms could then pool together to negotiate insurance rates that are more affordable than those offered to them individually. This policy could help the large numbers of individuals working for small firms who are presently uninsured.

## CONSUMER PROTECTION AND QUALITY IN THE HEALTH CARE INDUSTRY

Health insurance plans are of two general types: fee-for-service plans pay providers for each service they perform, whereas managed care plans (such as health maintenance organizations) usually shift some financial risk to providers. Between 1980 and 1996, the share of workers enrolled in fee-for-service plans fell from 92 percent to 25 percent, primarily in response to rising health insurance costs. The expansion of managed care has helped slow the rate of growth in health insurance premiums by giving providers a greater incentive to control costs. But perceptions that the quality of care has suffered in managed care plans have made managed care the subject of criticism from consumer groups, the press, and the public. The last few years have seen a flurry of activity by the Congress and State legislatures, regulatory agencies, health plans, consumer advocates, and others to define a new set of consumer rights, protections, and responsibilities in response to consumers' concerns about the changing health care system. Although managed care has focused new attention on these issues, many of the concerns raised by these groups—and the actions they propose to address them—are equally important for traditional insurance plans.

The President's Commission on Consumer Protection and Quality in the Health Care Industry was established to advise the President on changes occurring in the health care system and, where appropriate, to make recommendations on how best to promote and ensure consumer protection and the quality of health care. The commission submitted a report, including a Consumer Bill of Rights and Responsibilities, to the President in November 1997. In addition, the Health Care Financing Administration (HCFA) has promulgated rules designed to protect Medicare and Medicaid managed care participants.

### *How Managed Care Works*

Managed care organizations typically contract with a group of hospitals and doctors to care for their enrollees. Enrollees generally must seek care from providers in the plan's network, although point-of-service plans, which allow enrollees to see providers outside the network, with higher cost sharing, are growing in popularity. ("Cost sharing" refers to out-of-pocket payments, such as deductibles and copay-

ments, required of insured individuals who receive care.) Whereas traditional fee-for-service plans control utilization mainly through cost sharing, managed care organizations rely on a number of “supply-side” utilization controls. For example, they may require enrollees to see a primary care physician, or “gatekeeper,” before they can go to a specialist, or may limit the types of treatments that providers can offer. Another important feature of managed care plans is that providers often bear some of the financial risk. For example, managed care plans may pay providers a fixed (“capitated”) payment for each member or use other mechanisms that give providers financial incentives to limit care.

### *Promises and Pitfalls in Consumer Protection Legislation*

Managed care highlights a new challenge to policymakers, namely, how to protect consumers and promote their informed choice among health plans without undermining managed care’s ability to control costs. More employers now offer their employees a choice of health plans—including managed care plans—and many of these ask employees to pay more for more expensive coverage. This can encourage plans to operate more efficiently, control costs, and provide higher quality care, but consumers need sufficient information to make good decisions about what features they want in a health plan—and how much they are willing to pay for them. Many of the activities of the President’s commission have focused on addressing the need for more user-friendly information about health plan features and quality, and for strengthening consumer confidence in the health care system. In addition, government attempts to micromanage the practice of medicine—whether in the name of cost containment or in the name of consumer protection—are an unwise use of regulatory authority and would either waste valuable resources or run counter to the goal of a quality-focused system.

The commission includes consumers, health care providers, health insurers, health care purchasers, representatives of State and local governments, and experts in health care quality, financing, and administration. In drafting its Consumer Bill of Rights and Responsibilities, the commission was guided by four principles:

- *All consumers are created equal.* The rights and responsibilities outlined by the commission should apply to all participants in the health care system, including beneficiaries of public programs, government employees, persons with individual policies, and those with employer-based coverage, including self-funded coverage. In addition, to the extent possible, these rights should be accorded to those who have no health insurance but make use of the health care system.

