Chapter 11

Introduction to Imperfect Markets
In the two centuries since Adam Smith enunciated the view that markets ensure economic efficiency, economists have investigated the basic competitive model with great care. Nothing they have discovered has shaken their belief that markets are, by and large, the most efficient way to coordinate an economy. However, economists have also found significant ways in which modern economies differ from that envisioned by the basic competitive model. These differences can cause markets to operate inefficiently, and they may provide a rationale for government involvement in the economy.

Before we can understand the role of government in the economy, we need to understand how the differences between modern economies and the world envisioned in our basic competitive model affect the way markets work. If competition is less than perfect, do markets still produce efficient outcomes? If they do not produce efficient outcomes, is too much produced or is too little produced? If people do not have enough information, say, about the quality of goods, will markets be efficient? And if the outcomes when information is imperfect are not efficient, what can government do about it? What sorts of policies will improve the situation?

In this part of the book, we address these questions. We begin by outlining four important ways in which some markets may differ from the basic competitive model. These differences can help account for the important role that government plays in our economy. We examine how these differences affect the ability of private markets to efficiently use society’s scarce resources. Subsequent chapters explore each of these differences in greater depth. By understanding when markets fail to produce efficient outcomes and why, we can greatly extend the range of insights that economics has to offer. These insights will provide the key to understanding some of the dissatisfactions with markets and some of the roles of public policy. And by going beyond the competitive model, we obtain insights into many of the economic changes associated with new technologies and the information revolution.

As we explore the economics of imperfect markets, the five key concepts introduced in Chapter 1—trade-offs, 

**Key Questions**

1. What are the key differences between modern economies and the economy described by the basic competitive model?
2. How are price and quantity determined when there is imperfect competition? How do price and quantity compare to the case of perfect competition? Is the market still efficient when there is imperfect competition?
3. Why is information different from other goods, such as hats or cameras? Why do markets for information often not work well? How does imperfect information affect the efficiency of markets?
4. How do externalities and public goods affect market efficiency?
incentives, exchange, information, and distribution—continue to serve as guides to thinking like an economist. Individuals, firms, and government still face trade-offs when markets are imperfect. These trade-offs might differ from those faced in the world of the basic competitive model, and analyzing trade-offs when competition is imperfect or information is imperfect is an important step in any economic analysis. With trade-offs, choices must be made, and we must focus on incentives to understand these choices. Gaining an understanding of how market imperfections affect the outcome of market exchange will be especially critical. Information will take center stage in Chapter 14. Throughout, we will highlight how market imperfections affect not only the level but also the distribution of economic welfare. The basic concepts of economics do not apply just to the basic competitive model where competition is perfect and everyone has all the information they need. As economists have explored the role of imperfect competition and imperfect information in market economies, they have continued to find that these concepts provide the keys to thinking like an economist.

Extending the Basic Competitive Model

In Part Two, our understanding of markets and the role they play was aided by making several simplifying assumptions. We needed to focus on key factors that explain how markets work, without introducing all the details of actual markets. This is the general approach of theorizing in any field. If our objective had been to describe markets, detail would have been important so that we could obtain a good description of actual markets. Instead, our objective was to understand how prices and quantities are determined and to evaluate the nature of market outcomes. For that purpose, we needed to concentrate on the essence of markets, without being distracted by unnecessary detail.

The key assumptions in the basic competitive model include the following:

1. Firms and individuals take market prices as given—each is small relative to the market so that their decisions do not affect the market price.
2. Individuals and firms have perfect information about the quality and availability of goods, and about the prices of all goods.

3. Actions by an individual or firm do not directly affect other individuals or firms except through prices.
4. Goods are things that only the buyer can enjoy—if I buy and eat a slice of pizza, it is no longer available for you to eat; if you buy a bike, we both cannot use it at the same time.

There are many situations, however, in which we would like to analyze what happens if a firm has the power to set prices, or consumers are uninformed about the quality of different goods, or actions by one individual directly affect others (take secondhand smoke as an example), or there are goods we can all consume simultaneously (like national defense). We can extend our basic competitive model to deal with these cases. To extend the model, it will be helpful to begin by considering each of these assumptions in turn.

