After studying this chapter, you will be able to:

- Explain how monopoly arises and distinguish between single-price monopoly and price-discriminating monopoly
- Explain how a single-price monopoly determines its output and price
- Compare the performance and efficiency of single-price monopoly and competition
- Explain how price discrimination increases profit
- Explain how monopoly regulation influences output, price, economic profit, and efficiency

13 MONOPOLY

Microsoft, Google, and eBay are dominant players in the markets they serve. Because most PCs use Windows, programmers write most applications for this operating system, which attracts more users. Because most Web searchers use Google, most advertisers use it too, which attracts more searchers. Because most online auction buyers use eBay, most online sellers do too, which attracts more buyers. Each of these firms benefits from a phenomenon called a network externality, which makes it hard for other firms to break into their markets.

Microsoft, Google, and eBay are obviously not like firms in perfect competition. How does their behavior compare with perfectly competitive firms? Do they charge prices that are too high and that damage the interests of consumers? What benefits do they bring?

In this chapter, we study markets in which the firm can influence the price. We also compare the performance of the firm in such a market with that in a competitive market and examine whether monopoly is as efficient as competition. In *Reading Between the Lines* at the end of the chapter, we'll look at a claim by Consumer Watchdog, a California consumer protection organization, that Google abuses its market power and should be scrutinized by the Justice Department using the antitrust laws.

Monopoly and How It Arises

A **monopoly** is a market with a single firm that produces a good or service for which no close substitute exists and that is protected by a barrier that prevents other firms from selling that good or service.

How Monopoly Arises

Monopoly arises for two key reasons:

- No close substitute
- Barrier to entry

No Close Substitute If a good has a close substitute, even though only one firm produces it, that firm effectively faces competition from the producers of the substitute. A monopoly sells a good or service that has no good substitute. Tap water and bottled water are close substitutes for drinking, but tap water has no effective substitute for showering or washing a car and a local public utility that supplies tap water is a monopoly.

Barrier to Entry A constraint that protects a firm from potential competitors is called a **barrier to entry**. The three types of barrier to entry are

- Natural
- Ownership
- Legal

Natural Barrier to Entry A natural barrier to entry creates a **natural monopoly**: a market in which economies of scale enable one firm to supply the entire market at the lowest possible cost. The firms that deliver gas, water, and electricity to our homes are examples of natural monopoly.

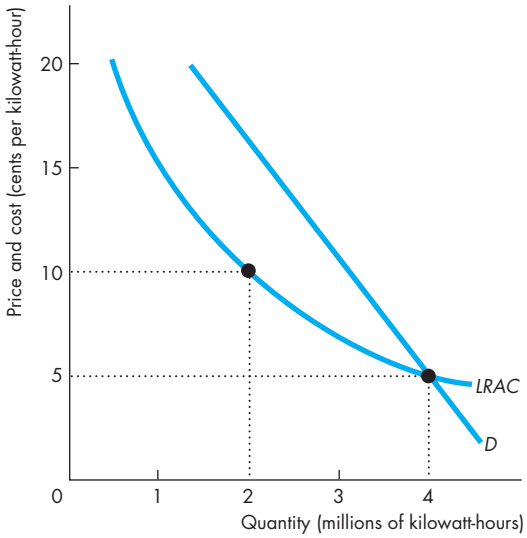
In Fig. 13.1 the market demand curve for electric power is *D*, and the long-run average cost curve is *LRAC*. Economies of scale prevail over the entire length of the *LRAC* curve.

One firm can produce 4 million kilowatt-hours at 5 cents a kilowatt-hour. At this price, the quantity demanded is 4 million kilowatt-hours. So if the price was 5 cents, one firm could supply the entire market.

If two firms shared the market equally, it would cost each of them 10 cents a kilowatt-hour to produce a total of 4 million kilowatt-hours.

In conditions like those shown in Fig. 13.1, one firm can supply the entire market at a lower cost than two or more firms can. The market is a natural monopoly.

FIGURE 13.1 Natural Monopoly



The market demand curve for electric power is *D*, and the long-run average cost curve is *LRAC*. Economies of scale exist over the entire *LRAC* curve. One firm can distribute 4 million kilowatt-hours at a cost of 5 cents a kilowatt-hour. This same total output costs 10 cents a kilowatt-hour with two firms. One firm can meet the market demand at a lower cost than two or more firms can. The market is a natural monopoly.

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Ownership Barrier to Entry An ownership barrier to entry occurs if one firm owns a significant portion of a key resource. An example of this type of monopoly occurred during the last century when De Beers controlled up to 90 percent of the world's supply of diamonds. (Today, its share is only 65 percent.)

Legal Barrier to Entry A legal barrier to entry creates a **legal monopoly**: a market in which competition and entry are restricted by the granting of a public franchise, government license, patent, or copyright.

A *public franchise* is an exclusive right granted to a firm to supply a good or service. An example is the U.S. Postal Service, which has the exclusive right to carry first-class mail. A *government license* controls entry into particular occupations, professions, and industries. Examples of this type of barrier to entry occur in medicine, law, dentistry, schoolteaching,

architecture, and many other professional services. Licensing does not always create a monopoly, but it does restrict competition.

A *patent* is an exclusive right granted to the inventor of a product or service. A *copyright* is an exclusive right granted to the author or composer of a literary, musical, dramatic, or artistic work. Patents and copyrights are valid for a limited time period that varies from country to country. In the United States, a patent is valid for 20 years. Patents encourage the *invention* of new products and production methods. They also stimulate *innovation*—the use of new inventions—by encouraging inventors to publicize their discoveries and offer them for use under license. Patents have stimulated innovations in areas as diverse as soybean seeds, pharmaceuticals, memory chips, and video games.

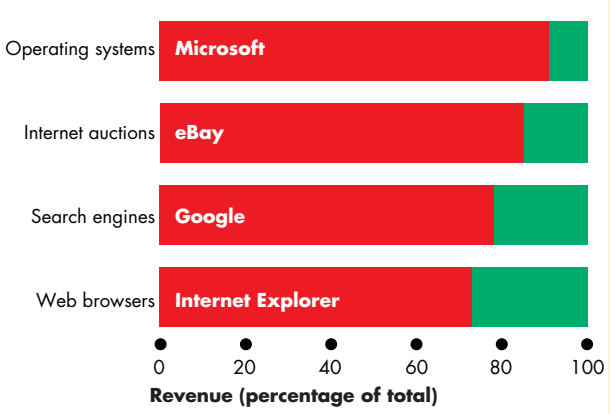
Economics in Action

Information-Age Monopolies

Information-age technologies have created four big natural monopolies. These firms have large plant costs but almost zero marginal cost, so they experience economies of scale.

Microsoft has captured 90 percent of the personal computer operating system market with Windows and 73 percent of the Web browser market with Internet Explorer. eBay has captured 85 percent of the consumer-to-consumer Internet auction market and Google has 78 percent of the search engine market.

New technologies also destroy monopoly. FedEx, UPS, the fax machine, and e-mail have weakened the monopoly of the U.S. Postal Service; and the satellite dish has weakened the monopoly of cable television companies.



Market Shares

Monopoly Price-Setting Strategies

A major difference between monopoly and competition is that a monopoly sets its own price. In doing so, the monopoly faces a market constraint: To sell a larger quantity, the monopoly must set a lower price. There are two monopoly situations that create two pricing strategies:

- Single price
- Price discrimination

Single Price A **single-price monopoly** is a firm that must sell each unit of its output for the same price to all its customers. De Beers sells diamonds (of a given size and quality) for the same price to all its customers. If it tried to sell at a low price to some customers and at a higher price to others, only the low-price customers would buy from De Beers. Others would buy from De Beers' low-price customers. De Beers is a *single-price* monopoly.

Price Discrimination When a firm practices **price discrimination**, it sells different units of a good or service for different prices. Many firms price discriminate. Microsoft sells its Windows and Office software at different prices to different buyers. Computer manufacturers who install the software on new machines, students and teachers, governments, and businesses all pay different prices. Pizza producers offer a second pizza for a lower price than the first one. These are examples of *price discrimination*.

