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3. What would be the advantages and disadvantages of a system in which, rather than having the FDA permit or prohibit new drugs, the FDA merely published its opinions about the safety and efficacy of drugs, and then allowed physicians to make their own decisions about whether to prescribe them for their patients?
4. Suppose, for simplicity, that Type I and Type II errors resulted in deaths only. Keeping in mind that too little caution produces Type I errors and too much caution produces Type II errors, what would be the best mix of Type I and Type II errors?

3

Flying the Friendly Skies?

Most of us hop into our car with little thought for our personal safety, beyond perhaps the act of putting on seat belts. Yet even though travel on scheduled, commercial airlines is safer than driving to work or to the grocery store, many people approach air travel with a sense of foreboding, if not downright fear.

If we were to think carefully about the wisdom of traveling 600 miles per hour in an aluminum tube seven miles above the earth, several questions might come to mind: How safe is this? How safe should it be? Because the people who operate airlines are not in it for fun, does their interest in making a buck ignore our interest in making it home in one piece? Is some form of government regulation the only way to ensure safety in the skies?

The science of economics begins with one simple principle: We live in a world of **scarcity**, which implies that to get more of any good, we must sacrifice some of other goods. This is just as true of safety as it is of pizzas or haircuts or works of art. Safety confers benefits (we live longer and more enjoyably), but achieving it also entails costs (we must give up something to obtain that safety).

As the degree of safety rises, the total benefits of safety rise but the marginal (or incremental) benefits of additional safety decline. Consider a simple example: Adding exit doors to an airplane increases the number of people who can escape in the event of an emergency evacuation. Nevertheless, each *additional* door adds less in safety benefits than does the previous one; if the fourth door enables, say, an extra ten people to escape, the fifth may enable only an extra six to escape. (If this sounds implausible, imagine having a door for each person; the last door added will enable at most one

more fuel to escape.) So we say that the marginal (or incremental) benefit of safety declines as the amount of safety increases.

Let's look now at the other side of the equation: As the amount of safety increases, both the total and the marginal (incremental) costs of providing safety rise. Having a fuel gauge on the plane's instrument panel clearly enhances safety, because it reduces the chance that the plane will run out of fuel while in flight.¹ It is always possible that a fuel gauge will malfunction, so having a backup fuel gauge also adds to safety. Because having two gauges is more costly than having just one, the total costs of safety rise as safety increases. It is also clear, however, that while the cost of the second gauge is (at least) as great as the cost of the first, the second gauge has a smaller positive impact on safety. Thus, the cost per unit of additional (incremental) safety is higher for the second fuel gauge than for the first.

How much safety should we have? For an economist, the answer to such a question is generally expressed in terms of marginal benefits and marginal costs. The economically *efficient* level of safety occurs when the marginal cost of increasing safety just equals the marginal benefit of that increased safety. Put somewhat differently, if the marginal benefits of adding (or keeping) a safety feature exceed the marginal costs of doing so, then the feature is worth it. But if the added benefits of a safety device do *not* exceed the added costs, we should refrain from installing the device. Note there are two related issues here: How safe should we be, and how should we achieve that level of safety?

Both of these issues took on added urgency on the morning of September 11, 2001, when terrorists hijacked four U.S. commercial jetliners. The hijackers deliberately crashed two of the planes into New York's World Trade Center and flew another into the side of the Pentagon. The fourth plane crashed in a Pennsylvania field, probably in the midst of a struggle for control between the passengers and hijackers. Most people were stunned with the ease with which the hijackers were able to carry out their mission, for it suggested that air travel, particularly in the U.S., was far less safe than

¹ Notice that we say "reduces" rather than "eliminates." In 1978 a United Airlines pilot preoccupied with a malfunctioning landing gear evidently failed to pay sufficient attention to his cockpit gauges. Eight people were killed when the plane was forced to crash land after running out of fuel.

previously believed. Immediately, it was clear that we should devote additional resources to airline safety; what was not clear was how *much* additional resources should be thus devoted, nor precisely *what* changes should be made. For example, some airline pilots wanted the right to carry firearms on flights, to help them prevent future hijackings. Other people objected, noting the high potential costs of such an action: an errant shot from a pistol could puncture a plane's skin, resulting in catastrophic cabin depressurization. Similarly, almost everyone agreed that more careful screening of passengers (and baggage) at airports would produce important safety benefits. But again, the question arose: how should we achieve this? Should carry-on bags be prohibited, or just examined more carefully? How thoroughly should checked luggage be screened for bombs? The precise answers to these questions will be decided upon only as we learn more about the extent of the threat and the costs of alternative responses to it. Nevertheless, throughout the process, economic principles can help us make the most sensible decisions.

In general, the efficient level of safety will not be perfect safety, because perfection is simply too costly to achieve. For example, to be absolutely *certain* that no one is ever killed or injured in an airplane crash, we would have to prevent all travel in airplanes. This does not mean it is efficient to have air disasters become a daily feature on the evening news. It does mean that it is efficient for there to be *some* risk associated with air travel. The unavoidable conclusion is that if we wish to enjoy the advantages of flying, we must be willing to accept some risk—a conclusion that each of us implicitly accepts every time we step aboard an airplane.

Changes in circumstances can alter the efficient level of safety. For example, if a technological change reduces the costs of bomb scanning equipment, the marginal costs of preventing terrorist bomb attacks will be lower. It will be efficient to have more airports install the machines, and to have extra machines at large airports to speed the screening process. Air travel will become safer because of the technological change. Similarly, if the marginal benefits of safety rise for some reason—perhaps because the president of the United States is on board—it could be efficient to take more precautions, resulting in safer air travel. Given the factors that determine the benefits and costs of safety, the result of a change in circumstances will be some determinate level of safety that generally will be associated with some risk of death or injury.

Airplanes are complex systems, and an amazing number of things can go wrong with them. Over the century that humans have been flying, airplane manufacturers and airlines have studied every one of the things that has gone wrong thus far, and put into place design changes and operating procedures aimed at preventing recurring error. Of course consumers have the greatest incentive to ensure that air travel is safe, and if information were free, we could assert with some confidence that the actual level of safety supplied by firms was the efficient level of safety. Consumers would simply observe the safety offered by different airlines, the prices they charge, and select the degrees of safety that best suited their preferences and budgets—just as with other goods. But, of course, information is not free; it is a **scarce good**, costly to obtain. As a result, it is possible that passengers are unaware of the safety records of various airlines, or the competency of the pilots and the maintenance procedures of an airline's mechanics. Indeed, it is possible that even the *airlines* are uncertain about the efficient level of safety, perhaps because they have no way of correctly estimating the true threat of terrorist attacks, for example. Both of these possibilities have been used to argue that it is appropriate for the federal government to mandate certain minimum levels of safety, as it does today through the operation of the Federal Aviation Administration (FAA). Let's look at this issue in some detail.

One argument in favor of government safety standards rests on the presumption that, left to their own devices, airlines would provide less safety than passengers actually want to have. This might happen, for example, if customers could not tell (at a reasonable cost) whether or not the equipment, training, procedures, and so on employed by an airline are safe. If passengers cannot cheaply gauge the level of safety, they will not be willing to reward airlines for being safe or punish them for being unsafe. If safety is costly to provide and consumers are unwilling to pay for it because they cannot accurately measure it, airlines will provide too little of it. The conclusion, at least as reached by some, is that government experts—such as the FAA—should set safety standards for the industry.

This conclusion seems plausible, but it ignores two simple points. First, how is the government to know what the efficient level of safety is? Even if the FAA is fully knowledgeable regard-

ing the efficacy and costs of all possible safety measures, it still does not have enough information to set efficient safety standards, because it does not know the value that people place on safety. Without such information, the FAA has no way of assessing the benefits of additional safety, and thus no means of knowing whether those benefits are greater or less than the **added costs**.