First, most markets are not as competitive as those envisioned by the basic model. In the competitive model discussed in Part Two, markets have so many buyers and sellers that no individual household or firm believes its actions will affect the market equilibrium price. The basic competitive model focuses on products like wheat or pig iron, which may be produced by different firms but are essentially identical and are perfect substitutes for one another. If a firm were to raise its price slightly above that of other firms, it loses all its customers. In that model, there is no room for brand names, yet it is hard to think of a consumer product without attaching a brand name to it. If Kodak raises the price of its film, it may lose some customers to other brands, but it won’t lose all its customers. A Kodak enthusiast would probably pay slightly more for Kodak film than for Fuji film. Likewise in the consumer market for running shoes, if Nike charges slightly more than Adidas, it will not lose all its customers. By taking the market price as given, a firm in the competitive model does not need to consider how other firms would react when it considers changing the quantity it produces. However, when Kodak or Nike consider their production and pricing decisions, they must worry about how their rivals will react. In the real world, many firms spend enormous energies trying to anticipate the actions and reactions of rivals.

Second, buyers and sellers seldom have all the information that the basic competitive model assumes. In the basic competitive model, buyers know what they are buying, whether it is stocks or bonds, a house, a used car, or a refrigerator. Firms know the productivity of each worker they hire, and when workers go to work for a firm, they know exactly what is ex-
Imperfect competition, imperfect information, externalities, and public goods all represent cases where the market will fail in its role of producing economic efficiency. Economists refer to these problems as market failures and have studied them closely. A market failure does not necessarily mean that a market fails to exist, only that it fails to produce efficient outcomes. When there is a market failure, government may be able to correct the market failure and improve economic efficiency. If we want to think about government policies to correct market failures, however, we first need to understand clearly how it is that market outcomes may be inefficient.

Many aspects of market economies cannot be well understood by the basic competitive model. For instance, in an economy with perfect information, there is no need—or role—for advertising. Innovation is at the heart of the modern economy and yet plays no role in the competitive model; indeed, since information is assumed to be perfect, there is no role for research.

Despite the presence of imperfect competition, imperfect information, externalities, and public goods, the basic competitive model continues to provide important and powerful insights. For that reason, most economists use the basic model as the starting point for building a richer, more complete model of the modern economy. This richer model is the focus of Part Three. In the next several chapters, we will examine how the introduction of imperfect competition, imperfect information, externalities, and public goods to the basic model increases the insights economics has to offer in understanding our economy.

Imperfect Competition and Market Structure

When economists look at markets, they look first at the market structure, that is, how the market is organized. The market structure that formed the basis of the competitive model of Part Two is called perfect competition. For example, there are so many wheat farmers (producers) that no individual farmer can realistically hope to move the price of wheat from that produced by the law of supply and demand.

Frequently, however, competition is not “perfect.” Rather, it is limited. Economists group markets in which competition is limited into three broad structures. In the
Alternative Market Structures

Perfect competition: Many, many firms, each believing that nothing it does will have any effect on the market price.

Monopoly: One firm.

Imperfect competition: Several firms, each aware that its sales depend on the price it charges and possibly other actions it takes, such as advertising. There are two special cases:

Oligopoly: Sufficiently few firms that each must be concerned with how its rivals will respond to any action it undertakes.

Monopolistic competition: Sufficiently many firms that each believes that its rivals will not change the price they charge should it lower its own price, and that profits may be driven down to zero.

Price and Quantity with Imperfect Competition

In the basic model of perfect competition, each firm took the market price as given. If one firm tried to raise its price, even slightly, it would lose all of its customers. When competition is imperfect, a firm will lose some but not all of its customers if it charges a slightly higher price. With imperfect competition, firms do not simply “take” the price as dictated to them by the market. They “make” the price. They are the price makers.

Whether a firm is a price taker or a price maker, it tries to maximize profits. In determining output, the firm will compare the extra, or marginal revenue, that it will receive from producing an extra unit of output with the extra, or marginal cost of producing that extra unit. If marginal revenue exceeds marginal cost, it pays to expand output. Conversely, if marginal revenue is less than marginal cost, it pays to reduce output. Whether the firm operates in a market characterized by perfect or imperfect competition, it will produce at the output level at which marginal revenue equals marginal costs.