When a firm price discriminates, it looks as though it is doing its customers a favor. In fact, it is charging the highest possible price for each unit sold and making the largest possible profit.

REVIEW QUIZ

1. How does monopoly arise?
2. How does a natural monopoly differ from a legal monopoly?
3. Distinguish between a price-discriminating monopoly and a single-price monopoly.

You can work these questions in Study Plan 13.1 and get instant feedback. myeconlab

We start with a single-price monopoly and see how it makes its decisions about the quantity to produce and the price to charge to maximize its profit.

A Single-Price Monopoly's Output and Price Decision

To understand how a single-price monopoly makes its output and price decision, we must first study the link between price and marginal revenue.

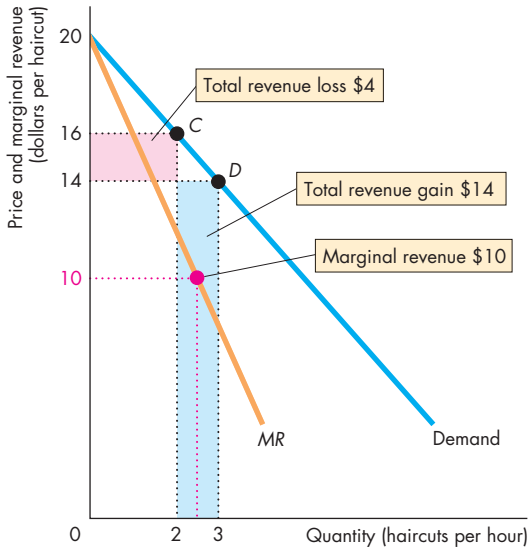
Price and Marginal Revenue

Because in a monopoly there is only one firm, the demand curve facing the firm is the market demand curve. Let's look at Bobbie's Barbershop, the sole supplier of haircuts in Cairo, Nebraska. The table in Fig. 13.2 shows the market demand schedule. At a price of $20, Bobbie sells no haircuts. The lower the price, the more haircuts per hour she can sell. For example, at $12, consumers demand 4 haircuts per hour (row *E*).

Total revenue (*TR*) is the price (*P*) multiplied by the quantity sold (*Q*). For example, in row *D*, Bobbie sells 3 haircuts at $14 each, so total revenue is $42. *Marginal revenue* (*MR*) is the change in total revenue (ΔTR) resulting from a one-unit increase in the quantity sold. For example, if the price falls from $16 (row *C*) to $14 (row *D*), the quantity sold increases from 2 to 3 haircuts. Total revenue increases from $32 to $42, so the change in total revenue is $10. Because the quantity sold increases by 1 haircut, marginal revenue equals the change in total revenue and is $10. Marginal revenue is placed between the two rows to emphasize that marginal revenue relates to the *change* in the quantity sold.

Figure 13.2 shows the market demand curve and marginal revenue curve (*MR*) and also illustrates the calculation we've just made. Notice that at each level of output, marginal revenue is less than price—the marginal revenue curve lies below the demand curve. Why is marginal revenue *less* than price? It is because when the price is lowered to sell one more unit, two opposing forces affect total revenue. The lower price results in a revenue loss, and the increased quantity sold results in a revenue gain. For example, at a price of $16, Bobbie sells 2 haircuts (point *C*). If she lowers the price to $14, she sells 3 haircuts and has a revenue gain of $14 on the third haircut. But she now receives only $14 on the first two haircuts—$2 less than before. As a result, she loses $4 of revenue on the first 2 haircuts. To calculate marginal revenue, she must deduct this amount from the revenue gain of $14. So her marginal revenue is $10, which is less than the price.

FIGURE 13.2 Demand and Marginal Revenue



	Price (*P*) (dollars per haircut)	Quantity demanded (*Q*) (haircuts per hour)	Total revenue (*TR* = *P* × *Q*) (dollars)	Marginal revenue (*MR* = $\Delta TR/\Delta Q$) (dollars per haircut)
A	20	0	0	 18
B	18	1	18	 14
C	**16**	**2**	**32**	..... **10**
D	**14**	**3**	**42**	 6
E	12	4	48	 2
F	10	5	50	

The table shows the demand schedule. Total revenue (*TR*) is price multiplied by quantity sold. For example, in row *C*, the price is $16 a haircut, Bobbie sells 2 haircuts, and total revenue is $32. Marginal revenue (*MR*) is the change in total revenue that results from a one-unit increase in the quantity sold. For example, when the price falls from $16 to $14 a haircut, the quantity sold increases from 2 to 3, an increase of 1 haircut, and total revenue increases by $10. Marginal revenue is $10. The demand curve and the marginal revenue curve, *MR*, are based on the numbers in the table and illustrate the calculation of marginal revenue when the price falls from $16 to $14 a haircut.

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Marginal Revenue and Elasticity

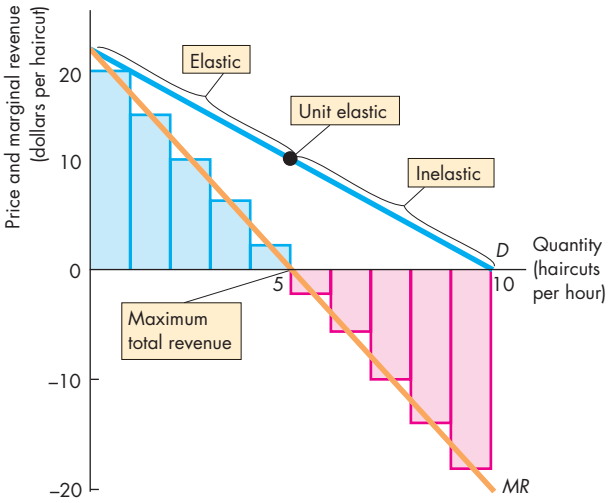
A single-price monopoly's marginal revenue is related to the *elasticity of demand* for its good. The demand for a good can be *elastic* (the elasticity is greater than 1), *inelastic* (the elasticity is less than 1), or *unit elastic* (the elasticity is equal to 1). Demand is *elastic* if a 1 percent fall in the price brings a greater than 1 percent increase in the quantity demanded. Demand is *inelastic* if a 1 percent fall in the price brings a less than 1 percent increase in the quantity demanded. Demand is *unit elastic* if a 1 percent fall in the price brings a 1 percent increase in the quantity demanded. (See Chapter 4, pp. 84–86.)

If demand is elastic, a fall in the price brings an increase in total revenue—the revenue gain from the increase in quantity sold outweighs the revenue loss from the lower price—and marginal revenue is *positive*. If demand is inelastic, a fall in the price brings a decrease in total revenue—the revenue gain from the increase in quantity sold is outweighed by the revenue loss from the lower price—and marginal revenue is *negative*. If demand is unit elastic, total revenue does not change—the revenue gain from the increase in the quantity sold offsets the revenue loss from the lower price—and marginal revenue is *zero*. (See Chapter 4, p. 88.)

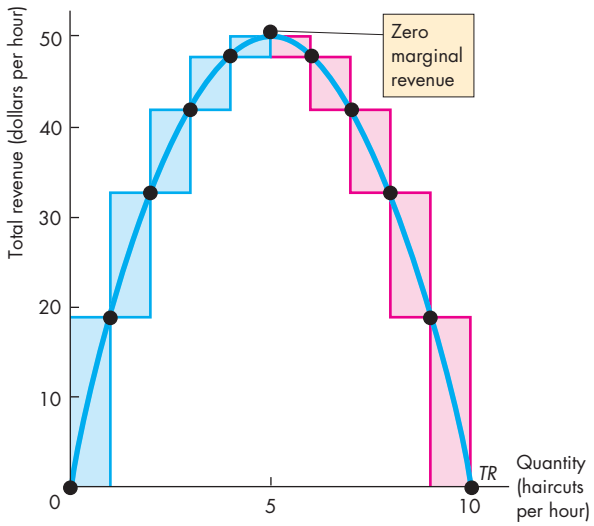
Figure 13.3 illustrates the relationship between marginal revenue, total revenue, and elasticity. As the price gradually falls from $20 to $10 a haircut, the quantity demanded increases from 0 to 5 haircuts an hour. Over this output range, marginal revenue is positive in part (a), total revenue increases in part (b), and the demand for haircuts is elastic. As the price falls from $10 to $0 a haircut, the quantity of haircuts demanded increases from 5 to 10 an hour. Over this output range, marginal revenue is negative in part (a), total revenue decreases in part (b), and the demand for haircuts is inelastic. When the price is $10 a haircut, marginal revenue is zero in part (a), total revenue is at a maximum in part (b), and the demand for haircuts is unit elastic.

