Chapter

17

Monopolistic Competition

You walk into a bookstore to buy a book to read. On the store's shelves, you find a James Patterson thriller, a Maya Angelou memoir, a Ron Chernow history, a Stephenie Meyer paranormal romance, and many other choices. When you pick out a book and buy it, what kind of market are you participating in?

On the one hand, the market for books seems competitive. As you browse, hundreds of authors and publishers vie for your attention. And because anyone can enter the industry by writing and publishing a book, the business is not very profitable. For every highly paid writer, there are dozens of struggling ones.

On the other hand, the market for books also seems monopolistic. Because each title is unique, publishers have some latitude in pricing. Sellers in this market are price makers rather than price takers, and the price of books greatly exceeds the marginal cost of producing them. The list price of a typical hardcover novel, for instance, is about $30, but the cost of printing one additional copy is less than $10. The price of e-books is often around $15, while the marginal cost of permitting one extra download is zero.

The market for books fits neither the competitive nor the monopoly model. Instead, it is best described by the model of **monopolistic competition**, the subject of this chapter. The term "monopolistic competition" might at first seem to be an oxymoron, like "jumbo shrimp." But as we will see, monopolistically competitive industries are monopolistic in some ways and competitive in others. The model describes not only the publishing industry but also the market for many other goods and services.

17-1 Between Monopoly and Perfect Competition

The previous two chapters analyzed markets with many competitive firms and markets with a single monopoly firm. Chapter 15 showed that the price in a perfectly competitive market always equals the marginal cost of production. In addition, in the long run, entry and exit drive economic profit to zero, so the price also equals average total cost. Chapter 16 examined how a monopoly firm can use its market power to keep price above marginal cost, leading to a positive economic profit for the firm and a deadweight loss for society. Perfect competition and monopoly are two extreme forms of market structure. Perfect competition describes a market with many firms offering essentially identical products; monopoly describes a market with only one firm.

Although the cases of perfect competition and monopoly illustrate important ideas about how markets work, most markets in the real world include elements of both these cases and are not completely described by either of them. The typical firm faces competition, but the competition is not so rigorous that it makes the firm a price taker like the firms in Chapter 15. The typical firm also has some degree of market power, but not so much that the firm can be described exactly by the monopoly model in Chapter 16. In other words, many industries fall somewhere between the polar cases of perfect competition and monopoly. Economists call this situation **imperfect competition**.

oligopoly
a market structure in which only a few sellers offer similar or identical products

One type of imperfectly competitive market is an **oligopoly**, a market with only a few sellers, each offering a product similar or identical to those of other sellers in the market. Economists often measure a market's domination by a small number of firms with a statistic called the **concentration ratio**, which is the percentage of total output in the market supplied by the four largest firms. In the U.S. economy, most industries have a four-firm concentration ratio under 50 percent, but in some industries, the biggest firms are more dominant. Industries with four-firm concentration ratios of 90 percent or more include aircraft manufacturing, tobacco, passenger car rentals, and express delivery services. These industries are best described as oligopolies. As the next chapter discusses, the small number of firms in oligopolies makes strategic interactions among them crucial to how these markets work. When deciding how much to produce and what price to charge, each firm in an oligopoly is concerned not only with what its competitors are doing but also with how its competitors would react to what it might do.

monopolistic competition
a market structure in which many firms sell products that are similar but not identical

A second type of imperfectly competitive market is called **monopolistic competition**, a market structure in which many firms sell similar but not identical products. In such a market, each firm has a monopoly over its product, but many other firms make similar products that compete for the same customers.

To be more precise, monopolistic competition describes a market with the following attributes:

- **Many sellers:** Numerous firms are competing for the same group of customers.
- **Product differentiation:** Each firm offers a product that is at least slightly different from those of other firms. Rather than being a price taker, each firm faces a downward-sloping demand curve.
- **Free entry and exit:** Firms can enter or exit the market without restriction. The number of firms in the market adjusts until economic profits are driven to zero.

A moment's thought reveals a long list of markets with these attributes: books, video games, restaurants, piano lessons, cookies, clothing, and so on.

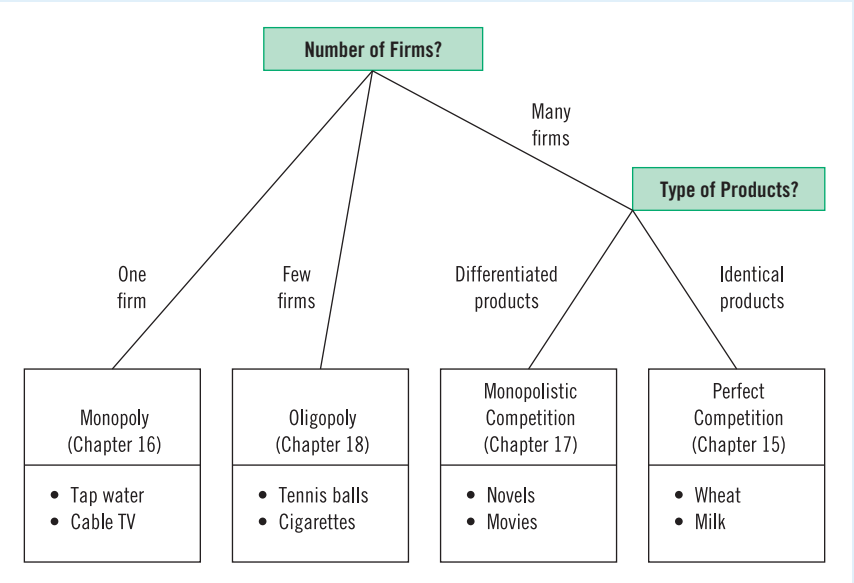
Monopolistic competition, like oligopoly, is a market structure that lies between the extreme cases of perfect competition and monopoly. But oligopoly and monopolistic competition are quite different. Oligopoly departs from the perfectly competitive ideal of Chapter 15 because the market has only a few sellers. The small number of sellers makes rigorous competition less likely and strategic interactions among them vitally important. By contrast, a monopolistically competitive market has many sellers, each of which is small compared with the market. It departs from the perfectly competitive ideal because each seller offers a somewhat different product.

Figure 1 summarizes the four types of market structure. The first question to ask about any market is how many firms there are. If there is only one firm, the market is a monopoly. If there are only a few, it is an oligopoly. If there are many firms, we need to ask another question: Do they sell identical or differentiated products? If their products are identical, the market is perfectly competitive. But if their products are differentiated, the market is monopolistically competitive.

Figure 1

The Four Types of Market Structure

Economists who study industrial organization divide markets into four types: monopoly, oligopoly, monopolistic competition, and perfect competition.



Because reality is never as clear-cut as theory, you may sometimes find it hard to decide what structure best describes a particular market. There is, for instance, no magic number that separates "few" from "many" when counting the number of firms. (Do the approximately dozen companies that sell cars in the United States make the market an oligopoly, or is it more competitive? The answer is open to debate.) Similarly, there is no sure way to determine when products are differentiated and when they are largely identical. (Are different brands of milk really the same? Again, the answer is debatable.) When analyzing actual markets, economists must keep in mind the lessons learned from studying all types of market structures and then apply each lesson as they deem appropriate.

Having defined the various market structures, let's continue our analysis of each of them. This chapter examines monopolistic competition, and the next examines oligopoly.

QuickQuiz

1. Which of the following conditions does NOT describe a firm in a monopolistically competitive market?
   a. It sells a product different from its competitors.
   b. It takes its price as given by market conditions.
   c. It maximizes profit both in the short run and in the long run.
   d. It has the freedom to enter or exit in the long run.
2. Which of the following markets best fits the definition of monopolistic competition?
   a. wheat
   b. tap water
   c. crude oil
   d. haircuts

Answers are at the end of the chapter.

17-2 Competition with Differentiated Products

To understand monopolistically competitive markets, we first consider the decisions facing an individual firm. We then examine what happens in the long run as firms enter and exit the industry. Next, we compare the equilibrium under monopolistic competition to the equilibrium under perfect competition that we examined in Chapter 15. Finally, we discuss whether the outcome in a monopolistically competitive market is desirable from the standpoint of society as a whole.

17-2a The Monopolistically Competitive Firm in the Short Run

Each firm in a monopolistically competitive market is, in many ways, like a monopoly. Because its product differs from those offered by other firms, its demand curve slopes down. (By contrast, a perfectly competitive firm faces a horizontal demand curve at the market price.) The monopolistically competitive firm follows a monopolist's rule for profit maximization: It produces the quantity at which marginal revenue equals marginal cost and then uses its demand curve to find the price at which it can sell that quantity.