### **Box 5-2.—Quality Data Collection for Medicare Managed Care**

The Health Care Financing Administration has promulgated rules that will enable the agency to collect data on quality of care in and beneficiary satisfaction with Medicare managed care plans. The National Committee for Quality Assurance, in conjunction with HCFA, industry representatives, other purchasers, and beneficiary advocates, has developed 40 quality measures related to the Medicare population. These measures build on the Health Plan Employer Data and Information Set (HEDIS) developed by the National Committee for Quality Assurance for the under-65 population. HCFA will publish summary data to help beneficiaries choose among plans. Quality indicators will also allow HCFA to ensure that Medicare beneficiaries receive appropriate care from managed care providers, and will help identify areas for quality improvement.

Currently, managed care plans contracting with Medicare may have no more than 50 percent of their enrollment from Medicare. This provision was designed to help ensure that plans contracting with Medicare offer service of similar quality to that provided in the private sector. The Balanced Budget Act of 1997 eliminated this requirement, and new rules will allow HCFA to use actual quality data, rather than the 50-percent rule, in deciding which managed care organizations are eligible to contract with Medicare. This effort will improve HCFA's ability to ensure high-quality care and help beneficiaries make informed health plan decisions. In addition, more information about these plans could improve confidence in Medicare managed care, encouraging more beneficiaries to enroll in these plans.

- *Quality first.* In considering each proposal, the commission asked whether it would improve the quality of care and of the system that delivers that care.
- *Preserve what works.* Some elements of managed care and of fee-for-service plans must be changed to protect the rights of consumers. But each delivery system can also point to elements that have improved quality and expanded access.
- *Costs matter.* The need for stronger consumer rights must be balanced against the need to keep coverage affordable. Ultimately costs are borne by consumers and their families through higher health insurance premiums, higher prices, lower wages, fewer benefits, or less coverage.



Some reforms proposed by States and consumer groups would make managed care plans look more like traditional plans—for example, by requiring health maintenance organizations to accept all providers or limiting the use of financial incentives that may encourage physicians to limit treatment. To the extent that these regulations would prohibit practices that have helped managed care plans control utilization and spending, they could undermine the ability of health plans to control costs, and could ultimately reduce accessibility and affordability. However, to the extent that such policies improve the delivery of high-quality, efficacious care, they could improve health outcomes and may help offset cost increases.

Among the rights laid out by the commission is the right of consumers to “fully participate in decisions related to their medical care.” In order for consumers to participate in decisions affecting their health care, both when choosing a health plan and when considering treatment, they need information. The commission recommended that plans should disclose all factors—for example, the method of provider compensation and the plan’s ownership of or financial interest in health care facilities—that could influence providers’ advice or treatment decisions. In addition, “gag clauses” and penalties on health care professionals who advocate on behalf of their patients should be eliminated, so that providers can freely discuss all treatment options with their patients, and so that patients can make decisions based on informed consent.

### *New Rules for Plans Serving Medicare and Medicaid*

In 1996, HCFA adopted regulations limiting the use of some financial arrangements for health plans serving the Medicare and Medicaid populations. These rules prohibited plans from making payments to providers to limit necessary care, required plans to institute “stop-loss” provisions—which protect providers from very large financial losses—if the compensation method used places physicians or groups of physicians at substantial financial risk, and required disclosure of information about arrangements that transfer substantial financial risk to the health care provider. HCFA also banned the use of “gag clauses” for Medicare plans beginning in 1996 and Medicaid plans beginning in 1997. In addition, HCFA has sought new ways to ensure that Medicare managed care plans provide high-quality care by collecting data on quality and satisfaction in those plans (Box 5-2).

## FOOD AND DRUG ADMINISTRATION REFORM

The Food and Drug Administration Modernization Act of 1997 is designed to ensure the timely availability of safe and effective new products that will benefit the public health. The act, which codifies a number of initiatives taken by the Administration as part of its reinventing government effort, includes important provisions that will

establish a clearly defined, balanced mission statement for the Food and Drug Administration (FDA), improve access to certain experimental drugs prior to their final approval, establish a fast-track approval process for drugs to treat life-threatening or serious diseases, and reauthorize the Prescription Drug Users Fee Act (PDUFA) of 1992, increasing the resources available for the drug approval process.

