Google and Microsoft are big players in the markets for Web search and advertising and for computer operating systems, markets that are obviously not perfectly competitive. In this chapter, we study markets dominated by one big firm. We call such a market monopoly. We study the performance and the efficiency of monopoly and compare it with perfect competition.

In Economics in the News at the end of the chapter, we look at the remarkable success of Google and ask whether Google is serving the social interest or violating Canadian, U.S., and European antitrust laws.

After studying this chapter, you will be able to:

◆ Explain how monopoly arises
◆ 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
Monopoly and How It Arises

A **monopoly** is a market with a single firm that produces a good or service with no close substitutes and that is protected by a barrier that prevents other firms from entering that market.

**How Monopoly Arises**

Monopoly arises for two key reasons:

- No close substitutes
- Barrier to entry

**No Close Substitutes** 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 substitutes. Tap water and bottled water are close substitutes for drinking, but tap water has no effective substitutes 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**. There are three types of barrier to entry:

- 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.

Figure 13.1 illustrates a natural monopoly. 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. At a price of 5 cents per kilowatt-hour, the quantity demanded is 4 million kilowatt-hours and one firm can produce that quantity at a cost of 5 cents per kilowatt-hour. If two firms shared the market equally, it would cost each of them 10 cents per kilowatt-hour to produce a total of 4 million kilowatt-hours.

**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 licence, patent, or copyright. A **public franchise** is an exclusive right granted to a firm to supply a good or service. An example is Canada Post, which has the exclusive right to deliver residential mail. A **government licence** 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 Canada, 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 licence. 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 three big natural monopolies. These firms have large plant costs but almost zero marginal cost, so they experience economies of scale.

These firms are Microsoft, Google, and Facebook. The operating system of 87 percent of personal computers is some version of Windows; Google performs 67 percent of Internet searches and 58 percent of Web browsing is done using Chrome; and Facebook has a 50 percent share of the social media market.

These same information-age technologies have also destroyed monopolies. FedEx, Purolator, the fax machine, and e-mail have weakened the monopoly of Canada Post; and the satellite dish has weakened the monopoly of cable television companies.

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 practises 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 favour. 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.

Work these questions in Study Plan 13.1 and get instant feedback. Do a Key Terms Quiz. 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 Trout River, Newfoundland. 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$) is the change in total revenue ($\Delta TR$) 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 on the original units sold and a revenue gain on the additional quantity sold. For example, at a price of $16 a haircut, Bobbie sells 2 haircuts (point C). If she cuts 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 each of the first 2 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 marginal revenue is $10, which is less than the price.
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.
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 behaviour 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 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>
<thead>
<tr>
<th>Price (P)</th>
<th>Quantity demanded (Q)</th>
<th>Total revenue (TR = P × Q)</th>
<th>Marginal revenue (MR = ∆TR/∆Q)</th>
<th>Total cost (TC)</th>
<th>Marginal cost (MC = ∆TC/∆Q)</th>
<th>Profit (TR − TC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>20</td>
<td>−20</td>
<td>−20</td>
</tr>
<tr>
<td>18</td>
<td>1</td>
<td>18</td>
<td>14</td>
<td>21</td>
<td>−3</td>
<td>−3</td>
</tr>
<tr>
<td>16</td>
<td>2</td>
<td>32</td>
<td>10</td>
<td>24</td>
<td>+8</td>
<td>+8</td>
</tr>
<tr>
<td>14</td>
<td>3</td>
<td>42</td>
<td>6</td>
<td>30</td>
<td>+12</td>
<td>+12</td>
</tr>
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<td>4</td>
<td>48</td>
<td>2</td>
<td>40</td>
<td>+8</td>
<td>+8</td>
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<tr>
<td>10</td>
<td>5</td>
<td>50</td>
<td></td>
<td>55</td>
<td>−5</td>
<td>−5</td>
</tr>
</tbody>
</table>

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).
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.

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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.

MyEconLab Animation and Draw Graph

WORK these questions in Study Plan 13.2 and get instant feedback.
CHAPTER 13 Monopoly

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. 277).

