CHAPTER

15

Monopoly

If you own a personal computer, it probably uses some version of Windows, the operating system sold by the Microsoft Corporation. When Microsoft first designed Windows many years ago, it applied for and received a copyright from the government. The copyright gives Microsoft the exclusive right to make and sell copies of the Windows operating system. If a person wants to buy a copy of Windows, she has little choice but to give Microsoft the approximately $100 that the firm has decided to charge for its product. Microsoft is said to have a *monopoly* in the market for Windows.

Microsoft's business decisions are not well described by the model of firm behavior we developed in the previous chapter. In that chapter,

we analyzed competitive markets, in which many firms offer essentially identical products, so each firm has little influence over the price it receives. By contrast, a monopoly such as Microsoft has no close competitors and, therefore, has the power to influence the market price of its product. Whereas a competitive firm is a *price taker*, a monopoly firm is a *price maker*.

In this chapter, we examine the implications of this market power. We will see that market power alters the relationship between a firm's costs and the price at which it sells its product. A competitive firm takes the price of its output as given by the market and then chooses the quantity it will supply so that price equals marginal cost. By contrast, a monopoly charges a price that exceeds marginal cost. Sure enough, we observe this practice in the case of Microsoft's Windows. The marginal cost of Windows—the extra cost that Microsoft incurs by downloading one more copy of the program onto a CD—is only a few dollars. The market price of Windows is many times its marginal cost.

It is not surprising that monopolies charge high prices for their products. Customers of monopolies might seem to have little choice but to pay whatever the monopoly charges. But if so, why does a copy of Windows not cost $1,000? Or $10,000? The reason is that if Microsoft were to set the price that high, fewer people would buy the product. People would buy fewer computers, switch to other operating systems, or make illegal copies. A monopoly firm can control the price of the good it sells, but because a high price reduces the quantity that its customers buy, the monopoly's profits are not unlimited.

As we examine the production and pricing decisions of monopolies, we also consider the implications of monopoly for society as a whole. Monopoly firms, like competitive firms, aim to maximize profit. But this goal has very different ramifications for competitive and monopoly firms. In competitive markets, self-interested consumers and producers reach an equilibrium that promotes general economic well-being, as if guided by an invisible hand. By contrast, because monopoly firms are unchecked by competition, the outcome in a market with a monopoly is often not in the best interest of society.

One of the *Ten Principles of Economics* in Chapter 1 is that governments can sometimes improve market outcomes. The analysis in this chapter sheds more light on this principle. As we examine the problems that monopolies raise for society, we discuss the various ways in which government policymakers might respond to these problems. The U.S. government, for example, keeps a close eye on Microsoft's business decisions. In 1994, it blocked Microsoft from buying Intuit, a leading seller of personal finance software, on the grounds that combining the two firms would concentrate too much market power. Similarly, in 1998, the U.S. Department of Justice objected when Microsoft started integrating its Internet browser into its Windows operating system, claiming that this addition would extend the firm's market power into new areas. In recent years, regulators in the United States and abroad have shifted their focus to firms with growing market power, such as Google and Samsung, but continue to monitor Microsoft's compliance with the antitrust laws.

15-1 Why Monopolies Arise

monopoly
a firm that is the sole seller of a product without any close substitutes

A firm is a **monopoly** if it is the sole seller of its product and if its product does not have any close substitutes. The fundamental cause of monopoly is *barriers to entry*: A monopoly remains the only seller in its market because other firms cannot enter the market and compete with it. Barriers to entry, in turn, have three main sources:

- *Monopoly resources:* A key resource required for production is owned by a single firm.
- *Government regulation:* The government gives a single firm the exclusive right to produce some good or service.
- *The production process:* A single firm can produce output at a lower cost than can a larger number of firms.

Let's briefly discuss each of these.

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"Rather than a monopoly, we like to consider ourselves 'the only game in town.'"

15-1a Monopoly Resources

The simplest way for a monopoly to arise is for a single firm to own a key resource. For example, consider the market for water in a small town. If dozens of town residents have working wells, the model of competitive markets discussed in the preceding chapter describes the behavior of sellers. Competition among suppliers drives the price of a gallon of water to equal the marginal cost of pumping an extra gallon. But if there is only one well in town and it is impossible to get water from anywhere else, then the owner of the well has a monopoly on water. Not surprisingly, the monopolist has much greater market power than any single firm in a competitive market. In the case of a necessity like water, the monopolist can command quite a high price, even if the marginal cost of pumping an extra gallon is low.

A classic example of market power arising from the ownership of a key resource is DeBeers, the South African diamond company. Founded in 1888 by Cecil Rhodes, an English businessman (and benefactor of the Rhodes scholarship), DeBeers has at times controlled up to 80 percent of the production from the world's diamond mines. Because its market share is less than 100 percent, DeBeers is not exactly a monopoly, but the company has nonetheless exerted substantial influence over the market price of diamonds.

Although exclusive ownership of a key resource is a potential cause of monopoly, in practice monopolies rarely arise for this reason. Economies are large, and resources are owned by many people. The natural scope of many markets is worldwide, because goods are often traded internationally. There are, therefore, few examples of firms that own a resource for which there are no close substitutes.

15-1b Government-Created Monopolies

In many cases, monopolies arise because the government has given one person or firm the exclusive right to sell some good or service. Sometimes the monopoly arises from the sheer political clout of the would-be monopolist. Kings, for example, once granted exclusive business licenses to their friends and allies. At other times, the government grants a monopoly because doing so is viewed to be in the public interest.

The patent and copyright laws are two important examples. When a pharmaceutical company discovers a new drug, it can apply to the government for a patent. If the government deems the drug to be truly original, it approves the patent, which gives the company the exclusive right to manufacture and sell the drug for 20 years. Similarly, when a novelist finishes a book, she can copyright it. The copyright is a government guarantee that no one can print and sell the work without the author's permission. The copyright makes the novelist a monopolist in the sale of her novel.

The effects of patent and copyright laws are easy to see. Because these laws give one producer a monopoly, they lead to higher prices than would occur under

competition. But by allowing these monopoly producers to charge higher prices and earn higher profits, the laws also encourage some desirable behavior. Drug companies are allowed to be monopolists in the drugs they discover to encourage research. Authors are allowed to be monopolists in the sale of their books to encourage them to write more and better books.

Thus, the laws governing patents and copyrights have both benefits and costs. The benefits of the patent and copyright laws are the increased incentives for creative activity. These benefits are offset, to some extent, by the costs of monopoly pricing, which we examine later in this chapter.

15-1c Natural Monopolies

natural monopoly
a type of monopoly that arises because a single firm can supply a good or service to an entire market at a lower cost than could two or more firms

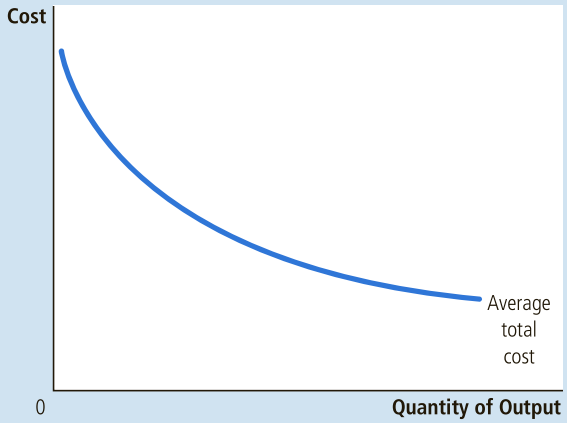
An industry is a **natural monopoly** when a single firm can supply a good or service to an entire market at a lower cost than could two or more firms. A natural monopoly arises when there are economies of scale over the relevant range of output. Figure 1 shows the average total costs of a firm with economies of scale. In this case, a single firm can produce any amount of output at the lowest cost. That is, for any given amount of output, a larger number of firms leads to less output per firm and higher average total cost.

An example of a natural monopoly is the distribution of water. To provide water to residents of a town, a firm must build a network of pipes throughout the town. If two or more firms were to compete in the provision of this service, each firm would have to pay the fixed cost of building a network. Thus, the average total cost of water is lowest if a single firm serves the entire market.

We saw other examples of natural monopolies when we discussed public goods and common resources in Chapter 11. We noted that *club goods* are excludable but not rival in consumption. An example is a bridge used so infrequently that it is never congested. The bridge is excludable because a toll collector can prevent someone from using it. The bridge is not rival in consumption because use of the bridge by one person does not diminish the ability of others to use it. Because there is a large fixed cost of building the bridge and a negligible marginal cost of additional users, the average total cost of a trip across the bridge (the total cost divided by the number of trips) falls as the number of trips rises. Hence, the bridge is a natural monopoly.