### *Why Drug Regulation Is Needed*

Even without regulation, drug manufacturers would have some incentive to distribute honest and accurate information about their products. If a manufacturer repeatedly releases drugs that turn out to be ineffective or unsafe, its reputation will suffer, and it may have more difficulty selling new products in the future. The threat of litigation or a public relations crisis can further discourage drug companies from marketing unsafe products. However, drug companies are not likely to produce enough information about their products' safety and efficacy without regulation. The legal system may not provide adequate consumer protection, and regulation through litigation may come with high transaction costs. For example, companies could set up corporate subsidiaries to issue new drugs and shield the parent company from loss of reputation. Government regulation is then needed to remedy this underprovision of information by evaluating and approving drugs before they may be marketed.

### *Setting the Standard of Proof*

Setting the standard of proof for new drug approvals entails balancing two risks. On the one hand, approval of unsafe drugs may cause injury or death, and approval of ineffective drugs may crowd out alternative treatments or increase wasteful medical spending. On the other hand, denials or delays in approval may prevent sick people from getting more effective treatment.

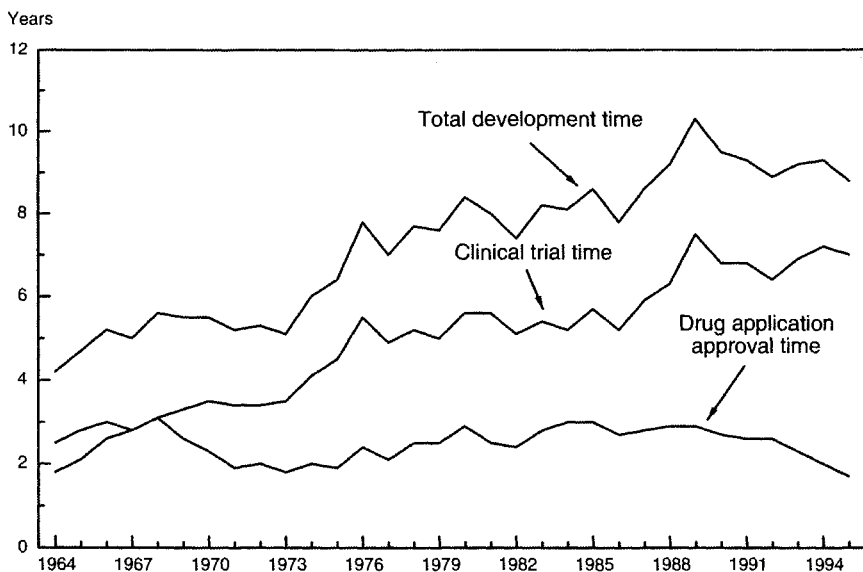
The FDA has historically focused primarily on minimizing the first type of risk (Box 5-3). In the late 1980s, however, the focus began to shift with respect to drugs for life-threatening illnesses, particularly AIDS. The FDA instituted a fast-track approval process for these drugs, and more patients were offered early access to these drugs before final approval. These policies recognize that the risk that a drug will prove unsafe or ineffective must be weighed against the risks of the disease itself. The FDA Modernization Act codifies and expands upon these reforms and establishes a mission for the FDA that explicitly emphasizes not only protecting the public health, by ensuring that products approved by the FDA meet high standards for safety and efficacy, but also designing a review process that does not unduly limit innovation or product availability.

### Box 5-3.—History of Food and Drug Administration Regulation of Drugs

In 1937 an elixir of sulfanilamide, an antibiotic, killed 107 people, most of them children. This tragedy hastened the enactment, the following year, of food and drug legislation already pending: the Federal Food, Drug, and Cosmetic Act gave the FDA authority to regulate cosmetics, prescription drugs, and therapeutic devices. The act required that products be shown to be safe before they are marketed. During the 1940s and 1950s the Congress subjected a number of other products, including food additives and pesticides, to FDA approval and enacted other requirements.