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 labelled $MC$.

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.

## 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. 277).

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 labelled $MC$.

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.

MyEconLab Animation

![Figure 13.5: Monopoly’s Smaller Output and Higher Price](image-url)
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 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 grey 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.

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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 a 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 licences 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 licence 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 transfers 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 cable television monopoly created and regulated by the Canadian Radio-Television and Telecommunications Commission (CRTC). Another is a regulation that restricts “split-run” magazines. 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 MPs, MPPs, and bureaucrats in the pursuit of licences 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 leads to a price of $300,000 in Toronto and $200,000 in Montreal for a taxi licence, 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 grey area in Fig. 13.7.
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, visit an art museum or theme park, or buy pizza. These are all examples of firms with market power, setting the prices of an identical good or service at different levels for different customers.

Not all price differences are price discrimination: they reflect differences in production costs. For example, real-time meters for electricity enable power utilities to charge a different price at peak-load times than during the night. But it costs more per kilowatt-hour to generate electricity at peak-load times, so this price difference reflects production cost differences and is not price discrimination.

At first sight, price discrimination appears to be inconsistent with profit maximization. Why would a movie theatre 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? The answer, as you are about to discover, is that price discrimination is profitable: It increases economic profit.

But to be able to price discriminate, the firm must sell a product that cannot be resold; and it must be possible to identify and separate different buyer types.

Two Ways of Price Discriminating

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, salespeople and other business travellers know that a face-to-face sales meeting with a customer might bring a large and profitable order. So for these travellers, the marginal benefit from a trip is large and the price that such a traveller is willing to pay for a trip is high. In contrast, for a leisure
A Price-Discriminating Airline

Inter-City Airlines has a monopoly on passenger flights between two cities. Figure 13.8 shows the market demand curve, \( D \), for travel on this route. It also shows Inter-City Airline’s marginal revenue curve, \( MR \), and marginal cost curve, \( MC \). Inter-City’s marginal cost is a constant $40 per trip. (It is easier to see how price discrimination works for a firm with constant marginal cost.)

Single-Price Profit Maximization

As a single-price monopoly, Inter-City maximizes profit by producing the quantity of trips at which \( MR \) equals \( MC \), which is 8,000 trips a week, and charging $120 a trip. With a marginal cost of $40 a trip, producer surplus is $80 a trip, and Inter-City’s producer surplus is $640,000 a week, shown by the area of the blue rectangle. Inter-City’s customers enjoy a consumer surplus shown by the area of the green triangle.

Increasing Profit and Producer Surplus

By getting buyers to pay a price as close as possible to their maximum willingness to pay, a monopoly captures the consumer surplus and converts it into producer surplus. And more producer surplus means more economic profit.

To see why more producer surplus means more economic profit, recall some definitions. With total revenue \( TR \) and total cost \( TC \),

\[
\text{Economic profit} = TR - TC.
\]

Producer surplus is total revenue minus the area under the marginal cost curve. But the area under the marginal cost curve is total variable cost, \( TVC \). So producer surplus equals total revenue minus \( TVC \), or

\[
\text{Producer surplus} = TR - TVC.
\]

You can see that the difference between economic profit and producer surplus is the same as the difference between \( TC \) and \( TVC \). But \( TC \) minus \( TVC \) equals total fixed cost, \( TFC \). So

\[
\text{Economic profit} = \text{Producer surplus} - TFC.
\]

For a given level of total fixed cost, anything that increases producer surplus also increases economic profit.

Let’s now see how price discrimination works by looking at a price-discriminating airline.
**Price Discrimination**

Figure 13.9 shows Inter-City’s two markets. Part (a), the market for business travel, is the same as Fig. 13.8. Part (b) shows the market for leisure travel. No leisure traveller is willing to pay the business fare of $120 a trip, so at that price, the quantity demanded in part (b) is zero. The demand curve $D_L$ is the demand for travel on this route after satisfying the demand of business travellers. Inter-City’s marginal cost remains at $40 a trip, so its marginal revenue curve is $MR_L$. Inter-City maximizes profit by setting the leisure fare at $80 a trip and attracting 4,000 leisure travellers a week. Inter-City’s producer surplus increases by $160,000 a week—the area of the blue rectangle in Fig. 13.9(b)—and leisure travellers enjoy a consumer surplus—the area of the green triangle.