The second point is that it is likely that people are really interested in reaching their destinations safely, and not in whether they got there because of a good plane, a good pilot, or a good mechanic. Even if they cannot observe whether an airline hires good pilots or bad pilots, they can observe whether that airline's planes land safely or crash. If it is *safety* that is important to consumers—and not the obscure, costly-to-measure set of reasons for that safety—the fact that consumers cannot easily measure metal fatigue in jet engines may be totally irrelevant to the process of achieving the efficient level of safety.

Interestingly, evidence shows that consumers *are* cognizant of the safety performance of airlines, and that they “punish” airlines that perform in an unsafe manner. Researchers Mark Mitchell and Michael Maloney have found that when an airline is “at fault” in a fatal plane crash, consumers appear to downgrade their safety rating of the airline (i.e., revise upward their estimates of the likelihood of future fatal crashes). As a result, the offending airline suffers substantial, adverse financial consequences, over and above the costs of losing the plane and being sued on behalf of the victims. These research findings suggest a striking degree of safety awareness on the part of supposedly ignorant consumers.

Of course this discussion leaves open the issue of how to handle safety threats posed by terrorists and the like. For example, much of the information that goes into assessing terrorist threats is classified as secret, and its revelation to airlines or consumers might well compromise key sources of the data. Hence there could be an advantage to having the government try to approximate the efficient safety outcome by mandating certain screening provisions, without revealing exactly why they are being chosen. Similarly, because airlines are connected in networks (so that people and baggage move from one airline to another in the course of a trip) one might argue that achieving the efficient level of safety necessitates a common set of screening rules for all airlines. Even

so, this does not inform us whether the government should impose those rules, or the airlines should come to a voluntary joint agreement on them.

We began this chapter by repeating the commonplace observation that airlines are safer than cars. Yet many people *still* worry for their safety every time they get on an airplane. Are they being irrational? Well, the answer, it seems, is in the eye of the beholder. Measured in terms of fatalities per mile traveled, airplanes are indeed some 15 times safer than cars (and 176 times safer than walking, we might add). But this number masks the fact that 68 percent of aircraft accidents happen on takeoff and landing, and these operations occupy only 6 percent of flight time. It is presumably this fact that quite sensibly makes people nervous whenever they find themselves approaching an airport.

DISCUSSION QUESTIONS

1. Is it possible to be too safe? Explain what you mean by "too safe."
2. Many automobile manufacturers routinely advertise the safety of their cars, yet airlines generally do not even mention safety in their advertising. Can you suggest an explanation for this difference?
3. Many economists would argue that private companies are likely to be more efficient than the government in operating airlines. Yet many economists would also argue that there is a valid reason for government to regulate the safety of those same airlines. Can you explain why (or why not) the government might be good at ensuring safety, even though it might not be good at operating the airlines?
4. Professional football teams sometimes charter airplanes to take them to their "away" games. Would you feel safer riding on a United Airlines plane that had been chartered by the Washington Redskins rather than on a regularly scheduled United Airlines flight?

4

The Costs of Terrorism

On September 11, 2001, terrorists hijacked four U.S. commercial jetliners. The hijackers deliberately crashed two of the planes into the twin towers of New York's World Trade Center. Another was flown into the side of the Pentagon. The fourth plane crashed in a Pennsylvania field, and is believed to have gone down in the midst of a struggle for control between the passengers and hijackers. Three thousand people died in the attacks, a toll that exceeded even that of the Japanese attack on Pearl Harbor, some 60 years before.

The terrorists who planned and executed these attacks presumably hoped to accomplish at least two goals: (1) destroy symbols of American capitalist and military might; and (2) damage—perhaps cripple—the American economy. They largely succeeded in their first objective: Although the Pentagon survived and has been repaired, the Trade Center's twin towers are no more, and may never be rebuilt as they were. Yet despite the horrific human carnage, the economic significance of the September 11 attacks will almost surely turn out to be far less than the terrorists hoped.

The loss of physical capital due to the attack can be fairly easily translated into economic terms. Rental rates on office space in Lower Manhattan (the location of the Trade Center) are available in the market place, and the computers, furniture, and art that was destroyed (as well as the jetliners themselves) can also be readily valued based on market prices of comparable items. The destruction of the Trade Center buildings, including the smaller ones around the twin towers, cost perhaps \$5 billion. The lost assets of the buildings' tenants, plus the clean-up costs, and the loss of the four planes add about \$10 billion more to the physical destruction

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Sex, Booze, and Drugs

Prior to 1914, cocaine was legal in this country; today it is not. Alcohol (of the intoxicating variety) is legal in United States today; from 1920 to 1933 it was not. Prostitution is legal in Nevada today; in the other forty-nine states it is not.¹ All these goods—sex, booze, and drugs—have at least one thing in common: The consumption of each brings together a willing seller with a willing buyer; there is an act of mutually beneficial exchange (at least in the opinion of the parties involved). Partly because of this property, attempts to proscribe the consumption of these goods have (1) met with less than spectacular success, and (2) yielded some peculiar patterns of production, distribution, and usage. Let's see why.

When the government seeks to prevent voluntary exchange, it generally must decide whether to go after the seller or the buyer. In most cases—and certainly when sex, booze, or drugs have been involved—the government targets sellers, because this is where the authorities get the most benefit from their enforcement dollars. A cocaine dealer, even a small retail pusher, often supplies dozens or even hundreds of users each day, as did speakeasies (illegal saloons) during Prohibition; a hooker typically services anywhere from three to ten tricks per day. By incarcerating the supplier, the police can prevent several—or even several hundred—transactions from taking place, which is usually much more cost-effective than going after the buyers one by one. It is not that the police ignore the consumers of illegal goods; indeed, sting operations—in which the police pose

¹ These statements are not quite correct. Even today, cocaine may be legally obtained by prescription from a physician. Prostitution in Nevada is legal only in those counties that have, by virtue of local option, chosen to proclaim it as such. Finally, some counties in the United States remain dry, prohibiting the sale of beer, wine, and distilled spirits.

as illicit sellers—often make the headlines. Nevertheless, most enforcement efforts focus on the supply side, and so shall we.

Law enforcement activities directed against the suppliers of illegal goods increase the suppliers' operating costs. The risks of fines, jail sentences, and possibly even violence become part of the costs of doing business and must be taken into account by existing and potential suppliers. Some entrepreneurs will leave the business, turning their talents to other activities; others will resort to clandestine (and costly) means to hide their operations from the police; still others will restrict the circle of buyers with whom they are willing to deal to minimize the chances that a customer is a cop. Across the board, the costs of operation are higher, and at any given price, less of the product will be available. There is a reduction in supply, and the result is a higher price for the good.

This increase in price is, in a sense, exactly what the enforcement officials are after, for the consumers of sex, booze, and drugs behave according to the law of demand: The higher the price of a good, the lower the amount consumed. So the immediate impact of the enforcement efforts against sellers is to reduce the consumption of the illegal good by buyers. There are, however, some other effects.

First, because the good in question is illegal, people who have a **comparative advantage** in conducting illegal activities will be attracted to the business of supplying (and perhaps demanding) the good. Some may have an existing criminal record and are relatively unconcerned about adding to it. Others may have developed skills in evading detection and prosecution while engaged in other criminal activities. Some may simply look at the illegal activity as another means of thumbing their noses at society. The general point is that when an activity is made illegal, people who are good at being criminals are attracted to that activity.

Illegal contracts usually are not enforceable through legal channels (and even if they were, few suppliers of illegal goods would be stupid enough to complain to the police about not being paid for their products). Thus, buyers and sellers of illegal goods frequently must resort to private methods of contract enforcement—which often means violence.² Hence, people who are relatively good at

² Fundamentally, violence—such as involuntary incarceration—also plays a key role in the government's enforcement of legal contracts. We often do not think of it as violence, of course, because it is usually cushioned by constitutional safeguards, procedural rules, and so on.

violence are attracted to illegal activities and are given greater incentives to employ their talents. This is one reason why the murder rate in America rose to record levels during Prohibition (1920–1933) and then dropped sharply when liquor was again made legal. It also helps explain why the number of drug-related murders soared during the 1980s, and why drive-by shootings became commonplace in many drug-infested cities. The Thompson submachine gun of the 1930s and the MAC-10 machine gun of the 1980s were, importantly, just low-cost means of contract enforcement.