The essential difference between a firm facing perfect competition and one facing imperfect competition is in the
relationship between marginal revenue and price. For a competitive firm, marginal revenue is just equal to the price. For instance, the marginal revenue received by a wheat farmer for one more bushel of wheat is just the price of a bushel of wheat. But with imperfect competition, a firm knows that the only way it can sell more is to lower its price. That is, it recognizes it faces a downward-sloping demand curve. By changing its price it will influence its sales. Marginal revenue is not equal to the present market price.

In the case of monopoly, for example, the firm controls the entire market, so a doubling of its output is a doubling of industry output, which will have a significant effect on price. If Alcoa, in the days when it had a monopoly on aluminum, had increased its production by 1 percent, the total supply of aluminum would have increased by 1 percent. Market prices would have fallen in response to a change in supply of even this magnitude.

How much the price must change as sales change will depend on whether the firm is a monopolist, a monopolistic competitive firm, or an oligopolist. If the firm is a monopolist, it controls the entire market, by definition, so the demand curve it faces is the market demand curve. By contrast, a firm such as PepsiCo will need to know how rivals like Coca-Cola will respond to any price change in order to determine how its sales will be affected if it changes its price. In either case, however, marginal revenue will be less than price. To sell more, the firm must lower its price, reducing the revenue it receives on all units that it produces.

To maximize profits, firms will set marginal cost equal to marginal revenue. When competition is imperfect, however, marginal revenue is less than price. As a consequence, the firm’s profit-maximizing output level will be at a point where marginal cost is also less than price. The market price will be too high—it exceeds the cost of producing the last unit sold. Under conditions of perfect competition, producers would have an incentive to increase production when price exceeds marginal cost. Relative to the efficient outcome of perfect competition, imperfect competition leads to a market outcome that results in too little being produced at too high a price.

**Government Policies**

Because imperfect competition leads to an inefficient outcome, with too little produced at too high a price, government has taken an active role in promoting competition and in limiting the abuses of market power.

**Antitrust** laws are designed to break up monopolies, to prevent monopolies from forming, and to restrain firms from engaging in practices that restrict competition. For instance, before two large firms in an industry can merge, or before one can acquire another, they must seek government approval. The government will seek to determine whether the merger of the two firms will significantly reduce competition. The most recent highly publicized antitrust case involved the U.S. government and Microsoft, with the government arguing that Microsoft had a near monopoly in the market for operating systems and that it had abused that market power—not only was price above the competitive level, but also it had used its market power to deter and destroy rivals.

In some cases, the government may decide not to break up a firm even if it is a monopoly. It may believe, for instance, that it is more efficient for a single firm to provide the service. Such cases are called a natural monopoly. Typically the government establishes a regulatory body to oversee such a monopoly. Industries that have been characterized in the past as regulated monopolies include local cable TV, electrical utility, and telephone industries. The regulated monopoly firm normally must obtain the approval of the regulatory agency before it can raise the price it charges.

In Chapters 12 and 13 we will discuss some of the ways government attempts to limit the power of monopolies and promote competition. The policies government uses depend on the source of imperfect competition and the structure of the market.

**Internet Connection**

**The Federal Trade Commission**

The Federal Trade Commission (FTC) enforces consumer protection and antitrust laws and plays an important role in eliminating unfair or deceptive practices while ensuring that American markets function competitively. The FTC provides articles at [http://www.ftc.gov/bcp/menu-internet.htm](http://www.ftc.gov/bcp/menu-internet.htm) on what to watch out for in e-commerce and when making purchases or seeking information over the Internet.
Imperfect Information

The model of perfect competition that was developed in Part Two assumed that market participants, whether consumers, firms, or the government, had perfect information. They had full information about the goods being bought and sold. Seldom do we actually approach this standard, and economists have gained new insights into how markets function by incorporating imperfect information into their models. Interestingly, economists’ understanding of the importance of imperfect information occurred at almost the same time that new technologies improved the ability of firms and households to gather, process, and transmit information.