FIGURE 1

Economies of Scale as a Cause of Monopoly
When a firm's average-total-cost curve continually declines, the firm has what is called a natural monopoly. In this case, when production is divided among more firms, each firm produces less, and average total cost rises. As a result, a single firm can produce any given amount at the lowest cost.



When a firm is a natural monopoly, it is less concerned about new entrants eroding its monopoly power. Normally, a firm has trouble maintaining a monopoly position without ownership of a key resource or protection from the government. The monopolist's profit attracts entrants into the market, and these entrants make the market more competitive. By contrast, entering a market in which another firm has a natural monopoly is unattractive. Would-be entrants know that they cannot achieve the same low costs that the monopolist enjoys because, after entry, each firm would have a smaller piece of the market.

In some cases, the size of the market is one determinant of whether an industry is a natural monopoly. Again, consider a bridge across a river. When the population is small, the bridge may be a natural monopoly. A single bridge can satisfy the entire demand for trips across the river at the lowest cost. Yet as the population grows and the bridge becomes congested, satisfying the entire demand may require two or more bridges across the same river. Thus, as a market expands, a natural monopoly can evolve into a more competitive market.

QuickQuiz *What are the three reasons that a market might have a monopoly? • Give two examples of monopolies and explain the reason for each.*

15-2 How Monopolies Make Production and Pricing Decisions

Now that we know how monopolies arise, we can consider how a monopoly firm decides how much of its product to make and what price to charge for it. The analysis of monopoly behavior in this section is the starting point for evaluating whether monopolies are desirable and what policies the government might pursue in monopoly markets.

15-2a Monopoly versus Competition

The key difference between a competitive firm and a monopoly is the monopoly's ability to influence the price of its output. A competitive firm is small relative to the market in which it operates and, therefore, has no power to influence the price of its output. It takes the price as given by market conditions. By contrast, because a monopoly is the sole producer in its market, it can alter the price of its good by adjusting the quantity it supplies to the market.

One way to view this difference between a competitive firm and a monopoly is to consider the demand curve that each firm faces. When we analyzed profit maximization by competitive firms in the preceding chapter, we drew the market price as a horizontal line. Because a competitive firm can sell as much or as little as it wants at this price, the competitive firm faces a horizontal demand curve, as in panel (a) of Figure 2. In effect, because the competitive firm sells a product with many perfect substitutes (the products of all the other firms in its market), the demand curve that any one firm faces is perfectly elastic.

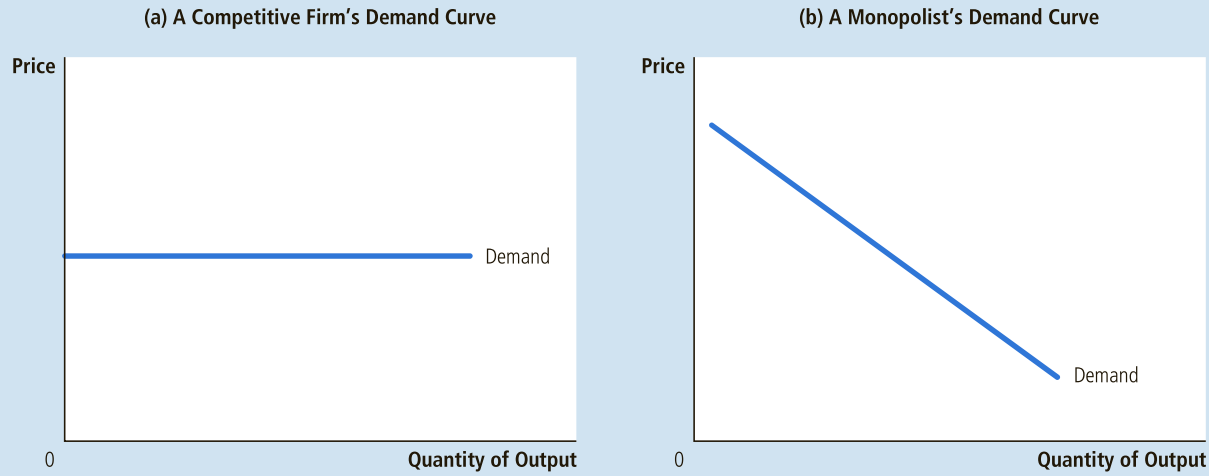
By contrast, because a monopoly is the sole producer in its market, its demand curve is the market demand curve. Thus, the monopolist's demand curve slopes downward, as in panel (b) of Figure 2. If the monopolist raises the price of its good, consumers buy less of it. Looked at another way, if the monopolist reduces the quantity of output it produces and sells, the price of its output increases.

The market demand curve provides a constraint on a monopoly's ability to profit from its market power. A monopolist would prefer, if it were possible, to

FIGURE 2

Demand Curves for Competitive and Monopoly Firms

Because competitive firms are price takers, they face horizontal demand curves, as in panel (a). Because a monopoly firm is the sole producer in its market, it faces the downward-sloping market demand curve, as in panel (b). As a result, the monopoly has to accept a lower price if it wants to sell more output.



charge a high price and sell a large quantity at that high price. The market demand curve makes that outcome impossible. In particular, the market demand curve describes the combinations of price and quantity that are available to a monopoly firm. By adjusting the quantity produced (or equivalently, the price charged), the monopolist can choose any point on the demand curve, but it cannot choose a point off the demand curve.

What price and quantity of output will the monopolist choose? As with competitive firms, we assume that the monopolist's goal is to maximize profit. Because the firm's profit is total revenue minus total costs, our next task in explaining monopoly behavior is to examine a monopolist's revenue.

15-2b A Monopoly's Revenue

Consider a town with a single producer of water. Table 1 shows how the monopoly's revenue might depend on the amount of water produced.

Columns (1) and (2) show the monopolist's demand schedule. If the monopolist produces 1 gallon of water, it can sell that gallon for $10. If it produces 2 gallons, it must lower the price to $9 to sell both gallons. If it produces 3 gallons, it must lower the price to $8. And so on. If you graphed these two columns of numbers, you would get a typical downward-sloping demand curve.

Column (3) of the table presents the monopolist's *total revenue*. It equals the quantity sold [from column (1)] times the price [from column (2)]. Column (4) computes the firm's *average revenue*, the amount of revenue the firm receives per unit sold. We compute average revenue by taking the number for total revenue in column (3) and dividing it by the quantity of output in column (1). As we discussed in the previous chapter, average revenue always equals the price of the good. This is true for monopolists as well as for competitive firms.

TABLE 1

A Monopoly's Total, Average, and Marginal Revenue

(1) Quantity of Water (Q)	(2) Price (P)	(3) Total Revenue ($TR = P \times Q$)	(4) Average Revenue ($AR = TR / Q$)	(5) Marginal Revenue ($MR = \Delta TR / \Delta Q$)
0 gallons	$11	$ 0	—	
				$10
1	10	10	$10	
				8
2	9	18	9	
				6
3	8	24	8	
				4
4	7	28	7	
				2
5	6	30	6	
				0
6	5	30	5	
				−2
7	4	28	4	
				−4
8	3	24	3	

Column (5) of Table 1 computes the firm's *marginal revenue*, the amount of revenue that the firm receives for each additional unit of output. We compute marginal revenue by taking the change in total revenue when output increases by 1 unit. For example, when the firm is producing 3 gallons of water, it receives total revenue of $24. Raising production to 4 gallons increases total revenue to $28. Thus, marginal revenue from the sale of the fourth gallon is $28 minus $24, or $4.

Table 1 shows a result that is important for understanding monopoly behavior: *A monopolist's marginal revenue is less than the price of its good*. For example, if the firm raises production of water from 3 to 4 gallons, it increases total revenue by only $4, even though it sells each gallon for $7. For a monopoly, marginal revenue is lower than price because a monopoly faces a downward-sloping demand curve. To increase the amount sold, a monopoly firm must lower the price it charges to all customers. Hence, to sell the fourth gallon of water, the monopolist must earn $1 less revenue for each of the first 3 gallons. This $3 loss accounts for the difference between the price of the fourth gallon ($7) and the marginal revenue of that fourth gallon ($4).

Marginal revenue for monopolies is very different from marginal revenue for competitive firms. When a monopoly increases the amount it sells, this action has two effects on total revenue ($P \times Q$):

- *The output effect:* More output is sold, so Q is higher, which tends to increase total revenue.
- *The price effect*: The price falls, so P is lower, which tends to decrease total revenue.

Because a competitive firm can sell all it wants at the market price, there is no price effect. When it increases production by 1 unit, it receives the market price for that unit, and it does not receive any less for the units it was already selling. That is, because the competitive firm is a price taker, its marginal revenue equals the price of its good. By contrast, when a monopoly increases production by 1 unit, it must reduce the price it charges for every unit it sells, and this cut in price reduces revenue on the units it was already selling. As a result, a monopoly's marginal revenue is less than its price.