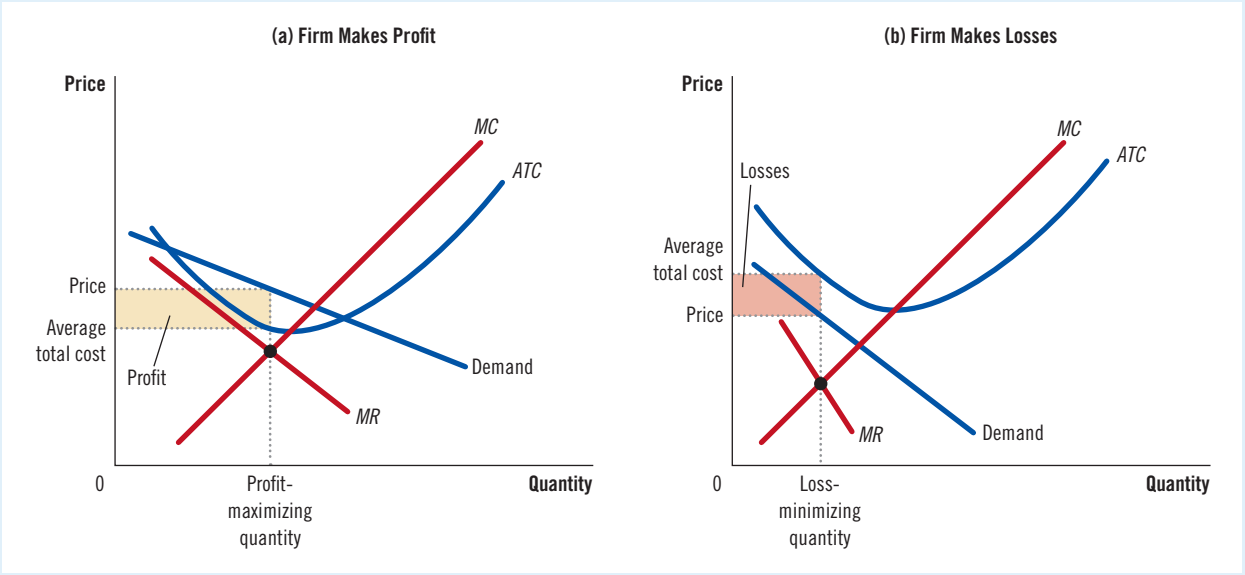
Figure 2 shows the cost, demand, and marginal-revenue curves for two typical firms, each in a different monopolistically competitive industry. In both panels, the profit-maximizing quantity is found where the marginal-revenue and marginal-cost curves intersect. The two panels show different outcomes for the firm's profit. In panel (a), price exceeds average total cost, so the firm makes a profit. In panel (b), price is below average total cost. In this case, the firm cannot make a positive profit, so the best it can do is to minimize its losses.

All this should seem familiar. A monopolistically competitive firm chooses its quantity and price just as a monopoly does. In the short run, these two market structures are similar.

Figure 2

Monopolistic Competitors in the Short Run

Monopolistic competitors, like monopolists, maximize profit by producing the quantity at which marginal revenue equals marginal cost. The firm in panel (a) makes a profit because, at this quantity, price is greater than average total cost. The firm in panel (b) makes losses because, at this quantity, price is less than average total cost.



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"GIVEN THE DOWNWARD SLOPE OF OUR DEMAND CURVE, AND THE EASE WITH WHICH OTHER FIRMS CAN ENTER THE INDUSTRY, WE CAN STRENGTHEN OUR PROFIT POSITION ONLY BY EQUATING MARGINAL COST AND MARGINAL REVENUE. ORDER MORE JELLY BEANS."

17-2b The Long-Run Equilibrium

The situations depicted in Figure 2 do not last long. When firms are making profits, as in panel (a), new firms have an incentive to enter the market. This entry increases the number of products from which customers can choose and, therefore, reduces the demand faced by each firm already in the market. In other words, profit encourages entry, and entry shifts the demand curves of the incumbent firms to the left. As the demand for incumbent firms' products falls, these firms experience declining profits.

Conversely, when firms are making losses, as in panel (b), firms in the market have an incentive to exit. As firms exit, customers have fewer products from which to choose. This decrease in the number of firms expands the demand faced by those that stay in the market. In other words, losses encourage exit, and exit shifts the demand curves of the remaining firms to the right. With increased demand, the remaining firms enjoy greater profits (that is, their losses decline).

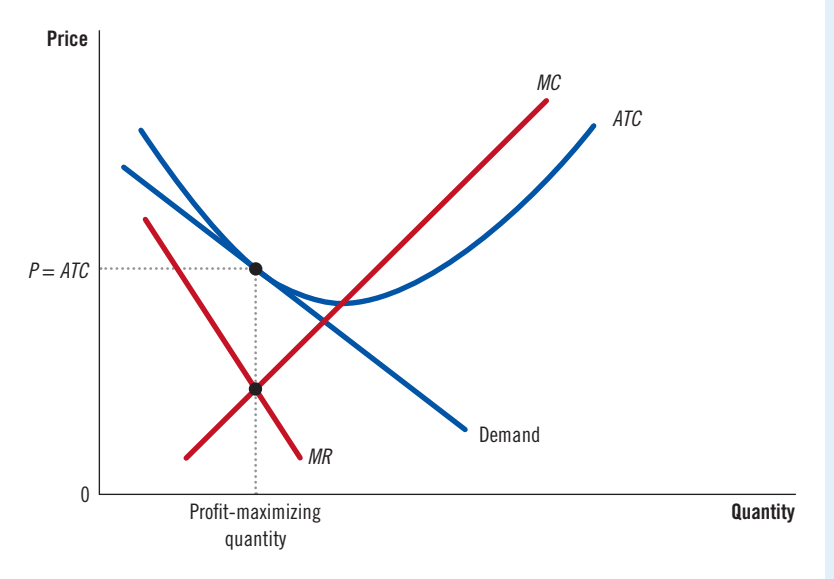
This process of entry and exit continues until the firms in the market make exactly zero economic profit. Figure 3 depicts the long-run equilibrium. Once the market reaches this equilibrium, new firms have no incentive to enter, and existing firms have no incentive to exit.

Notice that the demand curve in this figure just barely touches the average-total-cost curve. Mathematically, the two curves are said to be **tangent** to each other. These two curves must be tangent once entry and exit have driven profit to zero. Because profit per unit sold is the difference between price (found on the demand curve) and average total cost, the maximum profit is zero only if these two curves touch each other without crossing. Also, note that this point of tangency occurs at the same quantity where marginal revenue equals marginal cost. That these two points line up is not a coincidence: It is required because this quantity maximizes profit, which must be exactly zero in the long run.

Figure 3

A Monopolistic Competitor in the Long Run

In a monopolistically competitive market, if firms are making profits, new ones enter, causing the demand curves for the incumbent firms to shift to the left. Similarly, if firms are making losses, some of the firms in the market exit, causing the demand curves of the remaining firms to shift to the right. Because of these shifts in demand, monopolistically competitive firms eventually find themselves in the long-run equilibrium shown here. In this long-run equilibrium, price equals average total cost, and each firm earns zero profit.



To sum up, two characteristics describe the long-run equilibrium in a monopolistically competitive market:

- As in a monopoly market, price exceeds marginal cost ($P > MC$). This occurs because profit maximization requires marginal revenue to equal marginal cost ($MR = MC$) and because the downward-sloping demand curve makes marginal revenue less than the price ($MR < P$).
- As in a perfectly competitive market, price equals average total cost ($P = ATC$). This arises because free entry and exit drive economic profit to zero in the long run.

The second characteristic shows how monopolistic competition differs from monopoly. Because a monopoly is the sole seller of a product without close substitutes, it can earn positive economic profit, even in the long run. By contrast, because monopolistically competitive markets have free entry, the economic profit of a firm in this type of market is driven to zero in the long run.

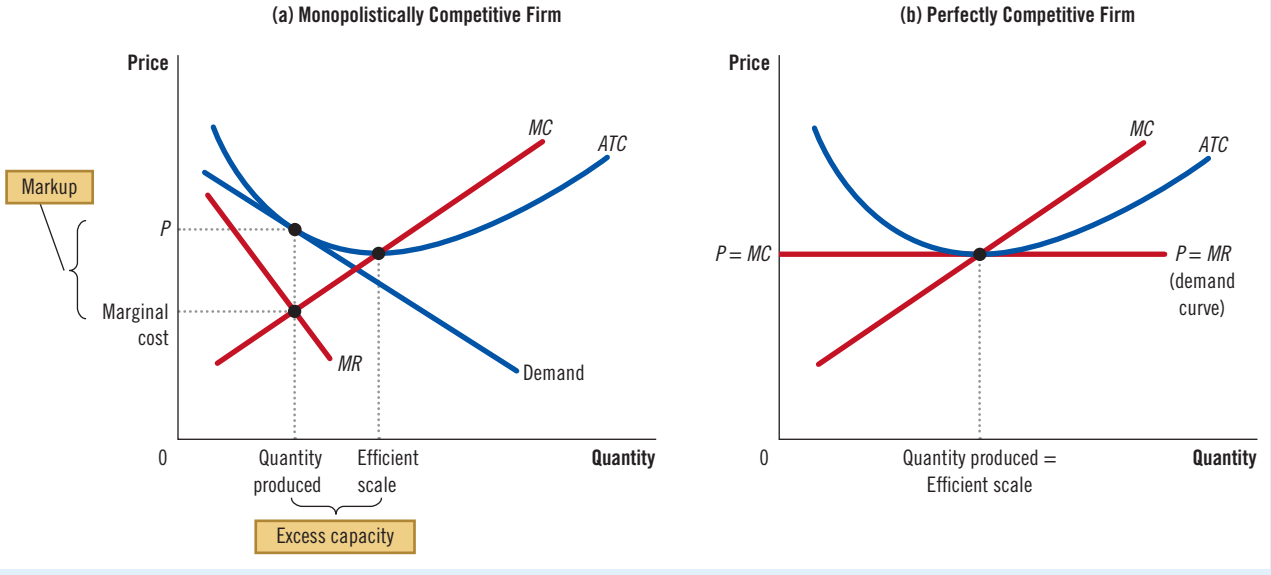
17-2c Monopolistic versus Perfect Competition

Figure 4 compares the long-run equilibria under monopolistic competition and perfect competition. (Chapter 15 discussed the equilibrium with perfect competition.) There are two noteworthy differences: excess capacity and the markup.

Figure 4

Monopolistic versus Perfect Competition

Panel (a) shows the long-run equilibrium in a monopolistically competitive market, and panel (b) shows the long-run equilibrium in a perfectly competitive market. Two differences are notable. (1) The perfectly competitive firm produces at the efficient scale, where average total cost is minimized. By contrast, the monopolistically competitive firm produces at less than the efficient scale. (2) Price equals marginal cost under perfect competition, but price is above marginal cost under monopolistic competition.