The Information Problem

The basic competitive model assumes that households and firms are well informed. This means that they know their opportunity set, or what is available and at what price. More strikingly, they know every characteristic of every good, including how long it will last. For some purchases, we do have very good information, so the assumption of the basic model is a reasonable one. When I buy my favorite breakfast cereal at the grocery store, I know all I need to know.\(^1\) Typically though, we must make decisions about what to buy with much less than perfect information.

The model also assumes that consumers know their preferences; that is, they know what they like. They know not only how many oranges they can trade for an apple but also how many oranges they want to trade. In the case of apples and oranges this may make sense. But how do students know how much they are going to enjoy, or even benefit from, a college education? How does an individual know whether she would like to be a doctor, a lawyer, or a writer? She gets some idea about what different professions are like by observing those who practice them, but her information is at best incomplete.

According to the basic model, firms too are perfectly well informed. They know the best available technology.

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\(^1\)Of course, to gain information about the cereal, I had to try it initially. So even in this example, the information was not automatically available. It is often only possible to gain information about a good by actually using it.

International Perspective

Trade and Competition

The increasing globalization of the world economy means that firms face competition from both foreign and domestic rivals. Even a firm that is the sole domestic producer of a product may be unable to take advantage of its monopoly position because of competition from foreign producers. Government actions to open a country to trade, therefore, can help promote competition. New Zealand provides a case in point.

New Zealand had a long history of restricting imports to protect domestic firms. Since the New Zealand economy was small, many industries had only one firm. To prevent the problems created by these monopolies, the government developed numerous regulations. This created problems for consumers. For example, suppose you wanted to buy auto paint to touch up a scratch on your car. Because New Zealand had a domestic paint producer, imports of paint were restricted. But because of the small size of the New Zealand market, the demand for any given type of paint was small. As a consequence, the New Zealand paint industry offered only a limited number of colors. If your car had an unusual color, you were out of luck.

In 1984, a Labor government was elected in New Zealand, and it implemented a new strategy for improving competition. The government realized that the regulatory structure that had limited the inefficiencies of monopoly could be eliminated, and competition could be increased simply by removing the many trade barriers that New Zealand had in place. It doesn’t matter that only a single paint firm is located in New Zealand—that firm’s market power will be limited if it must compete with foreign paint producers.

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They know the productivity of each applicant for a job. They know precisely how hard every worker is working and how good a job each is doing. They know the prices at which inputs can be purchased from every possible supplier (and all the input’s characteristics). And they know the prices at which they can sell the goods, not only today but in every possible circumstance in the future.

**How Big a Problem?**

That individuals and firms are not perfectly well informed is, by itself, not necessarily a telling criticism of the competitive model, just as the criticism that markets are not perfectly competitive does not cause us to discard the model. The relevant issues are as follows: Can the competitive model mislead us in these situations? Are there important economic phenomena that can be explained only by taking into account imperfect information? Are there important predictions of the model that are incorrect as a result of the assumption concerning well-informed consumers and firms?

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**Information, Competition, and the Internet**

The Internet is having a profound effect on consumer choices and on the nature of competition. One way it has done so is by providing consumers with easily accessible information at a low cost. For example, rather than pay a series of time-consuming visits to various car dealers when you want to shop for a car, you can now do your shopping from home through the Internet. Consumers can comparison shop using Web sites that provide car reviews and pricing information. They can even buy a car on-line and have it delivered to their doorstep. By increasing the information consumers have, many economists argue that the new information technologies will make the basic competitive model, with its assumption that consumers are fully informed, a closer approximation to actual markets.

The Internet also increases competition. Local retail stores must now compete against on-line sellers. Consumers can easily check prices at various on-line sellers, and there are even digital agents called “bots” that search Internet sites for the best available deals. Because consumers can easily comparison shop on the Web, Internet sellers are forced to offer low prices.

In business-to-business (B2B) commerce, the sheer number of firms linked through the Internet allows larger pools of buyers and sellers to be brought together, creating new marketplaces and lower costs for many businesses. For instance, the major U.S. auto manufacturers are moving their purchasing operations on-line, forming a marketplace for parts and other items that is estimated to handle almost $250 billion of purchases each year. By increasing competition among parts suppliers, the auto manufacturers expect to gain significant cost savings. But some antitrust experts worry that to the extent that the U.S. auto manufacturers cooperate in purchasing, they may actually reduce competition among the buyers. Single buyers (called monopolist) or limited competition among buyers are just as bad for economic efficiency as monopoly sellers or limited competition among sellers.

