CHAPTER 5

Markets and Regulatory Reform

THE U.S. ECONOMY RELIES primarily on the market system to determine what products are produced, in what quantity, and at what price. The market system is the most effective way of allocating resources to meet the needs and wants of households and families. The market system provides firms with strong incentives to produce the goods that consumers want at the lowest possible cost and to find innovative ways of meeting consumer demands. Firms that efficiently produce goods that consumers want will thrive; others will be driven out of business, and the resources they employ will be reallocated to more highly valued uses.

In deciding how much to buy at market prices, consumers register their opinions about the value of goods or services. In deciding how much to sell at market prices, producers reveal their information about how cheaply goods and services can be produced. Markets perform the complex job of sorting through this vast amount of information and opinion. The interaction between many producers and many consumers results in the production and consumption of an optimal quantity of each good—the best quantity from the standpoint of the economy as a whole. In order to produce more of one good, resources would have to be shifted away from producing other commodities, and the value of the lost production would be greater than the value gained by increased production of the first good.

Markets are flexible and accommodate change well. Changes in technology and consumer demands are quickly registered in the market, reordering the types, prices, and quantities of goods and services. The quest for profits encourages firms to develop new products and cheaper ways to produce existing products. A successful new product generates high profits, which provide an incentive to increase production of that product. Furthermore, markets can reduce the costs of adverse developments. A sudden shortage of a commodity will cause its market price to increase, encouraging consumers to conserve and producers to develop new sources of supply for the product.

The alternative to markets is to have central planners command production of what they think people should have, rather than what consumers want. As the experience of centrally planned

economies shows, government bureaucrats are rarely successful in matching quantity supplied and quantity demanded and can be quite inflexible in responding to change. In addition, people place a high value on the right to make free economic choices.

Some markets, however, do not operate according to the ideal. Some markets are necessarily served by a monopoly—a single seller that restricts output and sets prices higher than would occur in a more competitive market in order to maximize profits. In other markets, some people affected by the production or consumption of a good are not able to influence those choices. For example, firms and households may ignore the pollution problems they create or firms may not provide full information about the risks of using a product—information consumers may need to make the best decision. Market failures constitute a legitimate reason for governments to consider intervening in the private sector through such means as regulation. *There are costs associated with regulation, however. Attempts at regulation must be tempered by the understanding that the rules may be as imperfect as the market they are trying to improve; that is, governments as well as markets may fail.* A balanced approach to the limited amount of regulation that may be necessary in a market economy should be based on an understanding of costs and benefits and the use of market incentives to achieve the desired outcome.

REGULATORY REFORM

Since the mid-1970s, substantial progress has been made in reforming the way the Federal Government regulates industry. The result has been increased price competition and incentives for companies to introduce new products and services. For example, since the Airline Deregulation Act of 1978, the number of passengers flying annually has increased by 70 percent. Moreover, 43 percent of all trips are now flown in markets with three or more competitors, compared with only 24 percent in 1979 and the average fare per mile has declined 23 percent in real terms. In another example, the Securities and Exchange Commission eliminated fixed stock brokerage commissions in 1975, and in the following 6 years, rates for individual investors dropped by over 20 percent, while rates for institutional investors dropped almost 60 percent. Investors can now choose between discount brokers who simply make stock trades and brokers who provide complete investor services.

In some instances the benefits of regulatory reform efforts have not been fully realized because reform has not been completed. For example, the benefits of competition in the domestic airline industry have not been fully extended to international airline markets. Although the United States has negotiated some foreign aviation

treaties that encourage competition, many of the agreements allow foreign governments to restrict seating capacity, the number of competitors, and price competition. In addition, U.S. air carriers continue to be immune from antitrust laws when using the International Air Transport Association as a forum for setting international air fares. The use of this forum can lead to higher prices and fewer services than would be available in a more competitive market. By eliminating the immunity enjoyed by U.S. carriers an impediment to competition would be removed.

While some important examples of regulatory reform over the past 17 years have been the result of congressional legislation, agencies of the Federal, State, and local government often have great discretion in deciding how to implement the laws. The President's regulatory reform initiative has encouraged Federal agencies to eliminate unnecessary regulations and to use market incentives to achieve regulatory goals at lower cost, rather than using "command-and-control" mechanisms that mandate particular technologies or set profit levels.

REGULATION AND GOVERNMENT FAILURE

While regulation based on a careful balancing of costs and benefits can sometimes improve market performance, policymakers often ignore the fact that the government is an imperfect regulator. There are three reasons to be cautious about government intervention as the solution to market failure.

First, regulators often lack accurate information about an industry and cannot always predict the effects of specific regulations. While the decision to regulate may be well-intentioned, the regulations themselves can have perverse and unintended consequences. For example, corporate average fuel economy standards have led manufacturers to produce lighter and therefore less crashworthy cars than they would have, resulting in an estimated several thousand additional highway deaths per year.

Second, the regulatory process tends to favor those groups or businesses that can most influence the process in their own interest, rather than in the interest of society as a whole. For example, Federal rules continue to restrict competition in various industries such as international ocean shipping and international aviation. Restraints on competition continue in part due to the fact that organized groups, such as those representing labor and firms in the industry, capture benefits from the rules that exceed the costs of participating in the process and therefore invest in maintaining those rules. Each individual consumer, who must make similar expenditures to participate in the regulatory process, has less of a stake and thus as a group consumers tend to underinvest in changing the rules.

Third, regulation does not always accommodate change well. While regulation may be imposed to achieve economic and social goals, it is administered as a legal process. It often takes years to accommodate new technologies or new ways of doing business. For example, amendments made to the Real Estate Settlement Procedures Act in 1983 were meant to respond to the real estate settlement industry's interest in providing one-stop shopping for settlement services. Yet the process of actually writing the regulation that implemented the new laws took 9 years. During that period, uncertainties about what the regulations would permit slowed the development of innovative real estate settlement services. Regulatory inflexibility can also retard the introduction of new technologies, an issue discussed fully in the telecommunications section of this chapter.

Often the process of developing a rule does not end at the regulatory agency. Because all legislation requires interpretation, disputes arise concerning how well the rule conforms to the legislation's intent. Also, because those who stand to lose from a change in the regulatory structure can challenge a new rule, the regulatory process creates an incentive to litigate. Even after the courts render a decision, the process may have to begin again at the regulatory agency. Extended litigation makes it harder for the regulatory process to respond to changes within an industry and imposes costs over and above the expense of actually complying with a regulation.

A BALANCED REGULATORY POLICY

The Administration has sought to apply the lessons of imperfect regulation in developing its regulatory policy. The central principles of this policy have been to deregulate markets that can be competitive and to advocate only regulations meeting certain criteria: The benefits of any regulation should exceed the costs; the rules should rely, to the extent possible, on market incentives to achieve their goals; they should ensure that regulatory goals are achieved at the lowest possible cost; and they should provide clarity and certainty to the regulated community and be designed to minimize the potential for litigation. In January 1992 the President initiated a regulatory reform initiative asking Federal agencies to focus on these principles.

Similar principles have been applied, although not nearly extensively enough, when developing new legislation. The Clean Air Act Amendments of 1990 require major sulfur dioxide emissions reductions from electric utilities, but let markets arrange for those reductions at lowest cost. The use of "tradable allowances" will achieve the pollution reduction goals at savings of billions of dollars over the cost of mandating rigid pollution controls. Similarly,

the Energy Policy Act of 1992 contains significant changes in Federal regulations governing electric utilities. By encouraging competition among firms that generate electricity for sale to local electric utilities, these changes aim at reducing the cost of electricity to consumers and promoting more efficient operation of electric utilities.

These central principles of regulatory policy have also been incorporated into proposals for legal reform. Wasteful litigation carries with it a very high cost for the U.S. economy. *The Administration's proposed legal reforms are designed to reduce the costs of litigation, while maintaining a fair system of dispute resolution.* The 1991 Agenda for Civil Justice Reform in America proposes to reduce litigation costs by employing alternative dispute resolution techniques and by modifying the incentives for litigation. Greater access to alternative dispute resolution mechanisms such as private mediation or arbitration will enable less complex legal matters to be resolved without resorting to the court process. To modify the incentives for litigation the proposals suggest, among other things:

- capping punitive damages at an amount equal to a plaintiff's actual damages;
- discouraging frivolous suits by adopting, in a limited set of Federal cases, a modified "English rule" in which the loser would pay the winner's legal expenses, up to a level equal to the loser's expenses;
- limiting the amount of free document requests, after which the requestor would have to pay the costs of providing the documents.

These proposals would reduce litigation costs by hastening the resolution of disputes and discouraging waste in litigation.

THE REGULATORY REFORM INITIATIVE

The President began a regulatory reform initiative in January 1992 that asked Federal agencies, within existing statutes, to eliminate unnecessary government regulations and to ensure that the remaining regulations meet the criteria described earlier. In all, the 24 Federal agencies actively participating in the initiative proposed or adopted hundreds of reforms covering a wide array of government regulatory activities.

Many of the reforms are designed to reduce the paperwork burden regulation imposes on businesses. For example, the Internal Revenue Service has simplified the rules governing payroll tax deposits by businesses. Under the old rules many employers were required to make deposits as often as twice a week, but not necessarily on the same 2 days each week. Under the new rules, large employers will deposit payroll taxes on fixed days of the week and

more of the smaller employers are permitted to make monthly deposits.

Agencies have also streamlined the way they conduct their own business. For example, in April 1992 the Department of Justice and the Federal Trade Commission jointly issued Horizontal Merger Guidelines. For the first time, both agencies explicitly set forth the same standards for deciding whether certain mergers are anticompetitive. Joint guidelines should result in greater certainty about the standards applied in the more than 1,000 antitrust reviews of mergers conducted each year.

Finally, many agencies are working to promote competition by amending their existing regulations. For example, the Cable Communications Act of 1984 prevents local telephone companies from providing cable television service in their respective service areas. However, the act allows the Federal Communications Commission (FCC) to exempt telephone companies from this rule in rural areas, where competition from other sources is less likely to develop. In July 1992, as a part of its review of existing regulations under the regulatory reform initiative, the FCC proposed expanding the exemption from areas with fewer than 2,500 residents to those with fewer than 10,000 residents. If adopted, more rural residents would benefit from cable services provided by the telephone company in competition with existing television services. The FCC has also adopted new rules to increase competition in international communications and in local telephone markets.

MARKET INCENTIVES

A major objective of the regulatory reform initiative is to promote the use of regulations that utilize market incentives. The following sections describe three proposals of this type.

Performance Standards in Environmental Regulation

The Clean Air Act Amendments of 1990 require significant reductions in emissions that contribute to air pollution, but do not always dictate the precise methods that must be used to meet clean air standards. State and local governments will be able to determine how these standards are met in State Implementation Plans submitted to the Environmental Protection Agency (EPA) for approval.

The EPA has proposed allowing States to include in their plans the voluntary retirement of automobiles manufactured before the 1980 model year. Although these vehicles represent only 29 percent of registered vehicles, they cause 53 percent of hydrocarbon and 61 percent of carbon monoxide emissions, two contributors to air pollution. One cost-effective way of reducing these emissions is to replace aging vehicles with cars that emit fewer pollutants. Under the "cash-for-clunkers" program, a company that finds that a

planned expansion will increase its emissions over an existing EPA standard would have the option of offsetting this increase by purchasing and removing from the road "clunkers" operating in the same region as the plant.

For example, the cost to an industrial polluter of reducing emissions by some amount through conventional controls may be $1,000, but the owner of an old car that emits the same amount of pollution may be willing to sell the vehicle for $500. Under the EPA's proposal, the company could purchase the vehicle instead of directly reducing emissions from the plant. Estimates of emissions reduced would be based on a net reduction—for example, the difference between the emissions from the "clunker" and the emissions from the new car the seller is likely to purchase. *The EPA's "cash-for-clunkers" program expands the notion of performance standards by permitting standards to be met through alternative means, such as eliminating sources of pollution other than those directly controlled by the polluter.*

Incentive Regulation of Natural Gas Pipelines

Natural gas accounts for nearly one-half the energy consumed in American homes. Interstate natural gas pipelines transport gas across State lines, where it is sold to local gas distribution companies, electric utilities, and industrial users. The Federal Energy Regulatory Commission (FERC) is required by law to approve the prices interstate pipelines charge for transporting gas. Without regulation, a pipeline with a monopoly over gas delivery could raise prices above what they would be in a competitive market. Only when there is significant competition among pipelines to deliver gas would regulation be unnecessary.

While regulation may be necessary in cases where a pipeline does not face significant competition, the rules can be designed to create incentives to reduce costs and implement innovations. As part of the regulatory reform initiative, the FERC issued a policy statement on incentive rate regulation in October 1992. Along with outlining the essential elements of an incentive regulation policy, the policy statement sets guidelines for natural gas pipelines (as well as oil pipelines and electric utilities) that want to make specific incentive rate proposals to the FERC.

Under current practices, pipelines are regulated according to the traditional cost-of-service method. Pipelines provide the FERC with information on the costs they incur delivering gas, including the cost of building the pipeline facility. The FERC then determines the rates that can be charged to cover those costs, including a return on invested capital.

The limits placed on profits under cost-of-service regulation function as a substitute for the downward pressure on prices that exists in competitive markets. Unfortunately, cost-of-service regulation

offers the regulated firm few rewards for cutting costs or using innovative techniques and sets few penalties for excessive spending. Any attempt to reduce costs will eventually be followed by a reduction in the rates the company can charge, reducing total revenues, and leaving the firm no better off. A service innovation that increases profits will also result in a reduction in rates to bring revenues in line with costs.

The distinguishing feature of incentive rate regulation is that, unlike cost-of-service regulation, it focuses on prices rather than profits. Once rates are no longer tied to the costs incurred, further cost-cutting efforts do not translate into dollar-for-dollar reductions in revenues. Incentive regulation allows regulated companies to retain a portion of their cost savings, giving them an incentive to produce efficiently and to innovate.