Inter-City announces its new fare schedule: no restrictions, $120 and 14-day advance purchase, $80. Inter-City increases its passenger count by 50 percent and increases its producer surplus by $160,000.

**Discrimination Between Two Types of Travellers**

Inter-City surveys its customers and discovers that they are all business travellers. It also surveys people who are not its customers and discovers that they are mainly people who travel for leisure. These people travel by bus or car, but would travel by air at a low fare. Inter-City would like to attract some of these travellers and knows that to do so, it must offer a fare below the current $120 a trip. How can it do that?

Inter-City digs more deeply into its survey results and discovers that its current customers always plan their travel less than two weeks before departure. In contrast, the people who travel by bus or car know their travel plans at least two weeks ahead of time.

Inter-City sees that it can use what it has discovered about its current and potential new customers to separate the two types of travellers into two markets: one market for business travel and another for leisure travel.

**FIGURE 13.9 Price Discrimination**

(a) Business travel

Inter-City separates its market into two types of travel: business travel with no restrictions in part (a) and leisure travel that requires a 14-day advance purchase in part (b). For business travel, the profit-maximizing price is $120 a trip with 8,000 trips a week. For leisure travel, the profit-maximizing price is $80 a trip with 4,000 trips a week.

(b) Leisure travel

Inter-City continues to make the same producer surplus on business travel as it did with a single price, and business travellers continue to enjoy the same consumer surplus. But in part (b), Inter-City sells 4,000 trips to leisure travellers, which increases its producer surplus—the blue rectangle—and increases consumer surplus—the green triangle.
Discrimination Among Several Types of Travellers
Pleased with the success of its price discrimination between business and leisure travellers, Inter-City sees that it might be able to profit even more by dividing its customers into a larger number of types. So it does another customer survey, which reveals that some business travellers are willing to pay $160 for a fully-refundable, unrestricted ticket while others are willing to pay only $120 for a nonrefundable ticket. So applying the same principles as it used to discriminate between business and leisure travellers, Inter-City now discriminates between business travellers who want a refundable ticket and those who want a nonrefundable ticket.

Another survey of leisure travellers reveals that they fall into two groups: those who are able to plan 14 days ahead and others who can plan 21 days ahead. So Inter-City discriminates between these two groups with two fares: an $80 and a $60 fare.

By offering travellers four different fares, the airline increases its producer surplus and increases its economic profit. But why only four fares? Why not keep looking for ever more traveller types and offer even more fares?

Perfect Price Discrimination Firms try to capture an ever larger part of consumer surplus by devising a host of special conditions, each one of which appeals to a tiny segment of the market but at the same time excludes others from taking advantage of a lower price. The more consumer surplus a firm is able to capture, the closer it gets to the extreme case called perfect price discrimination, which occurs if a firm can sell each unit of output for the highest price someone is willing to pay for it. In this extreme (hypothetical) case consumer surplus is eliminated and captured as producer surplus.

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 monopoly cuts the price to sell a larger quantity, it 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 market demand curve becomes the monopoly’s marginal revenue curve.

With marginal revenue equal to price, Inter-City can obtain even greater producer surplus by increasing output up to the point at which price (and marginal revenue) equals marginal cost.

So Inter-City seeks new travellers who will not pay as much as $60 a trip but who will pay more than $40, its marginal cost. Inter-City offers a variety of vacation specials at different low fares that appeal only to new travellers. Existing customers continue to pay the higher fares and some, with further perks and frills that have no effect on cost, are induced to pay fares going all the way up to $200 a trip.

With all these special conditions and fares, Inter-City increases its output to the quantity demanded at marginal cost, extracts the entire consumer surplus on that quantity, and maximizes economic profit.