The attempts of law enforcement officials to drive sellers of illegal goods out of business have another effect. Based on recent wholesale prices, \$50,000 worth of pure heroin weighs about two ounces; \$50,000 worth of marijuana weighs about twenty pounds. As any drug smuggler can tell you, hiding two ounces of contraband is a lot easier than hiding twenty pounds. Thus, to avoid detection and prosecution, suppliers of the illegal good have an incentive to deal in the more valuable versions of their product, which for drugs and booze mean the more potent versions. Bootleggers during Prohibition concentrated on hard liquor rather than beer and wine; even today, moonshine typically has roughly twice the alcohol content of legal hard liquor such as bourbon, scotch, or vodka. After narcotics became illegal in this country in 1914, importers switched from the milder opium to its more valuable, more potent, and more addictive derivative, heroin.

The move to the more potent versions of illegal commodities is enhanced by enforcement activities directed against users. Not only do users, like suppliers, find it easier (cheaper) to hide the more potent versions, there is also a change in relative prices due to user penalties. Typically, the law has lower penalties for using an illegal substance than for distributing it. Within each category (use or sale), however, there is commonly the same penalty regardless of value per unit. For example, during Prohibition, a bottle of wine and a bottle of more expensive, more potent hard liquor were equally illegal. Today, the possession of one gram of 90 percent pure cocaine brings the same penalty as the possession of one gram of 10 percent pure cocaine. Given the physical quantities, there is a fixed cost (the legal penalty) associated with being caught, regardless of value per unit (and thus potency) of the substance.

Hence, the structure of legal penalties raises the relative value of less potent versions, encouraging users to substitute more potent versions—heroin instead of opium, hashish instead of marijuana, hard liquor instead of beer.

Penalties against users also encourage a change in the nature of usage. Prior to 1914, cocaine was legal in this country and was used openly as a mild stimulant, much as people today use caffeine. (Cocaine was even included in the original formulation of Coca-Cola.) This type of usage—small, regular doses over long time intervals—becomes relatively more expensive when the substance is made illegal. Extensive usage (small doses spread over time) is more likely to be detected by the authorities than is intensive usage (a large dose consumed at once), simply because possession time is longer and the drug must be accessed more frequently. Thus, when a substance is made illegal, there is an incentive for consumers to switch toward usage that is more intensive. Rather than ingesting cocaine orally in the form of a highly diluted liquid solution, as was commonly done before 1914, people switched to snorting or even injecting it. During Prohibition, people dispensed with cocktails before dinner each night; instead, on the less frequent occasions when they drank, they more often drank to get drunk. The same phenomenon is observed today. People under the age of twenty-one consume alcoholic beverages less frequently than do people over the age of twenty-one. But when they do drink, they are more likely to drink to get drunk.

Not surprisingly, the suppliers of illegal commodities are reluctant to advertise their wares openly; the police are as capable of reading billboards and watching TV as are potential customers. Suppliers are also reluctant to establish easily recognized identities and regular places and hours of business, because to do so raises the chance of being caught by the police. Information about the price and quality of products being sold goes underground, often with unfortunate effects for consumers.

With legal goods, consumers have several means of obtaining information. They can learn from friends, advertisements, and personal experience. When goods are legal, they can be trademarked for identification. The trademark may not legally be copied, and the courts protect it. Given such easily identified brands, consumers can be made aware of the quality and price of each. If their

experience does not meet expectations, they can assure themselves of no further contact with the unsatisfactory product by never buying that brand again.

When a general class of products becomes illegal, there are fewer ways to obtain information. Brand names are no longer protected by law, so falsification of well-known brands ensues. When products do not meet expectations, it is more difficult (costly) for consumers to punish suppliers. Frequently, the result is degradation of and uncertainty about product quality. The consequences for consumers of the illegal goods are often unpleasant, sometimes fatal.

Consider prostitution. In those counties in Nevada where prostitution is legal, the prostitutes are required to register with the local authorities, and they generally conduct their business within the confines of well-established bordellos. These establishments advertise openly and rely heavily on repeat business. Health officials test the prostitutes weekly for venereal disease and every month for AIDS. Contrast this with other areas of the country, where prostitution is illegal. Suppliers generally are streetwalkers, because a fixed, physical location is too easy for the police to detect and raid. Suppliers change locations frequently, to reduce harassment by police. Repeat business is reported to be minimal; frequently, customers have never seen the prostitute before and never will again.

The difference in outcomes is striking. In Nevada, the spread of venereal disease by legal prostitutes is estimated to be almost nonexistent; to date, none of the 9000 registered prostitutes in Nevada has tested positive for AIDS. By contrast, in some major cities outside Nevada the incidence of venereal disease among prostitutes is estimated to be near 100 percent. In Miami, one study found that 19 percent of all incarcerated prostitutes tested positive for AIDS; in Newark, New Jersey, 52 percent of the prostitutes tested were infected with the AIDS virus, and about half of the prostitutes in Washington, D.C., and New York City are also believed to be carrying the AIDS virus. Because of the lack of reliable information in markets for illegal goods, customers frequently do not know exactly what they are getting; as a result, they sometimes get more than they bargained for.

Consider alcohol and drugs. Today, alcoholic beverages are heavily advertised to establish their brand names and are carried by reputable dealers. Customers can readily punish suppliers for any deviation from the expected potency or quality by withdrawing

their business, telling their friends, or even bringing a lawsuit. Similar circumstances prevailed before 1914 in this country for the hundreds of products containing opium or cocaine.

During Prohibition, consumers of alcohol often did not know exactly what they were buying or where to find the supplier the next day if they were dissatisfied. Fly-by-night operators sometimes adulterated liquor with methyl alcohol. In extremely small concentrations, this made watered-down booze taste like it had more kick; in only slightly higher concentrations, the methyl alcohol blinded or even killed the unsuspecting consumer. Even in "reputable" speak-easies (those likely to be in business at the same location the next day), bottles bearing the labels of high-priced foreign whiskeys were refilled repeatedly with locally (and illegally) produced rotgut until their labels wore off.

In the 1970s, more than one purchaser of what was reputed to be high-potency Panama Red or Acapulco Gold marijuana ended up with low-potency pot heavily loaded with stems, seeds, and maybe even oregano. Buyers of cocaine must worry about not only how much the product has been cut along the distribution chain, but also what has been used to cut it. In recent years the purity of cocaine at the retail level has ranged between 10 percent and 95 percent; for heroin, the degree of purity has ranged from 5 percent to 50 percent. Cutting agents can turn out to be any of various sugars, local anesthetics, or amphetamines; on occasion, rat poison has been used.

We noted earlier that the legal penalties for the users of illegal goods encourage them to use more potent forms and to use them more intensively. These facts and the uncertain quality and potency of the illegal products yield a deadly combination. During Prohibition, the death rate from acute alcohol poisoning (i.e., due to an overdose) was more than thirty times higher than today. During 1927 alone, 12,000 people died from acute alcohol poisoning, and many thousands more were blinded or killed by contaminated booze. Today, about 3000 people per year die as a direct result of consuming either cocaine or heroin. Of that total, it is estimated, roughly 80 percent die from (1) an overdose caused by unexpectedly potent product, or (2) an adverse reaction to the material used to cut the drug. Clearly, caveat emptor (let the buyer beware) is a warning to be taken seriously if one is consuming an illegal product.

We noted at the beginning of the chapter that one of the effects of making a good illegal is to raise its price. One might well ask, by

how much? During the early 1990s, the federal government was spending about \$2 billion a year in its efforts to stop the importation of cocaine from Colombia. One recent study concluded that these efforts had hiked the price of cocaine by 4 percent (yes, 4 percent) relative to what it would have been had the federal government done nothing to interdict cocaine imports. The study estimated that the cost of raising the price of cocaine an additional 2 percent would be \$1 billion per year.³

The government's efforts to halt imports of marijuana have been more successful, presumably because that product is easier to detect than cocaine. Nevertheless, suppliers have responded by cultivating marijuana domestically instead of importing it. The net effect has been an estimated tenfold increase in potency due to the superior farming techniques available in this country, as well as the use of genetic bioengineering to improve strains.