In 1962 the sleeping pill thalidomide was linked to serious birth defects in Europe. Although concerns with thalidomide related to safety, not efficacy, and the drug had not been approved in the United States, the scare generated support for extending the FDA's mandate to determining the efficacy of new drugs. These events culminated in the passage of the 1962 Drug Amendments, which required drug manufacturers to show that drugs were not only safe but also effective. The effectiveness requirement was associated with a rapid increase in total drug development time (Chart 5-8).

Chart 5-8 **Clinical Trial and Drug Application Approval Times for New Drugs**  
New drug development time has trended upward since the 1960s, although drug application approval time is at an all-time low.



Note: Data are 3-year moving averages.

Source: Tufts Center for the Study of Drug Development, Tufts University.

#### **Box 5-4.—The Prescription Drug Users Fee Act of 1992**

Between 1980 and 1991 the Congress enacted 34 laws that placed additional demands on the FDA. Yet the agency's budget resources have not always kept pace with growth in the number of products it reviews. The Prescription Drug Users Fee Act (PDUFA) of 1992 helped address this problem by allowing the FDA to assess fees on manufacturers seeking approval for drugs. PDUFA also set ambitious performance goals for reducing approval time for new drug applications and required that the fees not offset current funding.

Although faster NDA approval is important, it represents only a fraction of the total time necessary to develop and approve new drugs. Nor do shorter NDA approval times necessarily translate month for month into shorter total drug development times. The standard of proof for approval determines how many trials and how much analysis must be completed and is an important determinant of the time it takes a drug to travel from the laboratory to the medicine cabinet. In addition, total drug development time may rise or fall in response to a variety of other factors, from the efficiency of laboratory analysis to the chemical complexity of the drug.

Growth in total development time appears to have slowed nevertheless, and PDUFA is widely viewed as a success. The FDA has hired more than 600 new reviewers, and NDA approval times have fallen to record lows. As a result, PDUFA and its recent reauthorization have garnered broad industry support. In fiscal 1995 the FDA reported that 100 percent of the application backlog had been eliminated. In addition, the agency has met and exceeded PDUFA's performance goals for action on NDAs.

#### *Improving Efficiency in the Drug Approval Process*

Whatever the standard of proof for approval, rapid processing of new drug applications (NDAs) reduces the health costs associated with delay. Over the last several years the FDA has endeavored to streamline the NDA approval process and reduce unnecessary delays, and NDA approval times have declined significantly, especially for "priority" medications expected to have important therapeutic value. For example, seven drugs for AIDS and other life-threatening illnesses were approved in under 6 months in 1995. After rising since the early 1960s, the growth in total drug development time seems to have stabilized in the 1990s (Chart 5-8).

The FDA Modernization Act builds on the success of these initiatives to further streamline the approval process and reduce costly delays in

drug application reviews. The act reauthorizes the Prescription Drug Users Fee Act of 1992, ensuring that the FDA has the resources to review drug applications quickly and efficiently (Box 5-4).

## REDUCING TEENAGE SMOKING

The mere fact that people engage in hazardous behavior is not by itself evidence of market failure. But an externality exists if their behavior imposes costs on others, and an information market failure exists if they are not aware of the full costs to themselves of the activity. Smoking, especially by teenagers, arguably illustrates both types of market failure. In addition, because the cigarette manufacturing industry is highly concentrated, with just four firms accounting for the bulk of sales, market power is also a concern—although the higher prices that might result discourage smoking and ameliorate the other possible market failures. This section reviews important tobacco policy developments in 1997 and assesses them with respect to the rationale for government action based on market failure.