Figure 13.10 shows the outcome with perfect price discrimination and compares it with the single-price monopoly outcome. The range of business-class fares extract the entire consumer surplus from this group. The new leisure-class fares going down to $40 a trip attract an additional 8,000 travellers and take the entire consumer surplus of leisure travellers. Inter-City makes the maximum possible economic profit.

FIGURE 13.10 Perfect Price Discrimination

Dozens of fares discriminate among many different types of business travellers, and many new low fares with restrictions appeal to leisure travellers. With perfect price discrimination, the market demand curve becomes Inter-City’s marginal revenue curve. Producer surplus is maximized when the lowest fare equals marginal cost. Inter-City sells 16,000 trips and makes the maximum possible economic profit.
Price Discrimination

Efficiency and Rent Seeking with Price Discrimination

With perfect price discrimination, output increases to the point at which price equals marginal cost. 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, no deadweight loss is created, 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 the outcomes of perfect competition and perfect price discrimination differ. First, the distribution of the total surplus is not the same. In perfect competition, total surplus is shared by consumers and producers, while with perfect price discrimination, the monopoly takes it all. Second, because the monopoly takes all the total surplus, rent seeking is profitable.

People use resources in pursuit of economic rent, and the bigger the rents, the more resources are 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 Inter-City Airlines, as you can see in the cartoon! Disney Corporation is creative too in extracting consumer surplus, as Economics in Action shows.

We next study some key monopoly policy issues.

Economics in Action

Attempting Perfect Price Discrimination

If you want to spend a day at Disney World in Orlando, it will cost you $99. You can spend a second consecutive day for an extra $89. A third day will cost you $86. But for a fourth day, you’ll pay only $20 and for more days all the way up to 10, you’ll pay only $10 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’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?

Work these questions in Study Plan 13.4 and get instant feedback. Do a Key Terms Quiz.

MyEconLab
CHAPTER 13 Monopoly

The figure illustrates the demand curve, \( D \), and marginal cost curve, \( MC \), for Windows licences.

Using the U.S. prices in the data table, the figure shows how Microsoft converts consumer surplus into producer surplus by price discriminating.

Because Microsoft also price discriminates among its different national markets, it gains even more producer surplus than the figure illustrates.

Microsoft Monopoly

Microsoft Windows 8 to Go on Sale in October

Microsoft announced that its Windows 8 operating system will be released in October 2012, three years after Windows 7 went public. Windows 8 will be available in 109 languages across 231 markets worldwide.

Source: AFP, July 9, 2012

SOME DATA

<table>
<thead>
<tr>
<th>Version</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>Upgrade from Microsoft</td>
<td>$199.99</td>
</tr>
<tr>
<td>Full from Amazon</td>
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</tr>
<tr>
<td>OEM</td>
<td>$148.95</td>
</tr>
<tr>
<td>Student from Microsoft</td>
<td>$69.99</td>
</tr>
</tbody>
</table>

Microsoft sold 180 million Windows 8 licences at different prices in different national markets.

THE QUESTIONS

- Is Microsoft a monopoly?
- Is Microsoft a natural monopoly or a legal monopoly?
- Does Microsoft price discriminate or do the different prices of Windows reflect cost differences?
- Sketch a demand curve for Windows, Microsoft’s marginal cost curve, and the distribution of the total surplus between consumers and Microsoft.

THE ANSWERS

- Microsoft controls 87 percent of the market for computer operating systems, and almost 100 percent of the non-Apple market, which makes it an effective monopoly.
- Microsoft is a natural monopoly. It has large fixed costs and almost zero marginal cost, so its long-run average cost curve (\( LRAC \)) slopes downward and economies of scale are achieved when the \( LRAC \) curve intersects the demand curve.
- Microsoft sells Windows for a number of different prices to different market segments and the marginal cost of a Windows licence is the same for all market segments, so Microsoft is a price-discriminating monopoly.
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 Canadian Transportation Agency regulates transport under federal jurisdiction, including rail, air, marine transportation, and some inter-provincial commercial motor transport. The National Energy Board regulates international and inter-provincial aspects of the oil, gas, and electric utility industries.

**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 many Canadian markets, including domestic rail and air transportation, telephone service, natural gas, and grain transportation. In 2012, wheat handling and marketing were deregulated.