One challenge in implementing incentive rate regulation is determining the price standard. Price cap regulation establishes an initial level of rates and then links a regulated company's rate increases to changes in an index of prices. An index related to the pipeline company's own costs would be inappropriate because it would immediately reestablish a link between prices and costs. An appropriate index would be one over which the company has no control, such as the consumer price index or the producer price index. Prices could be allowed to rise each year by an amount equivalent to a change in the index, less a fixed percentage that reflects expected improvements in productivity.

The price cap method has been employed in the FCC's regulation of American Telephone and Telegraph's (AT&T) long-distance services. A problem with price cap regulation as a long-run approach is that it frequently uses current prices as the base rate to which the index is applied. As costs change over time, the continued use of the same index could lead to firms earning large profits or suffering large losses. This is not a critical problem in the case of AT&T, which is in a transition to full deregulation. Many pipelines, however, are unlikely to face competition in the near future.

An alternative to the price cap method is yardstick competition, which establishes a target against which a company's performance can be measured. If the company improves on the target, its profits increase; if it does not meet the target goals, its profits fall. One way to implement this idea is to set a pipeline's prices equal to the average costs of *other similar* pipelines. All pipelines would want to lower costs under this system. Any pipeline that did not would eventually find itself with prices targeted to industry costs that are lower than its own costs. Yardstick competition forces firms to compete on the basis of efficiency even though they do not compete directly in transporting natural gas. One critical task facing a reg-

ulator proposing to use yardstick competition will be in identifying comparable pipelines and adjusting for differences among them.

Peak/Off-Peak Pricing at Airports

Every day, consumers pay for services whose prices are dependant on the time of day or the season. A typical long-distance telephone call has a price of 23 cents per minute during business hours, when usage is high, but only 13 cents per minute late at night, when usage is low. Movie ticket prices are higher during evening hours, when demand for service is high, but are often lower at other hours. In both of these cases there is a fixed capacity for providing a service and patterns of usage that vary throughout the day. The prices reflect the high value placed on the service during periods of peak demand.

Airports are in a similar situation, because they also operate with a fixed capacity, in this case to handle takeoffs and landings. Approximately one-third of all delays are caused by demand that exceeds the capacity of air traffic control and runways during peak periods. As a result, the Nation's airport infrastructure is inefficiently used and some of the benefits of airline deregulation are lost. Constructing additional runways is a plausible long-term solution, but in the short term the existing system can be more efficiently used. Time-based fees, or "peak/off-peak" prices, used regularly by electric utilities and telephone companies, are not commonly used by airports. The Department of Transportation is considering guidelines for local airport authorities on the use of time-based takeoff and landing fees to reduce airport congestion.

Currently, the typical airport landing fee is based on the weight of the airplane using the runway. Basing fees on weight is aimed at approximating the airport's costs of servicing an airplane flight (including space used and wear-and-tear on the runway). However, such fees do nothing to alleviate airport congestion during periods of high demand. Instead, takeoff and landing fees should reflect all costs, including the costs of delay that one carrier imposes on another, so that those who value airport use most highly will use the airport at peak times.

By making congestion costs explicit, so that those placing the highest value on peak service will use the airport during peak hours, congestion would be reduced. *Without a peak/off-peak pricing system, passengers will continue to "pay" the costs of congestion, but it will be in the form of long waiting times and takeoff delays.* Similarly, publicly funded highways and streets that serve as low-cost or free roadways tend to be congested at peak use times. Peak/off-peak pricing could be used to solve road congestion problems as well.

SUMMARY

- A major goal of the President's regulatory reform initiative has been to encourage Federal agencies to eliminate unnecessary regulations and to use regulatory innovations such as incentive rate regulation.
- Regulations that incorporate market incentives can be used to reduce pollution at lower cost than command-and-control methods.
- Setting appropriate prices for the use of the Nation's transportation system will assure that these resources are being used efficiently.

TELECOMMUNICATIONS: REGULATORY REFORM AND INNOVATION

Telecommunications is a broad sector encompassing local and long-distance telephone services, satellite services, information services, broadcasting, cable television, program production, and manufacturing of associated equipment. Rapid technological change and regulatory reform in the industry have increased the variety and quality of entertainment, information, and communications services available to consumers and businesses. In the past, for example, many Americans could only receive 3 television channels; now access to 50 channels is not uncommon. The venerable national "phone company" monopoly is being transformed into a multiplicity of entrepreneurs and firms, and competition has developed in many markets for telecommunications services and equipment.

While some parts of the industry are vigorously competitive, others remain tightly regulated. There is legitimate concern that, without regulation, consumers in some markets will not be protected from monopoly pricing. Insufficient weight, however, has been placed on the costs of regulation; costs that not only include complying with regulation, but also the hidden costs of forgone product innovation. *The goal of the Administration has been to reform the regulatory structure for telecommunications so that consumers receive the benefits of new products and services but are protected in cases where markets are not competitive.*

TELECOMMUNICATIONS AND THE U.S. ECONOMY

The U.S. telecommunications industry comprises thousands of businesses and over 1 million workers. Telephone services alone, including long distance, local, and cellular, are provided by over 2,000 companies employing over 700,000 people—about the same number as the entire U.S. automobile manufacturing industry. In

1991, reported local telephone revenues were $86 billion and long-distance revenues were $55 billion. Interstate long-distance communications represents a particularly high-growth component, with the volume of calls more than doubling since 1984. A second major segment of the telecommunications industry, the mass media, includes approximately 1,500 broadcast television stations, 11,000 radio stations, and 76 national cable television networks. In 1991, these industries earned about $36 billion in advertising revenues.

One measure of performance in the telecommunications industry is productivity. Even with significant deregulation in the United States, the telephone services sectors in more heavily regulated France and Japan have the same labor productivity levels, measured by output per worker, as the United States. One possible reason is that the majority of U.S. telecommunications employees still work for the regulated local telephone monopolies. Competitive pressure to improve efficiency has, until recently, been absent in this sector because traditional rate-of-return regulation does not encourage cost-cutting measures that could improve labor productivity.

Where the United States does hold a lead is in capital productivity. A recent study estimates that 2.4 calls are made in the United States for each dollar invested in the network, but only 1.3 in Japan, 1.2 in the United Kingdom, and 0.6 in France and Germany. The United States' lead is due largely to a higher demand for telephone services and a correspondingly higher rate of network utilization. In part, competition among long-distance carriers and government pricing policies have stimulated demand by lowering long-distance rates so that they more closely reflect the actual costs of providing the service.

Some have called for large public expenditures on the U.S. telecommunications infrastructure to expand the use of technologies such as fiber optics. Yet it may be regulation that is discouraging firms from investing in new infrastructure. When regulatory barriers are removed, competition and the ability of firms to reap the rewards of their success provide sufficient incentives to invest in commercially viable telecommunications technologies. There are times, however, that firms are reluctant to invest because they cannot be assured of fully capturing all the benefits of their investments. It is often difficult or inefficient to prevent information on research or developing technologies from being used by other firms. In such cases the government may have an appropriate role to play in financing basic research and precommercial technologies, but only if the benefits of the project exceed the costs.

However, government investment in particular commercial technologies amounts to little more than an attempt to guess which products will be most in demand and then to determine the best

ways of producing them. High-definition television (HDTV) provides a good example of this problem. The Japanese government determined the technology that would be used for HDTV in their country and financed its development. It now appears, however, that the government-chosen analog technology was inferior to other alternatives. Left to itself, U.S. industry has developed alternatives to Japanese HDTV using a digital technology that appears to be superior in quality. *Rather than having taxpayers invest in predetermined technologies, the government should create a more sensible regulatory environment to ensure continued productivity improvements and the development of advanced telecommunications technologies.*

GUIDELINES FOR REFORM IN TELECOMMUNICATIONS REGULATION

Today, technological innovations are making competition feasible in areas where it was previously considered infeasible. For example, one company has announced that it will soon have the technology to deliver movies over existing telephone wires. Similarly, cable television companies have the capability to provide customers with telephone service on their lines. The full benefits of these opportunities will be lost if the government maintains a regulatory structure that restricts competition and preserves artificial industry boundaries.

The Current Structure of Telecommunications Regulation

The U.S. telecommunications industry is governed by Federal, State, and local regulatory agencies, with the Federal courts playing a special role. The FCC, the principal Federal regulatory agency governing telecommunications, is responsible for regulating interstate and international long-distance telephone services, managing non-Federal U.S. radio spectrum use, enforcing the rules applicable to the broadcasting industry, and establishing standards.

A complicating factor in the Federal regulatory structure is the 1982 court settlement of the Federal Government's antitrust case against AT&T. This settlement, or consent decree, governed the subsequent breakup of AT&T. Under the decree, AT&T was required to divest itself of its 22 local telephone companies, which were then formed into 7 independent companies known as Regional Bell Operating Companies (RBOCs), or "Baby Bells." Most importantly, the decree also placed limits on the products and services the RBOCs could produce. Although some of these restrictions have been lifted, applications for interpretations of and waivers from the remaining restrictions have made the Federal courts a virtual second Federal regulator.

State regulatory commissions are responsible for regulating intrastate telephone services, but they also share their authority

with Federal regulators because the same equipment is often used to provide both interstate and intrastate service. For example, the same telephone company switch that handles calls from San Francisco to Los Angeles may handle calls from San Francisco to Phoenix as well. But the first call is regulated by the State government and the second by the FCC. A system of rules and joint boards has been developed to help separate the Federal and State roles. The role of local government, on the other hand, has generally focused on franchising cable television service. The local government's role in cable television rate regulation will be expanded by new legislation, an issue discussed in detail below.

The Transition to Competition

One primary justification for limiting competition in the telecommunications industry has been the belief that certain markets are served by "natural monopolies," or single suppliers that can meet consumer needs more efficiently than multiple suppliers, often with appropriate regulation of prices and the number of competitors. A classic example is the costly duplication of facilities that would result from having competing electric utilities within the same geographic area. Based on the natural monopoly rationale, cable television services and local telephone services are provided by a single company in most communities.

But monopoly franchising and rate regulation can also have drawbacks. Protecting a monopoly may prevent potential competitors from implementing technologies that do not share the cost characteristics of a natural monopoly. For many years, regulators considered long-distance telephone service a natural monopoly, but the development of microwave technology allowed the provision of long-distance telephone service on a much smaller scale than had been previously possible. Almost 500 firms now provide long-distance services, ranging from those that serve a variety of customers on a national scale to those that target specialized business markets or operate on a much more limited geographic basis. New transmission technologies may achieve similar results in other markets that have been characterized as natural monopolies, such as cable television and local telephone service. In fact, government regulation, and not economic factors, may be the real bar to competition in those markets.

Competition drives firms to innovate and provide new services. In many telecommunications markets, competition is superior to continuing rate regulation and monopoly franchises, because competition can lower prices and increase the diversity of available services.

Protecting Consumers in the Transition

Markets in which competition has been precluded by government regulation cannot become competitive overnight. For example, providing local telephone service requires significant capital expenditures for new companies. Immediate deregulation of rates would allow a monopolist to increase rates without fear of an immediate response from a competitor. As a result, where changing technology and removal of governmental regulation make it possible for a regulated monopoly market to evolve into a competitive market, consumers must be protected from temporary price increases during the transition to competition. As part of the transition, incentive regulation is being used to encourage regulated companies to operate more efficiently.

In many areas, regulation has been used to enforce a system of cross-subsidies that keep prices low for certain classes of users, such as residential and rural telephone subscribers (Box 5-1). During a transition period—or longer if the subsidies are justified—these cross-subsidies should be replaced by direct subsidies.

When deregulatory policies create partially deregulated firms or allow regulated firms to enter unregulated markets, additional safeguards may be necessary to protect consumers and competition. For example, telephone companies in States that use cost-of-service regulation to determine rates may inappropriately transfer costs, or "cross-subsidize," from the unregulated to the regulated sector, artificially inflating prices for telephone service, and under some circumstances, reducing competition in the unregulated markets. In such cases, safeguards are necessary to ensure that customers are not subsidizing company activities in unregulated markets. Safeguards are also necessary to ensure that telephone companies do not design or misuse the network in ways that discriminate against companies selling related but unregulated services.

REFORMING TELECOMMUNICATIONS REGULATION

The transition from regulation to competition in telecommunications began over 20 years ago. Technological change, actions taken by the FCC, and the breakup of AT&T in 1984 have allowed many new firms to enter the telecommunications industry. For example, in 1970 AT&T's manufacturing subsidiary, Western Electric, provided almost all of the company's equipment needs and the equipment used by its customers. FCC and court decisions to allow customers to use non-AT&T equipment and the separation of the RBOCs from the manufacturing subsidiary, coupled with rapid advances in electronics, created a competitive market for equipment. For instance, AT&T's U.S. market share of sales for private branch exchanges (telephone exchange equipment for use within businesses) fell from 80 percent in 1970 to 28 percent in 1989.

Box 5-1.—If Deregulation Is So Great, Why Has My Phone Bill Gone Up?

When a telephone call is made across the country, a local phone company starts the call, a different local company completes the call, and a long-distance company carries the call between the two areas. Thus, the local phone network plays two roles: It provides phone service in a local area and access to long-distance service. Before 1984, AT&T, with its virtual monopoly over long-distance and local telephone service, carried nearly all phone calls. To determine the price of a long-distance call, Federal and State regulators had to allocate some of the costs of the local network to long-distance usage. With a higher share of the costs attributed to long-distance calling, long-distance prices would be higher and local service prices lower.