Figure 3 graphs the demand curve and the marginal-revenue curve for a monopoly firm. (Because the firm's price equals its average revenue, the demand curve is also the average-revenue curve.) These two curves always start at the same point on the vertical axis because the marginal revenue of the first unit sold equals the price of the good. But for the reason we just discussed, the monopolist's marginal revenue on all units after the first is less than the price of the good. Thus, a monopoly's marginal-revenue curve lies below its demand curve.

You can see in Figure 3 (as well as in Table 1) that marginal revenue can even become negative. Marginal revenue is negative when the price effect on revenue is greater than the output effect. In this case, when the firm produces an extra unit of output, the price falls by enough to cause the firm's total revenue to decline, even though the firm is selling more units.

15-2c Profit Maximization

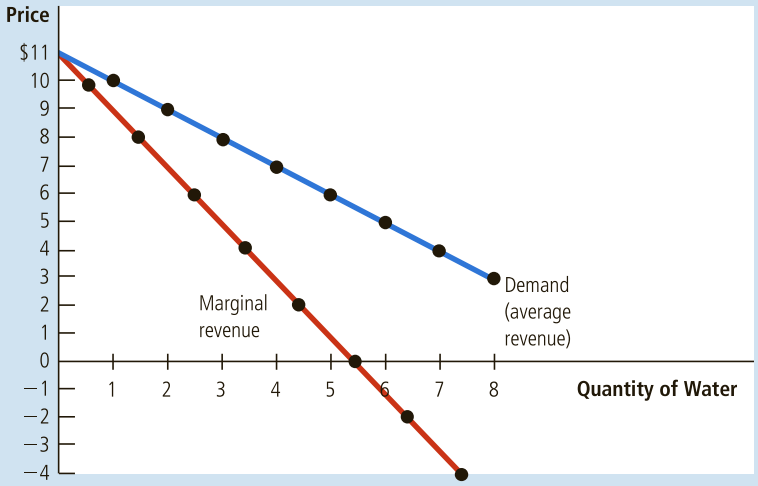
Now that we have considered the revenue of a monopoly firm, we are ready to examine how such a firm maximizes profit. Recall from Chapter 1 that one of the *Ten Principles of Economics* is that rational people think at the margin. This lesson is as true for monopolists as it is for competitive firms. Here we apply the logic of marginal analysis to the monopolist's decision about how much to produce.

Figure 4 graphs the demand curve, the marginal-revenue curve, and the cost curves for a monopoly firm. All these curves should seem familiar: The demand and marginal-revenue curves are like those in Figure 3, and the cost curves are like those we encountered in the last two chapters. These curves contain all the

FIGURE 3

Demand and Marginal-Revenue Curves for a Monopoly

The demand curve shows how the quantity sold affects the price of the good. The marginal-revenue curve shows how the firm's revenue changes when the quantity increases by 1 unit. Because the price on *all* units sold must fall if the monopoly increases production, marginal revenue is less than the price.



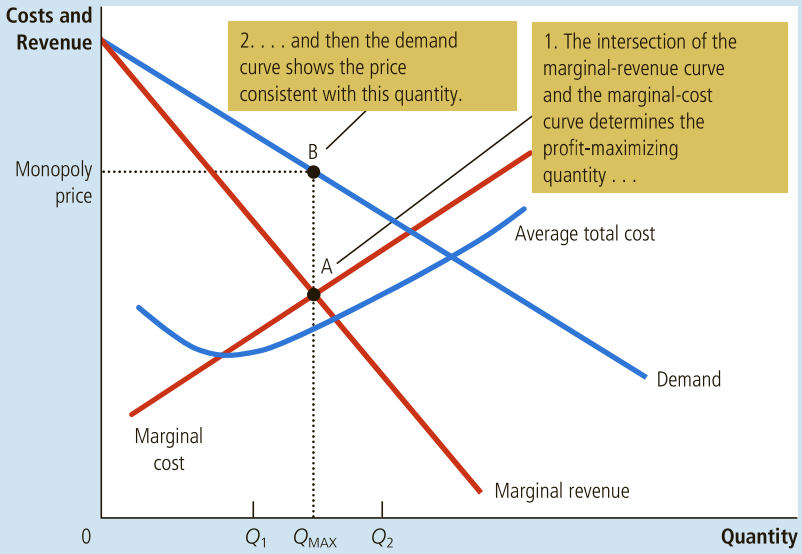


FIGURE 4

Profit Maximization for a Monopoly
A monopoly maximizes profit by choosing the quantity at which marginal revenue equals marginal cost (point A). It then uses the demand curve to find the price that will induce consumers to buy that quantity (point B).

information we need to determine the level of output that a profit-maximizing monopolist will choose.

Suppose, first, that the firm is producing at a low level of output, such as Q_1. In this case, marginal cost is less than marginal revenue. If the firm increased production by 1 unit, the additional revenue would exceed the additional costs, and profit would rise. Thus, when marginal cost is less than marginal revenue, the firm can increase profit by producing more units.

A similar argument applies at high levels of output, such as Q_2. In this case, marginal cost is greater than marginal revenue. If the firm reduced production by 1 unit, the costs saved would exceed the revenue lost. Thus, if marginal cost is greater than marginal revenue, the firm can raise profit by reducing production.

In the end, the firm adjusts its level of production until the quantity reaches Q_{MAX}, at which marginal revenue equals marginal cost. Thus, *the monopolist's profit-maximizing quantity of output is determined by the intersection of the marginal-revenue curve and the marginal-cost curve.* In Figure 4, this intersection occurs at point A.

You might recall from the previous chapter that competitive firms also choose the quantity of output at which marginal revenue equals marginal cost. In following this rule for profit maximization, competitive firms and monopolies are alike. But there is also an important difference between these types of firms: The marginal revenue of a competitive firm equals its price, whereas the marginal revenue of a monopoly is less than its price. That is,

$$\text{For a competitive firm: } P = MR = MC.$$
$$\text{For a monopoly firm: } P > MR = MC.$$

The equality of marginal revenue and marginal cost determines the profit-maximizing quantity for both types of firm. What differs is how the price is related to marginal revenue and marginal cost.

How does the monopoly find the profit-maximizing price for its product? The demand curve answers this question because the demand curve relates the amount that customers are willing to pay to the quantity sold. Thus, after the monopoly firm chooses the quantity of output that equates marginal revenue and marginal cost, it uses the demand curve to find the highest price it can charge for that quantity. In Figure 4, the profit-maximizing price is found at point B.

We can now see a key difference between markets with competitive firms and markets with a monopoly firm: *In competitive markets, price equals marginal cost. In monopolized markets, price exceeds marginal cost*. As we will see in a moment, this finding is crucial to understanding the social cost of monopoly.

15-2d A Monopoly's Profit

How much profit does a monopoly make? To see a monopoly firm's profit in a graph, recall that profit equals total revenue (TR) minus total costs (TC):

$$\text{Profit} = TR - TC.$$

We can rewrite this as

$$\text{Profit} = (TR/Q - TC/Q) \times Q.$$

TR/Q is average revenue, which equals the price, P, and TC/Q is average total cost, ATC. Therefore,

$$\text{Profit} = (P - ATC) \times Q.$$

This equation for profit (which also holds for competitive firms) allows us to measure the monopolist's profit in our graph.

Consider the shaded box in Figure 5. The height of the box (the segment BC) is price minus average total cost, $P - ATC$, which is the profit on the typical unit sold. The width of the box (the segment DC) is the quantity sold, Q_{MAX}. Therefore, the area of this box is the monopoly firm's total profit.

FYI

Why a Monopoly Does Not Have a Supply Curve

You may have noticed that we have analyzed the price in a monopoly market using the market demand curve and the firm's cost curves. We have not made any mention of the market supply curve. By contrast, when we analyzed prices in competitive markets beginning in Chapter 4, the two most important words were always *supply* and *demand*.

What happened to the supply curve? Although monopoly firms make decisions about what quantity to supply, a monopoly does not have a supply curve. A supply curve tells us the quantity that firms choose to supply at any given price. This concept makes sense when we are analyzing competitive firms, which are price takers. But a monopoly firm is a price maker, not a price taker. It is not meaningful to ask what amount such a firm would produce at any given price because it cannot take the price as given. Instead, when the firm chooses the quantity to supply, that decision (along with the demand curve) determines the price.