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. Shaw Communications provides cable TV to households in Western Canada. 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, Shaw 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 Shaw 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 $D$. Shaw’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, local telephone companies offers plans at a fixed monthly price that give access to the cellphone network and unlimited free calls. The price of a call (zero) equals the 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.
CHAPTER 13 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 labelled $MC$. 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. There are two possible ways of enabling a regulated monopoly to avoid an economic loss:

- 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, so 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 hockey 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.

**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.

Work these questions in Study Plan 13.5 and get instant feedback. Do a Key Terms Quiz. 

You’ve now completed your study of monopoly. Economics in the News 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.
Is Google Misusing Monopoly Power?

Google and E.U. Agree to Settle Search Row

The Financial Times
February 5, 2014

Google ended its three-year tangle with antitrust regulators on Wednesday, as it reached a deal with Brussels which critics claimed would cement its dominance of some of the most valuable commercial activity on the web.

Following the U.S. Federal Trade Commission closing a similar case last year, regulators on both sides of the Atlantic have now largely cleared Google’s practice of overriding its own algorithmically chosen results to put paid-for links at the top of its pages.

The European Commission went further than U.S. regulators by extracting a concession that will require the Internet group to give rival Internet services a showing alongside its own preferred results, provided they bid against each other for the space.

Rivals immediately panned the approach as “worse than nothing” as it gave Brussels’ blessing to Google sucking traffic from other Internet sites for some of the most valuable searches on the web, such as users looking for digital cameras or hotels. …

Joaquín Almunia, the E.U. competition chief, said … “Google should not be prevented from trying to provide users with what they’re looking for.” … “What Google should do is also give rivals a prominent space … in a visual format which will attract users.” …

Although it still faces an investigation in Canada, the deal effectively brings the curtain down on Google’s first showdown with the world’s leading antitrust regulators. Unlike Microsoft, which became embroiled in a 10-year battle with Brussels, it chose to settle rather than risk large fines or tying up senior management attention in a fight. …

MyEconLab More Economics in the News

ESSENCE OF THE STORY

- Google reached a settlement with the European Union antitrust regulators.
- It settled a similar case with the U.S. Federal Trade Commission in 2013 but still faces an investigation in Canada.
- The European regulators require Google to display rival Internet services alongside its preferred results, provided they bid against each other for the space.
- Competitors say the regulations are too weak and enable Google to capture traffic from other Internet sites for some of the most valuable searches.
Google gets its revenue by selling advertisements associated with search keywords. Google sells keywords based on a combination of willingness-to-pay and the number of clicks an advertisement receives, with bids starting at 5 cents per click. Google has steadily improved its search engine and refined and simplified its interface with both searchers and advertisers to make searches more powerful and advertising more effective. Figure 1 shows Google’s extraordinary success in terms of its revenue, cost, and profit. Google could have provided a basic search engine with none of the features of today’s Google. If Google had followed this strategy, people seeking information would have used other search engines and advertisers would have been willing to pay lower prices for Google ads. Google would have faced the market described in Fig. 2 and earned a small economic profit. Instead, Google improved its search engine and the effectiveness of advertising. The demand for Google ads increased. By selling keywords to the highest bidder, Google is able to achieve perfect price discrimination. Figure 3 shows the consequences of Google’s successful strategy. With perfect price discrimination, Google’s producer surplus is maximized. Google produces the efficient quantity of search and advertising by accepting ads at prices that exceed or equal marginal cost. Google does not appear to be acting against the social interest: There is no antitrust case to answer.
CHAPTER 13  Monopoly

The total loss that arises from monopoly equals the deadweight loss plus the cost of the resources devoted to rent seeking.

Working Problem 5 will give you a better understanding of the comparison of single-price monopoly and perfect competition.

Price Discrimination  (pp. 307–312)

- Price discrimination converts consumer surplus into economic profit.
- Perfect price discrimination extracts the entire consumer surplus; each unit is sold for the maximum price that each consumer is willing to pay; the quantity produced is the efficient quantity.
- Rent seeking with perfect price discrimination might eliminate the entire consumer surplus and producer surplus.