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**E-Insight**

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Increasingly, over the past two decades, economists have come to believe that the answer to these questions is yes. For example, college graduates may receive a higher income than high school graduates, not only because they have learned things in college that make them more productive but also because their college degree conveys valuable information to employers. Employers cannot easily learn in an interview which applicants for a job will be productive workers. Therefore use a college degree to help them identify those who are more productive. College graduates are, on average, more productive workers. But it is wrong to conclude from this that college has necessarily increased students’ productivity. It may simply have enabled firms to sort more easily students who are more productive from the less productive.

**How Prices Convey Information**

The price system provides brilliant solutions for some information problems. We have seen how prices play an important role in coordinating production and communicating information about economic scarcity. Firms do not have to know what John or Julia likes, what their trade-offs are. The price tells the producer the marginal benefit of producing an extra unit of the good, and that is all the firm needs to know. Similarly, a firm does not need to know how much iron ore is left in Minnesota, the cost of refining iron ore, or a thousand other details. All it needs to know is the price of iron ore. This tells the company how scarce the resource is, and how much effort it should expend in conserving it. Prices and markets provide the basis of the economy’s incentive system. But there are some information problems that markets do not handle, or do not handle well. And imperfect information sometimes inhibits the ability of markets to perform the tasks they perform so well when information is complete.

**Markets for Information**

Information has value; people are willing to pay for it. In this sense, we can consider information as a good similar to any other good. There is a market for information, with a price—just as there is a market for labor and a market for capital. Indeed, our economy is sometime referred to as an information economy. And every year, investors spend millions of dollars on newsletters that give them information about stocks, bonds, and other investment opportunities. Magazines sell specialized information about hundreds of goods. The growth of the Internet has had a major impact in reducing the cost of all types of information.

However, even with all the new information technologies, the markets for information are far from perfect, and for good reasons. The most conspicuous one is that information is not just like any other good. When you buy a chair, the furniture dealer is happy to let you look at it, sit on it, and decide whether you like it. When you buy information, you cannot do the same. The seller can either say, “Trust me. I’ll tell you what you need to know,” or show you the information and say, “Here’s what I know. If this is what you wanted to know, please pay me.” You would rightfully be skeptical in the first scenario and might be unwilling to pay in the second. After you were given the information, what incentive would you have to pay?

In some cases, there is a basic credibility problem. You might think, if a stock tipster really knows that a stock’s price is going to go up, why should he tell me, even if I pay him for the information? Why doesn’t he go out and make his fortune with the information? Or is it that he really is not sure, and would just as soon have me risk my money rather than risk his?

Most important, even after the firm or consumer buys all the information he thinks is worth paying for, his information is still far from perfect. Some information is simply too costly to obtain relative to the benefit of having it. So imperfect information is a fact of life, and in Chapter 14 we will examine the ways it can affect economic behavior and the structure of markets.

**Government Policies**

The market inefficiencies resulting from imperfect information can take a number of forms, and we will discuss these in more detail in Chapter 14. Government concern for the consequences of ill-informed consumers has motivated a number of pieces of consumer protection legislation. For example, the Wheeler-Lea Act of 1938 made “deceptive” trade practices illegal and gave the Federal Trade Commission power to stop false and deceptive advertising. Truth-in-lending legislation requires lenders to disclose the true interest rate being charged. Truth-in-packaging legislation makes it less likely that consumers will be misled by what is printed on the package. And the Securities and Exchange Commission, which regulates the sale of stocks and bonds, requires firms selling these securities to disclose a considerable amount of information.
Yet much of this legislation is of only limited effectiveness. One problem occurs when consumers try to absorb and process the information. A cereal manufacturer may disclose not only what is required but also a host of other information, which may or may not be important. How are consumers to know what to pay attention to? They cannot absorb everything. Occasionally, as in the case of warnings about the dangers of smoking, government regulators, aware of these problems of information absorption, have required the disclosures to be of a specific form and lettering size to make them stand out. But this kind of intervention on a more massive scale would be, at the very least, extremely costly.