In Monopoly, Demand Is Always Elastic The relationship between marginal revenue and elasticity of demand that you've just discovered implies that a profit-maximizing monopoly never produces an output in the inelastic range of the market demand curve. If it did so, it could charge a higher price, produce a smaller quantity, and increase its profit. Let's now look at a monopoly's price and output decision.

FIGURE 13.3 Marginal Revenue and Elasticity



(a) Demand and marginal revenue curves



(b) Total revenue curve

In part (a), the demand curve is *D* and the marginal revenue curve is *MR*. In part (b), the total revenue curve is *TR*. Over the range 0 to 5 haircuts an hour, a price cut increases total revenue, so marginal revenue is positive—as shown by the blue bars. Demand is elastic. Over the range 5 to 10 haircuts an hour, a price cut decreases total revenue, so marginal revenue is negative—as shown by the red bars. Demand is inelastic. At 5 haircuts an hour, total revenue is maximized and marginal revenue is zero. Demand is unit elastic.

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Price and Output Decision

A monopoly sets its price and output at the levels that maximize economic profit. To determine this price and output level, we need to study the behavior of both cost and revenue as output varies. A monopoly faces the same types of technology and cost constraints as a competitive firm, so its costs (total cost, average cost, and marginal cost) behave just like those of a firm in perfect competition. And a monopoly's revenues (total revenue, price, and marginal revenue) behave in the way we've just described.

Table 13.1 provides information about Bobbie's costs, revenues, and economic profit, and Fig. 13.4 shows the same information graphically.

Maximizing Economic Profit You can see in Table 13.1 and Fig. 13.4(a) that total cost (*TC*) and total revenue (*TR*) both rise as output increases, but *TC* rises at an increasing rate and *TR* rises at a decreasing rate. Economic profit, which equals *TR* minus *TC*, increases at small output levels, reaches a maximum, and then decreases. The maximum profit ($12) occurs when Bobbie sells 3 haircuts for $14 each. If she sells 2 haircuts for $16 each or 4 haircuts for $12 each, her economic profit will be only $8.

Marginal Revenue Equals Marginal Cost You can see Bobbie's marginal revenue (*MR*) and marginal cost (*MC*) in Table 13.1 and Fig. 13.4(b).

When Bobbie increases output from 2 to 3 haircuts, *MR* is $10 and *MC* is $6. *MR* exceeds *MC* by $4 and Bobbie's profit increases by that amount. If Bobbie increases output yet further, from 3 to 4 haircuts, *MR* is $6 and *MC* is $10. In this case, *MC* exceeds *MR* by $4, so profit decreases by that amount. When *MR* exceeds *MC*, profit increases if output increases. When *MC* exceeds *MR*, profit increases if output *decreases*. When *MC* equals *MR*, profit is maximized.

Figure 13.4(b) shows the maximum profit as price (on the demand curve *D*) minus average total cost (on the *ATC* curve) multiplied by the quantity produced—the blue rectangle.

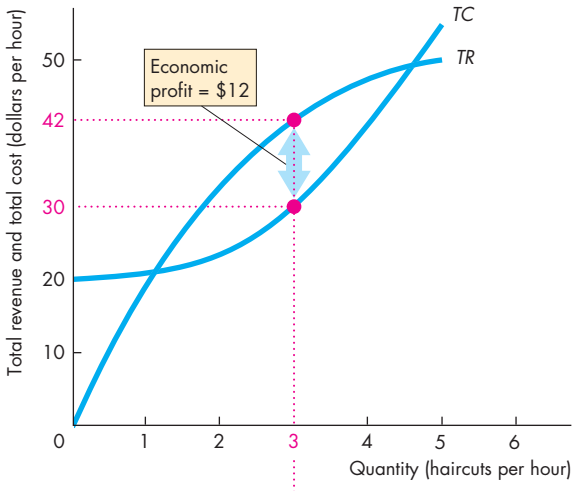
Maximum Price the Market Will Bear Unlike a firm in perfect competition, a monopoly influences the price of what it sells. But a monopoly doesn't set the price at the maximum *possible* price. At the maximum possible price, the firm would be able to sell only one unit of output, which in general is less than the profit-maximizing quantity. Rather, a monopoly produces the profit-maximizing quantity and sells that quantity for the highest price it can get.

TABLE 13.1 A Monopoly's Output and Price Decision

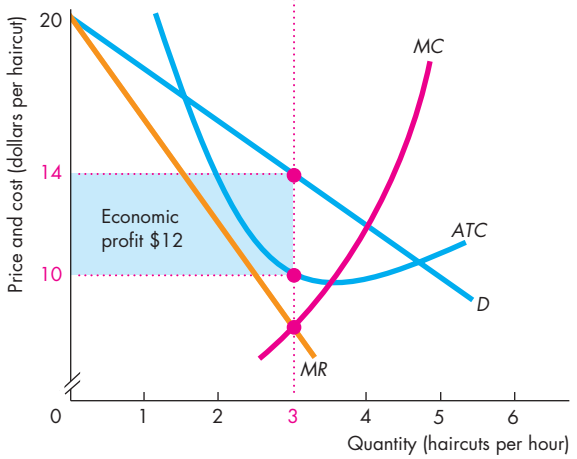
Price (*P*) (dollars per haircut)	Quantity demanded (*Q*) (haircuts per hour)	Total revenue (*TR* = *P* × *Q*) (dollars)	Marginal revenue (*MR* = Δ*TR*/Δ*Q*) (dollars per haircut)	Total cost (*TC*) (dollars)	Marginal cost (*MC* = Δ*TC*/Δ*Q*) (dollars per haircut)	Profit (*TR* − *TC*) (dollars)
20	0	0		20		−20
			18		1	
18	1	18		21		−3
			14		3	
16	2	32		24		+8
			10		6	
14	**3**	**42**		**30**		**+12**
			6		10	
12	4	48		40		+8
			2		15	
10	5	50		55		−5

This table gives the information needed to find the profit-maximizing output and price. Total revenue (*TR*) equals price multiplied by the quantity sold. Profit equals total revenue minus total cost (*TC*). Profit is maximized when 3 haircuts are sold at a price of $14 each. Total revenue is $42, total cost is $30, and economic profit is $12 ($42 − $30).

FIGURE 13.4 A Monopoly's Output and Price



(a) Total revenue and total cost curves



(b) Demand and marginal revenue and cost curves

In part (a), economic profit is the vertical distance equal to total revenue (*TR*) minus total cost (*TC*) and it is maximized at 3 haircuts an hour. In part (b), economic profit is maximized when marginal cost (*MC*) equals marginal revenue (*MR*). The profit-maximizing output is 3 haircuts an hour. The price is determined by the demand curve (*D*) and is $14 a haircut. The average total cost of a haircut is $10, so economic profit, the blue rectangle, is $12—the profit per haircut ($4) multiplied by 3 haircuts.

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All firms maximize profit by producing the output at which marginal revenue equals marginal cost. For a competitive firm, price equals marginal revenue, so price also equals marginal cost. For a monopoly, price exceeds marginal revenue, so price also exceeds marginal cost.