Working Problem 6 will give you a better understanding of price discrimination.

Monopoly Regulation  (pp. 313–315)

- Monopoly regulation might serve the social interest or the interest of the monopoly (the monopoly captures the regulator).
- Price equal to marginal cost achieves efficiency but results in economic loss.
- Price equal to average cost enables the firm to cover its cost but is inefficient.
- Rate of return regulation creates incentives for inefficient production and inflated cost.
- Price cap regulation with earnings sharing regulation can achieve a more efficient outcome than rate of return regulation.

Working Problems 7 to 9 will give you a better understanding of monopoly regulation.

Key Points

Monopoly and How It Arises (pp. 298–299)

- A monopoly is a market with a single supplier of a good or service that has no close substitutes and in which barriers to entry prevent competition.
- Barriers to entry may be legal (public franchise, licence, patent, or copyright), ownership (one firm controls a resource), or natural (created by economies of scale).
- A monopoly might be able to price discriminate when there is no resale possibility.
- Where resale is possible, a firm charges one price.

Working Problem 1 will give you a better understanding of monopoly and how it arises.

A Single-Price Monopoly’s Output and Price Decision  (pp. 300–303)

- A monopoly’s demand curve is the market demand curve and a single-price monopoly’s marginal revenue is less than price.
- A monopoly maximizes profit by producing the output at which marginal revenue equals marginal cost and by charging the maximum price that consumers are willing to pay for that output.

Working Problems 2 to 4 will give you a better understanding of a single-price monopoly’s output and price decision.

Single-Price Monopoly and Competition Compared  (pp. 304–307)

- A single-price monopoly charges a higher price and produces a smaller quantity than a perfectly competitive market.
- A single-price monopoly restricts output and creates a deadweight loss.
- The total loss that arises from monopoly equals the deadweight loss plus the cost of the resources devoted to rent seeking.

Working Problem 5 will give you a better understanding of the comparison of single-price monopoly and perfect competition.

Price Discrimination  (pp. 307–312)

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- Price cap regulation with earnings sharing regulation can achieve a more efficient outcome than rate of return regulation.

Working Problems 7 to 9 will give you a better understanding of monopoly regulation.

Key Terms

- Average cost pricing rule, 314
- Barrier to entry, 298
- Capture theory, 313
- Deregulation, 313
- Economic rent, 306
- Legal monopoly, 298
- Marginal cost pricing rule, 314
- Monopoly, 298
- Natural monopoly, 298
- Perfect price discrimination, 310
- Price cap regulation, 315
- Price discrimination, 299
- Rate of return regulation, 314
- Regulation, 313
- Rent seeking, 306
- Single-price monopoly, 299
- Social interest theory, 313
Tanya’s Tattoos is a local monopoly. Columns 1 and 2 of the table set out the market demand schedule and columns 2 and 3 set out the total cost schedule.

<table>
<thead>
<tr>
<th>Price (dollars per tattoo)</th>
<th>Quantity (tattoos per hour)</th>
<th>Total cost (dollars per hour)</th>
</tr>
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<tbody>
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<tr>
<td>20</td>
<td>4</td>
<td>110</td>
</tr>
</tbody>
</table>

Questions

1. If Tanya’s Tattoos is a single-price monopoly, what is Tanya’s profit-maximizing quantity? What price does Tanya charge? What are its economic profit and producer surplus?

2. If Tanya’s Tattoos can perfectly price discriminate, what is its profit-maximizing quantity? What are its economic profit and producer surplus?

Solutions

1. The profit-maximizing quantity is that at which marginal cost equals marginal revenue. Marginal cost—the increase in total cost when output increases by one unit—is $20 at all output levels. Marginal revenue—the change in total revenue when output increases by one unit—is calculated in the table at the top of the next column.

   Marginal revenue equals marginal cost of $20 at 2 tattoos per hour (midway between $30 and $10). So this quantity maximizes profit. The highest price of a tattoo at which 2 tattoos per hour can be sold is $40, so total revenue is $80. Total cost is $70, so economic profit is $10. TC (TVC at zero output) = $30, so TVC = $40 and producer surplus = TR – TVC = $40.