Political pressures resulted in a shift of costs to the long-distance operations of the telephone network, so that local rates were kept artificially low. This regulatory shift of costs resulted in prices that led to an inefficient use of the network. The cost of providing a customer access to a long-distance company is a *fixed cost*, unrelated to the number of long-distance minutes that are used. However, these fixed costs were reflected in the per-minute charge for service, a price that should only reflect the extra, or *marginal cost*, of providing the service. The higher long-distance rates resulting from this policy caused users to reduce long-distance calling and prompted the entry of other companies.

Realizing the problems arising from this pricing policy, the FCC began reform in the late 1970s. Instead of including the costs of access in long-distance prices, some access costs are now recovered through a fixed monthly *subscriber line charge* added to the local telephone bill. The FCC has been gradually shifting access costs for residential customers to the subscriber line charge since 1983. The monthly price for local telephone service increased 3.1 percent annually between 1983 and 1989 in real terms. For some, this increase has meant higher phone bills. But interstate long-distance prices *declined* 9.8 percent annually in the same period as a result of increased competition, the repricing of access, and technological improvements.

Many current regulations may continue to inhibit competition in the telecommunications industry, however. Even with safeguards in place, the RBOCs are limited in their ability to enter unregulated markets. Moreover, as discussed below, the cumbersome process

by which the government manages the electromagnetic spectrum continues to slow the development of new technologies that could lead to greater competition in local telephone markets. Competition in local telephone markets could make regulatory safeguards unnecessary. Competition would make it unprofitable for telephone companies to discriminate against customers wanting to connect with a local network, because dissatisfied customers could simply switch to alternative networks. Similarly, competition would undermine attempts by one firm to use one business to cross-subsidize another.

The government decides not only which services the local telephone companies can provide but also which services cable operators and broadcasters can provide. For example, three television broadcast networks—CBS, NBC, and ABC—have not been allowed to participate fully in the development, ownership, and syndication of programming for broadcast and cable television since 1970. At that time, the networks' over 90 percent share of the prime-time viewing audience created concern that the networks had excessive bargaining power over program producers, especially small independent producers. These financial interest and syndication rules are unnecessarily restrictive, given that the share of prime-time viewing the major networks command has fallen to 62 percent and that there are now a multiplicity of alternative broadcast outlets for program producers. Furthermore, an increasing fraction of program production is being done by a small number of large firms. Therefore, the rules should be eased to allow greater participation by networks to promote competition, while assuring that legitimately small independent producers are not subject to anticompetitive conduct. The FCC modified the rules slightly in 1991. A Federal Appeals Court, however, has questioned the manner in which the modified rules were devised and has sent the matter back to the FCC. The future of the rules remains uncertain.

While the goal of regulation has been to protect consumers, barring businesses from entering new markets may be reducing the incentive of firms to invest in new telecommunications technologies. Furthermore, policymaking in telecommunications is stymied because businesses protected from competition can use the political process to prevent entry by new competitors, while at the same time demanding freedom to enter other markets. To break this deadlock, protect consumers, and promote competition, reform of the current telecommunications regulatory policy is necessary.

Managing the Electromagnetic Spectrum

The electromagnetic spectrum is the foundation of many telecommunications services. Radio and television broadcasters, cellular telephone services, police and fire communications, air traffic control, and taxi dispatchers all rely on the spectrum. Because the

range of frequencies within which these services can be provided is limited, spectrum is a very valuable resource. The FCC, which is responsible for managing the portion of the spectrum not used by the Federal Government, determines which services will be allowed to use a given spectrum band (known as "allocating" the spectrum), and who will be assigned licenses for their use.

While the FCC has a legitimate role in defining the terms under which spectrum is used in order to prevent users from interfering with each other, it is not well-suited to judge whether, for example, paging systems have a higher social value than taxi dispatching. The current administrative process for determining how bands are used is slow and inflexible, constraining the introduction of new technologies and the development of competitive markets. Cellular telephone technology illustrates this problem. The spectrum allocation process began in 1968, yet the first commercial cellular license was not assigned until 1982. Also, the number of licenses is fixed, limiting competition to two cellular franchises in each local market.

Currently, the FCC typically assigns licenses to use a given service either after comparative hearings or by lottery. Comparative hearings are time-consuming, trial-like procedures. Companies that place value on a license will naturally want the FCC to assign it to them. The result is large expenditures by applicants to acquire the license and a long delay before the license is assigned. The lottery system is also cumbersome, involving large numbers of applicants attempting to "win" a license. When an assignment is made, the chosen licensee often does not provide the service. Instead, licenses are frequently sold after the initial assignment. *Since licenses are often sold to other users, the FCC could hold an auction for licenses, eliminating the current cumbersome process and generating revenue for the U.S. Treasury.* The bidder attaching the greatest value to the spectrum license would receive it, and the step of holding lotteries or comparative hearings would be eliminated.

To permit more efficient use of the spectrum the FCC could allow the licenses it auctions not only to be resold, but also to be reassigned by the licenseholder for a different use. This approach would offer licensees the maximum flexibility in using the spectrum, subject only to prohibitions on interfering with other spectrum users. Flexibility in the use of the spectrum would also encourage users to develop technologies that conserve the amount of the spectrum used.

Removing Artificial Barriers to Innovation

Like the spectrum management system, the consent decree governing the breakup of AT&T limits innovation and competition in telecommunications markets. Among other things, the 1982 decree contained provisions that prevented the RBOCS from manufactur-

ing telecommunications equipment, providing information services, and providing most long-distance services. The problems of cross-subsidization and discriminatory use of a monopoly network were two important reasons for initially limiting participation of the RBOCs in unregulated markets.

In 1991 a Federal court struck down the provision in the decree that barred the RBOCs from providing information services, allowing these companies to begin offering services such as message and database services. Previously forced to act as conduits for other providers of information services, the RBOCs can now provide these services themselves. Because these companies have developed expertise in communications networks and can take advantage of the efficiencies, or "economies of scope," that make it cheaper to provide multiple services over a single network than to have many specialized networks, they will increase competition for information services.

The benefits of having competing services will be reduced, however, if the RBOCs limit competition by engaging in cross-subsidization or by denying other firms access to the local telephone network. These problems must be continuously monitored by Federal and State regulatory agencies. To reduce the concern about cross-subsidization and discrimination, the FCC has adopted rules governing cost allocation and rules that attempt to assure open access to various components of the local telephone network on a timely and nondiscriminatory basis. If problems arise, these rules may have to be strengthened even further. The rules will continue to be necessary until competition is fully developed in local telephone markets.

The RBOCs are still barred from manufacturing telephone equipment, a category the courts have interpreted as including related research and development. The ban effectively prevents seven of the largest U.S. telecommunications companies from developing innovative technologies and otherwise competing in this market. Supporters of the ban fear that the RBOCs will attempt either to transfer manufacturing costs to the regulated sector or to engage in "self-dealing" by selling equipment to their affiliated telephone companies at inflated prices, raising the costs of regulated telephone service and reducing competition in equipment manufacturing.

The FCC and many States have begun using incentive regulation that should help to alleviate these problems by making it more difficult for the RBOCs to pass added costs on to telephone ratepayers. Also, a competitive market for telecommunications equipment should provide competitors and regulators with adequate information on the market value of equipment, to allow them to monitor the self-dealing problem.

While the consent decree prevents the RBOCs from participating in certain businesses, the Cable Communications Policy Act of 1984 and related FCC regulations prevent local telephone companies from operating cable television systems (except in certain rural communities). This ban remains in place, even though virtually all communities with cable television have only one franchised operator, and average rates for the most popular basic cable service have increased 36.5 percent, in real terms, since 1986 when the act effectively barred regulation in most communities. Although this increase may be due in part to the growing number of channels available, it may also reflect the presence of market power.

The solution pursued in the Cable Television Consumer Protection and Competition Act of 1992 is to allow local governments to regulate prices for basic cable television service in almost all communities. Regulating prices, however, does not solve the underlying problem, which is a lack of competition. This approach also overestimates the ability of regulatory authorities to establish rates that approximate competitive prices. The danger is that in the attempt to regulate prices they will simultaneously diminish the variety and quality of cable programming.

The preferred alternative is to promote competition that lowers prices and provides alternative sources of television programming. Having already invested in some of the fixed plant necessary to provide video services, telephone companies are the most likely competitors for incumbent cable operators. The FCC's "video dialtone" policy, adopted in July 1992, allows local telephone companies to act as conduits for carrying television and other video services by other companies. *Legislation is needed, however, to remove the provisions in the 1984 Cable Act that prevent telephone companies from actually becoming full participants in providing programming.* Such legislation may create an incentive for telephone companies to construct the infrastructure necessary for combining telephone and video services. Whether there is a demand for the services that such an infrastructure can provide will not be known until the barriers to competition are removed.

Competition in Local Telephone Services

State regulators have begun to approve competition from alternative local service providers that typically provide private fiber optic links between long-distance telephone companies and large businesses. In 1989, the New York Public Service Commission ordered New York Telephone to interconnect with alternative local service providers. The FCC recently modified its rules to allow these providers to interconnect their private lines with the interstate facilities of local telephone companies. The policy of expanded interconnection increases the possibility of competition for large customers. It recognizes that residential customers may be served

by a regulated monopoly for the near future, but is laying the groundwork for competition even in residential markets.

Technological changes suggest that competition can develop in the local telecommunications market. Many businesses have already switched to private networks for intracompany calls. Expanding wireless technologies, such as that for cellular telephone service, do not necessarily have the characteristics of a natural monopoly and represent potential competition for local telephone companies. Competition for local telephone service would be further enhanced if cable television companies were permitted to provide telephone service.

An important factor affecting competition in the future is the policy of "universal service"—access for all residential users to a basic level of telephone service at affordable rates. This policy has been motivated by both equity concerns and the understanding that each telephone user benefits from being connected to as many people as possible. To make telephone service universal, basic services are often priced lower than the cost of providing the service. Other services, such as touchtone or call waiting, are priced somewhat higher than costs to compensate for losses on the underpriced basic services. Residential customers are usually the recipients of these "subsidized" services.

One problem with this system of cross-subsidies is that companies—even those less efficient than the regulated incumbent—may be able to undercut the regulated price and still earn a profit. If the regulated monopolist cannot adjust its prices in response to this competition, the inefficient companies will remain in business. This pricing policy could ultimately cause many of the monopoly's customers to switch to the new entrants, meaning that rates for some of the subsidized services would have to be increased.

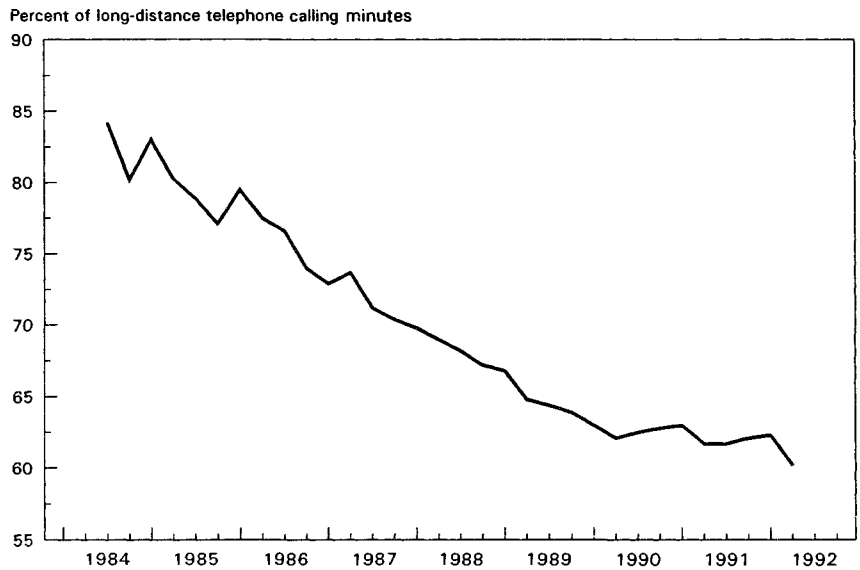
If regulated carriers are not permitted to respond to competition, they may find that their rates do not cover the costs of providing service to their remaining customers—most likely small businesses and residential customers. Restricting competition is not the answer to the problem, however. The best way to avoid the perverse results cross-subsidies can create is to give the regulated companies greater freedom to respond to competitive entry. Doing so will discourage entry by inefficient competitors and only efficient competitors will survive. Any perceived need for subsidies can be achieved directly—for example, by charging all interconnecting companies a fee that supports universal service and targeting the subsidy to the groups that need it.

Competition in Long-Distance Services

In a series of decisions that began in the 1970s, the FCC and the courts have opened the long-distance markets to competition. Chart 5-1 shows that since its breakup in 1984, AT&T's market share of

long-distance calling minutes has fallen from 84 percent to 60 percent. The FCC estimates that some 480 firms currently provide interstate long-distance services, while over 90 percent of all telephone customers now have equal access to multiple long-distance providers. Customers have shown a willingness to respond to competitive service offerings: Approximately 15 percent of all residential customers switched to a new long-distance carrier in 1991.

Chart 5-1 **AT&T's Market Share**
AT&T's market share has declined significantly since the breakup in 1984.



Source: Federal Communications Commission.

Except for AT&T, the FCC does not regulate the rates of interstate long-distance companies. To promote the efficiency of rate regulation while still protecting consumers, the FCC introduced price cap regulation for AT&T in 1989 and for the interstate services of local telephone companies in 1991. Several States have also introduced incentive regulation for intrastate services. In 1991, increasing competition led the FCC to eliminate price cap regulation for AT&T's large business services.

Price cap regulation is still in place for AT&T's residential, small business, and 800 number services. For these services AT&T must give the FCC at least 45 days notice before it can offer new services or prices. The ability of most long-distance customers to easily switch among long-distance companies that provide similar geographic coverage and service quality suggests that the FCC should

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consider relaxing the constraints of price cap regulation on AT&T. However, some form of regulation would still be appropriate for communities that do not have a competitive long-distance market.