Another problem with outlawing deceptive advertising is the difficulty of drawing a clear line between persuasion and deception. Advertisers are good at walking along the edge of any line—a suggestive hint may do where an explicit claim might be called deceptive. Congress or the courts cannot be expected to draw a line between informative and noninformative advertising for all the economy’s many products.

Most of the problems arising from imperfect information are not easily remedied. Firms will have imperfect information concerning potential employees, no matter what the government does. However, the government often must deal with the consequences. Imperfect information can lead to imperfect competition. In some markets, such as the health insurance market, the consequences are severe, and there has been considerable dissatisfaction with the way these markets work. Government has introduced a variety of interventions, but these clearly have not remedied the problems, and some question whether they have even improved matters.

**Externalities**

Even when there is perfect competition and information, the market may supply too much of some goods and too little of others. One of the reasons for this is externalities. Externalities arise whenever an individual or firm can take an action that directly affects others without paying for it. A harmful outcome or being paid for a beneficial one. When externalities are present, firms and individuals do not bear all the consequences of their action.

A common example of a negative externality is a factory that emits air pollution. The factory benefits from emitting the pollution, since the company can make its product more cheaply than if it put in pollution-control devices. When firms do not have to pay for the pollution they emit, society as a whole bears the negative costs of the pollution. If firms had to pay for their pollution, they would find ways to produce less of it, by adopting cleaner technologies, for instance. Government environmental regulations, which we will discuss in Chapter 21, are usually designed to ensure that firms bear the cost of the pollution they create.

When there are externalities, the market’s allocation of goods will be inefficient. This happens because the producer fails to take into account “social costs” in deciding how much to produce. To put it another way, the price of a good such as steel, determined in competitive markets by the law of supply and demand, only reflects private costs, the costs actually faced by firms. If firms do not have to pay all the costs (including the costs of pollution), equilibrium prices will be lower and output higher than they would be if firms took social costs into account. When the production of a good such as steel entails a negative externality—like smoke and its effects on the air—the market level of production is too high.

The reason market outcomes are inefficient in the presence of externalities can be understood by considering an important characteristic of market outputs in the basic competitive model. There, the market price is equal to the value consumers place on the last unit of output and it is equal to the cost to firms of producing the last unit. This ensures that at the margin, the value of the last good produced is just sufficient to cover the costs of producing it. When an externality is present, this will not be true. If the price consumers pay does not fully reflect the costs of producing the good (a negative externality), consumers will demand too much of the good and too much will be produced. If there are social benefits in addition to the private benefits to consumers (a positive externality), too little will be produced.

**Government Policies toward Externalities**

Because externalities lead to market inefficiencies, they can justify a role for government intervention in markets. The government can prevent the overproduction of goods with negative externalities either by regulation (for instance, environmental regulations that restrict the levels of pollution) or by providing incentives (through imposing fees or fines for pollution).

When the production of a good involves positive externalities, the market level of production is too low, and the
Thinking Like an Economist

Incentives and the Environment

When economists think about environmental issues, they focus on the incentives individuals and firms face. If too much air pollution is produced, economists try to understand why firms and individuals have an incentive to engage in activities that generate excessive pollution. If too many fish are taken, depleting fishing stocks, economists ask, why don’t fishermen have an incentive to preserve the fish stocks? In both of these examples, individuals and firms harm the environment because they do not have to bear the full cost of their actions. Take the case of fishermen. Each fisherman has to take into account the cost of operating his boat and the wages he needs to pay his crew. But he does not have to pay for the impact his fishing has on the total stock of fish. If he takes more fish, this reduces the stock available to other fishermen, but no individual fisherman has to account for this cost imposed on others. No one fisherman has an incentive to limit his own take to preserve the remaining fish stock.