   Key Point: Profit is maximized when marginal cost equals marginal revenue.

2. If Tanya can perfectly price discriminate, she produces 4 tattoos per hour and sells one for $50, one for $40, one for $30, and one for $20. Total revenue is $140 per hour. Total cost is $110 per hour, so economic profit is $30 per hour. Producer surplus = TR – TVC, which is $140 – $80 = $60 per hour.

   Key Point: With perfect price discrimination, a firm charges the highest price that each buyer is willing to pay and increases production to the quantity at which the lowest price equals marginal cost.

Key Figure

![Profit maximized: MR = MC](a) Single-price monopoly

![Producer surplus increases to $60](b) Price-discriminating monopoly
CHAPTER 13 Monopoly

b. Is Minnie’s an efficient producer of water? Explain your answer.
c. Suppose that new wells were discovered nearby to Minnie’s and Minnie’s faced competition from new producers. Explain what would happen to Minnie’s output, price, and profit.

Price Discrimination (Study Plan 13.4)
6. La Bella Pizza can produce a pizza for a marginal cost of $2. Its price of a pizza is $15.
   a. Could La Bella Pizza make a larger economic profit by offering a second pizza for $5? Use a graph to illustrate your answer.
   b. How might La Bella Pizza make even more economic profit? Would it then be more efficient than when it charged $15 for each pizza?

Monopoly Regulation (Study Plan 13.5)
Use the following figure to work Problems 7 to 9.
The figure shows Calypso, a natural gas distributor. Calypso is a natural monopoly that cannot price discriminate.

What quantity will Calypso produce, what price will it charge, and what will be the total surplus and deadweight loss if Calypso is:
7. An unregulated profit-maximizing firm?
8. Regulated to make zero economic profit?
9. Regulated to be efficient?

STUDY PLAN PROBLEMS AND APPLICATIONS

MyEconLab You can work this problems 1 to 9 in Chapter 13 Study Plan and get instant feedback.

Monopoly and How It Arises (Study Plan 13.1)
1. Canada Post has a monopoly on residential mail delivery. Pfizer Inc. makes Lipitor, a prescription drug that lowers cholesterol. Rogers Communications is the sole provider of cable television service in some parts of Ontario. Are any these firms protected by a barrier to entry? Do any of these firms produce a good or service that has a substitute? Might any of them be able to profit from price discrimination? Explain your answers.

A Single-Price Monopoly’s Output and Price Decision (Study Plan 13.2)
Use the following table to work Problems 2 to 4.
Minnie’s Mineral Springs is a single-price monopoly. Columns 1 and 2 of the table set out the market demand schedule for Minnie’s water, and columns 2 and 3 set out Minnie’s total cost schedule.

<table>
<thead>
<tr>
<th>Price (dollars per bottle)</th>
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<th>Total cost (dollars per hour)</th>
</tr>
</thead>
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</tr>
<tr>
<td>0</td>
<td>5</td>
<td>31</td>
</tr>
</tbody>
</table>

2. Calculate Minnie’s marginal revenue schedule and draw a graph of the market demand curve and Minnie’s marginal revenue curve. Explain why Minnie’s marginal revenue is less than the price.
3. At what price is Minnie’s total revenue maximized and over what price range is the demand for water elastic? Why will Minnie not produce a quantity at which the market demand is inelastic?
4. Calculate Minnie’s profit-maximizing output and price and economic profit.

Single-Price Monopoly and Competition Compared (Study Plan 13.3)
5. Use the data in Problem 2 to work this problem.
   a. Use a graph to illustrate the producer surplus generated from Minnie’s Mineral Springs’ water production and consumption.