SUMMARY

- Government policies that protect consumers while allowing firms to compete in new lines of business will promote an advanced telecommunications infrastructure.
- The current system for allocating the electromagnetic spectrum hampers the development and implementation of new technologies that could create competition for existing monopoly service providers such as cable television and local telephone service.
- Because competition in long-distance telephone service is increasing, some of the remaining regulations governing AT&T could be relaxed.

REGULATING FINANCIAL MARKETS AND SERVICES

Well-functioning financial markets are essential to a modern market economy. New and expanding business enterprises need capital to make investments and create jobs, and they rely on the futures, options, and foreign exchange markets to control unwanted risks. Families and businesses buy insurance to shield themselves from catastrophic losses. Well-developed mortgage markets foster widespread homeownership.

Like the telecommunications markets, financial markets are subject to a wide variety of government regulations, including some that are unnecessary, outmoded, and overly rigid. *U.S. financial markets are the largest and most developed in the world, and their continued success depends on the government's ability to remove unnecessary regulatory impediments while at the same time protecting investors and maintaining market integrity.*

THE CHANGING FINANCIAL SCENE

The last 20 years have witnessed an explosion in the scope and complexity of financial markets. The traditional roles of banks and savings and loans (S&Ls) are in transition, and new institutions and services have multiplied. Several important developments have contributed to these changes. First, technological progress in electronic communications has lowered information costs and made financial services more available. A familiar example is the spread of automatic teller machines, which freed depositors from the constraints of limited geographical access and short banking hours. Increased computerization also has accommodated large increases in

trading volume in the securities markets. Second, conceptual advances in finance have provided tools to assess the risk and value of financial instruments such as options and futures contracts, contributing to the rapid growth of these securities markets. Perhaps most important, the view of the government's role in financial markets has changed significantly since the 1970s. Regulatory reform has allowed the development of new services that are now available to the public. These changes have contributed to and in some cases were motivated by the globalization of these markets. Globalization has lowered the cost of raising capital for U.S. businesses by providing foreign sources of capital and has provided Americans with the opportunity to make valuable investments abroad.

These developments have not been universally welcomed. Some observers fear these innovations, perhaps because they know little about them or are uncomfortable with the colorful vocabulary used to describe new financial products. Skeptics associate what they view as the increased volatility of financial markets with some of these changes. After several highly publicized cases of fraud, other critics questioned the integrity of some markets. Still others are less concerned with the risks inherent in new products than with the possibility that an overly broad Federal safety net—including Federal deposit insurance—could encourage excessive risk-taking that would be difficult to monitor and regulate. In an effort to keep pace with innovation, public and private regulatory mechanisms have been put into place to identify problems as they arise and to correct them promptly. Most observers would agree that, in general, the innovations have been beneficial.

THE VALUE OF FINANCIAL SERVICES

Despite their seeming complexity, most financial instruments and institutions can be understood in terms of three basic functions. First, people use financial markets to reallocate money over time. For instance, instruments such as savings accounts, individual retirement accounts (IRAs), stocks, bonds, mutual funds, and pension funds allow households to save for retirement. At the same time, these instruments channel funds to businesses and households that borrow to make investments.

Second, people use financial contracts to share and reduce risk. An insurance policy is perhaps the most familiar example, but most new financial instruments can be used for risk management as well. One extremely effective way to reduce risk is through diversification. The return on a diversified stock portfolio is much less risky than the return on the stock of an individual company, because in a portfolio, gains from profitable firms offset losses from others that fail. Mutual funds are institutions that allow small in-

vestors to pool cash to purchase a diversified portfolio, balancing risk and return with tools once available only to large institutional investors or wealthy individuals.

Other contracts can also reduce risk. For instance, a U.S. manufacturer selling cars in France runs the risk of losing money if the franc falls against the dollar, and a French farmer selling cheese in the United States faces the opposite risk. In each case, the exchange-rate risk can be eliminated by writing a contract with a financial intermediary such as a bank or a trader in a brokerage firm, specifying the exchange rate that will be used in the future. Popular contracts of this type include futures, forwards, and swaps (all of which are agreements to make specified payments on specified dates). The growth of active futures, forward, and swap markets has significantly lowered the cost of risk-management.

The third function of financial markets is to provide liquidity. An asset is liquid if it can be bought or sold quickly, at a predictable price, and with low transactions costs. For instance, a savings account is very liquid because it can be turned into cash almost instantly, while a house is illiquid because it takes time to sell and its price is hard to predict. By offering standardized contracts with well-understood risks, returns, and legal status, and by providing information to the market, financial intermediaries enhance liquidity, lowering transactions costs for investors and borrowers alike.

Because participants in financial markets can invent, develop, and market new financial instruments, the macroeconomy has become better able to adapt to constantly changing conditions and weather external shocks. Even in an economic expansion, particular industries and geographic regions experience significant economic disruptions. For instance, the collapse of energy prices in 1986 hurt U.S. energy producers, and the sharp rise of the dollar in the early 1980s hurt our manufacturing industries. Episodes such as these would have had a more severe impact in the absence of active forward, futures, and swap markets in agricultural products, oil, interest rates, and foreign exchange.

THE CHANGING ROLE OF GOVERNMENT

As financial markets have evolved, so has the nature of the government's involvement with them. The history of government intervention in financial markets contains many useful lessons that can help in determining when intervention is appropriate and in understanding the problems that poorly designed intervention can cause.

Much of the regulatory structure governing the financial sector dates from the 1930s. The disruptive waves of bank failures throughout the 1800s and the early years of this century, as well as the Great Depression, convinced legislators that economic stability

depends on the stability of the financial system. Actions such as the creation of the Federal Deposit Insurance Corporation (FDIC) and the passage of the Glass-Steagall Act, which mandates the legal separation of investment and commercial banking, date from this period. Although the framers of this regulatory structure initially expressed some doubts, until the late 1970s calm prevailed in the financial markets, and the regulatory system was widely considered a success.

High and volatile interest rates in the United States in the late 1970s began to expose some of the system's underlying weaknesses. The heavy losses suffered by the S&L industry set the stage for the recent string of failures. Commercial banks fared somewhat better, but even they were adversely affected as depositors withdrew their funds to seek higher market returns. Banks were prohibited from paying the market interest rate by Regulation Q of the Federal Reserve, which set a 5-percent interest rate ceiling for savings accounts. Some obvious impediments to the effective operations of financial institutions were removed by the regulatory reforms of the early 1980s, when interest rate ceilings were phased out and S&Ls were given more freedom in their choice of investments. These changes, however, did little to address many fundamental problems in the regulatory structure. In fact, careless or uneven deregulation sometimes exacerbated these problems and added to the losses from S&L insolvencies.

The Government's Role in Financial Markets

The growth of financial services has been accompanied by a steady increase in government involvement in many of the new activities. Is the large and expanding role of the Federal Government in these markets beneficial? To evaluate this important and complex issue, it is useful to start with another, more basic question: What current or potential market failures require government intervention to be corrected? Most observers agree that regulation should have a role in two areas.

First, government institutions help to maintain the stability of the financial system. Financial markets act as the circulatory system of the economy, creating vital connections between seemingly unrelated enterprises. When this system breaks down, even healthy sectors of the economy may suffer. The Great Depression is the most compelling example of this phenomenon, when a sharp contraction of credit and a fall in asset prices preceded a 30-percent drop in aggregate output and an unemployment rate that reached 25 percent.

Institutions such as the FDIC and the Federal Reserve System limit the damage a financial crisis can cause by providing an emergency source of liquidity and by preventing financial panics from spreading. For example, during the October 1987 stock market

crash, the Federal Reserve provided the banking system with additional reserves. Banks used these reserves to make emergency loans that saved a number of financial firms from bankruptcy. Some have credited these measures with preventing more widespread repercussions from the crash.

A second role for regulation is to improve the day-to-day operation of financial markets, both by providing prudent oversight to prevent fraud and abuse, and by facilitating truthful disclosure of information. For example, the Securities and Exchange Commission (SEC) requires corporations financed with publicly traded stocks or bonds to disclose relevant financial information.

Challenges for Regulatory Reform

The dynamism of the financial marketplace presents a special challenge to regulators. When a rule becomes particularly onerous, someone is likely to invent a way to avoid it, often with unfortunate and unexpected consequences. For instance, in the late 1970s market interest rates rose well above the Regulation Q ceiling, and depositors moved their money into newly created high-yielding mutual funds. The drop in deposit levels ultimately hurt small businesses that depended on banks for loans not readily available elsewhere. Ironically, one of the original reasons for imposing interest rate ceilings had been to lower the cost of bank-intermediated financing. The lesson here is that effective regulation must be flexible and oriented toward creating incentives that will help and not hinder efficient resource allocation. Rigid regulations can cripple the market's ability to provide valuable services and almost inevitably result in an unproductive game of regulatory catch-up.

In designing effective policies, regulators must also take into account the globalization of the financial services industry. Large U.S. banks now have operations on every continent, while domestic banks face competition at home from U.S. branches of foreign banks. Many stocks that once traded exclusively in New York are now also traded in London and Tokyo. Securities change hands around the clock and around the world via new electronic trading systems.

As markets become more international, they also become extremely competitive and mobile. Policymakers worldwide have become increasingly aware that they must work together to create a fair and open environment, maintain stability, and ensure accountability. Because today's markets are highly mobile, countries that unilaterally impose costly regulations risk driving businesses to other, less regulated countries. For example, some have suggested imposing a heavy tax on stock or futures market transactions to discourage frequent trading and as a source of additional revenue. Such a policy, however, would have the unfortunate consequences

of reducing market liquidity in the short run, and losing U.S. jobs and tax revenues in the long run as transactions shifted overseas.

Finally, one unfortunate consequence of the piecemeal process of financial regulation and reform has been that responsibility for regulating the financial markets is spread across a large number of Federal regulatory agencies. The Federal Reserve Board, Treasury Department, Office of Thrift Supervision, Commodity Futures Trading Commission, FDIC, and SEC often find themselves with overlapping jurisdictions, especially as banks increase their participation in the securities markets and new financial instruments fall across what were once distinct categories. In some cases, conflicts between agencies have actually prevented viable financial products from reaching the public. *Better coordination in designing and implementing regulatory policy could significantly reduce the unnecessary burden imposed by inconsistent rules and reporting requirements.*

CURRENT ISSUES IN REGULATORY REFORM

Recent regulatory developments affecting banks, S&Ls, and insurance markets have begun to address some of these issues, but further reform is needed to ensure a safe and efficient financial system.

Lessons From the S&L Debacle

Since 1980, regulators have shut down almost 1,200 insolvent S&Ls with assets of over $500 billion, and additional insolvent S&Ls are expected to be resolved over the next few years. The Administration estimates that this wave of S&L failures will ultimately cost taxpayers between $100 billion and $160 billion (in nominal dollars). Because of deposit insurance, however, no insured depositor has lost a dime. Furthermore, in the last half century deposit insurance has contributed to the relative stability of U.S. financial markets.

Understanding the underlying causes of these failures can reduce the probability of future losses of this magnitude. The troubles began when the high interest rates of the inflationary 1970s substantially reduced the value of the long-term, fixed-rate mortgages that were the primary assets of the S&Ls. As interest rates rose, the cost of the short-term deposits used to finance mortgages increased, but the mortgage payments remained constant. By 1981, the total value of S&L liabilities exceeded the total value of assets; S&Ls as a group were technically bankrupt.

Although regulators and the Congress were aware of the problems, they chose to allow many insolvent S&Ls to continue operating. Ordinarily, when a private company nears bankruptcy, its operations are severely limited because investors refuse to provide further financing. With deposit insurance, however, depositors

have little incentive to withdraw their funds, and no natural market mechanism limits the activities of an insolvent S&L. In fact, regulations restricting investment to traditional mortgage lending were relaxed to make the S&Ls more competitive with commercial banks. With nothing to lose, many S&Ls used their insured deposits to gamble on high-risk investments in areas outside their scope of expertise. If these investments paid off, the financial health of the S&Ls would be restored. If they failed, the deposit insurer would pay the costs.

This episode provides several important lessons. First, deposit insurance can encourage excessive risk-taking by depository institutions, leading not only to enormous liabilities for the taxpayer, but to real economic losses to society through the inefficient use of private capital. For example, an insured lender has a greater incentive than an uninsured lender to provide financing for a very risky and economically unjustifiable venture. As long as the government provides deposit insurance, some regulation will be necessary to counterbalance this incentive. A second lesson concerns the workings of the regulatory system. Perhaps the most disquieting aspect of the S&L affair was the long delay before action was taken to close insolvent institutions.

Although most insolvent S&Ls have now been closed or merged with healthy institutions, a number of problems remain. The Resolution Trust Corporation (RTC), the Federal agency in charge of resolving insolvent S&Ls, is paying off depositors and recovering as much money as possible in liquidating remaining assets. The RTC can perform these activities only if it has the money to pay off depositors. As of this writing, the RTC has exhausted its funds. As a result, insolvent institutions continue to operate and to lose money. The Administration has urged prompt action, but until the Congress appropriates more funding, these avoidable costs will continue to mount.

Although they are less at risk than they were in the past, healthy S&Ls could still suffer substantial losses if interest rates rise, because these institutions hold a large portion of their portfolios in long-term mortgages or mortgage-backed securities financed with short-term deposits. A rapid increase in interest rates would raise funding costs, but the income from the mortgages would remain largely fixed. For the most part, this situation appears to be an indirect consequence of regulation and not the result of market forces. Partly to correct this bias, S&L regulators have recently proposed new interest rate risk-based capital requirements which are discussed below.

Developments In Commercial Banking

A variety of difficulties have also weakened commercial banks (Chapter 3 has a discussion of recent developments in banking).