Indeed, the monopolist's decision about how much to supply is impossible to separate from the demand curve it faces. The shape of the demand curve determines the shape of the marginal-revenue curve, which in turn determines the monopolist's profit-maximizing quantity. In a competitive market, each firm's supply decisions can be analyzed without knowing the demand curve, but that is not true in a monopoly market. Therefore, we never talk about a monopoly's supply curve. ■

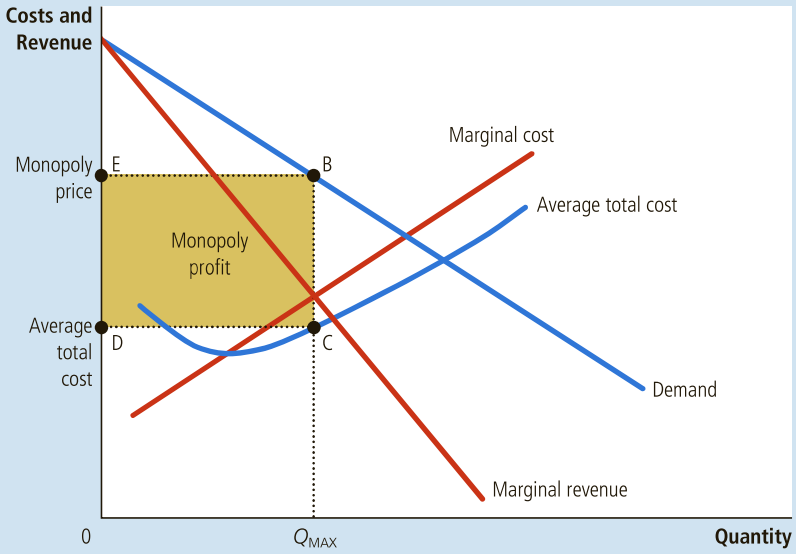


FIGURE 5

The Monopolist's Profit

The area of the box BCDE equals the profit of the monopoly firm. The height of the box (BC) is price minus average total cost, which equals profit per unit sold. The width of the box (DC) is the number of units sold.

CASE STUDY

MONOPOLY DRUGS VERSUS GENERIC DRUGS

According to our analysis, prices are determined differently in monopolized markets and competitive markets. A natural place to test this theory is the market for pharmaceutical drugs because this market takes on both market structures. When a firm discovers a new drug, patent laws give the firm a monopoly on the sale of that drug. But eventually, the firm's patent runs out, and any company can make and sell the drug. At that time, the market switches from being monopolistic to being competitive.

What should happen to the price of a drug when the patent runs out? Figure 6 shows the market for a typical drug. In this figure, the marginal cost of producing the drug is constant. (This is approximately true for many drugs.) During the life of the patent, the monopoly firm maximizes profit by producing the quantity at which marginal revenue equals marginal cost and charging a price well above marginal cost. But when the patent runs out, the profit from making the drug should encourage new firms to enter the market. As the market becomes more competitive, the price should fall to equal marginal cost.

Experience is, in fact, consistent with our theory. When the patent on a drug expires, other companies quickly enter and begin selling generic products that are chemically identical to the former monopolist's brand-name product. Just as our analysis predicts, the price of the competitively produced generic drug is well below the price that the monopolist was charging.

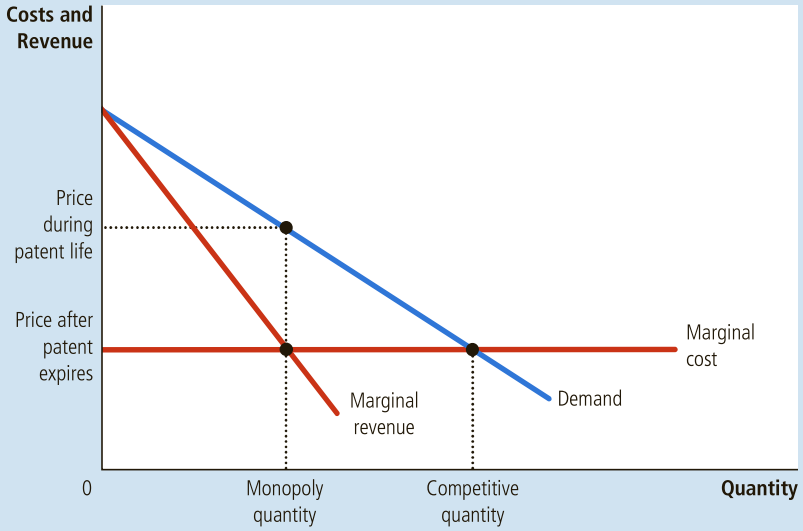
The expiration of a patent, however, does not cause the monopolist to lose all of its market power. Some consumers remain loyal to the brand-name drug, perhaps out of fear that the new generic drugs are not actually the same as the drug they have been using for years. As a result, the former monopolist can continue to charge a price above the price charged by its new competitors.

For example, one of the most widely used antidepressants is the drug fluoxetine, which is taken by millions of Americans. Because the patent on this drug expired in 2001, a consumer today has the choice between the original drug, sold under the

FIGURE 6

The Market for Drugs

When a patent gives a firm a monopoly over the sale of a drug, the firm charges the monopoly price, which is well above the marginal cost of making the drug. When the patent on a drug runs out, new firms enter the market, making it more competitive. As a result, the price falls from the monopoly price to marginal cost.



brand name Prozac, and a generic version of the same medicine. Prozac sells for about three times the price of generic fluoxetine. This price differential can persist because some consumers are not convinced that the two pills are perfect substitutes. ●

QuickQuiz *Explain how a monopolist chooses the quantity of output to produce and the price to charge.*

15-3 The Welfare Cost of Monopolies

Is monopoly a good way to organize a market? We have seen that a monopoly, in contrast to a competitive firm, charges a price above marginal cost. From the standpoint of consumers, this high price makes monopoly undesirable. At the same time, however, the monopoly is earning profit from charging this high price. From the standpoint of the owners of the firm, the high price makes monopoly very desirable. Is it possible that the benefits to the firm's owners exceed the costs imposed on consumers, making monopoly desirable from the standpoint of society as a whole?

We can answer this question using the tools of welfare economics. Recall from Chapter 7 that total surplus measures the economic well-being of buyers and sellers in a market. Total surplus is the sum of consumer surplus and producer surplus. Consumer surplus is consumers' willingness to pay for a good minus the amount they actually pay for it. Producer surplus is the amount producers receive for a good minus their costs of producing it. In this case, there is a single producer—the monopolist.

You can probably guess the result of this analysis. In Chapter 7, we concluded that the equilibrium of supply and demand in a competitive market is not only a natural outcome but also a desirable one. The invisible hand of the market leads to an allocation of resources that makes total surplus as large as it can be. Because a monopoly leads to an allocation of resources different from that in a competitive market, the outcome must, in some way, fail to maximize total economic well-being.

15-3a The Deadweight Loss

We begin by considering what the monopoly firm would do if it were run by a benevolent social planner. The social planner cares not only about the profit earned by the firm's owners but also about the benefits received by the firm's consumers. The planner tries to maximize total surplus, which equals producer surplus (profit) plus consumer surplus. Keep in mind that total surplus equals the value of the good to consumers minus the costs of making the good incurred by the monopoly producer.

Figure 7 analyzes how a benevolent social planner would choose the monopoly's level of output. The demand curve reflects the value of the good to consumers, as measured by their willingness to pay for it. The marginal-cost curve reflects the costs of the monopolist. Thus, *the socially efficient quantity is found where the demand curve and the marginal-cost curve intersect*. Below this quantity, the value of an extra unit to consumers exceeds the cost of providing it, so increasing output would raise total surplus. Above this quantity, the cost of producing an extra unit exceeds the value of that unit to consumers, so decreasing output would raise total surplus. At the optimal quantity, the value of an extra unit to consumers exactly equals the marginal cost of production.

If the social planner were running the monopoly, the firm could achieve this efficient outcome by charging the price found at the intersection of the demand and marginal-cost curves. Thus, like a competitive firm and unlike a profit-maximizing monopoly, a social planner would charge a price equal to marginal cost. Because this price would give consumers an accurate signal about the cost of producing the good, consumers would buy the efficient quantity.