We might also consider the government's efforts to eliminate the consumption of alcohol during the 1920s and 1930s. They failed so badly that the Eighteenth Amendment, which put Prohibition in place, was the first (and thus far the only) constitutional amendment ever to be repealed. As for prostitution—it is reputed to be “the oldest profession,” and by all accounts continues to flourish today, even in Newark and Miami.

The government's inability to halt the consumption of sex, booze, or drugs does not in and of itself mean that those efforts have failed. Indeed, the “successes” of these efforts are manifested in their consequences—ranging from tainted drugs and alcohol to disease-ridden prostitutes. The message instead is that when the government attempts to prevent mutually beneficial exchange, even its best efforts are unlikely to meet with spectacular success.

³ Federal attempts to prevent cocaine from entering the country are, of course, supplemented by other federal, as well as state and local, efforts to eradicate the drug once it has crossed our borders. To date, there are no empirical estimates of the extent to which these other efforts have increased prices.

DISCUSSION QUESTIONS

1. The federal government currently taxes alcohol on the basis of the 100-proof gallon. (One-hundred-proof alcohol is exactly 50 percent pure ethyl alcohol; most hard liquor sold is 80 proof, or 40 percent ethyl alcohol, whereas wine is usually about 24 proof and most beer is 6 to 10 proof.) How would alcohol consumption patterns be different if the government taxed alcohol strictly on the basis of volume rather than taking into account its potency as well?
2. During Prohibition, some speakeasy operators paid bribes to ensure that the police did not raid them. Would you expect the quality of the liquor served in such speakeasies to be higher or lower than in speakeasies that did not pay such bribes? Would you expect any systematic differences (e.g., with regard to income levels) among the customers patronizing the two types of speakeasies?
3. When comparing the markets for prostitution in Nevada and New Jersey, there are two important differences: (1) Prostitutes in New Jersey face higher costs because of government efforts to prosecute them; and (2) customers in New Jersey face higher risks of contracting diseases from prostitutes, because the illegal nature of the business makes reliable information about product quality much more costly to obtain. Given these facts, would you expect the price of prostitution services to be higher or lower in New Jersey, compared to Nevada? Which state would have the higher amount of services consumed (adjusted for population differences)?
4. According to the Surgeon General of the United States, nicotine is the most addictive drug known to humanity, and cigarette smoking kills perhaps 300,000 to 400,000 people per year in the United States. Why isn't tobacco illegal in the United States?

Columbia and Puerto Rico, have at least one VA medical center, and the VA boasts almost 250,000 employees nationwide.

The General Accounting Office (GAO) did a study of the VA a few years ago, concluding that the VA system faces a growing demand for "free" medical services. Herein lies the rub—the quantity demanded of most services at a zero price will almost always exceed the quantity supplied. Consequently, because price is not used as a rationing device, some other method must be used to ration the scarce resources. Fifty-five percent of the patients who use the VA for routine medical problems wait three hours or longer and sometimes an entire day in order to be seen for a few minutes by a VA general physician. Even among patients requiring urgent medical care, one in nine must wait at least three hours. Patients in need of specialized care cannot even be *seen* by a specialist for 60 to 90 days. They wait months more if surgery or other special procedures are required.

Whether the location is Britain, Canada, Holland, or even the U.S. Veterans Administration, when prices are prevented from clearing the market for medical care, waiting time is the most commonly used means of rationing demand. As one unidentified U.S. veteran told the GAO, "I pack a lunch and take a book." Another veteran, retired 69-year-old Army Major Elmer Erickson, stated, "Be prepared to spend the day there. You will eventually see a doctor."

DISCUSSION QUESTIONS

1. Suppose we had government-mandated universal access to food. How would the outcome likely differ from what is observed with health care systems of this type?
2. Under the Canadian system, those who are unhappy with the health care they receive can come to the United States for medical care if they can afford it. If the United States adopted a system similar to Canada's, where could Americans go if they were not satisfied with the medical care they were receiving?
3. Under the current U.S. health care system, insurance companies often perform the role performed by government agencies un-

der the British, Canadian, and Dutch systems—they pay the bills and they limit the care that people are able to consume. Why might health insurance companies be expected to do a better job in performing these functions than would a government agency?

4. How much health care do people "need"? Does this amount depend on the cost of providing it?

12

The Effects of the Minimum Wage

Ask workers if they would like a raise and the answer is likely to be a resounding yes. But ask them if they would like to be fired or have their hours of work reduced and they would probably tell you no. The effects of the minimum wage are centered on exactly these points.

Proponents of the **minimum wage**—the lowest hourly wage firms legally may pay their workers—argue that low-income workers are underpaid and unable to support themselves or their families. The minimum wage, they say, raises earnings at the bottom of the wage distribution, with little disruption to workers or businesses. Opponents claim that most low-wage workers are low-skilled youths without families to support. The minimum wage, it is said, merely enriches a few teenagers at the far greater expense of many others, who can't get jobs. Most important, opponents argue, many individuals at the bottom of the economic ladder lack the skills needed for employers to hire them at the federal minimum. Willing to work but unable to find jobs, these people never learn the basic job skills needed to move up the economic ladder to higher-paying jobs. The issues are clear—but what are the facts?

The federal minimum wage was instituted in 1938 as a provision of the Fair Labor Standards Act (FLSA). It was originally set at \$0.25 per hour, about 40 percent of the average manufacturing wage at the time. Over the next forty years, the legal minimum was raised periodically, roughly in accord with the movement of market wages throughout the economy. Typically, its level has averaged between 40 percent and 50 percent of average manufacturing wages. In re-

sponse to the high inflation of the late 1970s, the minimum wage was hiked seven times between 1974 and 1981, reaching \$3.35 per hour—about 42 percent of manufacturing wages. Ronald Reagan vowed to keep a lid on the minimum wage, and by the time he stepped down as president, the minimum's unchanged level left it at 31 percent of average wages. Legislation passed in 1989 raised the minimum to \$3.80 in 1990 and \$4.25 in 1991. Five years later, at the urging of President Clinton, Congress raised it in two steps to \$5.15 per hour. By the time you read this, it is likely that the minimum wage will have been increased again.

Nearly 4 million workers earn the minimum wage; another 2 million or so take home even less because the law doesn't cover them. Supporters of the minimum wage argue that it prevents exploitation of employees and helps them earn enough to support their families and themselves. Even so, at \$5.15 per hour, a full-time worker earns less than 60 percent of what the government considers enough to keep a family of four out of poverty. In fact, to get a family of four with one wage earner up to the poverty line, the minimum wage would have to be over \$8.00 per hour.

Yet those who oppose the minimum wage argue that such calculations are irrelevant. For example, two-thirds of the workers earning the minimum wage are single, and they earn enough to put them above the poverty cutoff. Moreover, about half of these single workers are teenagers, most of whom have no financial obligations, except possibly for their clothing and car insurance expenditures. Thus opponents argue that the minimum wage chiefly benefits upper-middle class teens who are least in need of assistance at the same time that it costs the jobs of thousands of disadvantaged minority youths.

The debate over the minimum wage intensified a few years ago when research by David Card and Alan Krueger suggested that a change in the New Jersey minimum wage had no adverse short-run impact on employment. Further research by other scholars focusing on Canada reveals more clearly what happens when the minimum wage is hiked. In Canada there are important differences in minimum wages both over time and across different provinces. This enabled researchers to distinguish between the short-run and long-run effects of changes in minimum wages. The short-run effects are indeed negligible, as implied by Card and Krueger. Nevertheless, the

Canadian research shows that in the *long run* the adverse effects of a higher minimum wage are quite substantial. In the short run, it is true that firms do not cut their workforce by much, if at all, in response to a higher minimum. But over time, the higher costs due to a higher minimum wage force smaller firms out of business, and it is here that the drop in employment shows up clearly.