The unusually large number of bank failures in recent years has left the bank insurance fund without enough money to cover anticipated future losses. Taxpayers are unlikely to be called on to make up the deficiency directly. Deposit insurance premiums have increased, however, and these increases are likely to be passed on to depositors through lower rates or higher service fees. To cover near-term costs, the FDIC is authorized to borrow up to $70 billion from the Treasury. This debt is expected to be repaid with future deposit insurance premiums.

The Impact of Recent Regulations

In December 1991 the Congress passed the Federal Deposit Insurance Corporation Improvement Act. This act is the most recent major legislative attempt to reform the rules governing depository institutions. Its primary goal is to decrease future deposit insurance losses by tightening supervisory standards and increasing insurance premium rates and capital requirements for riskier institutions. By authorizing new borrowing from the Treasury, it also provides some of the much-needed funding to finish closing insolvent banks and S&Ls.

In 1988, bank regulators around the world agreed, under the Basle Accord, to set capital standards based on the default risk of a bank's assets. Conceptually, bank capital is the difference between the value of a bank's assets and its liabilities. With deposit insurance, bank capital provides a buffer against losses to the FDIC, so it is appropriate that the capital requirement reflects a bank's risk.

For such a rule to provide the appropriate incentives, however, it must set a capital standard that reflects all types of risk. The current risk-based capital requirement primarily focuses on default risk. As a result, banks have an incentive to shift away from investing in commercial loans toward investing in Treasury securities, reducing one type of risk but incurring another: interest rate risk. If interests rates rise, the value of long-term Treasury securities will decline relative to the value of the deposits financing them, eroding bank capital. To correct this requires modifying risk-based capital standards to take into account interest rate and other types of risk.

The FDIC Improvement Act's "prompt closure" rule, which requires that the FDIC and other bank regulators restrict a bank's activities if its capital falls below specified levels, addresses the problem of lax regulation of weak institutions. For the most severely undercapitalized banks, the law generally requires closure or conservatorship within 90 days. The purpose of this regulation is to avoid the long delays and speculative losses that have added billions of dollars to the cost of the thrift crisis. The drawback is that because bank capital is often poorly measured, some healthy insti-

tutions may be unfairly constrained, and some insolvent institutions may be allowed to continue to operate.

Bank supervisors rely heavily on accounting data to determine the strength of individual banks. The need for reliable data has increased with regulations such as the prompt closure rule. Yet discrepancies between true and reported asset values continue to occur because the reported, or book, value of an asset does not necessarily reflect current market conditions. For instance, a bad loan can remain on the books for some time before a bank must recognize the loss. Conversely, a bank's assets may have appreciated, but regulators often do not take the increases into account.

Some observers have proposed adopting a system of market value accounting that would allow banks to report market values instead of (or in addition to) book values. Although market value accounting would increase the quality of some information available to regulators, it is difficult to determine the market value for infrequently traded assets such as some types of commercial loans. Many bankers believe that using a combination of market and book values can be more misleading than simply using book value. As debate on this issue continues, regulators appear to be moving toward a system that places increasing emphasis on market values but still relies primarily on book values.

Proposals for Further Bank Reform

The FDIC Improvement Act failed to address many of the fundamental problems in the current regulatory structure. In 1991 the Administration proposed a broader set of regulatory reforms to significantly improve the efficiency of our financial system. Since the 1991 *Report* described these proposals in detail, they are reviewed here only briefly.

The Administration supports the removal of branch banking regulations that limit interstate banking. Although such rules were originally intended to reduce the potential market power of large banks, they have had the opposite effect, decreasing competition between banks in local markets and increasing the cost of bank services. Interstate banking would make banks safer because they could more easily diversify their risks geographically and lower costs by avoiding legal barriers to efficient operation.

Currently, the FDIC insures deposits up to $100,000, and wealthy individuals can obtain virtually unlimited insurance by splitting deposits among many separate accounts. Capping the maximum insurance coverage for a single individual would reduce the government's liability and still provide ample protection for the savings of small depositors. An added benefit would be that large depositors would have the incentive to monitor the investment policies of their depository institutions.

The Administration supports a number of reforms that would allow banks to provide a wider range of financial services. Banks are currently limited in their ability to engage in such activities as selling insurance and underwriting new stock and bond issues—services that are complementary to traditional banking activities. Allowing banks greater freedom to participate in these activities could increase competition for such services and lower costs to the public.

Unfortunately, the recent legislative efforts to reform bank regulations—the FDIC Improvement Act and the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA)—may have created as many new problems as they have solved. (The 1991 *Report* has a discussion of FIRREA.) These laws burdened banks with costly and unnecessary paper work, and generally created a regulatory atmosphere that exacerbated the shortage of commercial credit during the recent recession and recovery. The Administration has proposed legislation to repeal several of the supervisory provisions that impose unreasonably high compliance costs on banks and do little to improve the soundness of the system.

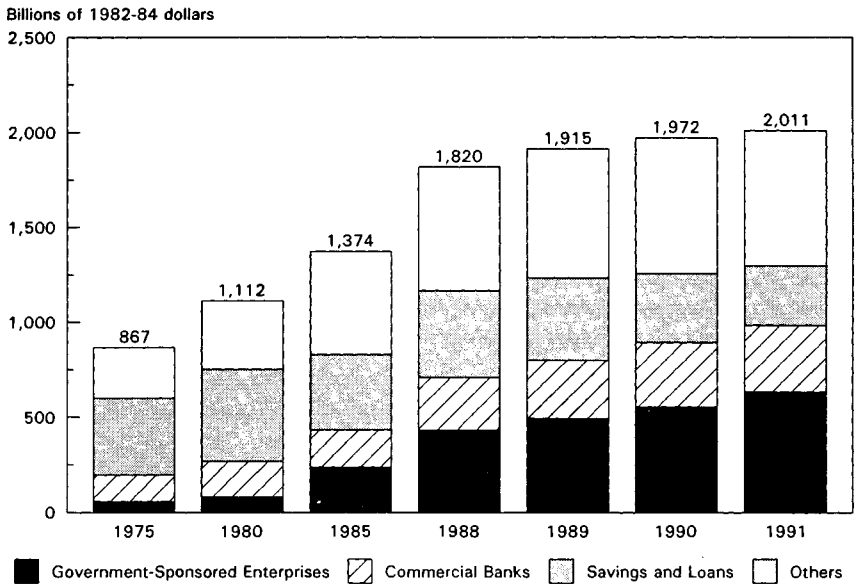
Government-Sponsored Enterprises

With little public fanfare, the mortgage market has undergone an enormous structural change. In 1975 S&Ls financed 46 percent of single-family mortgages. By 1991 this share had shrunk to 16 percent. Much of the private market has shifted to two government-sponsored enterprises (GSEs), the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac) (Chart 5-2).

Fannie Mae and Freddie Mac are shareholder-owned corporations chartered by the Congress to provide a secondary, or resale market for residential mortgages. Homebuyers still apply for mortgages from traditional lenders—S&Ls, banks, and mortgage banks—that make and often service the loans. The GSEs buy mortgages from the initiating lenders and retain some of the mortgages in their own portfolios. Through a process known as securitization, the GSEs also gather mortgages into diversified pools. They issue securities backed by these mortgage pools and sell the securities to investors such as banks, insurance companies, and pension and mutual funds. Interest and principal payments from the pool of mortgages are passed through to investors as they arrive, and the GSE promises to provide payment in the event of a default on an underlying mortgage. Securitization enhances the liquidity of mortgages, lowering the cost of mortgage financing for homebuyers.

Although GSE charters state that the securities they issue are not obligations of the Federal Government, the GSEs receive significant government benefits including exemption from State and local income taxes and certain registration requirements, as well as

Chart 5-2 **Single-Family Mortgage Debt Outstanding**
The principal source of single-family mortgages has shifted from savings and loans to government-sponsored enterprises.



Note: Other sources are private companies, government agencies, and individuals. Deflated by CPI-U.
Source: Board of Governors of the Federal Reserve System.

a contingent line of credit from the Treasury that authorizes discretionary emergency loans of up to $2.25 billion. Furthermore, the fact that yields on GSE securities are only slightly higher than those on Treasury securities with similar maturities suggests that investors believe that the Federal Government would step in and make the payments if the GSEs cannot meet their obligations.

In general, although the GSEs and the Federal Government may have eliminated the default risk for the purchaser of an insured security, they cannot eliminate the risk inherent in the investment activity being funded. The percentage of bad loans may actually increase when loans are insured and resold because the incentive to monitor the mortgage borrower is reduced. While the S&Ls suffered the consequences of their lending decisions, the GSEs resell mortgages originated by institutions that ultimately have a smaller stake in whether the loans are repaid, although they do have an interest in retaining the right to sell loans to the GSEs.

The phenomenal growth in GSE lending in recent years has made it appear likely that the government would honor the guarantee implicit in GSE securities rather than risk a crisis in the mortgage market. As a result, some have argued that potential

losses from these guarantees should be recognized in the budget (Chapter 6). These GSEs have been very profitable in the last few years. For instance, Fannie Mae had a net income of $1.4 billion in 1991. But Fannie Mae lost over $350 million between 1981 and 1985, and a large drop in housing prices could trigger much greater losses.

Until recently GSEs have been lightly regulated in comparison with banks and S&Ls. This fact is somewhat surprising given the central role GSEs play in the housing market, the significant implicit subsidies provided by their status, and the potentially enormous liability the government faces if a GSE fails. Recognizing the need for protection, the Congress passed a bill in October 1992 that sets capital standards for GSEs and establishes a regulator who is appointed by the President and located in the Department of Housing and Urban Development.

As it does with banks and S&Ls, higher capital reduces the government's potential liabilities and increases the incentive for GSEs to control risk. The new GSE capital standards are structured similarly to those for banks and S&Ls; they are risk-based and mandate prompt closure if capital falls below specified levels. They are significantly lower than those for banks and S&Ls, however, for several reasons. First, mortgage loans have a lower default rate than the commercial loans that make up a significant part of bank portfolios. Second, GSE capital is based partially on market value, providing a reliable estimate of an institution's strength. Finally, because the GSEs resell most mortgages rather than keeping them on their balance sheets, private investors bear a larger portion of any interest rate risk, although the GSEs retain the default risk. Whether these new standards will adequately protect the taxpayer from GSE losses, however, remains to be seen.

The private sector successfully securitizes many other types of loans, including credit card receivables, automobile loans, and some types of mortgages and commercial credit. A larger role for private sector securitization would reduce government liability and further enhance market liquidity. Until 1992, one impediment to further private securitization of assets such as small business loans was the securities law itself, which required compliance with the outmoded restrictions of the 1940 Investment Company Act. The SEC recently adopted new regulations to facilitate private securitization, while still ensuring adequate investor protection.

Insurance Markets

Insurance allows people to reduce their exposure to many types of risk by spreading losses across a larger group. Government insurance programs have been developed in part because some risks are difficult to predict and catastrophic in size. The nature of the losses may make it difficult for the private market to develop actu-

arially sound premium rates or sufficient reserves to credibly insure such risks. Political considerations dictate the provision of other types of insurance that in principle could be provided by the private sector.

As in the credit markets, the government is increasingly taking a direct role in providing insurance. In fact, the Federal Government has become the Nation's largest underwriter of risk. Government insurance programs affect the economy in three main ways: They reduce and redistribute risk, reallocate wealth, and change the incentives of the insured.

When insurance is underpriced relative to its long-term cost, those who are protected receive a subsidy. Federal insurance programs have suffered substantial losses over the last decade (Chapter 6). Although some insurance losses were due to unforeseen and perhaps unavoidable events such as the droughts that struck the Nation's farms in 1983, 1988, and 1989, many can be attributed to inaccurate risk assessments.

The Federal Government often undermines its insurance programs by providing disaster assistance with similar benefits, but at little or no cost to the individual. This subsidy weakens incentives to avoid risk or to buy insurance, putting the government under increased pressure to provide assistance after the next disaster. A good example of this phenomenon is the experience of the Federal crop insurance program (Box 5–2).

Insurance also reduces incentives for people to make cost-effective choices. For example, offering subsidized insurance rates for flood protection can encourage people to retain homes on flood plains. Well-designed insurance programs must provide incentives that encourage prudent behavior, and the cost of misallocated resources due to distorted incentives should be part of any cost-benefit analysis of government insurance programs.

Is there a further role for the private sector in providing insurance? As private financial markets continue to expand, private insurers may be able to handle liabilities that were once considered too large. For example, futures contracts related to health, homeowners, and catastrophic insurance have been developed that will allow insurers to shift risk to other private entities such as banks, mutual funds, and individual investors. Innovative combinations of private and public insurance could also improve efficiency. For instance, it has been suggested that private insurers could set premium rates and cover a portion of deposit insurance, limiting the government's liability to losses that exceed the private coverage level. To explore this idea, the FDIC Improvement Act requires the FDIC to test private reinsurance and report the results in 1993.

Box 5-2.—Federal Crop Insurance and Disaster Assistance

Crop insurance protects farmers against losses from low crop yields caused by bad weather, pests, or disease. Since 1938, the Federal Government has offered farmers subsidized crop insurance. Between 1981 and 1990, the Federal Crop Insurance Corporation paid out $2.5 billion more than it collected in premiums.

The Federal Crop Insurance Act of 1980 set out to establish crop insurance as the primary source of disaster risk management for farmers. But despite subsidized rates, many farmers do not participate in the program. In recent years, less than one-half of the eligible acreage was covered by Federal crop insurance.

Disaster assistance has undermined the effectiveness of the crop insurance program. Based on their experience, many farmers believe that whenever a widespread natural disaster occurs the government will provide emergency disaster assistance to all affected. In a recent survey, 41 percent of farmers who did not purchase crop insurance said that they did not do so because they believe that the government would bail them out in the event of a disaster. Conversely, low participation in the crop insurance program makes it all the more likely that the Congress will face political pressure to enact disaster legislation whenever a widespread disaster occurs.