Excess Capacity As we have just seen, the process of entry and exit drives each firm in a monopolistically competitive market to a point of tangency between its demand and average-total-cost curves. Panel (a) of Figure 4 shows that the quantity of output at this point is smaller than the quantity that minimizes average total cost. Under monopolistic competition, firms produce on the downward-sloping portion of their average-total-cost curves. In this way, monopolistic competition contrasts starkly with perfect competition. As panel (b) of Figure 4 shows, free entry in competitive markets drives firms to produce at the minimum of average total cost.

The quantity that minimizes average total cost is called the **efficient scale** of the firm. In the long run, perfectly competitive firms produce at the efficient scale, while monopolistically competitive firms produce below this level. Firms are said to have **excess capacity** under monopolistic competition. In other words, a monopolistically competitive firm, unlike a perfectly competitive firm, could increase the quantity it produces and lower the average total cost of production. The firm forgoes this opportunity because, to sell the additional output, it would need to cut its price for all the units it produces. It is more profitable for a monopolistic competitor to continue operating with excess capacity.

Markup over Marginal Cost A second difference between perfect competition and monopolistic competition is the relationship between price and marginal cost. For a perfectly competitive firm, such as the one in panel (b) of Figure 4, price equals marginal cost. For a monopolistically competitive firm, such as the one in panel (a), price exceeds marginal cost because the firm always has some market power.

How is this markup over marginal cost consistent with free entry and zero profit? The zero-profit condition ensures only that price equals average total cost. It does **not** ensure that price equals marginal cost. Indeed, in the long-run equilibrium, monopolistically competitive firms operate on the declining portion of their average-total-cost curves, so marginal cost is below average total cost. For price to equal average total cost, price must be above marginal cost.

This relationship between price and marginal cost highlights a key difference between perfect competitors and monopolistic competitors. Imagine that you were to ask a firm the following question: "Would you like to see another customer come through your door ready to buy from you at your current price?" A perfectly competitive firm would answer that it didn't care. Because price exactly equals marginal cost, the profit from an extra unit sold is zero. By contrast, a monopolistically competitive firm is always eager to get another customer. Because its price exceeds marginal cost, an extra unit sold at the posted price means more profit.

An old economist's joke says that monopolistically competitive markets are those in which sellers send holiday cards to buyers. Currying favor with customers to attract more of them makes sense only if price exceeds marginal cost. And since the business practice of sending out holiday cards is widespread, monopolistically competitive markets must be commonplace.

17-2d Monopolistic Competition and the Welfare of Society

Is the outcome in a monopolistically competitive market desirable from the standpoint of society as a whole? Can government policymakers improve on the market outcome? Previous chapters evaluated markets from the standpoint of efficiency by asking whether the economy is getting the most it can out of its scarce resources. We learned that perfectly competitive markets achieve efficient outcomes (unless there are externalities), while monopoly markets entail deadweight losses.

Monopolistically competitive markets are more complex than either of these polar cases, so evaluating welfare in these markets is a more subtle exercise.

One source of inefficiency in monopolistically competitive markets is the markup of price over marginal cost. Because of the markup, some consumers who value the good at more than the marginal cost of production (but less than the price) will be deterred from buying it. A monopolistically competitive market has the normal deadweight loss of monopoly pricing.

This outcome is undesirable compared with the efficient quantity that arises when price equals marginal cost, but policymakers can't easily fix the problem. To enforce marginal-cost pricing, they would need to regulate all firms that produce differentiated products. Because such products are so common, the administrative burden of such regulation would be overwhelming.

Regulating monopolistic competitors would also entail all the problems of regulating natural monopolies. In particular, because monopolistic competitors are already making zero profits, requiring them to lower their prices to equal marginal cost would cause them to incur losses. To keep these firms in business, the government would need to help them cover these losses. Rather than financing these subsidies with higher taxes, which would entail their own deadweight losses, policymakers may decide it is better to live with the inefficiency of monopolistic pricing.

Another source of inefficiency under monopolistic competition is that the number of firms in the market may not be ideal. That is, there may be too much or too little entry. Think of the externalities associated with entry. Whenever a new firm considers entering the market with a new product, it takes into account only the profit it would make. Yet its entry would also have two effects that are external to the firm:

- **The product-variety externality:** Because consumers benefit from the introduction of a new product, the entry of a new firm confers a positive externality on consumers.
- **The business-stealing externality:** Because other firms lose customers and profits when faced with a new competitor, the entry of a new firm imposes a negative externality on existing firms.

Thus, in a monopolistically competitive market, the entry of new firms entails both positive and negative externalities. Depending on which is larger, a monopolistically competitive market could have too few or too many products.

Both externalities are closely related to the conditions for monopolistic competition. The product-variety externality arises because new firms under monopolistic competition offer products that differ from those of the existing firms. The greater range of choices increases consumer surplus. The business-stealing externality arises because monopolistically competitive firms post a price above marginal cost and, therefore, are eager to sell additional units. Conversely, because perfectly competitive firms produce identical goods and charge a price equal to marginal cost, neither of these externalities exists under perfect competition.

In the end, we can conclude only that monopolistically competitive markets do not have all the desirable welfare properties of perfectly competitive markets. That is, the invisible hand does not ensure that total surplus is maximized under monopolistic competition. Yet because the inefficiencies are subtle, hard to measure, and hard to fix, public policy cannot easily improve the market outcome.

QuickQuiz

3. A monopolistically competitive firm will increase its production if
   a. marginal revenue is greater than marginal cost.
   b. marginal revenue is greater than average total cost.
   c. price is greater than marginal cost.
   d. price is greater than average total cost.
4. New firms will enter a monopolistically competitive market if
   a. marginal revenue is greater than marginal cost.
   b. marginal revenue is greater than average total cost.
   c. price is greater than marginal cost.
   d. price is greater than average total cost.
5. What is true of a monopolistically competitive market in long-run equilibrium?
   a. Price is greater than marginal cost.
   b. Price is equal to marginal revenue.
   c. Firms make positive economic profits.
   d. Firms produce at the minimum of average total cost.

Answers are at the end of the chapter.

17-3 Advertising

In the modern world, it is nearly impossible to go through a typical day without being bombarded with advertising. Whether you are surfing the Internet, watching television, or driving down the highway, some firm will try to convince you to buy its product. Such behavior is a natural feature of monopolistic competition (as well as some oligopolistic industries). When firms sell differentiated products and charge prices above marginal cost, each firm has an incentive to advertise to attract more buyers to its particular product.

The amount of advertising varies substantially across products. Firms that sell differentiated consumer goods, such as over-the-counter drugs, perfumes, soft drinks, razor blades, breakfast cereals, and dog food, typically spend between 10 and 20 percent of their revenue on advertising. Firms that sell industrial products, such as drill presses and communications satellites, typically spend very little on advertising. And those that sell homogeneous products, such as wheat, salt, sugar, and crude oil, often spend nothing at all.

For the overall economy, about 2 percent of total firm revenue is spent on advertising. This spending takes many forms, including ads on websites, social media, television, radio, and billboards and in newspapers, magazines, and direct mail.

17-3a The Debate over Advertising

Is society wasting the resources it devotes to advertising? Or does advertising serve a valuable purpose? Assessing the social value of advertising is difficult and often generates heated arguments among economists. Let's consider both sides of the debate.

The Critique of Advertising Critics argue that firms advertise to manipulate people's tastes. Much advertising is psychological rather than informational. Consider, for example, the typical television commercial for some brand of soft drink. The commercial most likely does not tell the viewer about the product's price or quality. Instead, it might show a group of happy and beautiful people at a party on a beach on a sunny day. In their hands are cans of the soft drink. The goal of the commercial is to convey a subconscious (if not subtle) message: "You too can have many friends and be happy and beautiful, if you drink our product." Critics of advertising argue that such a commercial creates a desire that otherwise might not exist.

Critics also argue that advertising impedes competition. Advertising often tries to convince consumers that products are more different than they truly are. By increasing the perception of product differentiation and fostering brand loyalty, advertising makes buyers less concerned with price differences among similar goods, making the demand for the brand being advertised less elastic. When a firm faces a less elastic demand curve, it can increase its profits by charging a larger markup over marginal cost.

The Defense of Advertising Defenders of advertising argue that firms use advertising to inform customers. Advertising often conveys the prices of the goods offered for sale, the existence of new products, and the ways in which they can be purchased. This information allows customers to make better choices about what to buy, contributing to the efficient allocation of resources.

Defenders also argue that advertising fosters competition. Because advertising may make customers more aware of the available products, customers can more easily take advantage of price differences, thereby reducing the market power of each firm. In addition, advertising allows new firms to enter more easily because it gives them a way to inform and attract customers.

Over time, the view that advertising can make markets more competitive has gained adherents. One important example is the regulation of advertising for lawyers, doctors, and pharmacists. In the past, these groups succeeded in getting state governments to prohibit advertising in their fields on the grounds that it was "unprofessional." In recent years, however, the courts have concluded that the primary effect of these restrictions was to curtail competition. They have, therefore, overturned many of the laws that prohibit advertising in these fields.

Case Study

How Advertising Affects Prices

What effect does advertising have on prices? On the one hand, it might make consumers view products as being more different from each other than they otherwise would. If so, it would make markets less competitive and firms' demand curves less elastic, allowing firms to charge higher prices. On the other hand, advertising might make it easier for consumers to find the firms with the best prices. In this case, it would make markets more competitive and firms' demand curves more elastic, which would lead to lower prices.

In an article published in *The Journal of Law and Economics* in 1972, the economist Lee Benham tested these two hypotheses. In the United States during the 1960s, state governments had vastly different rules about advertising by optometrists. Some states allowed advertising for eyeglasses and eye examinations, but many prohibited it. For example, a Florida law justified the advertising ban as "in the interest of public health, safety, and welfare." Optometrists endorsed these restrictions.