A monopoly charges a price that exceeds marginal cost, but does it always make an economic profit? In Fig. 13.4(b), Bobbie produces 3 haircuts an hour. Her average total cost is $10 (on the *ATC* curve) and her price is $14 (on the *D* curve), so her profit per haircut is $4 ($14 minus $10). Bobbie's economic profit is shown by the area of the blue rectangle, which equals the profit per haircut ($4) multiplied by the number of haircuts (3), for a total of $12.

If firms in a perfectly competitive market make a positive economic profit, new firms enter. That does *not* happen in monopoly. Barriers to entry prevent new firms from entering the market, so a monopoly can make a positive economic profit and might continue to do so indefinitely. Sometimes that economic profit is large, as in the international diamond business.

Bobbie makes a positive economic profit. But suppose that Bobbie's landlord increases the rent on her salon. If Bobbie pays an additional $12 an hour for rent, her fixed cost increases by $12 an hour. Her marginal cost and marginal revenue don't change, so her profit-maximizing output remains at 3 haircuts an hour. Her profit decreases by $12 an hour to zero. If Bobbie's salon rent increases by more than $12 an hour, she incurs an economic loss. If this situation were permanent, Bobbie would go out of business.

REVIEW QUIZ

1. What is the relationship between marginal cost and marginal revenue when a single-price monopoly maximizes profit?
2. How does a single-price monopoly determine the price it will charge its customers?
3. What is the relationship between price, marginal revenue, and marginal cost when a single-price monopoly is maximizing profit?
4. Why can a monopoly make a positive economic profit even in the long run?

You can work these questions in Study Plan 13.2 and get instant feedback. myeconlab

Single-Price Monopoly and Competition Compared

Imagine a market that is made up of many small firms operating in perfect competition. Then imagine that a single firm buys out all these small firms and creates a monopoly.

What will happen in this market? Will the price rise or fall? Will the quantity produced increase or decrease? Will economic profit increase or decrease? Will either the original competitive situation or the new monopoly situation be efficient?

These are the questions we're now going to answer. First, we look at the effects of monopoly on the price and quantity produced. Then we turn to the questions about efficiency.

Comparing Price and Output

Figure 13.5 shows the market we'll study. The market demand curve is *D*. The demand curve is the same regardless of how the industry is organized. But the supply side and the equilibrium are different in monopoly and competition. First, let's look at the case of perfect competition.

Perfect Competition Initially, with many small perfectly competitive firms in the market, the market supply curve is *S*. This supply curve is obtained by summing the supply curves of all the individual firms in the market.

In perfect competition, equilibrium occurs where the supply curve and the demand curve intersect. The price is P_C, and the quantity produced by the industry is Q_C. Each firm takes the price P_C and maximizes its profit by producing the output at which its own marginal cost equals the price. Because each firm is a small part of the total industry, there is no incentive for any firm to try to manipulate the price by varying its output.

Monopoly Now suppose that this industry is taken over by a single firm. Consumers do not change, so the market demand curve remains the same as in the case of perfect competition. But now the monopoly recognizes this demand curve as a constraint on the price at which it can sell its output. The monopoly's marginal revenue curve is *MR*.

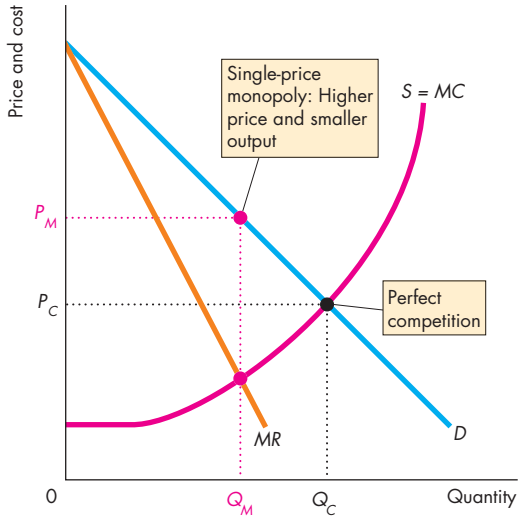
The monopoly maximizes profit by producing the quantity at which marginal revenue equals marginal cost. To find the monopoly's marginal cost curve, first recall that in perfect competition, the market supply curve is the sum of the supply curves of the firms in the industry. Also recall that each firm's supply curve is its marginal cost curve (see Chapter 12, p. 279). So when the market is taken over by a single firm, the competitive market's supply curve becomes the monopoly's marginal cost curve. To remind you of this fact, the supply curve is also labeled *MC*.

The output at which marginal revenue equals marginal cost is Q_M. This output is smaller than the competitive output Q_C. And the monopoly charges the price P_M, which is higher than P_C. We have established that

> Compared to a perfectly competitive market, a single-price monopoly produces a smaller output and charges a higher price.

We've seen how the output and price of a monopoly compare with those in a competitive market. Let's now compare the efficiency of the two types of market.

FIGURE 13.5 Monopoly's Smaller Output and Higher Price



A competitive market produces the quantity Q_C at price P_C. A single-price monopoly produces the quantity Q_M at which marginal revenue equals marginal cost and sells that quantity for the price P_M. Compared to perfect competition, a single-price monopoly produces a smaller output and charges a higher price.

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Efficiency Comparison

Perfect competition (with no externalities) is efficient. Figure 13.6(a) illustrates the efficiency of perfect competition and serves as a benchmark against which to measure the inefficiency of monopoly. Along the demand curve and marginal social benefit curve ($D = MSB$), consumers are efficient. Along the supply curve and marginal social cost curve ($S = MSC$), producers are efficient. In competitive equilibrium, the price is P_C, the quantity is Q_C, and marginal social benefit equals marginal social cost.

Consumer surplus is the green triangle under the demand curve and above the equilibrium price (see Chapter 5, p. 109). *Producer surplus* is the blue area above the supply curve and below the equilibrium price (see Chapter 5, p. 111). Total surplus (consumer surplus and producer surplus) is maximized.

Also, in long-run competitive equilibrium, entry and exit ensure that each firm produces its output at the minimum possible long-run average cost.

To summarize: At the competitive equilibrium, marginal social benefit equals marginal social cost; total surplus is maximized; firms produce at the lowest possible long-run average cost; and resource use is efficient.

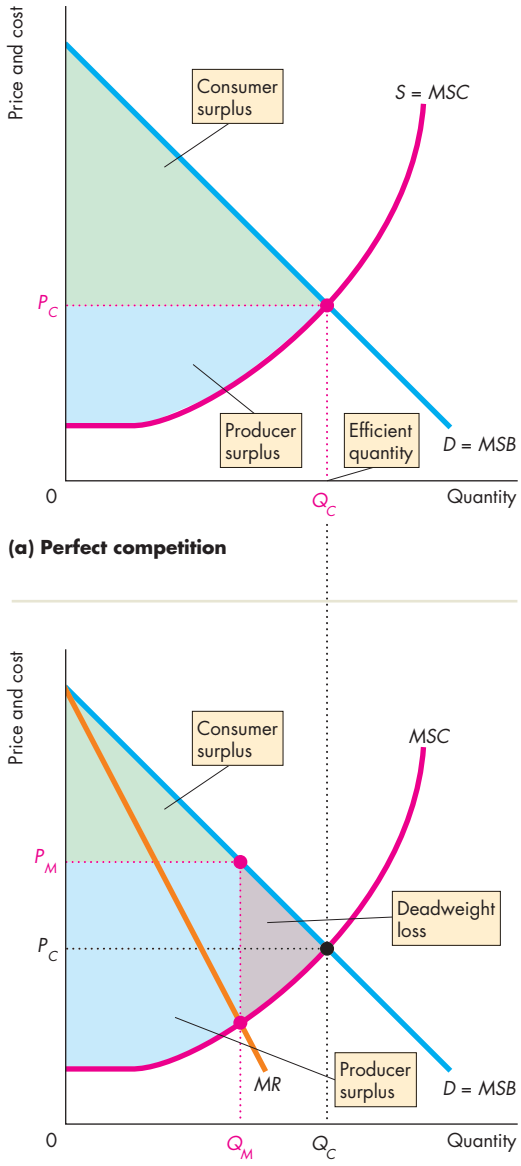
Figure 13.6(b) illustrates the inefficiency of monopoly and the sources of that inefficiency. A monopoly produces Q_M and sells its output for P_M. The smaller output and higher price drive a wedge between marginal social benefit and marginal social cost and create a *deadweight loss*. The gray triangle shows the deadweight loss and its magnitude is a measure of the inefficiency of monopoly.