SUMMARY

- The growth of financial services has lowered the cost of risk management and expanded investment opportunities.
- The increasing flexibility and international mobility of financial markets necessitates a regulatory framework that focuses on incentives and avoids rigid rules.
- Progress has been made in reforming the regulation of depository institutions, but impediments to efficient operation remain. Further reform is needed to ensure a safe and competitive financial system.

OWNERSHIP AND PRICING OF NATURAL RESOURCES

In the United States, the government owns a substantial share of the Nation's resources. The Federal Government owns about one-third of the total land in the United States, including 29 percent of forestlands and 43 percent of rangeland. State and local govern-

ments and American Indian Nations own another 8 percent of U.S. lands. Over 10 percent of the U.S. population receives water from Federal projects. The land and water bring with them other important natural resources, including wildlife and minerals.

The principles of regulatory reform—allowing markets to work where possible, and harnessing the power of market incentives to accomplish regulatory objectives—should also be applied to issues of government ownership and pricing of resources. Some resources such as Federal rangelands and industrial timber stands are indistinguishable from adjacent privately owned lands and have no special features warranting public stewardship. In addition, the U.S. Government often sets the price for using resources below the market price, sometimes even below the direct cost of providing them. These low prices can lead to overconsumption, distorted economic priorities, damage to the environment, and lost revenue.

WHY DOES THE GOVERNMENT OWN AND MANAGE RESOURCES?

Most goods and services in our economy are private property, traded in markets that determine prices and quantities. As has been noted, markets efficiently allocate commodities to serve the best interests of all. Government ownership of land and other natural resources in the United States is, in large part, a residual effect of policies adopted in the last century to encourage settlement of sparsely populated western territory. In many cases, there is no economic reason for the government to own these resources.

However, for some resources, there may be a market failure that does provide an underlying reason for government activity. There are two interrelated ways in which private markets for natural resources and the right to use them may fail.

First, a private market may fail to produce the right amount of a public good. Public goods are goods that can be used or enjoyed by one person without detracting from the use or enjoyment of others. For example, suppose Farmer Jones paves the road into town. The neighbors can use the road without affecting its usefulness to Jones, and, therefore, the road meets the definition of a public good. While roads are not a natural resource, this example illustrates how a private market may fail: The neighboring farmers have an incentive to wait, hoping someone else will incur the costs of paving the road that all of them can use. Some natural resources have the character of public goods; one person can enjoy the beauty of a forest without detracting from another person's use of it. On the other hand, grazing land and timberland are not public goods: Timber harvested by one person is then not available to anyone else. In fact, it is not uncommon for grazing land and timberland to be privately owned.

Second, in many cases, markets fail to reflect external costs or benefits of using a resource. External costs and benefits, or externalities, affect individuals who are not parties to the economic transaction. For example, logging on a hillside may cause soil erosion, imposing a cost on the people living at the bottom of the hill. The cost to these people is not taken into account in the private market for trees and lumber. Often, people are excluded from an economic transaction affecting them because of the high costs of negotiating and enforcing a settlement.

External costs and benefits are often a consequence of the failure to establish property rights for natural resources. An example is a communal grazing field. Anyone can bring cows to graze, but no single farmer owns the field. Because every farmer can use the field for free, farmers tend to bring more and more cows until the field becomes congested. Each farmer using the field is creating an external cost to the other farmers. Unless property rights have been assigned stating which parties "own" the rights to the land or the rights to graze on the land, the private market will not allocate the pasture in a way that maximizes the joint benefits of all users.

ESTABLISHING MARKETS FOR THE RIGHT TO USE RESOURCES

Establishing private markets for the right to use a resource often requires government action. The establishment and enforcement of property rights is quintessentially in the realm of government. During the 18th and 19th centuries, the U.S. Government established property rights for lands on the western frontier and then sold or gave away those rights to homesteaders.

The most direct way for the government to address certain failures in markets for natural resources is to sanction legally valid private property rights and allow owners to limit or sell access to resources. For example, the common grazing field could be given or sold into private hands and access limited by a fence. Private property rights give owners the incentive to stop the resource from being overused and to manage it in a way that maintains or increases its value. Private timber companies in the United States replant their lands to maintain forested areas. On the other hand, timber companies in some developing countries hold only short-term logging concessions on government-owned land and have little incentive to replant or otherwise sustain forest resources.

Not all natural resources lend themselves to ordinary boundaries and fences. It is difficult to assign ownership of the atmosphere as a storage space for waste products. One way to address this problem is to have the government create a special kind of property right—the right to use the resource—and then to allow holders of the right to sell it like any other property.

A familiar example of a government-issued right to use a resource is a deer hunting license that permits the licenseholder to hunt and kill a specified number of deer. However, hunting licenses cannot be traded or transferred. If a hunter wishes to kill more deer than the license allows, he or she cannot legally buy the licenses from other hunters and in that way gain the right to kill more deer.

Making permits tradable (allowing them to be bought and sold) is critical to ensure that the resource is used in an economically efficient way. People who attach a low value to using the resource will sell their right to use it to those who attach a relatively high value to use of the resource. The 1990 Clean Air Act Amendments, for example, use tradable permits in order to lower the cost of reducing pollution. The law sets yearly caps on sulfur dioxide emissions from electric utilities. Over time, the caps will be lowered, so that by the year 2000 these emissions will be about one-half of their 1990 levels. Plants receive permits each year for the amount of sulfur dioxide that may legally be released. Since the cost of limiting emissions may be much higher at some facilities than at others, it is not economical to force each plant to reduce emissions by the same amount. To deal with this, the law allows the permits to be bought and sold. Plants that would find it expensive to reduce emissions may be willing to pay a high price for the permits. Plants that can reduce emissions relatively cheaply may be willing to sell their permits. In this way, the market for permits reallocates them so that those plants able to reduce pollution inexpensively will reduce pollution the most. This system of tradable permits is expected to save the economy an estimated $1 billion per year, or about 15 to 25 percent of the cost of reducing pollution without tradable permits. Box 5–3 describes another example.

PRICING OF GOVERNMENT-OWNED NATURAL RESOURCES

Where privatizing a resource is not feasible, another solution to the problem of market failure is for the government itself to hold the resource on behalf of the public. Government ownership of a resource is most appropriate when the resource has the character of a public good (Box 5–4). Goods and services typically provided by the government include armed forces and public fire departments. The U.S. Government has purchased or created national parks such as the Grand Canyon. These are public goods that can be used and enjoyed by many people at the same time. As noted earlier, the private market may fail to provide the optimal quantity of public goods as potential users wait for others to make the investment. To an increasing extent, the government has adopted this prescription. Under this Administration, funds for State land and

Box 5-3.—Government Creates a Market for Fishing Rights

There is no practical way to establish ownership rights of ocean fish stocks. Traditionally, fish have been free for the taking—a common pool resource. Theory teaches that such underpricing leads to overconsumption. In the halibut fisheries off Alaska, fishing fleets caught so many halibut that the survival of the stock was threatened. No single fishing boat had an incentive to harvest fewer fish since the impact on its own future catch would be minimal and others would only increase their take. This is an example of what is known as "the tragedy of the commons."

Officials tried limiting the length of the fishing season. But this effort only encouraged new capital investment such as larger and faster boats with more effective (and expensive) fishing equipment. In order to control the number of fish caught, the season was shortened in some areas from 4 months to 2 days by the early 1990s. Most of the halibut caught had to be frozen rather than marketed fresh, and halibut caught out of season had to be discarded.

In late 1992, the Federal Government proposed a new approach: assigning each fisherman a permit to catch a certain number of fish. The total number of fish for which permits are issued will reflect scientific estimates of the number of fish that can be caught without endangering the survival of the species. Also, the permits will be transferable—they can be bought and sold. By making the permits transferable, the system in effect creates a market where one did not exist previously. The proposed system will encourage the most profitable and efficient boats to operate at full capacity by buying permits from less successful boats, ensuring a fishing fleet that uses labor and equipment efficiently. Moreover, the transferable permits system establishes a market price for the opportunity to fish—a price that better reflects the true social cost of using this common resource.

water conservation were tripled, and 20 new national park units and 57 new national wildlife refuges have been added or proposed.

The fact that the government owns certain resources does not automatically guarantee that they will be allocated and used in the best possible way. Prices charged for use of a resource significantly affect the economic efficiency of that use. The appropriate price is one where marginal social cost is equal to marginal social benefit. Marginal costs are the expenses involved in providing an incremental unit of a resource, marginal benefits are the gains associated

Box 5–4.—Forests as a Public Good

Government ownership of natural resources is sometimes intended to help produce the public goods that private ownership has failed to provide. A prime example is the recent reform of government stewardship of forests. Many private forests are harvested by logging companies through clearcutting, which involves removing every tree on a plot of land and then replanting the land with seedlings. While clearcutting can be the least costly way to produce timber for industrial uses, it does detract from the scenic value of forestlands.

In 1992 the Administration adopted a new "ecosystem approach" for managing these federally owned forests which phases out clearcutting as a standard timber harvest practice. Instead, trees in Federal forests will be selectively harvested in order to preserve the scenic value of the forests. The Forest Service expects that the new policy will reduce clearcutting on Federal lands by as much as 70 percent from 1988 levels while reducing the volume of logs cut by only 10 percent or less. This policy exemplifies the appropriate role of government, not as an owner of commercial timberland, but as a protector of forests as a public good.

with that additional unit. Social costs and benefits reflect the economic impact on all members of society and include externalities as well as direct economic effects. Box 5–5 discusses some difficulties in measuring social costs and benefits.

Chronic Underpricing

The rights to use government-owned natural resources are often sold at prices that fail to incorporate the full costs to society and sometimes at prices that do not even cover management expenses (Box 5–6). Nineteenth-century government policies set prices low to encourage settlement and development of the West. Powerful local constituencies have helped keep them low.

Timber from Federal forests has been sold at prices even lower than the government's cost of providing the timber—and without incorporating possible externalities such as environmental damage. Likewise, rights to graze on Federal lands are sold at prices that fail to cover administrative costs.

Drawbacks of Underpricing

Whether or not it was warranted in the past, underpricing the right to use natural resources today can create budgetary, economic, and environmental problems. On the first point, the budgetary consequences are readily apparent: When the government sells nat-

Box 5-5.—Measuring the Value of Nonmarket Goods

Since a public good is not traded on a competitive market, the market cannot assign it a price based on its value. Measuring the benefits public goods provide is problematic. One method is to infer the value of public goods from actual markets or observable economic behavior. For example, to estimate the value people put on scenic beauty, economists may measure the effect of scenic beauty on actual real estate prices. The value that people put on a park may be reflected in the amount of time and money that they spend to visit and use it.

The contingent valuation method (CVM) uses public opinion surveys. A polltaker asks people to estimate the amount they would be willing to pay to maintain or create a certain public good or the amount they would require to compensate for its loss. Advocates of the CVM argue that it can generate reliable estimates of value in cases where it is impossible to make inferences from actual markets or behavior, and in principle, it takes into account the fact that some people value a good more highly than others do.

However, the CVM also has generated considerable criticism. For example, those surveyed do not actually have to pay the amount they report, a factor that can lead to overstatements. Responses are sensitive to the way questions are posed. (In one case, the estimated value of protection from oil spills changed by a factor of 300 when polltakers asked additional questions before eliciting this value.) CVM results can be inconsistent. (For example, one CVM study showed that people were willing to pay more money to clean up small oilspills than to clean up both small and large spills.) In many cases CVM results cannot be verified except by another CVM study.

These problems are exacerbated when the CVM is used to estimate the value of goods that are abstract, symbolic, or difficult to comprehend. One study showed that if the CVM were used to estimate the value of saving whooping cranes from extinction, resulting estimates might be as high as $37 billion per year (more than the Federal Government spends each year on education and Head Start programs). Finally, even if all the problems of the CVM could be resolved, care must be taken to ensure that it is not used to analyze policy in a one-sided way. For example, a proposed program to protect whooping cranes might put people out of work. The $37 billion figure could be cited by those who claim that the benefits of the program exceed its costs. But opponents of that view could undertake a CVM study of their own asking people how much they would be willing to pay to protect these jobs.

Box 5–6.—Reform of California Water

One highly publicized example of government underpricing of natural resources has been California water. Forty-year contracts signed in the 1940s and 1950s guaranteed California farmers water from Federal projects at prices of about $3 per acre-foot, even though the government's current cost to supply that water is often about ten times that amount. Cities and industries that need water cannot obtain it from farmers because archaic legal restrictions block the development of water markets.

The Reclamation Projects Authorization and Adjustment Act of 1992 was signed by the President, despite his concern over certain aspects of the bill, in large part because it encouraged more market-oriented pricing of Federal water in California. The act allows those receiving water from the Federal Central Valley Project to pay low subsidized prices for the first 90 percent but increases the price for the last 10 percent, so that the price for the final units used will more closely reflect the full costs of providing the water.

The act also allows recipients of Federal water to sell their water rights. In this way, water can be shifted from relatively low-value agricultural use to relatively high-value municipal or industrial use. The high value of water to urban users is indicated by the fact that, in 1991, the California State Water Bank sold nearly 400,000 acre-feet of State water to cities and industrial users at a price of $175 per acre-foot.

ural resources below their market value, the taxpayer is subsidizing those uses. Under the 1872 Mining Law, mining companies are able to buy land from the Federal Government for $2.50-$5.00 per acre and then resell the land at market prices. In one extreme example, the government sold 17,000 acres of land for $42,500. Weeks later, these lands were resold to major oil companies for $37 million.