The Canadian results are consistent with the overwhelming bulk of the U.S. evidence on this issue, which points to a negative impact of the minimum wage on employment. After all, the number of workers demanded, like the quantity demanded for all goods, responds to price: the higher the price, the lower the number desired. There remains, however, debate over *how many* jobs are lost due to the minimum wage. For example, when the minimum wage was raised from \$3.35 to \$4.25, credible estimates of the number of potential job losses ranged from 50,000 all the way up to 400,000. When the minimum was hiked to \$5.15, researchers suggested that at least 200,000 jobs were at stake. With a workforce of 140 million persons, numbers like these may not sound very large. But most of the people who don't have jobs as a result of the minimum wage are teenagers; they comprise only about 5 percent of the workforce but bear almost all of the burden of foregone employment alternatives.

Significantly, the youths most likely to lose work due to the minimum wage are disadvantaged teenagers, chiefly minorities. On average, these teens enter the workforce with the fewest job skills and the greatest need for on-the-job training. Until and unless these disadvantaged teenagers can acquire these skills, they are the most likely to be unemployed as a result of the minimum wage—and thus least likely to have the opportunity to move up the economic ladder. With a teen unemployment rate better than triple the overall rate, and unemployment among black youngsters hovering above 30 percent, critics argue that the minimum wage is a major impediment to long-term labor market success for minority youth.

Indeed, the minimum wage has an aspect that its supporters are not inclined to discuss: It can make employers more likely to discriminate on the basis of sex or race. When wages are set by market forces, employers who would discriminate face a reduced, and thus more expensive, pool of workers. But when the government mandates an above-market wage, a surplus of low-skilled workers results, and it becomes easier and cheaper to discriminate. As former U.S. Treasury Secretary Lawrence Summers noted, the minimum wage

“removes the economic penalty to the employer. He can choose the one who's white with blond hair.”

Critics of the minimum wage also argue that it makes firms less willing to train workers lacking basic skills. Instead, companies may choose to hire only experienced workers whose abilities justify the higher wage. Firms are also likely to become less generous with fringe benefits in an effort to hold down labor costs. The prospect of more discrimination, less job training for low-skilled workers, and fewer fringe benefits for entry-level workers leaves many observers uncomfortable. As economist Jacob Mincer of Columbia University notes, the minimum wage means “a loss of opportunity” for the hard-core unemployed.

The last time Congress and the President agreed to raise the minimum wage, it was only after a heated battle lasting months. Given the stakes involved—an improved standard of living for some, a loss of job opportunities for others—it is not surprising that discussions of the minimum wage soon turn to controversy. As one former high-level U.S. Department of Labor official said: “When it comes to the minimum wage, there are no easy positions to take. Either you are in favor of more jobs, less discrimination, and more on-the-job training, or you support better wages for workers. Whatever stance you choose, you are bound to get clobbered by the opposition.” When the Congress and the President face this issue, one or both parties usually feel the same way.

DISCUSSION QUESTIONS

1. Are teenagers better off when a higher minimum wage enables some to get higher wages but causes others to lose their jobs?
2. Are there methods other than a higher minimum wage that could raise the incomes of low-wage workers without reducing employment among minority youngsters?
3. Why do you think organized labor groups, such as unions, are supporters of a higher minimum wage, even though their members all earn much more than the minimum wage?
4. Is it possible that a higher minimum wage could ever raise employment?

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Lights Out in California

In the summer of 2000 things started to get very strange in California's electricity market. First, wholesale electricity prices soared to ten times previous levels, even as retail prices stayed unchanged, pushing two of the state's three large electric utilities into financial ruin. Then the electric companies started turning the lights out—electricity services to large blocks of customers were simply turned off for several hours each day. And finally, the government of California decided to get into the electricity business, buying it on the wholesale market and selling it at retail for prices that didn't come close to covering costs. Plenty of people, in California and elsewhere, thought this mess was caused by a failure of the market system. In fact, nothing could be farther from the truth. The real culprit was the attempt by California's governor and legislature to circumvent market forces. Let's see why.

We must begin with a look back in time. Historically, electricity in this country has been supplied by **regulated monopolies**—firms that are granted the exclusive right to sell electricity in part or all of a state, but at prices that are regulated (decided upon) by an agency of the state government. The rationale for this arrangement has been technological constraints that led to **economies of scale** in the industry: costs have been lower when one firm supplied the electricity than when several firms competed to do so. But with only one firm in the market, there would be an incentive for it to raise prices well above costs. To ensure that the savings of the scale economies were achieved and passed on to consumers, states have thus allowed firms to be **monopoly** suppliers of electricity, but limited the prices they have been permitted to charge.

In recent years, rapidly advancing technology has virtually eliminated the huge economies of scale that once dominated this

industry. Small plants can now generate electricity much more cheaply than before; efficient high-power transmission lines enable firms to compete effectively with those in other states; and communications and computer advances have made it possible to coordinate the production and distribution of electricity across dozens or even thousands of different firms across the country. As a result, interest has grown in reducing the amount of electricity regulation in the U.S., i.e., opening up markets to competition, in the hopes that electricity bills could be lowered as more firms competed for the business of consumers. This process, called "deregulation," was the path along which California seemed to start in the 1990s. Unfortunately, although California used the term deregulation to describe the actions it took, the label bore almost no resemblance to reality. In fact, the new rules imposed by the state are better described as "re-regulation."

What California called deregulation was a combination of three policies. First, the state cut legally permissible retail electricity prices by 9% and then forbade firms from raising prices to customers, regardless of costs. Second, in a move that actually did resemble true deregulation, the state allowed wholesale electricity prices to move freely in response to market forces. Because California electric companies were on balance net importers of electricity from producers in other states, this meant that the wholesale costs of California electric companies were free to fluctuate, even though their retail prices were fixed by law. The third component of California's plan was to require utilities to sell off much of their productive capacity and simultaneously prohibit them from using long-term contracts to buy electricity on behalf of their customers. Instead, California electric utilities were required to buy electricity on a day-ahead basis in so-called "spot" markets at whatever prices happened to be each day.

This odd combination of rules was cobbled together by California politicians in their efforts to get consumers and producers to agree to deregulation. Consumers, suspicious of the long history of monopolies in this market, wanted assurances they wouldn't get stuck with higher bills when deregulation went into effect; thus the state cut retail prices and locked them in at the lower level. Producers hoped that wholesale prices would go down and wanted to be able to capture all of the profits if they did so; hence,

When a seller's decisions affect the price of a good, economists usually call the firm a **monopoly**. Literally, this means "single seller," but what is actually meant is that the firm faces a downward-sloping demand curve for its output, so that its decisions affect the price at which its output is sold. When a buyer's decisions affect the market price, we term the firm a **monopsony**, or "single buyer." This just means that the firm faces a positively sloped supply curve, so that its purchasing decisions affect the price at which it buys goods. (Some economists use the term **price searcher** to mean any firm—buyer or seller—whose decisions affect market prices, and who must therefore search for (or decide on) the price that maximizes the firm's profits. Following this terminology, a pure competitor would be called a **price taker**, for such a firm takes the market price as given.)

The starting point for our examination of different market structures, Chapter 14, "The Internet Economy," provides a look at some implications of the growth of commercial activity on the Internet. Many economists initially believed that the Internet would become the home of **pure competition** at its finest. Instead, two forces are combining to make price searchers the dominant organizational form on the Web. First, there are important **network effects**: sites such as Monster.com and eBay are more valuable to a given user the larger the number of *other* people who are also using them. Second, for most sites there are also important **economies of scale**: average costs are lower when the sites are larger. On both counts, there are tremendous competitive pressures for firms to consolidate down to one or a few dominant entities in each line of business. This has led to growing calls for government action to limit the pricing behavior and other business practices of these large firms. Such calls for government action are accompanied by other requests for government action to prevent piracy of **intellectual property**. Digital information is a tempting target for those who would steal ideas, and the Internet is the ideal medium for distributing the fruits of that theft. Between government efforts to prevent such behavior and to monitor the pricing behavior of large firms, the virtual world of the Web is starting to look a lot like the non-virtual reality we inhabited before the advent of the Internet.