Consumer surplus shrinks for two reasons. First, consumers lose by having to pay more for the good. This loss to consumers is a gain for monopoly and increases the producer surplus. Second, consumers lose by getting less of the good, and this loss is part of the deadweight loss.

Although the monopoly gains from a higher price, it loses some producer surplus because it produces a smaller output. That loss is another part of the deadweight loss.

A monopoly produces a smaller output than perfect competition and faces no competition, so it does not produce at the lowest possible long-run average cost. As a result, monopoly damages the consumer interest in three ways: A monopoly produces less, increases the cost of production, and raises the price by more than the increased cost of production.

FIGURE 13.6 Inefficiency of Monopoly



In perfect competition in part (a), output is Q_C and the price is P_C. Marginal social benefit (*MSB*) equals marginal social cost (*MSC*); total surplus, the sum of consumer surplus (the green triangle) and producer surplus (the blue area), is maximized; and in the long run, firms produce at the lowest possible average cost. Monopoly in part (b) produces Q_M and raises the price to P_M. Consumer surplus shrinks, the monopoly gains, and a deadweight loss (the gray triangle) arises.

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Redistribution of Surpluses

You've seen that monopoly is inefficient because marginal social benefit exceeds marginal social cost and there is deadweight loss—a social loss. But monopoly also brings a *redistribution* of surpluses.

Some of the lost consumer surplus goes to the monopoly. In Fig. 13.6, the monopoly takes the difference between the higher price, P_M, and the competitive price, P_C, on the quantity sold, Q_M. So the monopoly takes that part of the consumer surplus. This portion of the loss of consumer surplus is not a loss to society. It is redistribution from consumers to the monopoly producer.

Rent Seeking

You've seen that monopoly creates a deadweight loss and is inefficient. But the social cost of monopoly can exceed the deadweight loss because of an activity called rent seeking. Any surplus—consumer surplus, producer surplus, or economic profit—is called **economic rent**. The pursuit of wealth by capturing economic rent is called **rent seeking**.

You've seen that a monopoly makes its economic profit by diverting part of consumer surplus to itself—by converting consumer surplus into economic profit. So the pursuit of economic profit by a monopoly is rent seeking. It is the attempt to capture consumer surplus.

Rent seekers pursue their goals in two main ways. They might

- Buy a monopoly
- Create a monopoly

Buy a Monopoly To rent seek by buying a monopoly, a person searches for a monopoly that is for sale at a lower price than the monopoly's economic profit. Trading of taxicab licenses is an example of this type of rent seeking. In some cities, taxicabs are regulated. The city restricts both the fares and the number of taxis that can operate so that operating a taxi results in economic profit. A person who wants to operate a taxi must buy a license from someone who already has one. People rationally devote time and effort to seeking out profitable monopoly businesses to buy. In the process, they use up scarce resources that could otherwise have been used to produce goods and services. The value of this lost production is part of the social cost of monopoly. The amount paid for a monopoly is not a social cost because the payment is just a transfer of an existing producer surplus from the buyer to the seller.

Create a Monopoly Rent seeking by creating a monopoly is mainly a political activity. It takes the form of lobbying and trying to influence the political process. Such influence might be sought by making campaign contributions in exchange for legislative support or by indirectly seeking to influence political outcomes through publicity in the media or more direct contacts with politicians and bureaucrats. An example of a monopoly created in this way is the government-imposed restrictions on the quantities of textiles that may be imported into the United States. Another is a regulation that limits the number of oranges that may be sold in the United States. These are regulations that restrict output and increase price.

This type of rent seeking is a costly activity that uses up scarce resources. Taken together, firms spend billions of dollars lobbying Congress, state legislators, and local officials in the pursuit of licenses and laws that create barriers to entry and establish a monopoly.

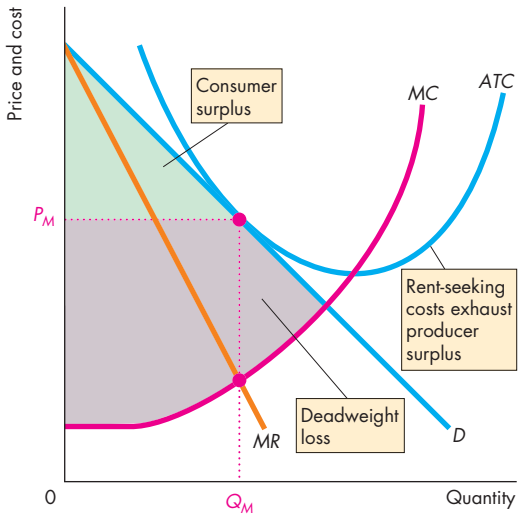
Rent-Seeking Equilibrium

Barriers to entry create monopoly. But there is no barrier to entry into rent seeking. Rent seeking is like perfect competition. If an economic profit is available, a new rent seeker will try to get some of it. And competition among rent seekers pushes up the price that must be paid for a monopoly, to the point at which the rent seeker makes zero economic profit by operating the monopoly. For example, competition for the right to operate a taxi in New York City leads to a price of more than $100,000 for a taxi license, which is sufficiently high to eliminate the economic profit made by a taxi operator.

Figure 13.7 shows a rent-seeking equilibrium. The cost of rent seeking is a fixed cost that must be added to a monopoly's other costs. Rent seeking and rent-seeking costs increase to the point at which no economic profit is made. The average total cost curve, which includes the fixed cost of rent seeking, shifts upward until it just touches the demand curve. Economic profit is zero. It has been lost in rent seeking.

Consumer surplus is unaffected, but the deadweight loss from monopoly is larger. The deadweight loss now includes the original deadweight loss triangle plus the lost producer surplus, shown by the enlarged gray area in Fig. 13.7.

FIGURE 13.7 Rent-Seeking Equilibrium



With competitive rent seeking, a monopoly uses all its economic profit to maintain its monopoly. The firm's rent-seeking costs are fixed costs. They add to total fixed cost and to average total cost. The *ATC* curve shifts upward until, at the profit-maximizing price, the firm breaks even.

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REVIEW QUIZ

1. Why does a single-price monopoly produce a smaller output and charge more than the price that would prevail if the market were perfectly competitive?
2. How does a monopoly transfer consumer surplus to itself?
3. Why is a single-price monopoly inefficient?
4. What is rent seeking and how does it influence the inefficiency of monopoly?

You can work these questions in Study Plan 13.3 and get instant feedback. myeconlab

So far, we've considered only a single-price monopoly. But many monopolies do not operate with a single price. Instead, they price discriminate. Let's now see how a price-discriminating monopoly works.

Price Discrimination

You encounter *price discrimination*—selling a good or service at a number of different prices—when you travel, go to the movies, get your hair cut, buy pizza, or visit an art museum or theme park. Many of the firms that price discriminate are not monopolies, but monopolies price discriminate when they can do so.

To be able to price discriminate, a firm must be able to identify and separate different buyer types and sell a product that cannot be resold.

Not all price *differences* are price *discrimination*. Some goods that are similar have different prices because they have different costs of production. For example, the price per ounce of cereal is lower if you buy your cereal in a big box than if you buy individual serving size boxes. This price difference reflects a cost difference and is not price discrimination.

At first sight, price discrimination appears to be inconsistent with profit maximization. Why would a movie theater allow children to see movies at a discount? Why would a hairdresser charge students and senior citizens less? Aren't these firms losing profit by being nice to their customers?

Capturing Consumer Surplus

Price discrimination captures consumer surplus and converts it into economic profit. It does so by getting buyers to pay a price as close as possible to the maximum willingness to pay.