Second, underpricing diverts resources from uses that would benefit society the most to less valuable tasks. In California, cities and industries are often willing to pay substantially more than farmers for water, demonstrating the high value water can have. But low-priced Federal water is often used to grow crops such as alfalfa—a crop fed to dairy cattle—in effect subsidizing the production of milk which has been in oversupply and is already subsidized by Federal support programs. Letting farmers transfer water from low-value agricultural uses to high-value uses could generate substantial economic gains for farmers and nonfarmers alike.

Third, when underpricing leads to overuse, the environment may suffer. For example, if the government underprices grazing rights on federally owned land, overgrazing may lead to soil erosion. *Pricing the right to use government-owned natural resources to reflect actual social costs and benefits could help the environment as well as improve economic performance.*

REFORMING PUBLIC RESOURCE POLICY

Given the chronic problems of government ownership of natural resources, what practical steps can be taken toward developing a better system? As mentioned above, in some cases, government-owned natural resources can be "privatized"—given or sold to private individuals. Once in private hands, access to the resource would be priced by the market ensuring more efficient allocation and reducing overconsumption. From the standpoint of economic efficiency, the decision to give away the natural resource or to sell it is not important. Even if the government gives away the resource to someone who cannot use it efficiently, efficient users will make attractive offers to buy it from the initial recipients.

For the same reasons, the issue of who becomes the initial owner of the resource is also unimportant in terms of economic efficiency. However, it may be of critical importance in determining the political viability of privatization. If government-owned resources are sold rather than given away to those now using them, the present users may form a powerful group blocking privatization. On the other hand, sales bring in government revenues which could be used to pursue other objectives.

In cases where using a natural resource involves significant externalities, however, putting it in the hands of private owners will not solve the problem of market failure, since the prices private owners charge would reflect private costs and benefits rather than social costs and benefits. But government ownership is not the only way to deal with externalities. The actions of private owners can be regulated by laws such as those that make people liable for damages if they cause hillside erosion. Externalities can also be incorporated in private market decisions through taxes and subsidies, fines and fees, or other government action.

When natural resources remain in government hands, prices charged for access to these resources ought to reflect, to the fullest extent possible, the actual costs and externalities associated with using the resource. This policy can be implemented in any of three ways. First, when the appropriate price can be calculated, the government can set the selling price at that level. Second, when the market price is unknown, the government can auction rights to use the resource, allowing the auction to determine the market price. Third, the government can give away or sell at low prices the right

to use the resource, and allow that right to be bought and sold. In this last case, the market for transferable rights will set prices and dictate the appropriate use.

SUMMARY

- Markets for natural resources are sometimes characterized by imperfections, either when the resource is a public good or when the use of the resource involves externalities.
- Sometimes the market imperfection can be eliminated by assigning property rights. One way to define these property rights is by creating tradable permits to use the resource.
- When the government retains ownership of a resource, access to that resource should be priced to reflect social costs and benefits.

RISKS TO HEALTH, SAFETY, AND THE ENVIRONMENT

Life involves risks as well as opportunities. Disease, crime, and car accidents are well-known risks; every week seems to bring claims of new kinds of risks, such as food contamination, toxic substances, and global climate change. Yet creating a truly zero-risk society would be impossible. And it would be undesirable, not only because such a goal would be prohibitively costly but also because people often decide that some risks are worth taking—such as testing new technologies, using the fastest mode of travel to save time, or even playing school sports.

Nevertheless, the risk of premature death and injury has in fact declined steadily over the long term as society has become richer and more technically advanced. In the short term, many risks can be reduced, but only at a cost; for example, cars built to withstand crashes will cost more than similar cars lacking such reinforcements. People often decide that avoiding risk is worth the cost: they buy insurance, join health clubs, install car alarms, and take detours to avoid dark alleys.

Amidst the myriad public choices about risk, the government often acts to reduce risks. It tests and sets safety standards for foods, drugs, automobiles, factories, and chemicals. It also plays an active role in providing information about risk, and in regulating behavior that may impose risks on others or on the environment.

RISK IN PERSPECTIVE

People commonly believe that contemporary life presents more risks than the "simpler" times of the past. Certainly some types of new technological risks exist today that did not in earlier eras. But it bears recalling that in the "good old days" standards of living

were lower, nutrition and health care were poorer, workdays were longer and more dangerous, and food and water supplies were less safe and reliable than they are today.

In fact the risk of premature death and injury is lower in modern industrial society than in earlier and less technologically advanced societies. Average life expectancy at birth, the most salient indicator of overall risk, has improved in the United States from 47 years in 1900 to 75 years in 1990. In most poorer, less industrialized countries life expectancy is increasing but is only about 55 years. Other indicators of risk are also improving: The life expectancy of an American at age 65 increased by 45 percent between 1900 and 1990. American infant mortality rates fell 81 percent between 1940 and 1990 to under 1 percent of live births; in low-income countries the infant mortality rate is as high as 10 percent. Since 1945, a person's risk of being killed on the job has fallen by more than 70 percent. In 1900, infectious diseases (mainly tuberculosis, pneumonia, diarrhea, and enteritis) were the leading causes of death in the United States, accounting for 30 percent of all fatalities in that year; today they cause about 5 percent, although the growing crisis of AIDS (acquired immune deficiency syndrome)—and associated resurgence of pneumonia and tuberculosis—is cause for national and international concern. Today cancer, heart disease, and strokes are the leading causes of death in the United States, together accounting for about two-thirds of all fatalities.

To be sure, the risk to Americans of certain new types of accidents has increased over time; after all, no Americans died in airplane crashes in 1900. But even new types of risk have been reduced as technology and operations have improved. A person's risk of dying in an automobile accident has declined over 30 percent since 1970. Furthermore, the increasing ability of science to detect ever-smaller potential risks may cause people to perceive an increase in risk.

Health risks associated with environmental pollution have also declined. Between 1970 and 1989, air pollution decreased significantly: particulates fell 61 percent, sulfur oxides 26 percent, carbon monoxide 40 percent, and volatile organic compounds 31 percent. As lead was phased out of gasoline over this period, lead emissions dropped 96 percent. Industrial discharges of key water pollutants also declined over 90 percent between the mid-1970s and mid-1980s. Though difficult to quantify, the health benefits of reducing pollutant emissions can be significant. For example, substantial evidence suggests that elevated levels of lead in children's blood cause lasting neurological damage, impairing IQ, productivity, and quality of life and increasing expenses for remedial education and treatment.

Today cancer causes about a quarter of American fatalities, but experts estimate that environmental pollution accounts for only

1–5 percent of all cancer deaths. Occupational exposure is estimated to account for another 2–8 percent, and food additives (which in some cases actually protect against cancer) for −5 to 2 percent. Smoking and other behavioral factors make much larger contributions to cancer.

Cancer is a less common cause of death in poorer countries, where food spoilage, diseases borne by drinking water, and infant mortality take their toll long before cancer can develop. Similarly, within the United States, residents of low-income neighborhoods are more likely to face high rates of crime and infant mortality, and to have high levels of lead in their blood.

RISK IN THE MARKETPLACE

Every day, people make decisions about taking or avoiding risks. Like other aspects of the quality of goods and services, riskiness is a product feature that people evaluate when making transactions in the marketplace. People can choose products and jobs with varying characteristics, including riskiness. People buy child car seats, fire extinguishers, and reinforced locks. Today consumers are more interested than ever in automotive safety features such as airbags and antilock brakes, and manufacturers are responding to these market demands.

Market prices for goods and services thus reflect people's preferences about risk-taking, the information they have about risks, and the freedom they have to accept or avoid risks. When people are well informed and can make their own decisions about risk-taking, market prices will send signals that guide producers and consumers to provide and consume the socially desired amount of safety. When people do not have sufficient information and choice, social systems may develop that help people learn about and manage risk. Government policy is one such social risk-management system, but not the only one. Others include norms of behavior, insurance markets, and the system of tort (wrongful injury) liability operated by the courts.

Personal behavior probably has the most pervasive influence on the risks people face. People learn to drive defensively, look both ways before crossing the street, lock their doors, and wash their hands before eating. Many norms of behavior also help protect others in the community, such as covering one's mouth while coughing. Meanwhile, the risks that people willingly face—and could choose to avoid—are often much larger than the risks that people worry about being obliged to endure. Of those who regularly drive or ride in automobiles, about 2 out of every 10,000 die in car accidents each year, for a total of about 45,000 deaths annually. By comparison, for those who live near municipal solid waste landfills, the mortality risk is substantially less than 1 in 1,000,000 and may

be far lower—a minute fraction of the risk of automobile travel, and a risk that shows up (if at all) only decades later in life.

In competitive labor markets, as Adam Smith pointed out in 1776, employers trying to attract workers will offer wage increases to offset undesirable job characteristics. Because most workers are less willing to take a more dangerous job, employers have to offer higher wages to attract workers to riskier jobs. The increase in wages paid to compensate for the added risk is called a "risk premium." *Studies show that workers in many occupations earn significant risk premiums.* Because workers vary in their aversion to bearing risk, the wage premium for a given amount of risk also varies. Evidence suggests that most workers accepting a job with an additional annual fatality risk of about 1 in 10,000 would earn some $300 to $700 (in 1990 dollars) more than they would in a similar job without the additional risk. Workers who are significantly less averse to bearing risk (such as those who seek jobs in especially risky occupations, like mining) tend to accept lower wage premiums for the same incremental increase in risk. *These risk premiums not only compensate workers for their willingness to bear risk, but also encourage employers to reduce risk.* An employer who can eliminate a risk at less than the cost of the premium the risk adds to wages has an incentive to invest in greater workplace safety. This incentive is significant: The extra wages that employers pay to compensate for risk currently total over $100 billion per year.

The fact that workers receive risk premiums for facing risk does not, of course, guarantee that the amount of these premiums represents the appropriate compensation or safety incentive. When people do not have enough information about risks, or when they cannot act freely on that information (such as when they cannot relocate to seek a new job), they may earn risk premiums that under- or overcompensate them for risk. Coal miners may be earning lower risk premiums because they are less mobile, not because they are more willing to accept risk. In situations where the perceived risk of an activity is less than the true risk—for instance, when a machine has an undisclosed defect or a substance is more toxic than believed—wage risk premiums probably do not fully compensate workers for the risk. Conversely, when the perceived risk of an activity is great but the true risk is small, market transactions may overcompensate for risk.

THE ROLE OF GOVERNMENT: PROVIDING INFORMATION AND REGULATING RISK

People's actions can create risks for others, yet in some circumstances the marketplace does not provide efficient price signals that encourage the socially desired amount of risk avoidance. Government can help people deal with risks by improving the way

markets operate. When markets fail to offer people the information and choice needed to understand and avoid or accept risks, the government can intervene to assess and manage risks. But the government can fail, too, and its intervention is only justified where it does more good than harm—where its social benefits exceed its social costs.

First, the government can try to improve the information about risk available to people in the marketplace. Information about risks may be inadequate because market participants do not have an incentive to collect, distribute, or analyze it. Rules that government has developed to increase awareness of risks include those requiring labels on foods, electrical appliances, and other consumer products, as well as the Occupational Safety and Health Administration (OSHA) Hazard Communication Rule that requires employers to inform employees about chemical hazards in the workplace. But government efforts to mandate information can be expensive and confusing, or can omit important information; in some cases informational mandates can even discourage innovation of better products. Extensive requirements for food labeling, for example, could overload consumers with extra information that obscures the most important nutritional facts, and could even keep some healthier food products off the market. Reports on toxic materials released by factories, which are required by community right-to-know laws, often present only the total weight of each chemical discharged and do not differentiate chemicals by degree of toxicity, potentially misleading people about the risks posed.

Second, the government can regulate risk by managing and limiting the choices open to individuals. As noted earlier in this chapter, government intervention may be warranted when private transactions fail to take account of "external costs" imposed on society by pollution and other activities. Government regulation might also be warranted when the information on which a risk decision must be based is so complex that the people affected do not have the time to invest in understanding and acting upon it. Imagine trying to decide whether to board an airplane based on a risk information label posted on the fuselage. Hence the government evaluates the risks of complex machinery, medicines, and toxic substances, and sets safety standards for their production and use. Again, poorly chosen or designed government regulations can be expensive and can fail to reduce risk; they may even do more harm than good.

Risk Assessment

To provide accurate information to the public and to develop appropriate regulations, the government must first identify and evaluate risks. "Risk assessment" has become a widespread government function, performed by agencies such as the Food and Drug

Administration (FDA), the EPA, and OSHA. It plays a pivotal role both in government regulatory decisions and in choices made by individuals and businesses. Accurate risk assessment is a necessary element of setting intelligent priorities and taking effective action to improve people's health and safety.

Risk assessment is supposed to be a scientific, policy-neutral, reliable, and accurate method of obtaining information on risks. *Unfortunately, the scientific credibility of government risk assessment has been undermined by embedded policy judgments.* Faced with incomplete information and pressure to deliver simplified findings that support the goals of agency regulators, government risk assessors have developed methods that incorporate policy-based assumptions and methods. Instead of providing complete and accurate information, risk assessments present filtered estimates that are tilted toward particular results. These embedded policy choices bias government risk estimates away from true risk estimates, distorting decisions made by both the public and government agencies.

First, embedded policy judgments have encumbered the government's efforts to identify whether a substance or activity poses a risk. Government assessments of health risks have tended to focus almost exclusively on cancer, overemphasizing environmental cancer risks but overlooking other dangers, such as reproductive and neurological toxicity. Government risk assessors typically assume that if high-level exposure to a substance causes cancer, then any minimal exposure will pose a risk of cancer, even where available evidence does not show harm below low doses. And researchers are required to use a classification system that simplifies descriptions of test results, forcing important differences between the physiology of laboratory animals and that of human beings to be ignored. For example, gasoline vapors have been classified as a human carcinogen because male rats exposed to these vapors in the laboratory developed liver tumors, even though the researchers knew that the mechanism that triggered these tumors does not occur in humans.