As we see in Chapter 15, "Contracts, Combinations, and Conspiracies," even when there are no technical factors tending to re-

duce the number of viable firms, the rigors (and low profits) of competition are such that firms often try to devise ways to avoid competing. One of the most popular is the **cartel**, which is simply a collective agreement by many or all firms in an industry to reduce total output so that the price of the product—and thus the profits of the cartel's members—may be raised. Cartels generally are illegal in the United States, but they sometimes are observed in international markets. Here we examine three such cartels, in the markets for oil, diamonds, and caviar. In each case we find that although the incentives to form cartels are great, even greater are the incentives to cheat on the cartels, almost as soon as they are formed. The overriding message of this chapter is that, despite their enormous profit potential, competitive pressures make cartels inherently unstable, and thus generally short-lived.

Whatever the degree of competition, firms are always seeking ways to raise profits. Often this means developing new products and striving to offer superior service. But sometimes, as we see in Chapter 16, "Coffee, Tea, or Tuition-Free?," it simply means adjusting prices on existing products. The practice of charging prices that differ across customers in ways not due to differences in the marginal costs of supplying them is called **price discrimination**. Although technically illegal in the United States, it is routinely observed, in markets ranging from airline travel to college financial aid. In the case of air travel, you are almost certainly the beneficiary of price discrimination, paying a lower price than you would if price discrimination were completely eliminated. But don't feel too smug: By the time you start traveling for business rather than pleasure, you are likely to be on the wrong end of the price discrimination, paying plenty so that the college kid in the seat next to can enjoy Spring Break in a sunny clime.

Yet another way that firms try to enhance profits is **product differentiation**—that is, developing new products or styles that catch the fancy of customers and pull business away from one's rivals. The story of product differentiation is usually told as a tale of great financial gain to the firms that do it, inflicted at sizeable cost on consumers, who don't really "need" the new products. In fact, as we see in Chapter 17, "The Perils of Product Differentiation," a careful look at the record suggests that the practice is neither so easy nor so profitable as it might seem at first glance. Instead, it appears that

consumers are considerably more discriminating than they are usually given credit for. Moreover, if they are not interested in what is being offered, they'll reject it—at great cost to the firm that tries to inflict it upon them. Because of this, product differentiation is a risky business, fraught with potential losses and likely to succeed only if the firms doing it have something that is truly of value to consumers. Thus, product differentiation seems to be much like any other business venture—likely to be successful only if the product is valued by the consumer, and on average an activity that can be expected to yield only the competitive rate of return.

As we see in Chapter 18, “Keeping the Competition Out,” enlisting the government to hamstring or exclude competitors is probably the most reliable means of ensuring that you are protected from the rigors of competition. Perhaps for this reason, the array of markets in which the government stifles competition is nothing short of remarkable. Here we examine just a handful, ranging from taxicabs to hair braiding, but the list could have gone on and on. In each case, the method is the same: Usually under the guise of “consumer protection,” the government prevents entry by some firms into a market, thereby reducing supply in that market. The effect is much the same as that produced by a fully enforced cartel. Firms thus protected by the government enjoy both a higher price for their product and a larger market share. Consumers—supposedly “protected” by their government—are usually the big losers, due to higher product prices and reduced selection among suppliers.

14

The Internet Economy

It didn't sound like much—one penny of profit per share. That was the operating profit that Amazon.com announced for the last quarter of 2001, a grand total of \$5 million for those three months. That penny per share made headlines all over the country, even though many other companies made far larger profits without getting any press coverage. Why did Amazon's tiny profit make big news?

The reason is simple: Amazon.com was the first major Internet retailing company to show *any* profit. Indeed, precious few Internet companies of any description have ever made money. It was this almost universal lack of profits that played a key role in the dot-com stock market meltdown of 2000–2001. When investors got tired of yearly financial losses, they punished the Internet firms by dumping shares of those stocks. The result? The NASDAQ, a stock market index heavily weighted toward Internet stocks, lost over 60 percent of its value from its high in March of 2000 to its low in September of 2001.

Does all this mean the Internet economy is dead? Will nothing be left of the on-line world? The answer is: Definitely not. The Internet world is here to stay and grow and thrive. But it surely will be much different than many people thought it would be just a few years ago.

In the 1990s, it seemed that the commercial development of the Internet was going to yield thousands—or even millions—of tiny new companies, each with the capacity to reach all over the world from their Web sites. The result, it was confidently forecast, was that competition in the marketplace would be revolutionized,

as dot-com startups effectively competed with (and sometimes out-competed) large-scale, old-line brick and mortar companies. To be sure, the dot-com companies tried this, but most of them never made it, and for the very reasons that make the Internet itself what it is. Let's see why.

An essential element of the Internet, and indeed of computer systems in general, is the presence of **network effects**. If just one person has an email account, it is worthless. But if a second person gets an account, email now has some value, and it becomes increasingly valuable as more and more people get accounts. Similarly, job-hunting sites such as Monster.com and auction sites such as eBay become more valuable to *other* people each time someone uses the sites. The result is that combining, say, many job-hunting sites into one site creates a single entity that is far more valuable than the sum of the previous independent entities. Thus, from the very day commercial activity started on the Internet, there were tremendous incentives to consolidate firms into larger and larger entities—and tremendous competitive pressure on any remaining smaller firms. The law of the jungle—eat or be eaten—soon took its toll.

There are also elements of the Internet that create **economies of scale**—that is, average costs that are lower when firms are larger. For example, to create a successful Web site, one must invest heavily in software development. But once the site is in existence, hundreds, thousands, or even millions of people can visit it without any additional new software. To be sure, more servers may have to be added, but many of the site's costs increase little as output rises, so average costs fall. This makes larger firms more formidable competitors, and creates an incentive for firms to consolidate, driving smaller competitors out of business.

Economies of scale are also referred to as **increasing returns**, a concept that is not new. The British economist Alfred Marshall discussed the notion back in the 1890s. He used as his examples the provision of electricity and gas to households and firms. At the time, the Standard Oil Trust in the United States was another real-world example of economies of scale. There was a big difference between then and now, however. At the beginning of the twentieth century Standard Oil, which was twice the size of its rivals, saw average costs fall by about 10 percent due to this size advantage. Such savings are tiny compared to what is possible in the knowl-

edge economy of today. The reason is that once an idea is created, if the knowledge can be transformed into a digital string of zeros and ones, which is the case for movies, books, financial services, and software, then it can be reproduced and distributed via the Internet at a cost of almost zero. There are vast potential economies of scale with all knowledge-based products, importantly because of the Internet. The result is that a knowledge-intensive company that is twice as big as its rivals may have average costs that are 50 percent lower. This is the **natural monopoly** argument at its extreme—in the Internet economy, it is becoming more and more difficult for new entrants to break into the market because existing firms have already taken advantage of increasing returns to scale.

According to economist J. Bradford DeLong of the University of California at Berkeley and law professor A. Michael Froomkin of the University of Miami, the existence of factors such as these could prove to be the undoing of the Internet as we know it. These authors argue that the commercial aspects of the Net are going to be dominated by a few individual firms in each market sector. For example, there might be only a few major portals, such as Yahoo!, and a few auction sites, a few job-hunting sites, and so forth. Each of these major sites will be a monopoly or, at the very least an **oligopoly**, choosing prices well above marginal costs and enjoying freedom from substantial competition. DeLong and Froomkin suggest that in coming years, this could induce many consumers to clamor for government regulation of the prices and business practices of these companies. Ironically, the very medium that was originally envisioned to be the consummate example of pure competition may turn out to be merely one more haven for oligopolies—and one more venue for government regulation of private economic activity.