Benham used the differences in state laws as a natural experiment to test the two views of advertising. The results were striking. In states that prohibited advertising, the average price paid for a pair of eyeglasses was $33, or $288 in 2021 dollars. In states that did not restrict advertising, the average price was $26, or $227 in 2021 dollars. Advertising reduced average prices by more than 20 percent.

A similar natural experiment occurred in 1996 when the U.S. Supreme Court struck down a Rhode Island law that banned advertising the prices of liquor products. A study by Jeffrey Milyo and Joel Waldfogel, published in the *American*

Economic Review in 1999, examined liquor prices in Rhode Island after the legal change, compared with liquor prices in the neighboring state of Massachusetts, where there was no change. According to this research, stores in Rhode Island that started advertising cut their prices substantially, often by more than 20 percent, but only on those products that they or their rivals advertised. In addition, after these stores began advertising, they attracted a larger share of customers.

The bottom line: In many markets, advertising fosters competition and leads to lower prices for consumers. ●

17-3b Advertising as a Signal of Quality

Advertising often contains little apparent information about the product being advertised. Consider a firm introducing a new breakfast cereal. It might saturate the airwaves with advertisements showing some actor eating the cereal and exclaiming how wonderful it tastes. How much information does that provide?

According to one theory, the answer is more than you might think. Even advertising that appears to contain little hard information may tell consumers something about product quality. The willingness of the firm to spend a large amount of money on advertising can itself be a **signal** to consumers about the quality of the product being offered.

To see how this works, let's examine the problem facing two firms—General Mills and Kellogg. Each company has just come up with a recipe for a new cereal, which it would sell for $5 a box. To keep things simple, assume that the marginal cost of making cereal is zero, so the $5 is all profit. Each company knows that if it spends $20 million on advertising, it will get 1 million consumers to try its cereal. And each knows that if consumers like the cereal, they will buy it many times.

First, consider General Mills' decision. Based on market research, General Mills knows that its cereal tastes like shredded newspaper with sugar on top. Advertising would sell one box to each of the 1 million consumers, but they would quickly learn that the cereal is not very good and stop buying it. General Mills decides it is not worth spending $20 million on advertising to get only $5 million in sales. So it does not bother to advertise. It sends its cooks back to the kitchen to come up with a better recipe.

Kellogg, on the other hand, knows that its cereal is great. Each person who tries it will buy a box a month for the next year, so the $20 million in advertising will bring in $60 million in sales. In this case, advertising is profitable because Kellogg has a good product that consumers will buy repeatedly. Thus, Kellogg chooses to advertise.

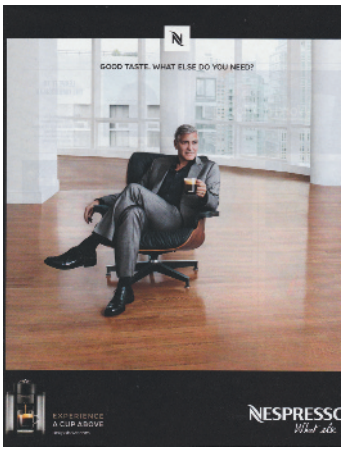
Now consider the behavior of consumers. We began by asserting that consumers are inclined to try a new cereal that they see advertised. But is this behavior rational? Should a consumer try a new cereal just because the seller has chosen to advertise it?

In fact, it may be completely rational for consumers to try new products that they see advertised. In this story, consumers decide to try Kellogg's new cereal because Kellogg advertises. Kellogg chooses to advertise because it knows that its cereal is quite good, while General Mills chooses not to advertise because it knows that its cereal is not good at all. By its willingness to spend on advertising, Kellogg signals to consumers the quality of its cereal. Each consumer thinks, quite sensibly, "If the Kellogg Company is willing to spend so much money advertising this new cereal, it must be really good."

What is striking about this theory of advertising is that the content of the advertisement is irrelevant. Kellogg signals the quality of its product by its willingness

to spend money on advertising. What the advertisements say is not as important as the fact that consumers know the ads are expensive. By contrast, cheap advertising cannot be effective at signaling quality to consumers. In this example, if an advertising campaign cost less than $5 million, both General Mills and Kellogg would use it to market their new cereals. Because both good and bad cereals would now be advertised, consumers could not infer the quality of a new cereal from the fact that it is advertised. Over time, consumers would learn to ignore such cheap advertising.

This theory can explain why firms pay famous actors large sums of money to make advertisements that, on the surface, appear to convey no information at all. The information is not in the ad's content but simply in its existence and expense.



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Is it rational for consumers to be impressed that George Clooney endorses this product?

17-3c Brand Names

Many markets have two types of firms: those that sell products with widely recognized brand names and those that sell generic substitutes. For example, Bayer aspirin competes with generic aspirin. Coke and Pepsi compete with less familiar colas. Firms with brand names usually spend more on advertising and charge more for their products. Just as there is debate about the economics of advertising, there is debate about the economics of brand names.

Critics argue that brand names cause consumers to perceive differences that do not really exist. In many cases, the generic is almost indistinguishable from the brand-name good. Consumers' willingness to pay more for the brand-name good, these critics assert, is a form of irrationality fostered by advertising. The economist Edward Chamberlin, one of the early developers of the theory of monopolistic competition, concluded from this argument that brand names were bad for the economy. He proposed that the government discourage their use by refusing to enforce the trademarks that companies use to identify their products.

More recently, economists have defended brand names as a way for consumers to ensure that the goods they buy are of high quality. There are two related arguments. First, brand names provide consumers with **information** about quality when quality cannot be easily judged in advance of purchase. Second, brand names give firms an **incentive** to maintain high quality because firms have a financial stake in maintaining their brands' reputations.

To see how these arguments work in practice, consider a famous brand name: McDonald's. Imagine that you are driving through an unfamiliar town and want to stop for lunch. You see a McDonald's and a local restaurant next to it. Which do you choose? The local restaurant may offer better food at lower prices, but you don't really know. By contrast, McDonald's offers a consistent product across many cities and countries. Its brand name is useful to you as a way of judging the quality of what you are about to buy.

The McDonald's brand name also ensures that the company has an incentive to maintain quality. For example, if some customers were to become ill from spoiled food sold at a McDonald's, the news would be disastrous for the company. McDonald's would lose much of the valuable reputation that it has built up with years of expensive advertising. As a result, it would lose sales and profit not only in the outlet that sold the bad food but also in many other McDonald's outlets throughout the country. By contrast, if some customers were to become ill from bad food at a local restaurant, that restaurant might have to close, but the lost profits would be much smaller. McDonald's has a greater incentive to ensure that its food is safe.

The debate over brand names thus centers on the question of whether consumers are rational in preferring brand-name products. Critics argue that brand names are the result of an irrational consumer response to advertising. Defenders argue that consumers have good reason to pay more for brand-name products because they can be more confident in these products' quality.

QuickQuiz

6. If advertising makes consumers more loyal to particular brands, it could _____ the elasticity of demand and _____ the markup of price over marginal cost.
   a. increase; increase
   b. increase; decrease
   c. decrease; increase
   d. decrease; decrease
7. If advertising makes consumers more aware of alternative products, it could _____ the elasticity of demand and _____ the markup of price over marginal cost.
   a. increase; increase
   b. increase; decrease
   c. decrease; increase
   d. decrease; decrease
8. Advertising can be a signal of quality
   a. if advertising is freely available to all firms.
   b. if the benefit of attracting customers is greater for firms with better products.
   c. only if consumers are irrationally attracted to the products they see advertised.
   d. only if the content of the ads contains credible information about the products.

Answers are at the end of the chapter.

17-4 Conclusion

Monopolistic competition is true to its name: It is a hybrid of monopoly and competition. Like a monopoly, each monopolistic competitor faces a downward-sloping demand curve and charges a price above marginal cost. As in a perfectly competitive market, there are many firms, and entry and exit drive the profit of each monopolistic competitor toward zero in the long run. Table 1 summarizes these lessons.

Because monopolistically competitive firms produce differentiated products, each advertises to attract customers to its own brand. To some extent, advertising manipulates consumers' tastes, promotes irrational brand loyalty, and impedes

Table 1

Monopolistic Competition: Between Perfect Competition and Monopoly

	Market Structure		
	Perfect Competition	**Monopolistic Competition**	**Monopoly**
Features that all three market structures share			
Goal of firms	Maximize profits	Maximize profits	Maximize profits
Rule for maximizing	$MR = MC$	$MR = MC$	$MR = MC$
Can earn economic profits in the short run?	Yes	Yes	Yes
Features that monopolistic competition shares with monopoly			
Price taker?	Yes	No	No
Price	$P = MC$	$P > MC$	$P > MC$
Produces welfare-maximizing level of output?	Yes	No	No
Features that monopolistic competition shares with perfect competition			
Number of firms	Many	Many	One
Entry in the long run?	Yes	Yes	No
Can earn economic profits in the long run?	No	No	Yes

competition. Often, however, it informs consumers, establishes brand names of reliable quality, and fosters competition.

The theory of monopolistic competition describes many markets in the economy. It is somewhat disappointing, therefore, that the theory does not yield simple and compelling advice for public policy. From the standpoint of economic theorists, the allocation of resources in monopolistically competitive markets is not perfect. Yet from the standpoint of practical policymakers, there may be little that can be done to improve it.

Chapter in a Nutshell

- A monopolistically competitive market is characterized by three attributes: many firms, differentiated products, and free entry and exit.
- The long-run equilibrium in a monopolistically competitive market differs from that in a perfectly competitive market in two ways. First, in a monopolistically competitive market, each firm has excess capacity. That is, it chooses a quantity that puts it on the downward-sloping portion of the average-total-cost curve. Second, each firm charges a price above marginal cost.
- Monopolistic competition does not have all the desirable properties of perfect competition. There is the standard deadweight loss of monopoly caused by the markup of price over marginal cost. In addition, the number of firms (and thus the number of product varieties) can be too large or too small. In practice, the

ability of policymakers to correct these inefficiencies is limited.