Last year marked a historic turning point in the long-running battle between tobacco companies and public health advocates over the harmful effects of cigarettes. First, a landmark rule by the FDA to protect children from the damage of tobacco products was upheld by a Federal judge in North Carolina. Next, the 1997 Balanced Budget Act took a first step toward reducing teen smoking by increasing the Federal excise tax on cigarettes. Revenue from this tax increase will help fund the State Children's Health Insurance Program. In addition, a proposed national tobacco settlement was reached last June between the major tobacco companies and a group of state attorneys general. Following an Administration review of the proposed settlement, the President challenged the Congress to pass sweeping tobacco legislation to reduce teen smoking. Full congressional consideration of such legislation was postponed until this year.

A major objective of both the FDA rule and the proposed settlement is to reduce access to and use of tobacco products by minors. The FDA rule prohibits the sale of nicotine-containing cigarettes and smokeless tobacco to persons under age 18 and imposes a number of restrictions on manufacturers, distributors, and retailers to limit easy access to cigarettes and other tobacco products and to decrease the amount of positive advertising imagery that makes these products appealing to children and teenagers. The proposed settlement goes beyond these prohibitions: it would increase the price of cigarettes and impose penalties on the industry if specific targets for reducing youth smoking are not met. Teens are more sensitive to the price of cigarettes than adult smokers. Estimates suggest that for every 10-percent increase in the price of cigarettes, the number of teenage smokers falls by 7 percent, versus about 4 percent for adults. The President's call for legislative action sought a comprehensive plan to reduce teen

smoking, including even tougher penalties than under the proposed settlement if targets are not met.

### *The Rationale for Regulating Smoking*

Tobacco use is one of the most important preventable causes of illness and premature death in the United States. Tobacco use is responsible for over 400,000 deaths each year—about 20 percent of all deaths. The average smoking-related death costs its victim up to 15 years of life. These facts alone might justify an active antismoking effort on public health grounds. But to make an economic case for discouraging smoking based on market failure requires evidence that people are unaware of the risks of smoking or that their smoking imposes costs on others. This case is less obvious than the public health case. It is hard to argue, for example, that people do not know that smoking is hazardous to their health. Indeed, at least one study suggests that people generally perceive the risks from smoking to be even greater than is consistent with scientific evidence. Another study finds that light and moderate smokers' assessments of the impact of their smoking on life expectancy are realistic, whereas heavy smokers significantly underestimate the risks. Similarly, it is widely recognized that smoking is habit-forming and most likely addictive. Yet mature adults are generally given the freedom to make choices that involve trading off the best possible health for other pleasures (like playing dangerous sports, overeating, overdrinking, or sitting on a couch watching too much TV).

The economic case for discouraging smoking based on incomplete information focuses therefore on the decision by teenagers to start smoking. To the extent that young people have short time horizons and are influenced by industry advertising, they may discount too heavily the risks of smoking and the difficulty of quitting. The studies cited above of people's perceptions of the risks associated with smoking did not include teenagers. The finding that heavy smokers underestimate the risks included only 50- to 62-year-olds; it is likely that teenagers' assessments are even more unrealistic. Society may legitimately wish to limit to adults the right to make such a risky decision as whether or not to smoke.

Tobacco use also imposes externalities. To the extent that the costs of treating smoking-related illnesses are not reflected in the insurance premiums paid by smokers, or in their tax and premium contributions to programs such as Medicare and Medicaid, smokers impose uncompensated costs on the rest of society. One influential study suggests that these costs are offset to some extent by the social savings in reduced pension and Social Security payments due to the premature death of smokers; it also suggests that existing excise taxes cover the net external costs of smoking. However, this study does not include the costs of all diseases in which smoking has been implicated, nor does it

consider such additional, potentially large external effects as illness and death from second-hand smoke.