This pressure toward more government regulation of Internet firms will likely be intensified by another feature of the Internet economy—namely, its impact on the security of **intellectual property**. The total world value of intellectual property—movies, music, software, etc.—is at least as great as, and probably greater than, the total world value of physical property. Thus, what happens to intellectual properties is essential to economies around the world.

During the early days of the Internet, many observers felt that its most beneficial impact would be due to the instantaneous

transmission of ideas it made possible. This, it was thought, would not merely enhance the current state of knowledge, but would also stimulate still more creative activity in the future. To some extent these predictions have been borne out, but there is another, darker side to this feature of the Internet.

Most intellectual property does not sell for the cost of reproduction plus a normal profit. Rather, intellectual property is sold at a higher price per unit that reflects the high fixed research costs involved in creating ingenious ideas. Any property that involves high research or development costs and low production costs is vulnerable to "piracy"—the unauthorized copying and use of the property. This is because to stay in business in the long run, the pirates don't have to cover the fixed costs of developing the good.

In the past, copying intellectual products was time consuming, and the pirated copies were worse than the originals. Even though the Xerox machine was vastly superior on both counts to transcription by hand, copying remained tedious and no copy was ever quite as good as the original. In today's on-line world, however, things have changed. Simply clicking a mouse can create millions of unauthorized copies, and pirated duplicates of copyrighted works obtained via the Internet are exactly the same as the originals—after all, they are digitized. Today, copyright law is based on national boundaries—but the Internet economy and its technology transcend those boundaries. Despite attempts to increase protection for intellectual property on a global level, countries vary widely in their implementation and enforcement of international agreements. The result is piracy on a widespread scale.

One example is file sharing, which has become a growing problem for intellectual property owners. Internet file sharing is accomplished through what is called peer-to-peer (P2P) networking. The concept is simple. Rather than going through a central Web server, P2P involves numerous personal computers (PCs) that are connected via the Internet. Others who are members of the same network can access files stored on one PC. Sometimes this is called a distributed network, because parts of the network are distributed all over the country or the world.

In all file-sharing arrangements, copyright issues abound. If you took this textbook to your local copy center and asked for fifty copies to resell to your classmates, you would be attempting

to violate copyright law; the copy center would likely (we hope!) refuse your order. The materials in this text are copyrighted so that the authors and the publisher are rewarded for their efforts and so that the expense of publishing the text is covered. While Congress allows for "fair use," copying the entire book for resale (or even for distribution at no charge) would not fall under that exception to copyright law. File sharing over the Internet, when it involves copyrighted materials, is no different legally. Clearly, recording artists and their labels stand to lose large amounts of royalties and revenues if relatively few CDs are purchased and then made available on distributed networks, from which everyone can then get them for "free," which is to say, at a zero price to them and a zero return to the original creators. This is why many publishers, authors, and artists are concerned about unauthorized distribution of their works, and why the courts have so far taken a dim view of such activities.

Already some people are arguing that government should take a heavy hand in preventing intellectual piracy, including intensive (and intrusive) monitoring of who is doing what with their computers. After all, computer technologies developed to eavesdrop on international terrorists could be adapted to keep watch on domestic music fans. Moreover, one imagines, new government regulations could be devised that limit the hardware and software that individuals and firms are allowed to purchase. Although drastic measures such as these seem unbelievable to some, there is little doubt we will face a future ablaze with disagreements about whether Internet commerce should be subjected to the same kinds of governmental interventions that traditional firms have experienced. Thus, whether we are talking about product pricing or the protection of intellectual property, it seems the virtual world of the Web will probably end up looking a lot like the non-virtual reality we inhabited before the advent of the Internet.

DISCUSSION QUESTIONS

1. Suppose a firm invents a technology that reduces its costs so far that it can drive all of its competitors out of business, even though the price that maximizes the firm's profits is well above

its marginal cost. Would consumers be better off if this firm was forbidden from introducing its cost-saving technology?

2. Some music groups are in favor of allowing people to distribute their songs at no charge through P2P networks, while others are strongly opposed. Can you suggest why there are these differences of opinion?
3. Are the network effects present with the Internet fundamentally any different from those present with telephone systems or even from old-fashioned 3.5-inch disk drives and diskettes?
4. Some people argue that copyright protection and patent protection should be abolished, because the owners of patents and copyrights are effectively monopolists when it comes to supplying the goods for which they have these rights. What do you think would happen to the rate of innovation if patents and copyrights were abolished? What would be the likely impact on the well-being of consumers?

15

Contracts, Combinations, and Conspiracies

In December 2001, A. Alfred Taubman, chairman of the famous Sotheby's auction house, was convicted of masterminding an international price-fixing conspiracy with his firm's chief rival, Christie's. Taubman was convicted under the terms of the Sherman Act of 1890, which outlaws any "contract, combination, . . . or conspiracy, in restraint of trade or commerce" in the United States. Translated from the legalese, this means that firms in America may not lawfully join with competitors to form a cartel to raise prices above the competitive level.¹ Because successful cartels—like the alleged conspiracy between Sotheby's and Christie's—have the potential for great profits, there are strong incentives to form them. Usually, however, if the government discourages them, or even if it does not actively encourage them, cartels are difficult to keep together. This is because a cartel must meet four requirements if it is to be successful:

1. *Share*—It must control a large share of actual and potential output, so that other producers of the good it sells will not be able to depress prices by expanding output significantly.
2. *Substitutes*—Consumers must regard alternatives to the cartel's product as being relatively poor substitutes, and these substitutes must be few in number and relatively inelastic in

¹ Despite this, many American agricultural producers are legally permitted to collectively agree to raise their prices on products ranging from almonds to oranges. They do so under the umbrella of "marketing orders," which effectively are cartels approved and enforced by the U.S. Department of Agriculture.

supply; such factors all reduce the elasticity of demand facing the cartel, helping it to raise prices.

3. *Stability*—There must be very few outside factors that tend to disturb cost or demand conditions in the industry, so that the cartel is not continually having to make new price and output decisions in response to changing conditions.
4. *Solidarity*—It must be relatively easy for the cartel to maintain solidarity by identifying and punishing cartel members who cheat on the cartel agreement with price cuts.

All successful cartels have been able to meet these requirements to some extent. Conversely, it has been a breakdown in one or more of these factors that has been the downfall of each of them. In general, successful cartels are international in character. They are either effectively beyond (or exempt from) national laws forbidding them, or are encouraged by, or comprised of, governments themselves.

One of the most famous and successful cartels has been the Organization of Petroleum Exporting Countries (OPEC). Formed in 1960, its members have included many major oil producing countries, such as Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Saudi Arabia, and Venezuela. OPEC had little impact on the price of oil until the outbreak of the Middle East war in 1973 provided the impetus for cohesive action. Saudi Arabia, Kuwait, and several other Arab nations sharply reduced their production of oil; because the demand curve for oil is downward sloping, this reduction in supply pushed oil prices—and thus the profits of OPEC members—up sharply. On January 1, 1973, one could buy Saudi Arabian crude oil at \$2.12 per barrel. Within one year, the price of crude had risen to \$7.61 per barrel; by 1975, to \$10.50; and by the end of the decade, the price of oil was \$35 per barrel and rising.

Several forces combined to send oil prices in the opposite direction by the mid-1980s. At least partly in response to the high prices charged by OPEC, worldwide output of oil from other sources began to grow, led by rising production on Alaska's North Slope and by aggressive marketing of the oil flowing out of the Norwegian and British fields located in the North Sea. Eventually, this additional production significantly reduced the market share controlled by OPEC members, and helped reduce their stranglehold on price.

The most important problem for OPEC, however, as for so many cartels, has been cheating on the cartel agreement by its members. Whenever there are numerous firms or countries in a cartel arrangement, there will always be some that are unhappy with the situation, perhaps because they think they are not getting enough of the profits. They cheat by charging a slightly lower price than the one stipulated by the cartel, a move that will result in a very large increase in the cheater's revenues (and thus profits). The potential for cheating is a constant threat to a cartel's existence, and when enough of a cartel's members try to cheat, the cartel breaks up.