- The product differentiation inherent in monopolistic competition leads to the use of advertising and brand names. Critics of advertising and brand names argue that firms use them to manipulate consumers' tastes and reduce competition. Defenders of advertising and brand names argue that firms use them to inform consumers and compete more vigorously on price and product quality.

Key Concepts

oligopoly, p. 342

monopolistic competition, p. 342

Questions for Review

1. Describe the three attributes of monopolistic competition. How is monopolistic competition like monopoly? How is it like perfect competition?
2. Draw a diagram depicting a firm that is making a profit in a monopolistically competitive market. Now show what happens to this firm as new firms enter the industry.
3. Draw a diagram of the long-run equilibrium in a monopolistically competitive market. How is price related to average total cost? How is price related to marginal cost?
4. Does a monopolistic competitor produce too much or too little output compared with the most efficient level? What practical considerations make it difficult for policymakers to solve this problem?
5. How might advertising reduce economic well-being? How might advertising increase economic well-being?
6. How might advertising with no apparent informational content still inform consumers?
7. Explain two benefits that might arise from the existence of brand names.

Problems and Applications

1. Among monopoly, oligopoly, monopolistic competition, and perfect competition, how would you classify the markets for each of the following drinks?
   a. tap water
   b. bottled water
   c. cola
   d. beer
2. Classify the following markets as perfectly competitive, monopolistic, or monopolistically competitive, and explain your answers.
   a. wooden no. 2 pencils
   b. copper
   c. local electricity service
   d. peanut butter
   e. lipstick
3. For each of the following characteristics, say whether it describes a perfectly competitive firm, a monopolistically competitive firm, both, or neither.
   a. sells a product differentiated from that of its competitors
   b. has marginal revenue less than price
   c. earns economic profit in the long run
   d. produces at the minimum of average total cost in the long run
   e. equates marginal revenue and marginal cost
   f. charges a price above marginal cost
4. For each of the following characteristics, say whether it describes a monopoly firm, a monopolistically competitive firm, both, or neither.
   a. faces a downward-sloping demand curve
   b. has marginal revenue less than price
   c. faces the entry of new firms selling similar products
   d. earns economic profit in the long run
   e. equates marginal revenue and marginal cost
   f. produces the socially efficient quantity of output
5. You are hired as a consultant to a monopolistically competitive firm, which reports the following information about its price, marginal cost, and average total cost. Can the firm possibly be maximizing profit? If not, what should it do to increase profit? If the firm is maximizing profit, is the market in a long-run equilibrium? If not, what will happen to restore long-run equilibrium?
   a. $P < MC$, $P > ATC$
   b. $P > MC$, $P < ATC$

c. $P = MC$, $P > ATC$
d. $P > MC$, $P = ATC$

6. Sparkle is one of the many firms in the market for toothpaste, which is in a long-run, monopolistically competitive equilibrium.
   a. Draw a diagram showing Sparkle's demand curve, marginal-revenue curve, average-total-cost curve, and marginal-cost curve. Label Sparkle's profit-maximizing output and price.
   b. What is Sparkle's profit? Explain.
   c. On your diagram, show the consumer surplus derived from the purchase of Sparkle toothpaste. Also, show the deadweight loss relative to the efficient outcome.
   d. If the government forced Sparkle to produce the efficient level of output, what would happen to the firm? What would happen to Sparkle's customers?

7. Consider a monopolistically competitive market with N firms. Each firm's business opportunities are described by the following equations:

$$\text{Demand: } Q = 100/N - P.$$

$$\text{Marginal Revenue: } MR = 100/N - 2Q.$$

$$\text{Total Cost: } TC = 50 + Q^2.$$

$$\text{Marginal Cost: } MC = 2Q.$$

   a. How does N, the number of firms in the market, affect each firm's demand curve? Why?
   b. How many units does each firm produce? (The answers to this and the next two questions depend on N.)
   c. What price does each firm charge?
   d. How much profit does each firm make?
   e. In the long run, how many firms will exist in this market?

8. The market for peanut butter in Nutville is monopolistically competitive and in long-run equilibrium. One day, consumer advocate Jif Skippy discovers that all brands of peanut butter in Nutville are identical. Thereafter, the market becomes perfectly competitive and again reaches its long-run equilibrium. Using an appropriate diagram, explain whether each of the following variables increases, decreases, or stays the same for a typical firm in the market.
   a. price
   b. quantity
   c. average total cost
   d. marginal cost
   e. profit

9. For each of the following pairs of firms, explain which one would be more likely to engage in advertising.
   a. a family-owned farm or a family-owned restaurant
   b. a manufacturer of forklifts or a manufacturer of cars
   c. a company that invented a very comfortable razor or a company that invented a less comfortable razor

10. Sleek Sneakers Co. is one of many firms in the market for shoes.
    a. Assume that Sleek is currently earning short-run economic profit. On a correctly labeled diagram, show Sleek's profit-maximizing output and price as well as the area representing profit.
    b. What happens to Sleek's price, output, and profit in the long run? Explain this change in words, and show it on a new diagram.
    c. Suppose that over time, consumers become more focused on stylistic differences among shoe brands. How would this change in attitudes affect each firm's price elasticity of demand? In the long run, how will this change in demand affect Sleek's price, output, and profit?
    d. At the profit-maximizing price you identified in part (c), is Sleek's demand curve elastic or inelastic? Explain.

QuickQuiz Answers

1. **b** 2. **d** 3. **a** 4. **d** 5. **a** 6. **c** 7. **b** 8. **b**

Chapter

18

Oligopoly

If you play tennis, you have probably used balls from one of a handful of brands: Penn, Wilson, Dunlop, Prince, or Babolat. These few companies supply most of the tennis balls sold in the United States. Together, they determine the quantity of tennis balls produced and, given the market demand curve, the price at which tennis balls are sold.

The market for tennis balls is an example of an **oligopoly**. The essence of an oligopolistic market is that there are only a few sellers, so the actions of any one of them can have a large impact on the profits of all the others. This chapter examines how this interdependence shapes the firms' behavior and what problems it raises for public policy.

The analysis of oligopoly leads us to **game theory**, the study of how people behave in strategic situations. By "strategic," we mean a situation in which people, when choosing a course of action, must anticipate how others might respond to their choice. Strategic thinking is crucial not only in chess, checkers, and tic-tac-toe but also in many business decisions. Because oligopolistic markets have only a few firms, each firm must be strategic when making supply decisions. The firms are keenly aware that each firm's profit

oligopoly
a market structure in which only a few sellers offer similar or identical products

game theory
the study of how people behave in strategic situations

BLACKCAT/E+/GETTY IMAGES; GOWITHSTOCK/SHUTTERSTOCK.COM

depends not only on how much it produces but also on how much each of the others produce. When setting production, a firm in an oligopoly needs to consider how its choices might affect the choices of other firms in the market.

Game theory isn't necessary for analyzing competitive or monopoly markets. In a market that is either perfectly or monopolistically competitive, each firm is so small compared with the overall market that strategic interactions are insignificant. And for a monopoly, there are no other firms to worry about. But game theory is important for understanding oligopolies and may be applied whenever a small number of players interact with one another. It helps explain the strategies that people choose, whether they are playing tennis or selling tennis balls.

18-1 Markets with Only a Few Sellers

An oligopolistic market has only a small group of sellers and is characterized by the tension between cooperation and self-interest. Oligopolists can make the most profit if they cooperate and together act like one big monopolist—producing a small quantity of output and charging a price well above marginal cost. Yet because each oligopolist cares only about its own profit, powerful incentives pull them apart, making it hard to maintain the cooperative outcome.

18-1a A Duopoly Example

Consider the simplest type of oligopoly, one with only two members, called a **duopoly**. Oligopolies with three or more members face the same problems as duopolies, so little is lost by starting with the simpler case.

Imagine a town in which only two residents, Jack and Jill, own wells that produce water safe for drinking. Each Saturday, Jack and Jill decide how many gallons of water to pump, bring the water to town, and sell it for whatever price the market will bear. To keep things simple, suppose that they can pump as much as they want without cost. That is, the marginal cost of water is zero.

Table 1 shows the town's demand schedule for water. The first column shows the total quantity demanded, and the second shows the price. If the well owners sell a total of 10 gallons of water, water goes for $110 a gallon. If they sell a total of 20 gallons, the price falls to $100 a gallon. And so on. If you graphed these two columns of numbers, you would get a standard downward-sloping demand curve.

The last column in Table 1 shows total revenue from the sale of water. It equals the quantity sold times the price. Because there is no cost to pumping water, the total revenue of the two producers equals their total profit.

Now consider how the organization of the town's water industry affects the price of water and the quantity sold.

18-1b Competition, Monopolies, and Cartels

Before examining the price and quantity of water that results from the Jack and Jill duopoly, let's consider the outcomes that would result if the water market were either perfectly competitive or monopolistic. These polar cases are natural benchmarks.

If the market for water were perfectly competitive, the production decisions of each firm would drive price to equal marginal cost. Because here the marginal cost

Table 1

The Demand Schedule for Water

Quantity	Price	Total Revenue (and total profit)
0 gallons	$120	$0
10	110	1,100
20	100	2,000
30	90	2,700
40	80	3,200
50	70	3,500
60	60	3,600
70	50	3,500
80	40	3,200
90	30	2,700
100	20	2,000
110	10	1,100
120	0	0

of pumping additional water is zero, the equilibrium price of water under perfect competition would be zero as well. The equilibrium quantity would then be 120 gallons. The price of water would reflect the cost of producing it, and the efficient quantity of water would be produced and consumed.

Now consider how a monopoly would behave. Table 1 shows that total profit is maximized at a quantity of 60 gallons and a price of $60 a gallon. A profit-maximizing monopolist, therefore, would produce this quantity and charge this price. As is standard for monopolies, price would exceed marginal cost. The result would be inefficient because the quantity of water produced and consumed would fall short of the socially efficient level of 120 gallons.