Firms price discriminate in two broad ways. They discriminate:

- Among groups of buyers
- Among units of a good

Discriminating Among Groups of Buyers People differ in the value they place on a good—their marginal benefit and willingness to pay. Some of these differences are correlated with features such as age, employment status, and other easily distinguished characteristics. When such a correlation is present, firms can profit by price discriminating among the different groups of buyers.

For example, a face-to-face sales meeting with a customer might bring a large and profitable order. So for salespeople and other business travelers, the marginal benefit from a trip is large and the price that such a traveler is willing to pay for a trip is high. In

contrast, for a vacation traveler, any of several different trips and even no vacation trip are options. So for vacation travelers, the marginal benefit of a trip is small and the price that such a traveler is willing to pay for a trip is low. Because business travelers are willing to pay more than vacation travelers are, it is possible for an airline to profit by price discriminating between these two groups.

Discriminating Among Units of a Good Everyone experiences diminishing marginal benefit and has a downward-sloping demand curve. For this reason, if all the units of the good are sold for a single price, buyers end up with a consumer surplus equal to the value they get from each unit of the good minus the price paid for it.

A firm that price discriminates by charging a buyer one price for a single item and a lower price for a second or third item can capture some of the consumer surplus. Buy one pizza and get a second one free (or for a low price) is an example of this type of price discrimination.

(Note that some discounts for bulk arise from lower costs of production for greater bulk. In these cases, such discounts are not price discrimination.)

Let's see how price discriminating increases economic profit.

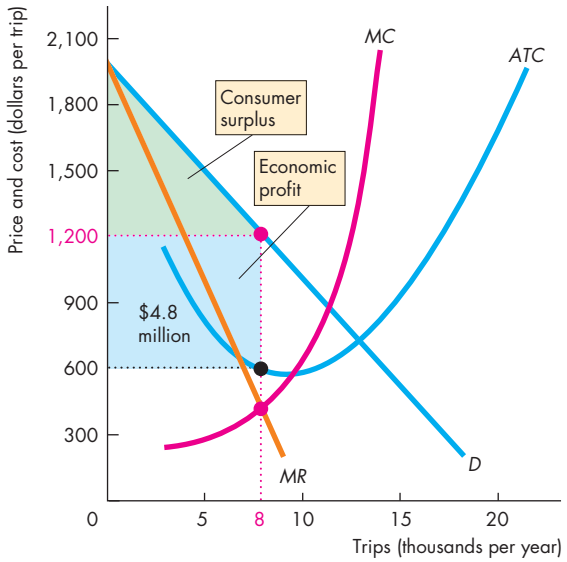
Profiting by Price Discriminating

Global Airlines has a monopoly on an exotic route. Figure 13.8 shows the market demand curve (*D*) for travel on this route. It also shows Global Airline's marginal revenue curve (*MR*), marginal cost curve (*MC*), and average total cost curve (*ATC*).

As a single-price monopoly, Global maximizes profit by producing the quantity at which *MR* equals *MC*, which is 8,000 trips a year, and charging $1,200 per trip. At this quantity, average total cost is $600 per trip, economic profit is $600 a trip, and Global's economic profit is $4.8 million a year, shown by the blue rectangle. Global's customers enjoy a consumer surplus shown by the green triangle.

Global is struck by the fact that many of its customers are business travelers, and it suspects they are willing to pay more than $1,200 a trip. Global does some market research, which reveals that some business travelers are willing to pay as much as $1,800 a trip. Also, these customers frequently change their travel plans at the last minute. Another group of business travelers is willing to pay $1,600. These

FIGURE 13.8 A Single Price of Air Travel



Global Airlines has a monopoly on an air route. The market demand curve is *D*. Global Airline's marginal revenue curve is *MR*, its marginal cost curve is *MC*, and its average total cost curve is *ATC*. As a single-price monopoly, Global maximizes profit by selling 8,000 trips a year at $1,200 a trip. Its profit is $4.8 million a year—the blue rectangle. Global's customers enjoy a consumer surplus—the green triangle.

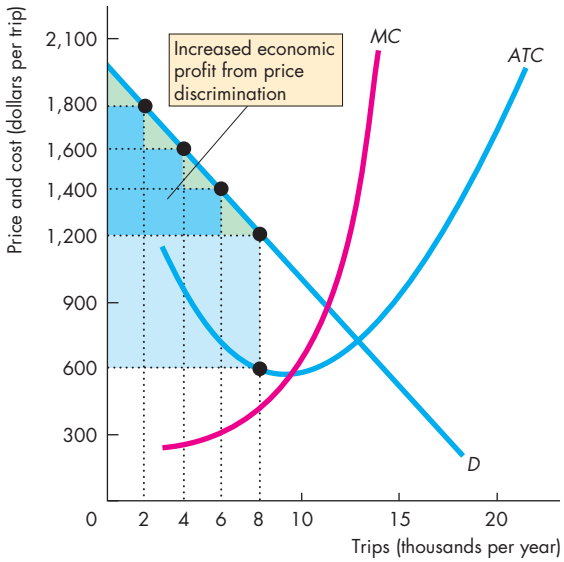
myeconlab animation

customers know a week ahead when they will travel, and they never want to stay over a weekend. Yet another group would pay up to $1,400. These travelers know two weeks ahead when they will travel and also don't want to stay away over a weekend.

Global announces a new fare schedule: no restrictions, $1,800; 7-day advance purchase, nonrefundable, $1,600; 14-day advance purchase, nonrefundable, $1,400; 14-day advance purchase, must stay over a weekend, $1,200.

Figure 13.9 shows the outcome with this new fare structure and also shows why Global is pleased with its new fares. It sells 2,000 seats at each of its four prices. Global's economic profit increases by the dark blue steps. Its economic profit is now its original $4.8 million a year plus an additional $2.4 million from its new higher fares. Consumer surplus shrinks to the sum of the smaller green areas.

FIGURE 13.9 Price Discrimination



Global revises its fare structure: no restrictions at $1,800, 7-day advance purchase at $1,600, 14-day advance purchase at $1,400, and must stay over a weekend at $1,200. Global sells 2,000 trips at each of its four new fares. Its economic profit increases by $2.4 million a year to $7.2 million a year, which is shown by the original blue rectangle plus the dark blue steps. Global's customers' consumer surplus shrinks.

myeconlab animation

Perfect Price Discrimination

Perfect price discrimination occurs if a firm is able to sell each unit of output for the highest price anyone is willing to pay for it. In such a case, the entire consumer surplus is eliminated and captured by the producer. To practice perfect price discrimination, a firm must be creative and come up with a host of prices and special conditions, each one of which appeals to a tiny segment of the market.

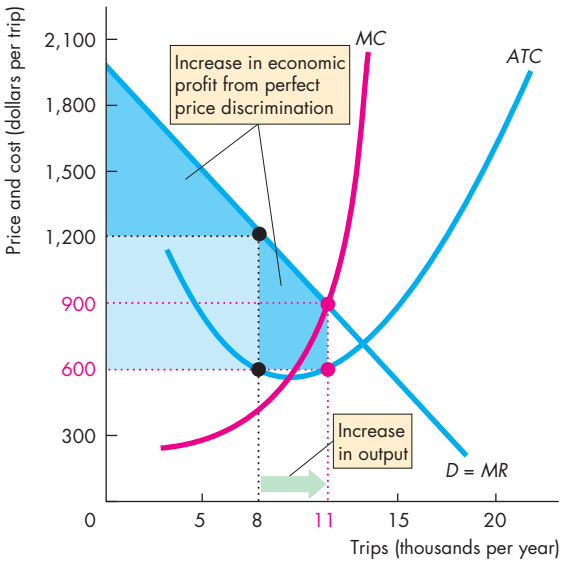
With perfect price discrimination, something special happens to marginal revenue—the market demand curve becomes the marginal revenue curve. The reason is that when the price is cut to sell a larger quantity, the firm sells only the marginal unit at the lower price. All the other units continue to be sold for the highest price that each buyer is willing to pay. So for the perfect price discriminator, marginal revenue *equals* price and the demand curve becomes the marginal revenue curve.