In these, and many other cases of externalities, the source of the problem can be traced to the lack of property rights over valuable resources such as clean air or the stock of commercially valuable fish. When a valuable resource is not privately owned, individuals and firms do not need to pay a price to use the resource. If the stock of fish were privately owned, the owner would charge each fisherman a fee to take fish. When the cost to society of the resource is not reflected in what the user has to pay, there is no incentive to economize on its use. In some cases, it is easy to assign property rights. In the case of a small lake, the government can auction off the exclusive right to fish to a single individual, who might extract the fish himself or might charge others for fishing. In either scenario, however, he would have an incentive to ensure that the resource is used efficiently. But in most cases, there is no reasonable or easy property rights solution: Who should be given the right to the air? Indeed, the inability of political leaders to address this question is at the center of the failure of attempts to reduce the greenhouse gas emissions that are leading to global warming. As an alternative to property rights solutions, governments can provide appropriate incentives by designing taxes to make users pay the full social costs of their activities, ensuring that individuals and firms face incentives to economize on all of society’s scarce resources.

Public Goods

The final category of market failure arises in the presence of public goods. A pure public good is one where the marginal costs of providing it to an additional person are strictly zero and where it is impossible to exclude people...
from receiving the good. Many public goods that government provides are not pure public goods in this sense. The cost of an additional person using an uncrowded interstate highway is very, very small, but it is not zero, and it is possible, though relatively expensive, to exclude people from (or charge people for) using the highway.

Figure 11.1 compares examples of publicly provided goods against the strict definition of a pure public good. It shows ease of exclusion along the horizontal axis and the (marginal) cost of an additional individual using the good along the vertical axis. The lower left corner represents a pure public good. Of the major public expenditures, only national defense is close to a pure public good. Completely uncongested highways, to the extent they exist, are another example. The upper right corner represents a pure private good (health services or education), where the cost of exclusion is low and the marginal cost of an additional individual using the good is high.

Many goods are not purely public goods but have one or the other property to some degree. Fire protection is like a private good in that exclusion is relatively easy—individuals who refuse to contribute to the fire department could simply not be helped in the event of a fire. But fire protection is like a public good in that the marginal cost of covering an additional person is low. Most of the time, firefighters are not engaged in fighting fires but are waiting for calls. Protecting an additional individual has little extra cost. Only in the rare event when two fires break out simultaneously will there be a significant cost to extending fire protection to an additional person.

Sometimes the marginal cost of using a good to which access is easy (a good that possesses the property of nonexcludability) will be high. When an uncongested highway turns congested, the costs of using it rise dramatically, not in terms of wear and tear but in terms of the time lost by drivers using the road. It is costly to exclude by charging for road use—as a practical matter, this can only be done on toll roads, and ironically, the tollbooths often contribute to the congestion.2

Many of the goods that are publicly provided, such as education and health services, have high costs associated with providing the service to additional individuals. For most of these goods, exclusion is also relatively easy. In fact, many of these goods and services are provided privately in some countries, or provided both publicly and privately. Though they are provided publicly in this country, they are not pure public goods, in the technical sense in which the term is defined.

Private markets undersupply public goods. If a shiowner uses a port near which a lighthouse should be located, he could weigh the costs and benefits of constructing the lighthouse. But if there were one large shipowner and many smaller owners, it would not pay any one of the small owners to build the lighthouse; and the large shipowner, in deciding whether to construct the lighthouse, would only take into account the benefits she would receive, not the benefits to the small shipowners. If the costs of construction exceeded the benefits she alone would receive, she would not build the lighthouse. But if the benefits accruing to all the shipowners, large and small, were taken into account, those benefits might exceed the costs. It would then be desirable to build the lighthouse.

One can imagine a voluntary association of shipowners getting together to construct a lighthouse in this situation. But what happens if some small shipowner refuses to contribute, thinking that even if she does not contribute, the lighthouse will still be built anyway? This is the free-rider aspect of public goods; because it is difficult to preclude

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2New technologies will allow drivers to be charged for the toll without stopping at tollbooths. Scanners can identify cars as they pass, automatically billing the driver. Thus, new technologies can convert what was a public good into a private good.
anyone from using them, those who benefit from the goods have an incentive to avoid paying for them. Every shipowner has an incentive to “free ride” on the efforts of others. When too many decide to do this, the lighthouse will not be built.