What outcome would the duopolists achieve? One possibility is that Jack and Jill get together and agree on the quantity of water to produce and the price to charge for it. Such an agreement among firms over production and price is called **collusion**, and the group of firms acting in unison is called a **cartel**. Once a cartel is formed, the market is in effect served by a monopoly, and the analysis from Chapter 16 applies. That is, if Jack and Jill collude, they will agree on the monopoly outcome because it maximizes their total profit. Together, they produce a total of 60 gallons, which sell at a price of $60 a gallon. Price exceeds marginal cost, and the outcome is socially inefficient.

collusion
an agreement among firms in a market about quantities to produce or prices to charge

cartel
a group of firms acting in unison

A cartel must agree not only on total production but also on the amount produced by each member. Each wants a larger share of the market because that means more individual profit. In this case, Jack and Jill must agree on how to split the production of 60 gallons. If they agree to split the market equally, each produces 30 gallons, the price is $60 a gallon, and each earns a profit of $1,800.

18-1c The Equilibrium for an Oligopoly

Oligopolists would like to form cartels and earn monopoly profits, but that is often impossible. Squabbling among cartel members over how to divide the profit can make agreement among members difficult. In addition, antitrust laws prohibit explicit agreements among oligopolists. Even talking about pricing and production restrictions with competitors can be a criminal offense. Let's consider, therefore, what happens if Jack and Jill decide separately how much water to produce.

One might expect Jack and Jill to reach the monopoly outcome on their own because this outcome maximizes their joint profit. In the absence of a binding agreement, however, the monopoly outcome is unlikely. To see why, imagine that Jack expects Jill to produce only 30 gallons (half the monopoly quantity). Jack would reason as follows:

"I could produce 30 gallons as well. Together, we'd sell 60 gallons of water at $60 a gallon. My profit would be $1,800 (30 gallons × $60 a gallon). But why settle for that? I could produce 40 gallons. Then together, we'd sell 70 gallons of water at $50 a gallon. My profit would be $2,000 (40 gallons × $50 a gallon). Total profit in the market would fall, but who cares? My profit would rise because I'd have more of the market."

That's logical, as far as it goes. But there's a catch: Jill might well think the same way. Then she would bring 40 gallons to the market, too. Total sales would be 80 gallons, the price would fall to $40, and total profits would be $3,200. Jack and Jill would each earn only $1,600. By pursuing their individual self-interest when deciding how much to produce, the duopolists produce a total quantity greater than the monopoly quantity, charge a price lower than the monopoly price, and earn total profit less than the monopoly profit.

The logic of self-interest increases the duopoly's output above the monopoly level, but it does not push the duopolists all the way to the competitive allocation. Consider what happens when Jack and Jill each produce 40 gallons. The price is $40, and they each make a profit of $1,600. Jack ponders the situation further, but his self-interested logic leads to a different conclusion:

"Right now, my profit is $1,600. Suppose I increase production to 50 gallons. In this case, a total of 90 gallons would be sold, and the price would be $30 a gallon. Then, my profit would be only $1,500. Hmmm. Rather than increasing production and driving down the price, I am better off keeping my production at 40 gallons."

Jill, on her own, reaches the same conclusion.

The outcome in which Jack and Jill each produce 40 gallons looks like some sort of equilibrium. In fact, this outcome is called a Nash equilibrium. (It is named after the Nobel Prize–winning mathematician and economic theorist John Nash, whose life was portrayed in the book and movie *A Beautiful Mind*.) A **Nash equilibrium** is a situation in which economic actors interacting with one another each choose their best strategy given the strategies that the others have chosen. In this case, once Jill is producing 40 gallons, the best strategy for Jack is also to produce 40 gallons. Similarly, once Jack is producing 40 gallons, the best strategy for Jill is also to produce 40 gallons. At this Nash equilibrium, neither Jack nor Jill has an incentive to make a different decision.

Nash equilibrium
a situation in which economic actors interacting with one another each choose their best strategy given the strategies that all the other actors have chosen

This example shows the tension between cooperation and self-interest that is the essence of oligopolies. Oligopolists would be better off cooperating to attain the monopoly outcome. Yet because they each pursue their own self-interest, they fail to do so. Each oligopolist is tempted to raise production and capture a larger share of the market. As each tries to do this, total production rises, the price falls, and total profit falls.

Yet self-interest does not drive the market all the way to the competitive outcome. Like monopolists, oligopolists know that producing more reduces the price they will receive, which in turn affects profits. So they stop short of following the competitive firm's rule of producing up to the point where price equals marginal cost.

In summary, when firms in an oligopoly individually choose production to maximize profit, they produce a quantity greater than the level produced by a monopoly and less than the level produced under perfect competition. The oligopoly price is less than the monopoly price but greater than the competitive price (which equals marginal cost).

18-1d How the Size of an Oligopoly Affects the Market Outcome

We can use the insights from studying duopoly to discuss how the size of an oligopoly affects the market outcome. Suppose, for instance, that Jude and Jade suddenly discover water sources on their properties and join Jack and Jill in the water oligopoly. The demand schedule in Table 1 remains the same, but more producers are available to satisfy this demand. How does an increase from two to four sellers affect the price and quantity of water in the town?

If the sellers formed a cartel, they would again try to maximize total profit by producing the monopoly quantity and charging the monopoly price. Just as with only two sellers, the cartel members would need to agree on individual production levels and find a way to enforce the agreement. As the cartel grows larger, however, this outcome is less likely. If you have ever been a member of a team or a club, you might have noticed that working harmoniously becomes more difficult as the size of the group increases. In addition, evading the antitrust laws may be harder with a larger group of conspirators.

If the oligopolists do not form a cartel, they must each decide on their own how much water to produce. To see how the increase in the number of sellers affects the outcome, consider the decision facing each seller. At any time, each well owner has the option to raise production by one gallon. In making this decision, the well owner weighs two effects:

- **The output effect:** Because price exceeds marginal cost, selling one more gallon of water at the going price increases profit.
- **The price effect:** Because raising production increases the total quantity sold, the price of water declines, as does the profit on all the other gallons sold.

If the output effect outweighs the price effect, the well owner increases production. If the price effect outweighs the output effect, the owner does not raise production. (In this case, it is profitable to reduce production.) Each oligopolist increases production until these two marginal effects exactly balance, taking the other firms' production as given.

Now consider how the number of firms in the industry affects the marginal analysis of each oligopolist. The more firms there are, the smaller each firm's market share is. As a firm's market share shrinks, the less the firm is concerned about its own impact on the market price. That is, as the oligopoly grows, the magnitude of the price effect falls.

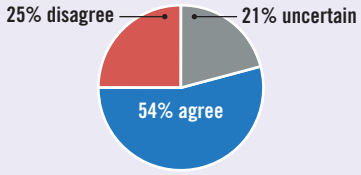
When the oligopoly grows very large, the price effect disappears altogether. In this extreme case, the production decision of an individual firm no longer affects the market price. Each firm takes the market price as given when deciding how much to produce and, therefore, increases production as long as price exceeds marginal

Ask the Experts

Market Share and Market Power

"If a small number of firms have a large combined market share in a properly defined market, it is strong evidence that those firms have substantial market power."

What do economists say?



Source: IGM Economic Experts Panel, September 25, 2018.

cost. In other words, a large oligopoly is essentially a group of competitive firms.

In summary, as the number of sellers in an oligopoly grows, an oligopolistic market increasingly resembles a competitive market. The price approaches marginal cost, and the quantity produced approaches the socially efficient level.

This analysis of oligopoly offers a new perspective on international trade. Imagine that Toyota and Honda are the only automakers in Japan, Volkswagen and BMW are the only ones in Germany, and Ford and General Motors are the only ones in the United States. If these countries prohibited international trade in autos, each would have an oligopoly with only two members, and the market price and quantity would likely depart substantially from the competitive ideal. With international trade, however, a world market arises, and the oligopoly in this example has six members. Allowing free trade increases the number of producers from which each consumer can choose, and the greater competition keeps prices closer to marginal cost. Thus, the theory of oligopoly provides another reason, in addition to the theory of comparative advantage discussed in Chapter 3, why countries can benefit from free trade.

QuickQuiz

1. The key feature of an oligopolistic market is that
   a. each firm sells a product different from other firms.
   b. a single firm chooses a point on the market demand curve.
   c. each firm takes the market price as given.
   d. a small number of firms are acting strategically.
2. If an oligopolistic industry organizes itself as a cooperative cartel, it will produce a quantity of output _____ the competitive level and _____ the monopoly level.
   a. less than; more than
   b. more than; less than
   c. less than; equal to
   d. equal to; more than
3. If an oligopoly does not cooperate and each firm chooses its own quantity, the industry will produce a quantity of output _____ the competitive level and _____ the monopoly level.
   a. less than; more than
   b. more than; less than
   c. less than; equal to
   d. equal to; more than
4. As the number of firms in an oligopoly grows, the industry approaches a level of output _____ the competitive level and _____ the monopoly level.
   a. less than; more than
   b. more than; less than
   c. less than; equal to
   d. equal to; more than

Answers are at the end of the chapter.

18-2 The Economics of Cooperation

Oligopolists would like to reach the monopoly outcome but may find it hard to cooperate. This situation is not unusual: Often in life, people fail to cooperate with one another even when cooperation would make them all better off. An oligopoly is just one example.