With marginal revenue equal to price, Global can obtain even greater profit by increasing output up to the point at which price (and marginal revenue) is equal to marginal cost.

So Global seeks new travelers who will not pay as much as $1,200 a trip but who will pay more than marginal cost. Global offers a variety of vacation specials at different low fares that appeal only to new travelers. Existing customers continue to pay the higher fares. With all these fares and specials, Global increases sales, extracts the entire consumer surplus, and maximizes economic profit.

Figure 13.10 shows the outcome with perfect price discrimination. The fares paid by the original travelers extract the entire consumer surplus from this group. The new fares between $900 and $1,200 attract 3,000 additional travelers and take their entire consumer surplus also. Global now makes an economic profit of more than $9 million.

FIGURE 13.10 Perfect Price Discrimination



Dozens of fares discriminate among many different types of business traveler, and many new low fares with restrictions appeal to vacation travelers. With perfect price discrimination, the market demand curve becomes Global's marginal revenue curve. Economic profit is maximized when the lowest price equals marginal cost. Global sells 11,000 trips and makes an economic profit of more than $9 million a year.

myeconlab animation

Efficiency and Rent Seeking with Price Discrimination

With perfect price discrimination, output increases to the point at which price equals marginal cost—where the marginal cost curve intersects the market demand curve (see Fig. 13.10). This output is identical to that of perfect competition. Perfect price discrimination pushes consumer surplus to zero but increases the monopoly's producer surplus to equal the total surplus in perfect competition. With perfect price discrimination, deadweight loss is zero, so perfect price discrimination achieves efficiency.

The more perfectly the monopoly can price discriminate, the closer its output is to the competitive output and the more efficient is the outcome.

But there are two differences between perfect competition and perfect price discrimination. First, the distribution of the total surplus is different. It is shared by consumers and producers in perfect competition, while the producer gets it all with perfect price discrimination. Second, because the producer grabs all the surplus, rent seeking becomes profitable.

People use resources in pursuit of economic rent, and the bigger the rents, the more resources get used in pursuing them. With free entry into rent seeking, the long-run equilibrium outcome is that rent seekers use up the entire producer surplus.

Real-world airlines are as creative as Global Airlines, as you can see in the cartoon!

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

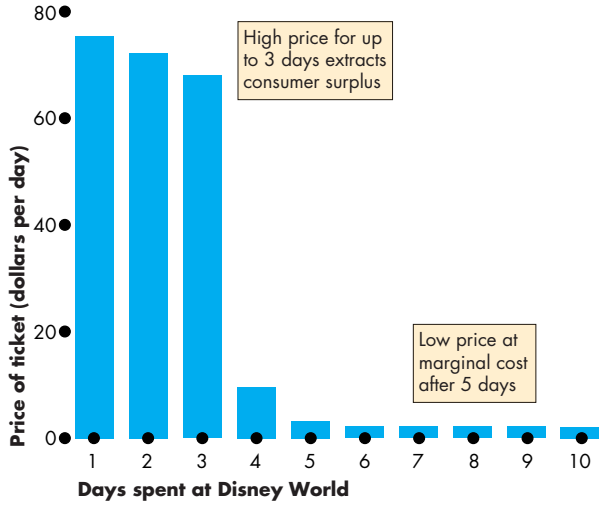
From William Hamilton, "Voodoo Economics," © 1992 by The Chronicle Publishing Company, p.3. Reprinted with permission of Chronicle Books.

Economics in Action

Attempting Perfect Price Discrimination

If you want to spend a day at Disney World in Orlando, it will cost you $75.62. You can spend a second (consecutive) day for an extra $72.42. A third day will cost you $68.17. But for a fourth day, you'll pay only $9.59 and for a fifth day, $3.20. For more days all the way up to 10, you'll pay only $2.12 a day.

The Disney Corporation hopes that it has read your willingness to pay correctly and not left you with too much consumer surplus. Disney figures though that after three days, your marginal benefit is crashing.



Disney's Ticket Prices

REVIEW QUIZ

1. What is price discrimination and how is it used to increase a monopoly's profit?
2. Explain how consumer surplus changes when a monopoly price discriminates.
3. Explain how consumer surplus, economic profit, and output change when a monopoly perfectly price discriminates.
4. What are some of the ways that real-world airlines price discriminate?

You can work these questions in Study Plan 13.4 and get instant feedback. myeconlab

You've seen that monopoly is profitable for the monopoly but costly for consumers. It results in inefficiency. Because of these features of monopoly, it is subject to policy debate and regulation. We'll now study the key monopoly policy issues.

Monopoly Regulation

Natural monopoly presents a dilemma. With economies of scale, it produces at the lowest possible cost. But with market power, it has an incentive to raise the price above the competitive price and produce too little—to operate in the self-interest of the monopolist and not in the social interest.

Regulation—rules administered by a government agency to influence prices, quantities, entry, and other aspects of economic activity in a firm or industry—is a possible solution to this dilemma.

To implement regulation, the government establishes agencies to oversee and enforce the rules. For example, the Surface Transportation Board regulates prices on interstate railroads, some trucking and bus lines, and water and oil pipelines. By the 1970s, almost a quarter of the nation's output was produced by regulated industries (far more than just natural monopolies) and a process of deregulation began.

Deregulation is the process of removing regulation of prices, quantities, entry, and other aspects of economic activity in a firm or industry. During the past 30 years, deregulation has occurred in domestic air transportation, telephone service, interstate trucking, and banking and financial services. Cable TV was deregulated in 1984, re-regulated in 1992, and deregulated again in 1996.

Regulation is a possible solution to the dilemma presented by natural monopoly but not a guaranteed solution. There are two theories about how regulation actually works: *the social interest theory* and the *capture theory*.

The **social interest theory** is that the political and regulatory process relentlessly seeks out inefficiency and introduces regulation that eliminates deadweight loss and allocates resources efficiently.

The **capture theory** is that regulation serves the self-interest of the producer, who captures the regulator and maximizes economic profit. Regulation that benefits the producer but creates a deadweight loss gets adopted because the producer's gain is large and visible while each individual consumer's loss is small and invisible. No individual consumer has an incentive to oppose the regulation but the producer has a big incentive to lobby for it.

We're going to examine efficient regulation that serves the social interest and see why it is not a simple matter to design and implement such regulation.

Efficient Regulation of a Natural Monopoly

A cable TV company is a *natural monopoly*—it can supply the entire market at a lower price than two or more competing firms can. Cox Communications, based in Atlanta, provides cable TV to households in 20 states. The firm has invested heavily in satellite receiving dishes, cables, and control equipment and so has large fixed costs. These fixed costs are part of the firm's average total cost. Its average total cost decreases as the number of households served increases because the fixed cost is spread over a larger number of households.

Unregulated, Cox produces the quantity that maximizes profit. Like all single-price monopolies, the profit-maximizing quantity is less than the efficient quantity, and underproduction results in a deadweight loss.

How can Cox be regulated to produce the efficient quantity of cable TV service? The answer is by being regulated to set its price equal to marginal cost, known as the **marginal cost pricing rule**. The quantity demanded at a price equal to marginal cost is the efficient quantity—the quantity at which marginal benefit equals marginal cost.