Second, embedded policy choices also bias the government's assessment of the number of people actually exposed to a risk. Most risk assessments do not analyze real data about exposure to real people; instead, they hypothesize a "maximum exposed individual" who breathes or ingests the most concentrated emissions 24 hours a day for every day of a 70-year lifespan. Examples bordering on the absurd are not uncommon. To determine the potential risk of hazardous waste disposal sites, government risk assessors assume that hypothetical children will unerringly locate the most contaminated spot on the site, dig through a five-foot clay cap and two plastic liners to reach the most toxic dirt, and ingest 200 milligrams every day for 350 days a year (even in towns where the

ground is frozen and snow-covered many months a year). Until recently, EPA risk assessors assumed that the level of pesticide residue on food was the maximum level permitted to be applied at the farm, even though the permitted level at the farm is hundreds to many thousands of times higher than the actual level of residue found at the supermarket.

The Impact of Skewed Risk Assessments on Decisions

Inaccurate and biased risk assessments do not help protect people. On the contrary, when skewed risk assessments are used to guide regulatory policy, they distort the government's effort to manage risks in ways that make regulation both more expensive and less protective. They lead to excessive regulation that imposes costs on society in lost use of products or the higher cost of substitutes. And they cause regulators to pay too much attention to low risks and not enough to high risks.

Even apart from biasing regulation, skewed risk assessments can have important negative consequences. Mixing policy with scientific risk assessment undercuts the credibility of risk estimates. Inconsistent risk assessment methods used by different agencies also erode their credibility. Reports implying that all chemicals pose high cancer risks can perpetuate exaggerated public fears. When reported risks are not put into the perspective of everyday experience, the public can be frightened away from substances that in fact pose very small risk.

Ironically, this fear may actually raise risks—increasing mortality and suffering—if inaccurate risk estimates mislead people into ignoring the risks or eschewing useful products. A particularly tragic example may have occurred recently in Peru when the government reduced the chlorination of its drinking water, apparently relying in part on a study reporting that chlorination of U.S. drinking water could increase the risk of cancer. Yet in Peru, waterborne disease may be far more important than minute cancer risks; the ensuing cholera outbreak killed nearly 4,000 people and afflicted almost 400,000 more.

Risk Management

If reliable information is available about the real risk posed by a given substance, what should the government do? In many cases the best answer is nothing, because the market will incorporate the information and provide appropriate incentives for safety. As noted above, government does have a role in addressing "externalities," as long as appropriate government action will do more good than harm.

The primary issue in shaping government risk management is the degree to which risk-causing activity should be restricted. Determining when the incremental cost of reducing risk begins to

equal and then exceed the incremental benefit is often a difficult analytic task. With limited social resources to spend on reducing risk, weighing the costs and benefits of policy choices is not only inevitable: it is the daily challenge of good government. For example, experts have pointed out that if the entire U.S. national income were somehow devoted to preventing all of the 95,000 or so accident fatalities that are occurring every year, about $60 million could be spent per accident. Yet such a program would address only about 4 percent of the yearly death toll in America, with no funds left to address cancer or homicide, to say nothing of other social imperatives like food, housing, education, and national defense.

A frequent objection to cost-benefit analysis is that some benefits can be difficult to quantify. For example, it may be hard to measure in dollar terms the benefits of disease prevention or visibility across a national park. Some costs of regulation are also hard to quantify, such as the effect of a rule on future technological innovation. The solution to these difficulties, however, is not to give up on rational balancing of costs and benefits. It is often useful to produce a reliable estimate of the range within which costs and benefits fall, since the alternative is to make a subjective and unsubstantiated judgment. The real question is whether it makes sense to invest in improving our ability to measure costs and benefits—an investment which could end up costing society less than omitting important costs or benefits from regulatory decisions.

Federal agencies now routinely conduct cost-benefit analyses of policy proposals. Executive Order 12291, issued in 1981, requires agencies to analyze the costs and benefits of proposals for major regulations and to submit those analyses to an office of regulatory review, which examines the calculations and suggests possible alternative approaches.

Even with expert cost-benefit analysis, it is not easy to determine the proper level of government risk management. Yet we can be fairly sure that there are substantial problems with existing approaches. First, some laws prevent agencies from considering costs and benefits in making regulatory decisions. For example, parts of the 1977 Clean Air Act required companies to install equipment that reduced pollution by the maximum possible amount, no matter how small the benefits of the marginal reduction in pollution might be or how much the extra equipment might cost. The Delaney Clause of the Food, Drug, and Cosmetic Act requires the FDA to ban any food additive that is found to induce cancer in humans or animals, not matter how trivial the risk or how substantial the benefits of the substance; in 1992 a Federal court reaffirmed the rigidity of this rule. Moreover, the stringency of such

rules only increases as scientific ability to measure minute risks sharpens.

Second, some laws and rules set priorities that do not correspond to real risks. Money spent on programs that make little difference in risk is money no longer available for programs that are more effective in reducing risks. For example, hundreds of billions of dollars will be spent to clean up waste disposal sites, which experts have consistently ranked near the bottom of the environmental risks facing Americans, while much less money is dedicated to combating the greater risk of childhood exposure to lead in paint and soil in the inner city. Moreover, the costs of regulation can themselves increase health risks, by reducing the income of workers and consumers.

The costs and benefits of a risk management policy depend in part on the regulatory instrument or tool chosen to implement that policy. Given a defined goal for risk reduction, policy tools should be selected that minimize the cost of achieving that goal. On the other hand, given a fixed budget for reducing risk, policy tools should be selected that maximize the risk reduction achieved with those resources. These are the two sides of the cost-effectiveness of policy tools.

The "cost" side of cost-effectiveness has been heavily studied. The central conclusion is that *the cost of achieving a given regulatory goal can be significantly reduced by harnessing marketplace incentives to achieve that goal rather than by dictating specific conduct or technologies.* Risk management in the United States has often employed command-and-control regulations that compel businesses to install particular pollution control or workplace safety technologies. Today policymakers are increasingly using market-based regulatory tools, such as fees and tradable allowances, that focus on outcomes rather than methods. These tools set performance objectives and then allow industry the flexibility to achieve results at least cost, thus allocating control efforts to the least costly sources and providing an economic incentive to seek continuous improvements. Market-based tools have been applied to phase down lead in gasoline, phase out ozone-depleting chlorofluorocarbons, and limit urban air pollution. *Market-based incentive tools can achieve environmental goals at substantial cost savings compared to command-and-control tools.* Studies estimate these cost savings at 10 to 50 percent or more, even 90 percent in some cases.

The "effectiveness" side of cost-effectiveness has received less analytic attention, but is equally important. *Rules aimed at reducing risk can often miss their targets.* Increasingly critical attention is being paid to the standard assumption that regulations will successfully eliminate the problem they address, even in cases in which the regulated industry is in compliance. For example, stud-

ies show that even though employers comply with OSHA safety standards, injury rates are barely affected because OSHA's detailed standards for physical design of the workplace do not address the actual underlying causes of most injuries. In contrast, the workers' compensation insurance system simply charges employers insurance premiums tied to the safety record at the workplace. Because fewer injuries mean lower insurance payments, employers invest in safety improvements that address the causes of injury at each workplace. Although concerns about instances of abuse and mismanagement of workers' compensation have arisen recently, in general its incentive-based feature is estimated to have reduced workplace fatalities nationwide by some 20–30 percent.

The effectiveness of some regulations is undercut by "risk tradeoffs." Some regulations aimed at reducing a "target" risk inadvertently promote increases in "nontarget" risks.

- Because environmental laws focus on air, water, waste, and workplace pollution separately, in some cases they may only shift pollution from one of these "media" (such as air) to others (such as water or the workplace). Scrubbers to remove sulfur from air emissions, for example, generate sludge that must be disposed of in some other way.
- Ethylene dibromide (EDB), once a widely used pesticide, has been barred because regulators determined that it poses a small cancer risk. Yet this pesticide kills a mold on peanuts that harbors natural aflatoxins. The estimated human cancer risk from the aflatoxin in one peanut putter sandwich is about 75 times greater than a full day's dietary risk from EDB exposure. Focusing on the pesticide's risk alone, instead of on the net risk of the consumed food, may induce a net increase in overall cancer risk.
- Immediate removal of asbestos from schools to protect occupants many years in the future could stir up asbestos fibers that pose an increased risk to both the workers removing the material and the children occupying the school today.

A different type of "risk tradeoff" occurs when regulation aimed at one risk only causes consumers to switch to riskier products or activities.

- Rules requiring higher gas mileage in cars have saved fuel but encouraged consumers to purchase smaller, lighter vehicles that have higher fatality rates in crashes.
- Laws that place more restrictions on new facilities or products than on old ones create an incentive against innovation, encouraging people to keep existing high-risk plants and products in use longer, with a potential net increase in risk.

334-230 O—92——8 (QL3)

- Rules requiring parents to purchase separate airplane seats for infants could encourage the parents to travel by car instead, increasing the net risk of injury to the child.

IMPROVING GOVERNMENT EFFORTS TO ADDRESS RISK

By exaggerating some risks and using cumbersome regulatory tools, the current government approach to risk assessment and management provides far less protection of the public and the environment than it could for the resources it expends. The Administration has supported several efforts to improve risk assessment and management. The overriding goal is to save more lives and better protect the environment by improving our ability to identify the most important risks and to reduce them cost-effectively.

First, the Administration has sought to disentangle the scientific role of risk assessment from the policy role of risk management. In 1992 the EPA issued new "Risk Characterization" guidelines requiring that all assumptions and methods embedded in risk assessments be disclosed in full. These guidelines are a positive step toward credible and accurate risk assessment that should be forcefully implemented. Risk assessments need to examine not extreme hypothetical cases but the real physiological risks to which real people are exposed. In the case of pesticide residues on food, the EPA has begun to test real supermarket residue levels instead of assuming maximum permitted farm levels. Consideration should be given to creating an independent scientific office to review agency risk assessments, analogous to (but clearly separate from) the review of agency risk management proposals currently conducted by the Office of Management and Budget. Such a review process would improve interagency consistency as well as the accuracy, neutrality, and credibility of risk assessments.

Second, the Administration has emphasized the need to direct society's resources to their best uses. The Administration has insisted on cost-benefit review of regulations under Executive Order 12291, and is strengthening this process via the regulatory reform initiative discussed earlier. These efforts would be enhanced by automatic "sunset" provisions requiring that regulations be reviewed periodically to determine which have outlived their usefulness and can be removed. In 1992 the President extended the cost-benefit analysis requirement to proposals for legislation; surprisingly, agencies had not been routinely evaluating the costs and benefits of their legislative proposals, and the Congress still does not. And the Administration has worked to base legislation, regulations and the federal budget on the principle that priorities address major rather than minor risks.

Further, the problem of "risk tradeoffs" is not insoluble. *Broader and more thorough cost-benefit analyses, taking into account nontarget risks, can help identify potential risk tradeoffs.* Cost-benefit analyses should also be performed by experts independent of the regulatory process who are not subject to pressure from affected constituencies. To address the problem of cross-media shifts in pollution, the EPA is now moving toward a more integrated multimedia regulatory approach that addresses air, water, and land pollution in concert. A potential solution to the problem of regulations that disproportionately burden new facilities and products is the use of new source offsets, such as the provisions in the EPA's urban air pollution rules, which allow new sources to operate as long as they obtain emissions reductions at existing plants equal to or larger than the new emissions they would contribute. *More generally, statutes and rules should direct agencies to prevent "unreasonable risk," rather than mandating reductions in narrow categories of risk or use of specific technological fixes.* By incorporating this principle, the Administration's 1992 policy on the oversight of biotechnology products will help ensure that biotechnology is used safely to produce better drugs, better pest control systems, and an improved food supply, without stifling a promising new technology.

SUMMARY

- Facing risks is inevitable, but reducing risk is costly. Some risks can be worth taking because of their significant benefits. Most risks are addressed by human behavior and by market functions such as insurance and compensating risk premiums.
- Government risk assessment activities need to be improved by disclosing embedded assumptions and incorporating more accurate risk assessment methods.
- The government should intervene to address risks when the benefits of government action exceed the costs. Government risk management policies should employ cost-effective incentive-based tools and should account for risk tradeoffs that may undermine the effectiveness of policy efforts.

CONCLUSION

Millions of complex economic decisions are made every day: How many soybeans should be produced, and how many ball bearings? How much labor and how much equipment should be used to produce these products? How much should a person be paid for a given job? The U.S. economy relies on the market system for answers to these questions. Markets constitute an extraordinarily effective system for processing information on consumer demand, the scarcity of resources, and methods of production. The market

system also allows people to make free economic choices. At times, however, markets may not perform well because of externalities, failures in the availability of information, or because they are inclined toward natural monopoly. While government intervention in such markets may be justified in these limited cases, government attempts to improve performance in these markets can create unintended consequences. Government regulation should be undertaken only when there is a strong presumption that the benefits from intervention exceed the costs, taking into account hidden costs such as forgone innovation. This analysis should be conducted with the understanding that regulation itself is imperfect and can reduce the ability of firms to respond to changing conditions, including new technologies. It is also important to recognize that government regulation of risk is only one among many risk management systems, including norms of behavior, insurance, the marketplace itself, and the tort system.

The President's regulatory reform initiative has established a governmentwide review of regulatory policy to ensure that existing regulations are necessary and cost-effective. Market incentives are now being used to achieve regulatory objectives such as pollution control and more efficient energy markets. Reform of telecommunications regulation is benefiting consumers by lowering prices for communications services and encouraging service innovations. Similarly, in the financial services sector, regulatory reform has been directed at reducing the cost of risk management and expanding investment opportunities while continuing to preserve investor protection and maintain market integrity. The government can also use market incentives to prevent the overconsumption of natural resources by establishing property rights and by considering all social costs when pricing government-owned resources.