This section looks more closely at the problems that arise when cooperation is desirable but difficult. This requires an understanding of game theory. We focus on a "game" called the **prisoners' dilemma**, which teaches a general lesson that applies to any group trying to maintain cooperation among its members.

prisoners' dilemma a particular "game" between two captured prisoners that illustrates why cooperation is difficult to maintain even when it is mutually beneficial

18-2a The Prisoners' Dilemma

The prisoners' dilemma is a story about two criminals who have been captured by the police. Call them Bonnie and Clyde. The police have enough evidence to convict them of the minor crime of carrying an unregistered gun, so each would spend a year in jail. The police also suspect that these criminals committed a bank robbery but lack evidence to convict them for it. The police question Bonnie and Clyde in separate rooms and offer each of them the following deal:

"Right now, we can lock you up for 1 year. But if you confess to the bank robbery and implicate your partner, we'll give you immunity, and you can go free. Your partner will get 20 years in jail. If you both confess, we won't need your testimony, and we can avoid the cost of a trial, so you'll each get a sentence of 8 years."

If Bonnie and Clyde, heartless bank robbers that they are, care only about their own individual sentences, what would you expect them to do? Figure 1 shows the **payoff matrix** for their choices. Each prisoner has two strategies: confess or remain silent. The sentence each prisoner gets depends on the strategy he or she chooses and the strategy chosen by his or her partner in crime.

Consider first Bonnie's decision. She reasons as follows: "We had a fabulous time robbing banks together, but now I don't know what Clyde is going to do. If he remains silent, my best strategy is to confess because then I'll go free rather than spending a year in jail. If he confesses, I should still confess because then I'll spend just 8 years in jail rather than 20. So, whatever Clyde does, I'm better off confessing."

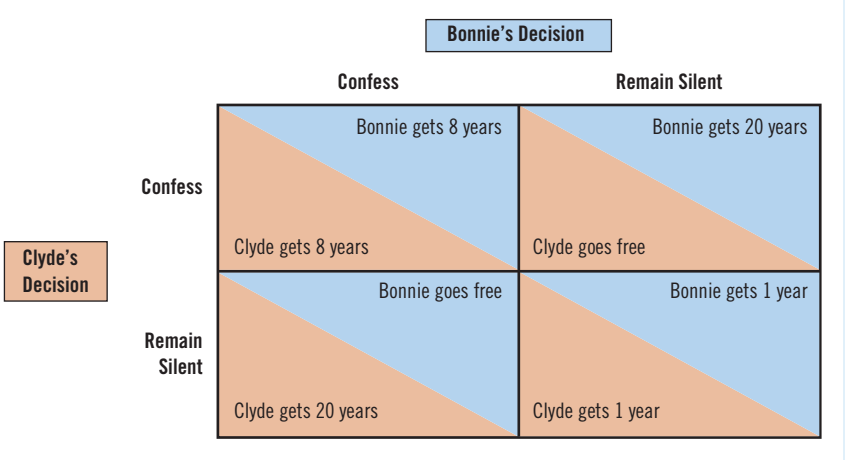
dominant strategy a strategy that is best for a player in a game regardless of the strategies chosen by the other players

In the language of game theory, a strategy is called a **dominant strategy** if it is the best one for a player to follow regardless of the strategies pursued by other players. In this case, confessing is a dominant strategy for Bonnie. She spends less time in jail if she confesses, regardless of whether Clyde confesses or remains silent.

Figure 1

The Prisoners' Dilemma

In this game between two criminals suspected of committing a major crime, the sentence that each receives depends both on his or her decision whether to confess or remain silent and on the decision made by the other.



Now consider Clyde's decision. He faces the same choices as Bonnie, and he reasons the same way. Regardless of what Bonnie does, Clyde can reduce his jail time by confessing. In other words, confessing is also a dominant strategy for Clyde.

In the end, both Bonnie and Clyde confess, and they each spend 8 years in jail. This outcome is a Nash equilibrium: Each chooses the best strategy available given the strategy the other is following. Yet, from their standpoint, the outcome is terrible. If they had **both** remained silent, both would have been better off, spending only 1 year in jail on the gun charge. Because they pursue their own interests, the two prisoners together reach an outcome that is worse for each of them.

You might have thought that Bonnie and Clyde would have planned for this situation. But even if they had, they would still run into problems. Imagine that, before the police captured them, the two criminals had sworn undying love and agreed never to confess. Clearly, this pact would make them both better off **if** they both lived up to it because each would spend only 1 year in jail. They could then ride off into a glorious sunset. But would Bonnie and Clyde remain silent simply because they had agreed they would? Once they are being questioned separately, the logic of self-interest takes over and leads them to confess. Cooperation between the prisoners is difficult to maintain because cooperation is individually irrational. So is love, but it's easier to maintain when you're not facing a prison sentence.

18-2b Oligopolies as a Prisoners' Dilemma

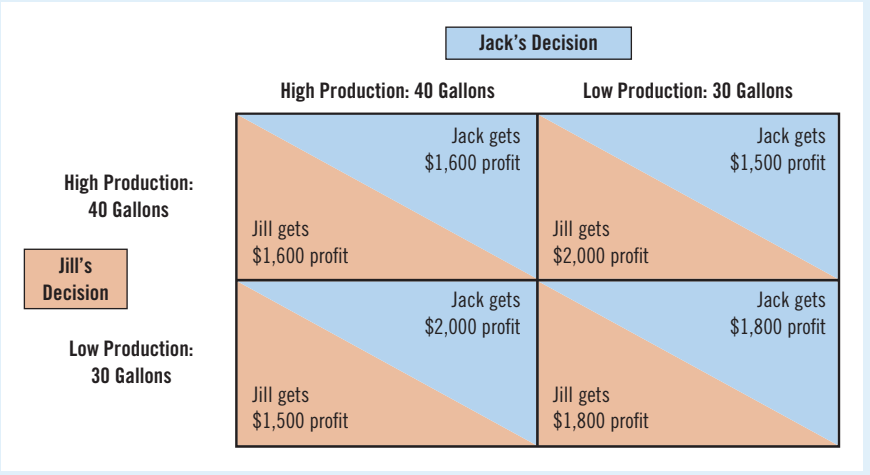
What does the prisoners' dilemma have to do with markets and imperfect competition? It turns out that the decisions oligopolists face in trying to reach the monopoly outcome are similar to those that Bonnie and Clyde faced in the prisoners' dilemma.

Consider again the choices facing Jack and Jill. After prolonged negotiation, the two water suppliers agree to keep production at 30 gallons. That way, the price will be high, and together, they will earn the maximum profit. After they agree on production levels, however, each of them must decide whether to honor this agreement or to ignore it and produce at a higher level. Figure 2 shows how the profits of the two producers depend on the strategies they choose.

Figure 2

Jack and Jill's Oligopoly Game

In this game between Jack and Jill, the profit that each earns from selling water depends on both the quantity he or she chooses to sell and the quantity the other chooses to sell.



Jack might reason as follows: "I could keep production at 30 gallons as we agreed, or I could raise my production and sell 40 gallons. If Jill lives up to the agreement and keeps her production at 30 gallons, then my profit is $2,000 if I sell 40 gallons and $1,800 if I sell 30 gallons. In this case, I am better off with the higher production level. If Jill fails to live up to the agreement and produces 40 gallons, then I earn $1,600 by selling 40 gallons and $1,500 by selling 30 gallons. Again, I am better off with higher production. So, whatever Jill chooses to do, I am better off reneging on our agreement and producing at the higher level."

Producing 40 gallons is a dominant strategy for Jack. Of course, Jill reasons in the same way, and so both produce at the higher level of 40 gallons. The result is the inferior outcome (from Jack and Jill's standpoint) with low profits for each of the two producers.

This example shows why oligopolies have trouble maintaining monopoly profits. The monopoly outcome is jointly rational, but each oligopolist has an incentive to cheat. Just as self-interest drives the suspects in the prisoners' dilemma to confess, self-interest makes it hard for the oligopolists to maintain the cooperative outcome with low production, high prices, and monopoly profits.

OPEC and the World Oil Market

The story about the town's market for water is fictional, but if we change water to crude oil and Jack and Jill to Saudi Arabia and Iraq, the story is close to reality. Much of the world's oil is produced by a few countries, mostly in the Middle East. These countries together make up an oligopoly. Their decisions about how much oil to pump are much the same as Jack and Jill's decisions about how much water to pump.

In 1960, the countries that produce much of the world's oil formed a cartel called the Organization of Petroleum Exporting Countries (OPEC). It includes Saudi Arabia, Iraq, Iran, United Arab Emirates, Kuwait, Venezuela, and several other nations. In 2016, ten other oil-producing nations, led by Russia, joined forces with OPEC, and the cartel is now known as OPEC Plus. Together, OPEC Plus countries control most of the world's oil reserves. The cartel tries to raise the price of its product through a coordinated reduction in quantity produced. To do so, it sets production targets for each of the member countries.

The problem that OPEC Plus faces is much the same as the problem that Jack and Jill face in our story. The countries in the cartel would like to maintain a high price for oil. But each member is tempted to increase its production to get a larger share of the total profit. OPEC Plus members frequently agree to reduce production but then cheat on their agreements.

OPEC was quite successful at maintaining cooperation and high prices in the period from 1973 to 1985. The price of crude oil rose from $3 a barrel in 1972 to $11 in 1974 and then to $35 in 1981. But in the mid-1980s, member countries began arguing about production levels, and OPEC became ineffective at maintaining cooperation. By 1986, the price of crude oil had fallen back to $13 a barrel.

In recent years, the members of OPEC have continued to meet regularly and to confer with allies in the larger oil bloc, but they have been less successful at reaching and enforcing agreements. Changes in technology, such as the development of fracking, have expanded oil supply around the world and reduced OPEC's market power. As a result, fluctuations in oil prices have been driven more by the natural forces of supply and demand than by the cartel's artificial restrictions on production. ●

18-2c Other Examples of the Prisoners' Dilemma

The logic of the prisoners' dilemma applies not only to oligopolies but also to many other situations. Here are two examples in which self-interest impedes cooperation, leading to inferior outcomes for the parties involved.