We can evaluate the welfare effects of monopoly by comparing the level of output that the monopolist chooses to the level of output that a social planner would

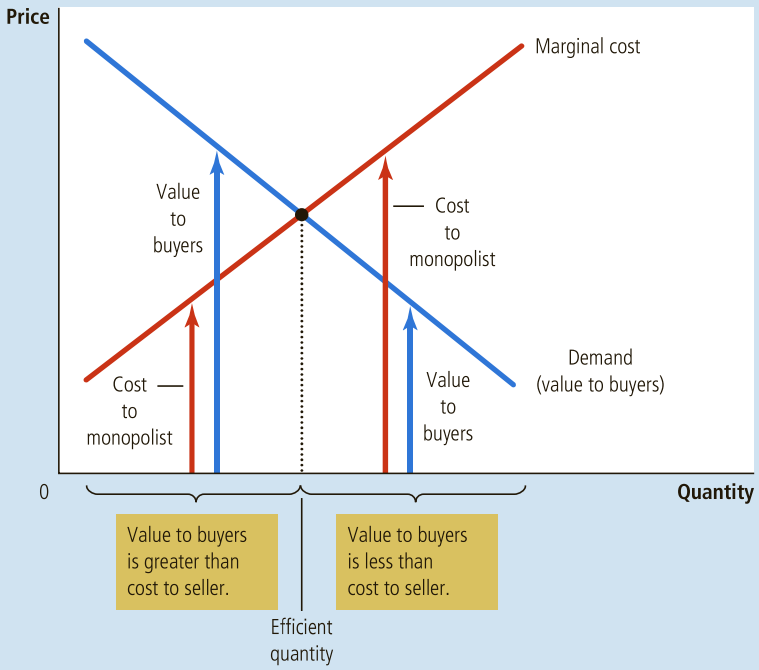


FIGURE 7

The Efficient Level of Output

A benevolent social planner maximizes total surplus in the market by choosing the level of output where the demand curve and marginal-cost curve intersect. Below this level, the value of the good to the marginal buyer (as reflected in the demand curve) exceeds the marginal cost of making the good. Above this level, the value to the marginal buyer is less than marginal cost.

choose. As we have seen, the monopolist chooses to produce and sell the quantity of output at which the marginal-revenue and marginal-cost curves intersect; the social planner would choose the quantity at which the demand and marginal-cost curves intersect. Figure 8 shows the comparison. *The monopolist produces less than the socially efficient quantity of output.*

We can also view the inefficiency of monopoly in terms of the monopolist's price. Because the market demand curve describes a negative relationship between the price and quantity of the good, a quantity that is inefficiently low is equivalent to a price that is inefficiently high. When a monopolist charges a price above marginal cost, some potential consumers value the good at more than its marginal cost but less than the monopolist's price. These consumers do not buy the good. Because the value these consumers place on the good is greater than the cost of providing it to them, this result is inefficient. Thus, monopoly pricing prevents some mutually beneficial trades from taking place.

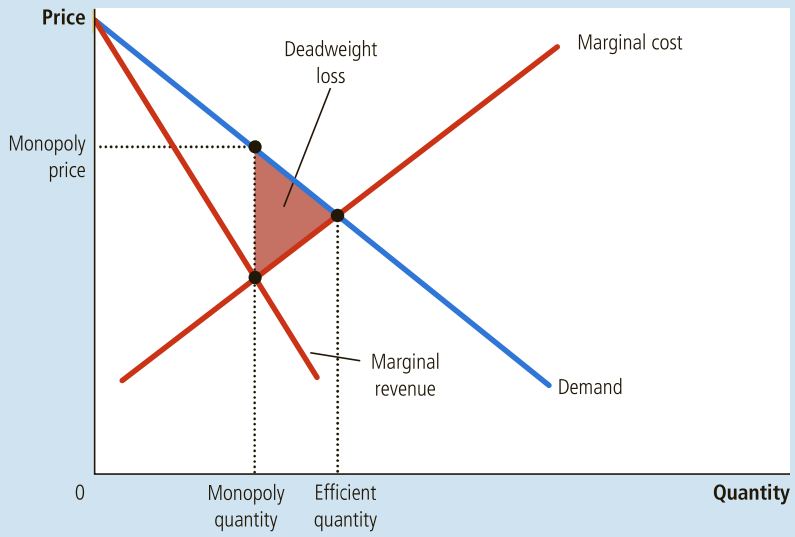
The inefficiency of monopoly can be measured with a deadweight loss triangle, as illustrated in Figure 8. Because the demand curve reflects the value to consumers and the marginal-cost curve reflects the costs to the monopoly producer, the area of the deadweight loss triangle between the demand curve and the marginal-cost curve equals the total surplus lost because of monopoly pricing. It represents the reduction in economic well-being that results from the monopoly's use of its market power.

The deadweight loss caused by a monopoly is similar to the deadweight loss caused by a tax. Indeed, a monopolist is like a private tax collector. As we saw in Chapter 8, a tax on a good places a wedge between consumers' willingness to pay (as reflected by the demand curve) and producers' costs (as reflected by the supply curve). Because a monopoly exerts its market power by charging a price above marginal cost, it creates a similar wedge. In both cases, the wedge causes the quantity sold to fall short of the social optimum. The difference between the two cases is that the government gets the revenue from a tax, whereas a private firm gets the monopoly profit.

FIGURE 8

The Inefficiency of Monopoly

Because a monopoly charges a price above marginal cost, not all consumers who value the good at more than its cost buy it. Thus, the quantity produced and sold by a monopoly is below the socially efficient level. The deadweight loss is represented by the area of the triangle between the demand curve (which reflects the value of the good to consumers) and the marginal-cost curve (which reflects the costs of the monopoly producer).



15-3b The Monopoly's Profit: A Social Cost?

It is tempting to decry monopolies for "profiteering" at the expense of the public. And indeed, a monopoly firm does earn a profit by virtue of its market power. According to the economic analysis of monopoly, however, the firm's profit is not in itself necessarily a problem for society.

Welfare in a monopolized market, as in all markets, includes the welfare of both consumers and producers. Whenever a consumer pays an extra dollar to a producer because of a monopoly price, the consumer is worse off by a dollar and the producer is better off by the same amount. This transfer from the consumers of the good to the owners of the monopoly does not affect the market's total surplus—the sum of consumer and producer surplus. In other words, the monopoly profit itself represents not a reduction in the size of the economic pie but merely a bigger slice for producers and a smaller slice for consumers. Unless consumers are for some reason more deserving than producers—a normative judgment about equity that goes beyond the realm of economic efficiency—the monopoly profit is not a social problem.

The problem in a monopolized market arises because the firm produces and sells a quantity of output below the level that maximizes total surplus. The deadweight loss measures how much the economic pie shrinks as a result. This inefficiency is connected to the monopoly's high price: Consumers buy fewer units when the firm raises its price above marginal cost. But keep in mind that the profit earned on the units that continue to be sold is not the problem. The problem stems from the inefficiently low quantity of output. Put differently, if the high monopoly price did not discourage some consumers from buying the good, it would raise producer surplus by exactly the amount it reduced consumer surplus, leaving total surplus the same as that achieved by a benevolent social planner.

There is, however, a possible exception to this conclusion. Suppose that a monopoly firm has to incur additional costs to maintain its monopoly position. For example, a firm with a government-created monopoly might need to hire lobbyists to convince lawmakers to continue its monopoly. In this case, the monopoly may use up some of its monopoly profits paying for these additional costs. If so, the social loss from monopoly includes both these costs and the deadweight loss resulting from reduced output.

QuickQuiz *How does a monopolist's quantity of output compare to the quantity of output that maximizes total surplus? How does this difference relate to the deadweight loss?*

15-4 Price Discrimination

So far, we have been assuming that the monopoly firm charges the same price to all customers. Yet in many cases, firms sell the same good to different customers for different prices, even though the costs of producing for the two customers are the same. This practice is called **price discrimination**.

price discrimination the business practice of selling the same good at different prices to different customers

Before discussing the behavior of a price-discriminating monopolist, we should note that price discrimination is not possible when a good is sold in a competitive market. In a competitive market, many firms are selling the same good at the market price. No firm is willing to charge a lower price to any customer because the firm can sell all it wants at the market price. And if any firm tried to charge a

higher price to a customer, that customer would buy from another firm. For a firm to price discriminate, it must have some market power.

15-4a A Parable about Pricing

To understand why a monopolist would price discriminate, let's consider an example. Imagine that you are the president of Readalot Publishing Company. Readalot's best-selling author has just written a new novel. To keep things simple, let's imagine that you pay the author a flat $2 million for the exclusive rights to publish the book. Let's also assume that the cost of printing the book is zero (as it would be, for example, for an e-book). Readalot's profit, therefore, is the revenue from selling the book minus the $2 million it has paid to the author. Given these assumptions, how would you, as Readalot's president, decide the book's price?

Your first step is to estimate the demand for the book. Readalot's marketing department tells you that the book will attract two types of readers. The book will appeal to the author's 100,000 die-hard fans who are willing to pay as much as $30. In addition, it will appeal to about 400,000 less enthusiastic readers who will pay up to $5.

If Readalot charges a single price to all customers, what price maximizes profit? There are two natural prices to consider: $30 is the highest price Readalot can charge and still get the 100,000 die-hard fans, and $5 is the highest price it can charge and still get the entire market of 500,000 potential readers. Solving Readalot's problem is a matter of simple arithmetic. At a price of $30, Readalot sells 100,000 copies, has revenue of $3 million, and makes profit of $1 million. At a price of $5, it sells 500,000 copies, has revenue of $2.5 million, and makes profit of $500,000. Thus, Readalot maximizes profit by charging $30 and forgoing the opportunity to sell to the 400,000 less enthusiastic readers.