Governments bring an important advantage to bear on the problem of public goods. They have the power to coerce citizens to pay for them. There might be some level of purchase of public goods—lighthouses, highways, parks, even police or fire services—in the absence of government intervention. But societies would be better off if the level of production were increased, and citizens were forced to pay for the increased level of public services through taxes.

Looking Ahead

We have now learned about four situations in which markets may fail to develop an efficient allocation of society’s scarce resources. In each of these cases—imperfect competition, imperfect information, externalities, and public goods—a role for government exists. Government can employ a variety of policies to promote competition, address the problems created by externalities and imperfect information, and supply public goods.

In the next several chapters, we will study market failures in more detail, beginning, in Chapter 12, with the analysis of imperfect competition including the extreme case, that of a monopoly. Chapter 13 shows how public policy addresses the problems posed by imperfections of competition. Imperfect information is the focus of Chapter 14, while Chapter 15 examines how imperfect competition and imperfect information affect labor markets. Finally, Chapter 16 studies the role of the public sector in the economy.

Review and Practice

Summary

1. By and large, private markets allocate resources efficiently. However, in a number of areas they do not, as in the cases of imperfect competition, imperfect information, externalities, and public goods.

2. Economists identify four broad categories of market structure: perfect competition, monopoly, oligopoly, and monopolistic competition.

3. When competition is imperfect, the market will produce too little of a good and the market price will be too high.

4. The basic competitive model assumes that participants in the market have perfect information about the goods being bought and sold and their prices. However, information is often imperfect.

5. Individuals and firms produce too much of a good with a negative externality, such as air or water pollution, since they do not bear all the costs. They produce too little of a good with positive externalities since they cannot receive all the benefits.

6. Public goods are goods that cost little or nothing for an additional individual to enjoy, but to exclude an individual from enjoying them costs a great deal. National defense and lighthouses are two examples. Free markets underproduce public goods.

Key Terms

externality
public goods
market failures
market structure
perfect competition
monopoly
oligopoly
monopolistic competition
imperfect competition
marginal revenue
antitrust
natural monopoly
imperfect information
consumer protection legislation
free-rider

Review Questions

1. What is the difference between perfect competition and imperfect competition?

2. What does it mean when an economist says that monopoly output is “too little” or a monopoly price is “too high”? By what standard? Compared with what?
3. What role does information play in the basic competitive model? How does the market for information differ from the market for a good such as wheat?

4. What is an example of a positive externality? Of a negative externality? Why are goods with negative externalities often overproduced? Why are goods with positive externalities often underproduced? Give an example for each.

5. What sorts of policies can government use to address the problem of externalities?

6. What two characteristics define a public good? Give an example. Why will private markets not supply the efficient level of public goods?

**Problems**

1. Colleges and universities compete for students, and students shop for colleges. Is the market for college placements characterized by perfect competition? Does Harvard face a horizontal demand curve or a downward-sloping demand curve? Is the market for college placements characterized by perfect information? Describe how students’ information about colleges might be imperfect. Describe how colleges’ information about prospective students might be imperfect.

2. Each of the situations below involves an externality. Tell whether it is a positive or a negative externality, or both, and explain why a free market will overproduce or underproduce the good in question:

   (a) a business performing research and development projects;

   (b) a business that discharges waste into a nearby river;

   (c) a concert given in the middle of a large city park;

   (d) an individual who smokes cigarettes in a meeting.

3. When some activity causes a negative externality like pollution, would it be a good idea to ban the activity altogether? Why or why not? (Hint: Consider marginal costs and benefits.)

4. Do highways provide an example of a public good? Can you describe a situation in which the marginal costs of an additional driver on the highway might be high? How might society deal with this problem?

5. Many highways have designated car pool or high-occupancy lanes. Generally, only cars containing at least two people can use these lanes. Single drivers are fined heavily if they are caught using these lanes. With new technologies, it is possible to charge drivers using car pool lanes by recording identifying markings on the car and billing the owners. Would allowing single drivers to pay to use car pool lanes increase economic efficiency? Explain.

6. Group projects are often assigned in classes, with everyone in the group receiving the same grade for the project. Explain why a free-rider problem might arise in this situation.