In the case of OPEC, war between the member nations of Iran and Iraq during the 1980s precipitated a major outbreak of cheating, as those two nations expanded production beyond their quotas, using the extra sales to finance heavy military expenditures. The price of crude oil plunged to \$10 per barrel in 1986, when cheating on output quotas spread throughout the cartel. OPEC member Saudi Arabia, the world's largest producer of crude, finally restored order when it threatened to double its output if other OPEC members did not adhere to quotas. Although there have been short-lived price spikes since then (in 1990-91 and 2000-01) crude oil prices typically have hovered around \$20 per barrel; after adjusting for inflation, this is more than 75 percent cheaper than in 1980.

The perils faced by cartels are also illustrated in the diamond market, where DeBeers Consolidated Mines, the famous diamond company, has controlled as much as 80 percent of the world supply. Although DeBeers itself produces only about 35 percent of the world's diamond output, it typically has directed the marketing of another 35-45 percent through a cartel called the Central Selling Organization, or CSO. The CSO has long restricted the sale of rough-cut diamonds to keep their prices at levels that maximize the profits of its members. After many years of profitable success, however, the diamond cartel hit rough times. Cartel profits spurred searches for new sources of supply, and major discoveries were made in Australia and Canada. Moreover, Russia, which accounted for about one-fourth of CSO's output, became a chronic cheater on CSO rules by permitting diamonds to "leak" into international markets. The combined effect of these forces has been substantial. In 1980, the wholesale price of investment-grade D-flawless diamonds—considered the most reliable

measure of market conditions in the industry—was about \$55,000 per carat. After adjusting for inflation, D-flawless diamonds recently have been worth 85 percent less.

Russians have had troubles with their own historically successful cartel, the one that controls—or controlled—the supply of fine caviar. The principal source of some of the world's best caviar is the Volga River Delta, where Kazakhstan and Russia (both former members of the Soviet Union) share a border at the northern end of the Caspian Sea. Both the temperature and salinity of the water in the Delta make it the ideal spawning ground for sturgeon, the long-nosed prehistoric fish whose eggs have for centuries been viewed as the world's finest caviar. Originally, the Russian czars and czarinas ran the show, eating what they wanted of the harvest, and then controlling the remaining supplies to their advantage.

Once the Bolsheviks disposed of the Romanovs in 1917, they quickly saw the potential profits to be had from cornering the market on caviar. Thus, for the next 75 years or so, a Soviet state-dominated cartel controlled the nation's caviar business from top to bottom. Although the Soviet sturgeon were considerate enough to produce an annual catch of some 2,000 tons of caviar, the communist cartel allowed only 150 tons out of the country. As a result, a state-supplied kilogram (2.2 pounds) of top-grade black caviar costing \$5 or less on the Moscow black market, commanded \$1000 or more in New York.

The demise of the Soviet Union spawned trouble, however, for competition reared its ugly head. As it turns out, the largest sturgeon fisheries fell under the jurisdictions of two different autonomous republics—Russia and Kazakhstan—each of which wanted to own and operate its own lucrative caviar business. Moreover, a variety of individuals, including enterprising Caspian Sea fishermen from these republics, staked private claims, and in some cases set up their own export channels (behavior officially termed “black market piracy”). The effect of this capitalist behavior was a 20-percent drop in the official caviar export price during the first year of autonomy, plus an escalation of competition since then.

Caviar consumers were pleased at this turn of events, but old-line suppliers were not quite so happy. “We don't need this kind of competition,” complained one. “All of these small rivals mean that

prices will fall and the market will be ripped apart. This is a delicacy—we need to keep it elite.” Recent years have seen a sharp upswing in world caviar prices, although not because Russia and Kazakhstan have managed to get competition under control. Instead, it turns out that pollution from left-over Soviet industry in the area has helped sharply reduce the region's sturgeon population. The resulting decline in the amount of harvestable caviar drove costs and prices up, and profits even lower. Adding insult to injury, firms in America (whose costs are not affected by the Soviet pollution) have entered the caviar market in response to the higher prices, intensifying the price-cost squeeze that the former Soviet republics are suffering. And so, just as Soviet citizens found that communism wasn't all that it was cracked up to be, it appears some of them are now learning that capitalism may be more than they bargained for—but perhaps no less than Karl Marx warned them about.

DISCUSSION QUESTIONS

1. Why are all cartels inherently unstable?
2. Would it be easier to form a cartel in a market with many producers or one with very few producers?
3. What happens to the producers of caviar made from other types of fish eggs (such as salmon, whitefish, and trout) when the price of the finest sturgeon caviar changes? Would these firms ever have an incentive to help the governments of Russia and Kazakhstan re-establish the caviar cartel?
4. If the members of your class were to attempt to form a study-reduction cartel in which everyone agreed to study less, which individuals would have the greatest to gain from the cartel? Which ones would have the greatest incentive to cheat on the cartel?

Coffee, Tea, or Tuition-Free?

A few years ago, Internet retailing giant Amazon.com received some unwanted publicity when it was revealed that the company was charging different prices for movies sold to different customers. Amazon insisted that the price differences were random and amounted to an effort to simply test the market. But some customers complained that Amazon was using the practice to tailor prices to customer characteristics, charging more to people who were likely to be willing to pay more. The flap over Amazon's "market test" soon died out, but as time passes, Internet firms will find it almost irresistible to regularly charge different prices to different customers. The reason is simple: by tracking past buying habits, other sites visited, and so forth, firms can get a pretty good idea of how to engage in **price discrimination** among their customers, and thus increase their profits.

Now, price discrimination not only sounds like something that should be illegal, it *is* illegal, at least under some circumstances. Despite that, it is routinely practiced by businesses of all descriptions—and perhaps even by the college you attend. Interestingly, although price discrimination definitely benefits the firms (or colleges) that engage in it, you too may benefit. Let's see how.

First things first: Price discrimination is defined as the existence of price differences across customers for the same good that are not due to differences in the marginal costs of supplying the customers. Thus, price discrimination can occur when marginal costs are the same across customers, but prices are different, or

when prices are the same, despite differences in marginal costs. An example of the former occurs when pharmacies or movie theaters charge lower prices to "senior citizens" than to other customers. An example of the latter can be found at "all-you-can-eat" buffets, where the price is the same to all diners, even though some eat much more food than others.

There are three conditions that must exist for a firm to engage in price discrimination. First, the firm must be, at least to some extent, a **price searcher**—that is, it must be able to raise price above marginal cost without losing all of its sales to rivals. Second, there must be identifiable differences across customers in their willingness (or ability) to pay different prices for the same good. Third, the firm must be able to prevent customers who pay lower prices from reselling the good to customers who otherwise would be charged higher prices—or else customers eligible for the lowest price will buy on behalf of all customers.

The objective of price discrimination is, of course, higher profits for the firm that engages in it. To see how this might work, consider a firm selling to two identifiable groups of customers, say, retirees and working people. Also suppose that the retirees have lower income, and so perhaps have a higher **price elasticity of demand** for the good; that is, they tend to be more sensitive to changes in price. In this case, it may be possible for the firm to reallocate sales among customer groups, lowering prices slightly to retirees and raising them somewhat more to working people, thereby getting more revenue at the same costs, and so earning higher profits. Of course to be able to accomplish this, it must be possible to distinguish between the two groups. (This is often approximated by offering the lower prices only to persons who can prove they are older, and thus more likely to be retired.) Moreover, the firm must be able to prevent resale from low-price buyers to other customers; in the case of prescription medicines, pharmacies are aided by federal and state laws that forbid such resale, while in the case of movie theaters, the person getting the lower price generally must attend the movie personally to get the lower price. (This helps explain why movie rental companies like Blockbuster are less likely to offer senior citizen discounts than are movie theaters: it would be too easy for seniors to rent movies