Notice that Readalot's decision causes a deadweight loss. There are 400,000 readers willing to pay $5 for the book, and the marginal cost of providing it to them is zero. Thus, $2 million of total surplus is lost when Readalot charges the higher price. This deadweight loss is the inefficiency that arises whenever a monopolist charges a price above marginal cost.

Now suppose that Readalot's marketing department makes a discovery: These two groups of readers are in separate markets. The die-hard fans live in Australia, and the other readers live in the United States. Moreover, it is hard for readers in one country to buy books in the other.

In response to this discovery, Readalot can change its marketing strategy and increase profits. To the 100,000 Australian readers, it can charge $30 for the book. To the 400,000 American readers, it can charge $5 for the book. In this case, revenue is $3 million in Australia and $2 million in the United States, for a total of $5 million. Profit is then $3 million, which is substantially greater than the $1 million the company could earn charging the same $30 price to all customers. Not surprisingly, Readalot chooses to follow this strategy of price discrimination.

The story of Readalot Publishing is hypothetical, but it describes the business practice of many publishing companies. Consider the price differential between hardcover books and paperbacks. When a publisher has a new novel, it initially releases an expensive hardcover edition and later releases a cheaper paperback edition. The difference in price between these two editions far exceeds the difference in printing costs. The publisher is price discriminating by selling the hardcover to die-hard fans and the paperback to less enthusiastic readers, thereby increasing its profit.

15-4b The Moral of the Story

Like any parable, the story of Readalot Publishing is stylized. Yet also like any parable, it teaches some general lessons. In this case, three lessons can be learned about price discrimination.

The first and most obvious lesson is that price discrimination is a rational strategy for a profit-maximizing monopolist. That is, by charging different prices to different customers, a monopolist can increase its profit. In essence, a price-discriminating monopolist charges each customer a price closer to her willingness to pay than is possible with a single price.

The second lesson is that price discrimination requires the ability to separate customers according to their willingness to pay. In our example, customers were separated geographically. But sometimes monopolists choose other differences, such as age or income, to distinguish among customers.

A corollary to this second lesson is that certain market forces can prevent firms from price discriminating. In particular, one such force is *arbitrage*, the process of buying a good in one market at a low price and selling it in another market at a higher price to profit from the price difference. In our example, if Australian bookstores could buy the book in the United States and resell it to Australian readers, the arbitrage would prevent Readalot from price discriminating, because no Australian would buy the book at the higher price.

The third lesson from our parable is the most surprising: Price discrimination can raise economic welfare. Recall that a deadweight loss arises when Readalot charges a single $30 price because the 400,000 less enthusiastic readers do not end up with the book, even though they value it at more than its marginal cost of production. By contrast, when Readalot price discriminates, all readers get the book and the outcome is efficient. Thus, price discrimination can eliminate the inefficiency inherent in monopoly pricing.

Note that in this example the increase in welfare from price discrimination shows up as higher producer surplus rather than higher consumer surplus. Consumers are no better off for having bought the book: The price they pay exactly equals the value they place on the book, so they receive no consumer surplus. The entire increase in total surplus from price discrimination accrues to Readalot Publishing in the form of higher profit.

15-4c The Analytics of Price Discrimination

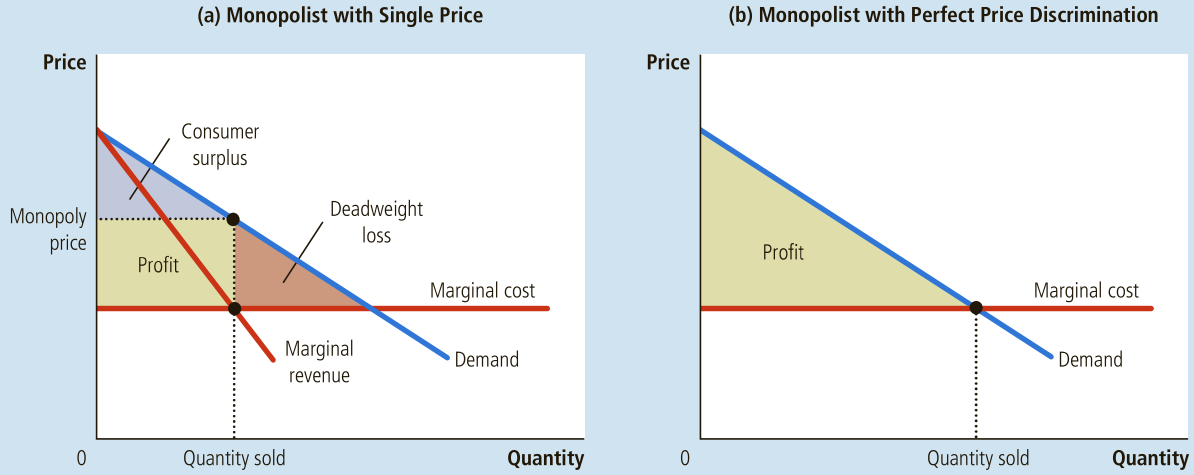
Let's consider a bit more formally how price discrimination affects economic welfare. We begin by assuming that the monopolist can price discriminate perfectly. *Perfect price discrimination* describes a situation in which the monopolist knows exactly each customer's willingness to pay and can charge each customer a different price. In this case, the monopolist charges each customer exactly her willingness to pay, and the monopolist gets the entire surplus in every transaction.

Figure 9 illustrates producer and consumer surplus with and without price discrimination. To keep things simple, this figure is drawn assuming constant per unit costs—that is, marginal cost and average total cost are constant and equal. Without price discrimination, the firm charges a single price above marginal cost, as shown in panel (a). Because some potential customers who value the good at more than marginal cost do not buy it at this high price, the monopoly causes a deadweight loss. Yet when a firm can perfectly price discriminate, as shown in panel (b), each customer who values the good at more than marginal cost buys the good and is charged her willingness to pay. All mutually beneficial trades take

FIGURE 9

Welfare with and without Price Discrimination

Panel (a) shows a monopoly that charges the same price to all customers. Total surplus in this market equals the sum of profit (producer surplus) and consumer surplus. Panel (b) shows a monopoly that can perfectly price discriminate. Because consumer surplus equals zero, total surplus now equals the firm's profit. Comparing these two panels, you can see that perfect price discrimination raises profit, raises total surplus, and lowers consumer surplus.



place, no deadweight loss occurs, and the entire surplus derived from the market goes to the monopoly producer in the form of profit.

In reality, of course, price discrimination is not perfect. Customers do not walk into stores with signs displaying their willingness to pay. Instead, firms price discriminate by dividing customers into groups: young versus old, weekday versus weekend shoppers, Americans versus Australians, and so on. Unlike those in our parable of Readalot Publishing, customers within each group differ in their willingness to pay for the product, making perfect price discrimination impossible.

How does this imperfect price discrimination affect welfare? The analysis of these pricing schemes is complicated, and it turns out that there is no general answer to this question. Compared with the single-price monopoly outcome, imperfect price discrimination can raise, lower, or leave unchanged the total surplus in a market. The only certain conclusion is that price discrimination raises the monopoly's profit; otherwise, the firm would choose to charge all customers the same price.

15-4d Examples of Price Discrimination

Firms in our economy use various business strategies aimed at charging different prices to different customers. Now that we understand the economics of price discrimination, let's consider some examples.

Movie Tickets Many movie theaters charge a lower price for children and senior citizens than for other patrons. This fact is hard to explain in a competitive market. In a competitive market, price equals marginal cost, and the marginal cost of providing a seat for a child or senior citizen is the same as the marginal cost

of providing a seat for anyone else. Yet the differential pricing is easily explained if movie theaters have some local monopoly power and if children and senior citizens have a lower willingness to pay for a ticket. In this case, movie theaters raise their profit by price discriminating.

"Would it bother you to hear how little I paid for this flight?"

Airline Prices Seats on airplanes are sold at many different prices. Most airlines charge a lower price for a round-trip ticket between two cities if the traveler stays over a Saturday night. At first, this seems odd. Why should it matter to the airline whether a passenger stays over a Saturday night? The reason is that this rule provides a way to separate business travelers and leisure travelers. A passenger on a business trip has a high willingness to pay and, most likely, does not want to stay over a Saturday night. By contrast, a passenger traveling for personal reasons has a lower willingness to pay and is more likely to be willing to stay over a Saturday night. Thus, the airlines can successfully price discriminate by charging a lower price for passengers who stay over a Saturday night.

Discount Coupons Many companies offer discount coupons to the public in newspapers, magazines, or online. A buyer simply has to clip the coupon to get $0.50 off her next purchase. Why do companies offer these coupons? Why don't they just cut the price of the product by $0.50?