What quantity will Calypso produce, what price will it charge, and what will be the total surplus and deadweight loss if Calypso is:
7. An unregulated profit-maximizing firm?
8. Regulated to make zero economic profit?
9. Regulated to be efficient?
15. If the government imposes a tax on Hot Air's profit, how do its output and price change?
16. If instead of taxing Hot Air's profit, the government imposes a sales tax on balloon rides of $30 a ride, what are the new profit-maximizing quantity, price, and economic profit?
17. The figure illustrates the situation facing the publisher of the only newspaper containing local news in an isolated community.

a. On the graph, mark the profit-maximizing quantity and price and the publisher's total revenue per day.
b. At the price charged, is the demand for this newspaper elastic or inelastic? Why?

A Single-Price Monopoly and Competition Compared

18. Show on the graph in Problem 17 the consumer surplus from newspapers and the deadweight loss created by the monopoly. Explain why this market might encourage rent seeking.
19. If the newspaper market in Problem 17 were perfectly competitive, what would be the quantity, price, consumer surplus, and producer surplus? Mark each on the graph.
20. What the Apple-Samsung Verdict Means for Your Smartphone

A California jury found Samsung guilty of violating the majority of the patents in question, including software features like double-tap zooming and scrolling. It recommended that Apple be awarded more than $1 billion in damages. This verdict
could significantly affect both smartphone users and producers.

Source: CNN Money, August 26, 2012

a. If Apple became a monopoly in the smartphone market, who would benefit and who would lose?
b. Compared to a smartphone monopoly, who would benefit and who would lose if the smartphone market became perfectly competitive?
c. Explain which market would be efficient: a perfectly competitive one or a monopoly.

Price Discrimination

21. AT&T Moves Away from Unlimited-Data Pricing

AT&T said it will eliminate its $30 unlimited data plan as the crush of data use from the iPhone has hurt call quality. AT&T is introducing new plans costing $15 a month for 200 megabytes of data traffic or $25 a month for 2 gigabytes. AT&T says those who exceed 2 gigabytes of usage will pay $10 a month for each additional gigabyte. AT&T hopes that these plans will attract more customers.

Source: The Wall Street Journal, June 2, 2010

a. Explain why AT&T’s new plans might be price discrimination.
b. Draw a graph to illustrate the original plan and the new plans.

Monopoly Regulation

22. iSurrender

In 2008, getting your hands on the new iPhone meant signing a two-year AT&T contract. Some markets, because of the costs of being a player, tend toward either a single firm or a small number of firms. Everyone hoped the wireless market would be different. A telephone monopoly has been the norm for most of American telecommunication history, except for what may turn out to have been a brief experimental period from 1984 through 2012 or so. It may be that telephone monopolies in America are a national tradition.

Source: Slate, June 10, 2008

a. How did AT&T, the exclusive provider of wireless service for the iPhone in 2008, influence the wireless telecommunication market?
b. Explain why the wireless market might “tend toward either a single firm or a small number of firms.” Why might this justify allowing a regulated monopoly to exist in this market?

Economics in the News

23. After you have studied Economics in the News on pp. 316–317, answer the following questions.
a. Why did the European regulators say that Google was misusing its monopoly power? Do you agree? Explain why or why not.
b. Explain why it would be inefficient to regulate Google to make it charge the same price per keyword click to all advertisers.
c. Explain why selling keywords to the highest bidder can lead to an efficient allocation of advertising resources.

24. F.C.C. Planning Rules to Open Cable Market

The Federal Communications Commission (F.C.C.) is setting new regulations to open the cable television market to independent programmers and rival video services. The new rules will make it easier for small independent programmers to lease access to cable channels, and the size of the nation’s largest cable companies will be capped at 30 percent of the market.


a. What barriers to entry exist in the cable television market?
b. Are high cable prices evidence of monopoly power?
c. Draw a graph to illustrate the effects of the F.C.C.’s new regulations on the price, quantity, total surplus, and deadweight loss.

25. Antitrust Inquiry Launched into Intel

Intel, the world’s largest chipmaker, holds 80 percent of the microprocessor market. Advanced Micro Devices complains that Intel stifles competition, but Intel says that the 42.4 percent fall in prices between 2000 and 2007 shows that this industry is fiercely competitive.


a. Is Intel a monopoly in the chip market?
b. Evaluate the argument made by Intel that the fall in prices “shows that this industry is fiercely competitive.”