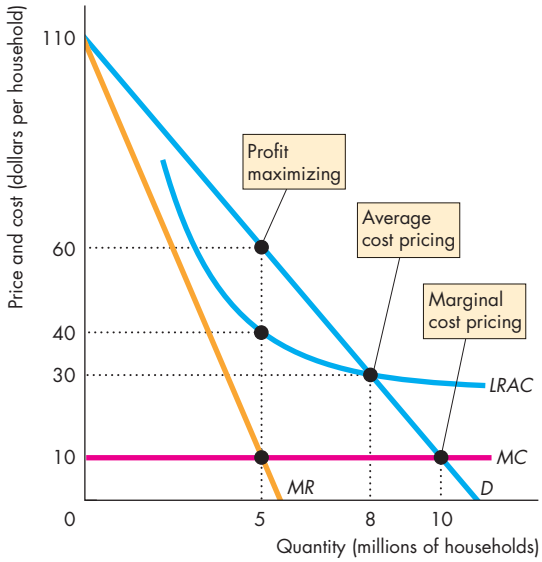
Figure 13.11 illustrates the marginal cost pricing rule. The demand curve for cable TV is *D*. Cox's marginal cost curve is *MC*. That marginal cost curve is (assumed to be) horizontal at $10 per household per month—that is, the cost of providing each additional household with a month of cable programming is $10. The efficient outcome occurs if the price is regulated at $10 per household per month with 10 million households served.

But there is a problem: At the efficient output, average total cost exceeds marginal cost, so a firm that uses marginal cost pricing incurs an economic loss. A cable TV company that is required to use a marginal cost pricing rule will not stay in business for long. How can the firm cover its costs and, at the same time, obey a marginal cost pricing rule?

There are two possible ways of enabling the firm to cover its costs: price discrimination and a two-part price (called a *two-part tariff*).

For example, Verizon offers plans at a fixed monthly price that give access to the cell-phone network and unlimited free calls. The price of a call (zero) equals Verizon's marginal cost of a call. Similarly, a cable TV operator can charge a one-time connection fee that covers its fixed cost and then charge a monthly fee equal to marginal cost.

FIGURE 13.11 Regulating a Natural Monopoly



A natural monopoly cable TV supplier faces the demand curve *D*. The firm's marginal cost is constant at $10 per household per month, as shown by the curve labeled *MC*. The long-run average cost curve is *LRAC*.

Unregulated, as a profit-maximizer, the firm serves 5 million households at a price of $60 a month. An efficient marginal cost pricing rule sets the price at $10 a month. The monopoly serves 10 million households and incurs an economic loss. A second-best average cost pricing rule sets the price at $30 a month. The monopoly serves 8 million households and earns zero economic profit.

myeconlab animation

Second-Best Regulation of a Natural Monopoly

A natural monopoly cannot always be regulated to achieve an efficient outcome. Two possible ways of enabling a regulated monopoly to avoid an economic loss are

- Average cost pricing
- Government subsidy

Average Cost Pricing The **average cost pricing rule** sets price equal to average total cost. With this rule the firm produces the quantity at which the average total cost curve cuts the demand curve. This rule results in the firm making zero economic profit—breaking even. But because for a natural monopoly average total cost exceeds marginal cost, the quantity produced is less than the efficient quantity and a deadweight loss arises.

Figure 13.11 illustrates the average cost pricing rule. The price is $30 a month and 8 million households get cable TV.

Government Subsidy A government subsidy is a direct payment to the firm equal to its economic loss. To pay a subsidy, the government must raise the revenue by taxing some other activity. You saw in Chapter 6 that taxes themselves generate deadweight loss.

And the Second-Best Is ... Which is the better option, average cost pricing or marginal cost pricing with a government subsidy? The answer depends on the relative magnitudes of the two deadweight losses. Average cost pricing generates a deadweight loss in the market served by the natural monopoly. A subsidy generates deadweight losses in the markets for the items that are taxed to pay for the subsidy. The smaller deadweight loss is the second-best solution to regulating a natural monopoly. Making this calculation in practice is too difficult and average cost pricing is generally preferred to a subsidy.

Implementing average cost pricing presents the regulator with a challenge because it is not possible to be sure what a firm's costs are. So regulators use one of two practical rules:

- Rate of return regulation
- Price cap regulation

Rate of Return Regulation Under **rate of return regulation**, a firm must justify its price by showing that its return on capital doesn't exceed a specified target rate. This type of regulation can end up serving the self-interest of the firm rather than the social interest. The firm's managers have an incentive to inflate costs by spending on items such as private jets, free baseball tickets (disguised as public relations expenses), and lavish entertainment. Managers also have an incentive to use more capital than the efficient amount. The rate of return on capital is regulated but not the total return on capital, and the greater the amount of capital, the greater is the total return.

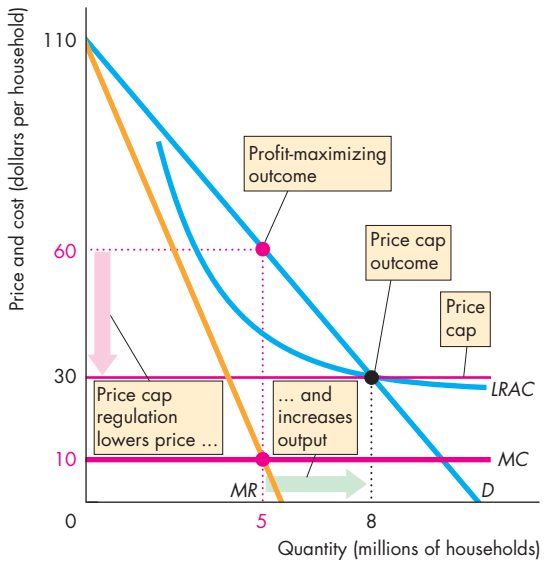
Price Cap Regulation For the reason that we've just examined, rate of return regulation is increasingly being replaced by price cap regulation. A **price cap regulation** is a price ceiling—a rule that specifies the highest price the firm is permitted to set. This type of regulation gives a firm an incentive to operate efficiently and keep costs under control. Price cap regulation has become common for the electricity and telecommunications industries and is replacing rate of return regulation.

To see how a price cap works, let's suppose that the cable TV operator is subject to this type of regulation. Figure 13.12 shows that without regulation, the firm maximizes profit by serving 5 million households and charging a price of $60 a month. If a price cap is set at $30 a month, the firm is permitted to sell any quantity it chooses at that price or at a lower price. At 5 million households, the firm now incurs an economic loss. It can decrease the loss by increasing output to 8 million households. To increase output above 8 million households, the firm would have to lower the price and again it would incur a loss. So the profit-maximizing quantity is 8 million households—the same as with average cost pricing.

Notice that a price cap lowers the price and increases output. This outcome is in sharp contrast to the effect of a price ceiling in a competitive market that you studied in Chapter 6 (pp. 128–130). The reason is that in a monopoly, the unregulated equilibrium output is less than the competitive equilibrium output, and the price cap regulation replicates the conditions of a competitive market.

In Fig. 13.12, the price cap delivers average cost pricing. In practice, the regulator might set the cap too high. For this reason, price cap regulation is often combined with *earnings sharing regulation*—a regulation that requires firms to make refunds to customers when profits rise above a target level.

FIGURE 13.12 Price Cap Regulation



A natural monopoly cable TV supplier faces the demand curve *D*. The firm's marginal cost is constant at $10 per household per month, as shown by the curve labeled *MC*. The long-run average cost curve is *LRAC*.

Unregulated, the firm serves 5 million households at a price of $60 a month. A price cap sets the maximum price at $30 a month. The firm has an incentive to minimize cost and serve the quantity of households that demand service at the price cap. The price cap regulation lowers the price and increases the quantity.

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REVIEW QUIZ

1 What is the pricing rule that achieves an efficient outcome for a regulated monopoly? What is the problem with this rule?
2 What is the average cost pricing rule? Why is it not an efficient way of regulating monopoly?
3 What is a price cap? Why might it be a more effective way of regulating monopoly than rate of return regulation?
4 Compare the consumer surplus, producer surplus, and deadweight loss that arise from average cost pricing with those that arise from profit-maximization pricing and marginal cost pricing.

You can work these questions in Study Plan 13.5 and get instant feedback. myeconlab

You've now completed your study of monopoly. *Reading Between the Lines* on pp. 316–317 looks at Google's dominant position in the market for Internet search advertising.

In the next chapter, we study markets that lie between the extremes of perfect competition and monopoly and that blend elements of the two.