The answer is that coupons allow companies to price discriminate. Companies know that not all customers are willing to spend time clipping coupons. Moreover, the willingness to clip coupons is related to the customer's willingness to pay for the good. A rich and busy executive is unlikely to spend her time clipping discount coupons out of the newspaper, and she is probably willing to pay a higher price for many goods. A person who is unemployed is more likely to clip coupons and to have a lower willingness to pay. Thus, by charging a lower price only to those customers who clip coupons, firms can successfully price discriminate.

Financial Aid Many colleges and universities give financial aid to needy students. One can view this policy as a type of price discrimination. Wealthy students have greater financial resources and, therefore, a higher willingness to pay than needy students. By charging high tuition and selectively offering financial aid, schools in effect charge prices to customers based on the value they place on going to that school. This behavior is similar to that of any price-discriminating monopolist.

Quantity Discounts So far in our examples of price discrimination, the monopolist charges different prices to different customers. Sometimes, however, monopolists price discriminate by charging different prices to the same customer for different units that the customer buys. For example, many firms offer lower prices to customers who buy large quantities. A bakery might charge $0.50 for each donut but $5 for a dozen. This is a form of price discrimination because the customer pays a higher price for the first unit she buys than for the twelfth. Quantity discounts are often a successful way of price discriminating because a customer's willingness to pay for an additional unit declines as she buys more units.

QuickQuiz *Give two examples of price discrimination. • Explain how perfect price discrimination affects consumer surplus, producer surplus, and total surplus.*

IN THE NEWS

Price Discrimination in Higher Education

Colleges and universities are increasingly charging different prices to different students, which makes data on the cost of education harder to interpret.

Misconceptions 101: Why College Costs Aren't Soaring

By Evan Soltas

Conventional wisdom suggests that U.S. colleges and universities have become sharply more expensive in recent years.

"When kids do graduate, the most daunting challenge can be the cost of college," President Barack Obama said in his 2012 State of the Union address. "We can't just keep subsidizing skyrocketing tuition; we'll run out of money."

At first, the view that the cost of college is rising appears to have data on its side. Published tuition prices and fees at colleges have risen three times faster than the rate of Consumer Price Index inflation since 1978, according to the Bureau of Labor Statistics….

Real tuition and fees have increased, to be sure, but hardly as significantly as the media often report or the data suggest at face value. The inflation-adjusted net price of college has risen only modestly over the last two decades, according to data from the College Board's Annual Survey of Colleges.

What has happened is a shift toward price discrimination—offering multiple prices for the same product. Universities have offset the increase in sticker price for most families through an expansion of grant-based financial aid and scholarships. That has caused the BLS measure to rise without increasing the net cost.

Wealthier families now pay more than ever to send their children to college. But for much of the middle class, the real net cost of college has not changed significantly; for much of the poor, the expansion of aid has increased the accessibility and affordability of a college education….

MICHAELJUNG/SHUTTERSTOCK

The nation's most selective institutions are leading the trend toward income-based price discrimination. For example, at Harvard University, the majority of students receive financial aid: In 2012, one year of undergraduate education had a sticker price of $54,496 and came with an average grant of roughly $41,000.

In other words, the cost burden of college has become significantly more progressive since the 1990s. Students from wealthier families not only now pay more for their own educations but also have come to heavily subsidize the costs of the less fortunate. ■

Source: Bloomberg.com, November 27, 2012.

15-5 Public Policy toward Monopolies

We have seen that monopolies, in contrast to competitive markets, fail to allocate resources efficiently. Monopolies produce less than the socially desirable quantity of output and charge prices above marginal cost. Policymakers in the government can respond to the problem of monopoly in one of four ways:

- By trying to make monopolized industries more competitive
- By regulating the behavior of the monopolies
- By turning some private monopolies into public enterprises
- By doing nothing at all

15-5a Increasing Competition with Antitrust Laws

If Coca-Cola and PepsiCo wanted to merge, the deal would be closely examined by the federal government before it went into effect. The lawyers and economists in the Department of Justice might well decide that a merger between these two

large soft-drink companies would make the U.S. soft-drink market substantially less competitive and, as a result, would reduce the economic well-being of the country as a whole. If so, the Department of Justice would challenge the merger in court, and if the judge agreed, the two companies would not be allowed to merge. It is precisely this kind of challenge that prevented software giant Microsoft from buying Intuit in 1994. Similarly, in 2011, the government blocked the phone giant AT&T from buying its competitor T-Mobile.

The government derives this power over private industry from the antitrust laws, a collection of statutes aimed at curbing monopoly power. The first and most important of these laws was the Sherman Antitrust Act, which Congress passed in 1890 to reduce the market power of the large and powerful "trusts" that were viewed as dominating the economy at the time. The Clayton Antitrust Act, passed in 1914, strengthened the government's powers and authorized private lawsuits. As the U.S. Supreme Court once put it, the antitrust laws are "a comprehensive charter of economic liberty aimed at preserving free and unfettered competition as the rule of trade."

SCIENCECARTOONSPLUS.COM

"But if we do merge with Amalgamated, we'll have enough resources to fight the antitrust violation caused by the merger."

The antitrust laws give the government various ways to promote competition. They allow the government to prevent mergers, such as the merger between AT&T and T-Mobile. At times, they allow the government to break up a large company into a group of smaller ones. Finally, the antitrust laws prevent companies from coordinating their activities in ways that make markets less competitive.

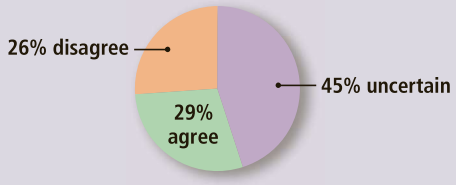
Antitrust laws have costs as well as benefits. Sometimes companies merge not to reduce competition but to lower costs through more efficient joint production. These benefits from mergers are sometimes called *synergies*. For example, many U.S. banks have merged in recent years and, by combining operations, have been able to reduce administrative staff. The airline industry has experienced a similar consolidation. If antitrust laws are to raise social welfare, the government must be able to determine which mergers are desirable and which are not. That is, it must be able to measure and compare the social benefit from synergies with the social costs of reduced competition. Critics of the antitrust laws are skeptical that the government can perform the necessary cost–benefit analysis with sufficient accuracy. In the end, the application of antitrust laws is often controversial, even among the experts.

ASK THE EXPERTS

Airline Mergers

"If regulators had not approved mergers in the past decade between major networked airlines, travelers would be better off today."

What do economists say?



Source: IGM Economic Experts Panel, August 28, 2013.

15-5b Regulation

Another way the government deals with the problem of monopoly is by regulating the behavior of monopolists. This solution is common in the case of natural monopolies, such as water and electric companies. These companies are not allowed to charge any price they want. Instead, government agencies regulate their prices.

What price should the government set for a natural monopoly? This question is not as easy as it might at first appear. One might conclude that the price should equal the monopolist's marginal cost. If price equals marginal cost, customers will buy the quantity of the monopolist's output that maximizes total surplus and the allocation of resources will be efficient.

There are, however, two practical problems with marginal-cost pricing as a regulatory system. The first arises from the logic of cost curves. By definition, natural monopolies have

declining average total cost. As we first discussed in Chapter 13, when average total cost is declining, marginal cost is less than average total cost. This situation is illustrated in Figure 10, which shows a firm with a large fixed cost and then constant marginal cost thereafter. If regulators were to set price equal to marginal cost, that price would be less than the firm's average total cost and the firm would lose money. Instead of charging such a low price, the monopoly firm would just exit the industry.

Regulators can respond to this problem in various ways, none of which is perfect. One way is to subsidize the monopolist. In essence, the government picks up the losses inherent in marginal-cost pricing. Yet to pay for the subsidy, the government needs to raise money through taxation, which involves its own deadweight losses. Alternatively, the regulators can allow the monopolist to charge a price higher than marginal cost. If the regulated price equals average total cost, the monopolist earns exactly zero economic profit. Yet average-cost pricing leads to deadweight losses because the monopolist's price no longer reflects the marginal cost of producing the good. In essence, average-cost pricing is like a tax on the good the monopolist is selling.

The second problem with marginal-cost pricing as a regulatory system (and with average-cost pricing as well) is that it gives the monopolist no incentive to reduce costs. Each firm in a competitive market tries to reduce its costs because lower costs mean higher profits. But if a regulated monopolist knows that regulators will reduce prices whenever costs fall, the monopolist will not benefit from lower costs. In practice, regulators deal with this problem by allowing monopolists to keep some of the benefits from lower costs in the form of higher profit, a practice that requires some departure from marginal-cost pricing.