Thus, reasonable economic grounds exist for policies aimed at regulating and discouraging smoking. Until last year, the tobacco industry was able to mount a largely successful effort to limit such efforts. It did, however, face the prospect of numerous lawsuits, including several State-initiated class action suits, aimed at recovering damages for smoking-related State Medicaid expenditures. Although the industry had a good record of winning such lawsuits, the ongoing litigation costs and the huge potential costs of an adverse verdict apparently made it worthwhile to the tobacco companies to seek a settlement.

### *Economics of the Proposed Settlement*

The proposed tobacco settlement reached last June illustrates some of the issues that will have to be addressed in any tobacco legislation. The settlement would impose a one-time \$10 billion charge on tobacco firms plus an annual payment, which would be adjusted for inflation and for the quantity of tobacco sold in the United States. In effect, the annual payment would function like an excise tax. Although the figure of \$368.5 billion is often cited as the industry's total payment, this number is misleading in several respects. First, \$368.5 billion is the simple sum of the \$10 billion initial payment and the base value of the first 25 years of annual payments (in constant 1997 dollars). A more economically meaningful approach would calculate the discounted present value of the stream of payments expected from the settlement, recognizing that a dollar paid 25 years from now is worth far less than a dollar paid today. For example, using a conservative discount rate of 3 percent, the present value of the first 25 years of payments described in the proposed settlement would be about \$260 billion at current sales volumes. Second, the base payment does not represent the amount that would actually be paid. Because the annual payment functions like an excise tax, the quantity of cigarettes sold will decline to the extent that the payment is passed on to consumers through higher cigarette prices. The payment collected will fall accordingly. (On the other hand, other features of the proposed settlement, such as the surcharge for not meeting youth smoking targets and an "excess profits" provision, could increase the payment.) Third, because it is anticipated that the settlement payment will be fully reflected in the price of cigarettes, the incidence of the annual payment will fall primarily on continuing smokers, not on the tobacco companies.

A Federal Trade Commission analysis of the proposed settlement raises additional concerns about its antitrust implications. The tobacco industry is highly concentrated, as noted above. Gross profit margins are also high. But even in highly concentrated industries, where prices may be higher than would prevail under perfect compe-

tition, rivalry among firms and the illegality of explicit collusion tend to keep prices below the level that would maximize industry profits. Numerous economic studies have found an elasticity of demand for cigarettes in the range of about 0.4 to 0.5 in the short run—meaning that each 10-percent increase in the price of cigarettes leads to a 4- to 5-percent decline in the number of packs sold. This implies that a price increase would raise industry profits: not only would the increase in price be more than enough to offset the decline in the quantity sold, but total costs would also fall with the reduction in quantity. Since demand is inelastic, if firms were free to collude they would have an incentive to raise prices substantially. The Federal Trade Commission's analysis points to certain aspects of the settlement, most notably its broad antitrust exemption, that could reduce rivalry and increase collusion. In general, the antitrust laws forbid collusion to fix prices because higher prices increase industry profits at the expense of consumer welfare and economic efficiency. In the case of cigarettes, however, higher prices could further the social policy goal of reducing smoking. Nevertheless, granting a broad antitrust exemption is neither the most direct nor the most socially desirable way of achieving higher cigarette prices.

This Administration believes that tobacco legislation must include stiff penalties that give the tobacco industry the strongest possible incentive to stop targeting young smokers. The proposed settlement includes targets to cut teen smoking by 30 percent in 5 years, 50 percent in 7 years, and 60 percent in 10 years. Legislation should further impose financial penalties that hold tobacco companies accountable to meet those targets. The Administration supports penalties that are non-tax-deductible, uncapped, and escalating—so that the penalties get stiffer and the price increases greater the more the companies miss their targets. Recognizing that one of the surest ways to reduce youth smoking is to increase the price of cigarettes, the President has called for a combination of industry payments and penalties that could add up to \$1.50 per pack to the price of cigarettes over the next decade. The Administration also supports a number of nonprice strategies for reducing youth smoking through tobacco settlement legislation, including public education, counteradvertising, stronger and more visible warning labels, and expanded efforts to prevent youth access to tobacco products.