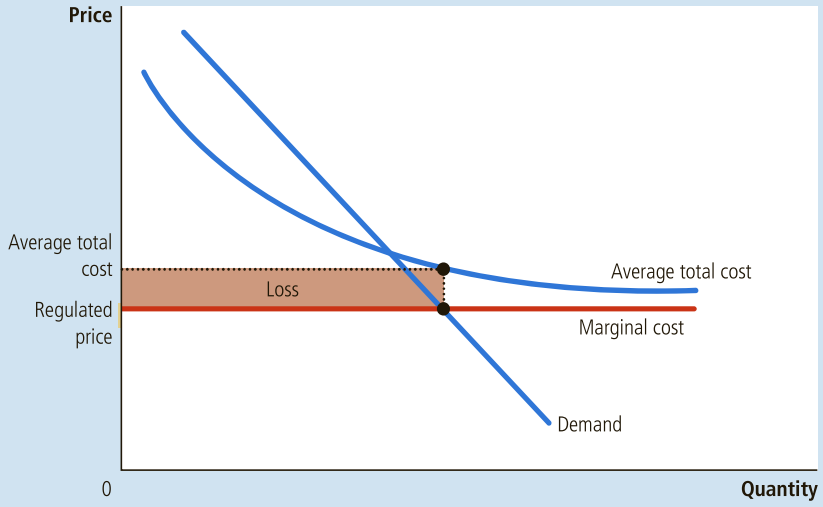
15-5c Public Ownership

The third policy used by the government to deal with monopoly is public ownership. That is, rather than regulating a natural monopoly that is run by a private firm, the government can run the monopoly itself. This solution is common in many European countries, where the government owns and operates utilities

FIGURE 10

Marginal-Cost Pricing for a Natural Monopoly

Because a natural monopoly has declining average total cost, marginal cost is less than average total cost. Therefore, if regulators require a natural monopoly to charge a price equal to marginal cost, price will be below average total cost, and the monopoly will lose money.



such as telephone, water, and electric companies. In the United States, the government runs the Postal Service. The delivery of ordinary first-class mail is often thought to be a natural monopoly.

Economists usually prefer private to public ownership of natural monopolies. The key issue is how the ownership of the firm affects the costs of production. Private owners have an incentive to minimize costs as long as they reap part of the benefit in the form of higher profit. If the firm's managers are doing a bad job of keeping costs down, the firm's owners will fire them. By contrast, if the government bureaucrats who run a monopoly do a bad job, the losers are the customers and taxpayers, whose only recourse is the political system. The bureaucrats may become a special-interest group and attempt to block cost-reducing reforms. Put simply, as a way of ensuring that firms are well run, the voting booth is less reliable than the profit motive.

15-5d Doing Nothing

Each of the foregoing policies aimed at reducing the problem of monopoly has drawbacks. As a result, some economists argue that it is often best for the government not to try to remedy the inefficiencies of monopoly pricing. Here is the assessment of economist George Stigler, who won the Nobel Prize for his work in industrial organization:

> A famous theorem in economics states that a competitive enterprise economy will produce the largest possible income from a given stock of resources. No real economy meets the exact conditions of the theorem, and all real economies will fall short of the ideal economy—a difference called "market failure." In my view, however, the degree of "market failure" for the American economy is much smaller than the "political failure" arising from the imperfections of economic policies found in real political systems.

As this quotation makes clear, determining the proper role of the government in the economy requires judgments about politics as well as economics.

QuickQuiz *Describe the ways policymakers can respond to the inefficiencies caused by monopolies. List a potential problem with each of these policy responses.*

15-6 Conclusion: The Prevalence of Monopolies

This chapter has discussed the behavior of firms that have control over the prices they charge. We have seen that these firms behave very differently from the competitive firms studied in the previous chapter. Table 2 summarizes some of the key similarities and differences between competitive and monopoly markets.

From the standpoint of public policy, a crucial result is that a monopolist produces less than the socially efficient quantity and charges a price above marginal cost. As a result, a monopoly causes deadweight losses. In some cases, these inefficiencies can be mitigated through price discrimination by the monopolist. But other times, they call for policymakers to take an active role.

How prevalent are the problems of monopoly? There are two answers to this question.

In one sense, monopolies are common. Most firms have some control over the prices they charge. They are not forced to charge the market price for their goods

TABLE 2

Competition versus Monopoly: A Summary Comparison

	Competition	Monopoly
Similarities		
Goal of firms	Maximize profits	Maximize profits
Rule for maximizing	$MR = MC$	$MR = MC$
Can earn economic profits in the short run?	Yes	Yes
Differences		
Number of firms	Many	One
Marginal revenue	$MR = P$	$MR < P$
Price	$P = MC$	$P > MC$
Produces welfare-maximizing level of output?	Yes	No
Entry in the long run?	Yes	No
Can earn economic profits in the long run?	No	Yes
Price discrimination possible?	No	Yes

because their goods are not exactly the same as those offered by other firms. A Ford Taurus is not the same as a Toyota Camry. Ben and Jerry's ice cream is not the same as Breyer's. Each of these goods has a downward-sloping demand curve, which gives each producer some degree of monopoly power.

Yet firms with substantial monopoly power are rare. Few goods are truly unique. Most have substitutes that, even if not exactly the same, are similar. Ben and Jerry can raise the price of their ice cream a little without losing all their sales, but if they raise it a lot, sales will fall substantially as their customers switch to other brands.

In the end, monopoly power is a matter of degree. It is true that many firms have some monopoly power. It is also true that their monopoly power is usually limited. In such a situation, we will not go far wrong assuming that firms operate in competitive markets, even if that is not precisely the case.

CHAPTER QuickQuiz

1. A firm is a natural monopoly if it exhibits the following as its output increases:
   a. decreasing marginal revenue.
   b. increasing marginal cost.
   c. decreasing average revenue.
   d. decreasing average total cost.

2. For a profit-maximizing monopoly that charges the same price to all consumers, what is the relationship between price P, marginal revenue MR, and marginal cost MC?
   a. $P = MR$ and $MR = MC$.
   b. $P > MR$ and $MR = MC$.
   c. $P = MR$ and $MR > MC$
   d. $P > MR$ and $MR > MC$.

3. If a monopoly's fixed costs increase, its price will _____ and its profit will _____.
   a. increase, decrease
   b. decrease, increase
   c. increase, stay the same
   d. stay the same, decrease
4. Compared to the social optimum, a monopoly firm chooses
   a. a quantity that is too low and a price that is too high.
   b. a quantity that is too high and a price that is too low.
   c. a quantity and a price that are both too high.
   d. a quantity and a price that are both too low.
5. The deadweight loss from monopoly arises because
   a. the monopoly firm makes higher profits than a competitive firm would.
   b. some potential consumers who forgo buying the good value it more than its marginal cost.
   c. consumers who buy the good have to pay more than marginal cost, reducing their consumer surplus.
   d. the monopoly firm chooses a quantity that fails to equate price and average revenue.
6. When a monopolist switches from charging a single price to practicing perfect price discrimination, it reduces
   a. the quantity produced.
   b. the firm's profit.
   c. consumer surplus.
   d. total surplus.

SUMMARY

- A monopoly is a firm that is the sole seller in its market. A monopoly arises when a single firm owns a key resource, when the government gives a firm the exclusive right to produce a good, or when a single firm can supply the entire market at a lower cost than many firms could.
- Because a monopoly is the sole producer in its market, it faces a downward-sloping demand curve for its product. When a monopoly increases production by 1 unit, it causes the price of its good to fall, which reduces the amount of revenue earned on all units produced. As a result, a monopoly's marginal revenue is always below the price of its good.
- Like a competitive firm, a monopoly firm maximizes profit by producing the quantity at which marginal revenue equals marginal cost. The monopoly then sets the price at which that quantity is demanded. Unlike a competitive firm, a monopoly firm's price exceeds its marginal revenue, so its price exceeds marginal cost.
- A monopolist's profit-maximizing level of output is below the level that maximizes the sum of consumer and producer surplus. That is, when the monopoly charges a price above marginal cost, some consumers who value the good more than its cost of production do not buy it. As a result, monopoly causes deadweight losses similar to those caused by taxes.
- A monopolist can often increase profits by charging different prices for the same good based on a buyer's willingness to pay. This practice of price discrimination can raise economic welfare by getting the good to some consumers who would otherwise not buy it. In the extreme case of perfect price discrimination, the deadweight loss of monopoly is completely eliminated and the entire surplus in the market goes to the monopoly producer. More generally, when price discrimination is imperfect, it can either raise or lower welfare compared to the outcome with a single monopoly price.
- Policymakers can respond to the inefficiency of monopoly behavior in four ways. They can use the antitrust laws to try to make the industry more competitive. They can regulate the prices that the monopoly charges. They can turn the monopolist into a government-run enterprise. Or, if the market failure is deemed small compared to the inevitable imperfections of policies, they can do nothing at all.

KEY CONCEPTS

monopoly, p. 290 natural monopoly, p. 292 price discrimination, p. 303