Arms Races In the decades after World War II, the world's two superpowers—the United States and the Soviet Union—were engaged in a prolonged competition over military power. This struggle motivated some of the early work on game theory. Theorists pointed out that an arms race is much like the prisoners' dilemma. Today, it applies to relations among the United States, Russia, and another great military power, China.

Consider the decisions of the United States and the Soviet Union about whether to build new weapons or to disarm. Each country wants to have more arms than the other because larger arsenals give it more influence in world affairs. But each country also worries about the other's weapons.

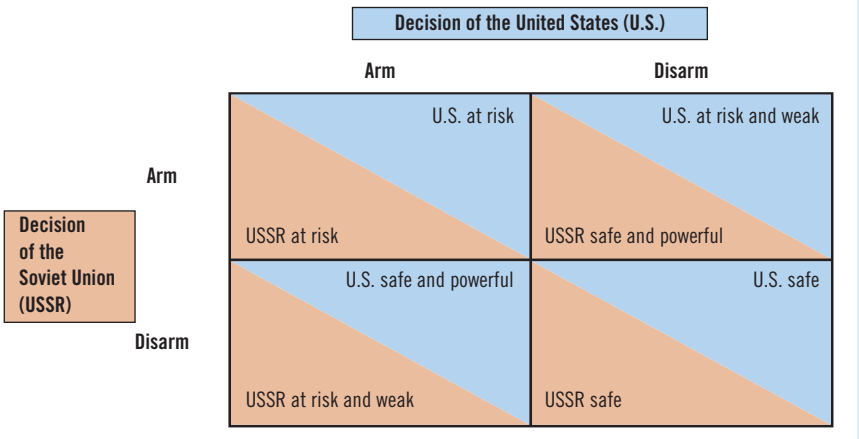
Figure 3 shows the payoff matrix for this deadly game. If the Soviet Union arms, the United States is better off doing the same to prevent the loss of power. If the Soviet Union disarms, the United States is better off arming because doing so would make it more powerful. For each country, arming is a dominant strategy. So each country chooses to continue the arms race, resulting in the inferior outcome with both countries at risk.

From about 1945 to 1991, the United States and the Soviet Union attempted to solve this problem through arms control negotiations and agreements. The difficulties the two countries faced were like those encountered by oligopolists in trying to maintain a cartel. Much as oligopolists argue over production levels, the United States and the Soviet Union argued over the amount and type of arms that each country would be allowed. And just as cartels have trouble enforcing production levels, the United States and the Soviet Union feared that the other country would find ways to cheat. In both arms races and oligopolies, the logic of self-interest can drive the participants toward the noncooperative outcome, which is worse for both parties. Yet with transparency and stringent methods for verifying that agreements are being honored, it is possible to break out of the boxes of the prisoners' dilemma. It helps, however, to understand the pressures that hamper cooperation on both sides.

Figure 3

An Arms-Race Game

In this game between two countries, the safety and power of each depends on what its adversary does, as well as on its own decision whether to arm.



Common Resources Chapter 11 noted that people tend to overuse common resources. One can view this problem as an example of the prisoners' dilemma.

Imagine that two oil companies—ExxonMobil and Chevron—own adjacent oil fields. Under the fields is a common pool of oil worth $120 million. Drilling a well to recover the oil costs $10 million. If each company drills one well, each will get half of the oil and earn a $50 million profit ($60 million in revenue minus $10 million in costs).

Because the pool of oil is a common resource, the companies will not use it efficiently. Suppose that either company could drill a second well. If one company has two of the three wells, that company gets two-thirds of the oil, which yields a profit of $60 million. The other company gets one-third of the oil for a profit of $30 million. Yet if each company drills a second well, the two companies again split the oil. In this case, each bears the cost of a second well and earns a profit of only $40 million.

Figure 4 shows the game. Drilling two wells is a dominant strategy for each company. Once again, the self-interest of the two players leads them to an inferior outcome.

18-2d The Prisoners' Dilemma and the Welfare of Society

The prisoners' dilemma shows that cooperation can be difficult to maintain, even when it would make both players in the game better off. This lack of cooperation is a problem for those directly involved. But is it a problem from the standpoint of society as a whole? The answer depends on the circumstances.

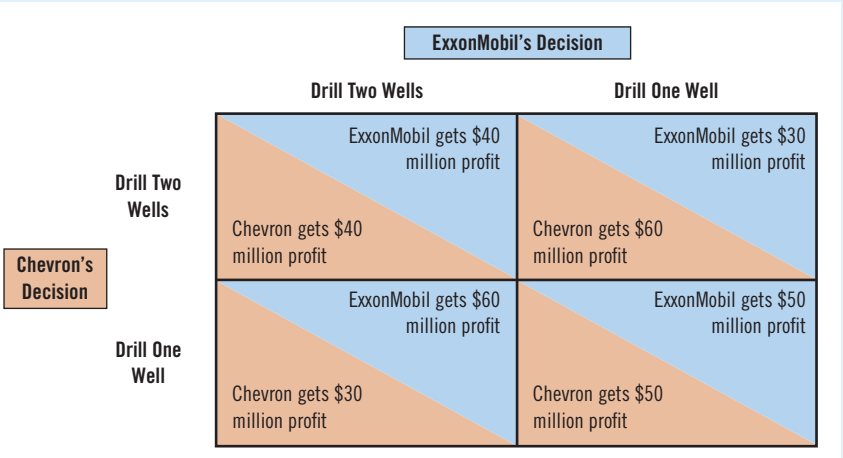
In some cases, the noncooperative equilibrium is bad for society as well as the players. In the arms race depicted in Figure 3, both the United States and the Soviet Union end up at risk (and so does everyone else on the planet). In the common-resources game in Figure 4, the extra wells dug by Chevron and ExxonMobil are pure waste. In these cases, society would be better off if the two players could reach the cooperative outcome.

By contrast, in the case of oligopolists trying to maintain monopoly profits, a lack of cooperation is desirable from the standpoint of society. The monopoly outcome is good for the oligopolists but bad for consumers. As Chapter 7 showed, the competitive outcome is best for society because it maximizes total surplus. When oligopolists fail to cooperate, the quantity they produce is closer to this optimal level.

Figure 4

A Common-Resources Game

When firms pump oil from a common pool, each firm's profit depends on both the number of wells it drills and the number of wells drilled by the other firm.



Put differently, the invisible hand guides markets to allocate resources efficiently only when markets are competitive, and markets are competitive only when firms in the market fail to cooperate with one another.

Similarly, consider the case of the police questioning two suspects. Lack of cooperation between the suspects is desirable for society because it allows the police to convict more criminals. The prisoners' dilemma is a dilemma for the prisoners, but it can be a boon to everyone else.

18-2e Why People Sometimes Cooperate

The prisoners' dilemma shows that cooperation is difficult. But is it impossible? Not all prisoners, when questioned by the police, turn in their partners. Cartels sometimes manage to maintain collusive arrangements, despite the incentive for members to defect. Very often, players can solve the prisoners' dilemma because they play the game not once but many times.

To see why cooperation is easier to enforce in repeated games, let's return to our duopolists, Jack and Jill, whose choices were given in Figure 2. They would like to achieve the monopoly outcome in which each produces 30 gallons. Yet if Jack and Jill are to play this game only once, neither has any incentive to live up to an agreement to do so. Self-interest drives each of them to renege and choose the dominant strategy of 40 gallons.

Now suppose that Jack and Jill know that they will play the same game every week. When making their initial agreement to keep production low, they can specify what happens if one party reneges. They might agree, for instance, that once one of them produces 40 gallons, both will produce 40 gallons forever after. This penalty is easy to enforce because if one party produces at the high level, the other has every reason to do the same.

The threat of this penalty may be all that is needed to maintain cooperation. Each person knows that defecting would raise his or her profit from $1,800 to $2,000. But this benefit would last for only one week. Thereafter, profit would fall to $1,600 and stay there. As long as the players care enough about future profits, they will forgo the one-time gain from defection. In a game of repeated prisoners' dilemma, like an ongoing arms race, the two players may well be able to reach the cooperative outcome.

The Prisoners' Dilemma Tournament

Imagine that you are playing the prisoners' dilemma with a person being questioned in a separate room and that you are to play with this other person many times. Your score at the end of the game is the total number of years you will spend in jail, a total you'd like to make as small as possible. What strategy would you play? Would you begin by confessing or remaining silent? How would the other player's actions in one round affect your choices in subsequent rounds?

This has now become a complicated game. To encourage cooperation, each player will want to impose some penalty when the player in the other room does not cooperate. Yet the strategy described earlier for Jack and Jill's water cartel—defect forever as soon as the other player defects—is not in the least forgiving. If the game is going to be repeated many times, a strategy that allows players to return to the cooperative outcome after a period of noncooperation may be preferable.

To see what strategies work best, the political scientist Robert Axelrod held a contest. People entered by submitting computer programs designed to play a game of repeated prisoners' dilemma. Each program was then paired with each of the others as in a round-robin tournament. The goal was to receive the fewest total years in jail.

The winning program turned out to be a simple strategy called **tit-for-tat**. According to tit-for-tat, a player should start by cooperating and then do whatever the other player did last time. A tit-for-tat player cooperates until the other player defects and then defects until the other player cooperates again. This strategy starts out friendly, penalizes unfriendly players, and forgives them if warranted. To Axelrod's surprise, this simple strategy did better than the more complex strategies that people had sent in.

The tit-for-tat strategy has a long history. It is essentially "an eye for an eye, a tooth for a tooth." The prisoners' dilemma tournament suggests that this classic strategy may be a good rule of thumb for playing some of the games of life. ●

QuickQuiz

5. The prisoners' dilemma is a two-person game illustrating that
   a. the cooperative outcome could be worse for both people than the Nash equilibrium.
   b. even if the cooperative outcome is better than the Nash equilibrium for one person, it might be worse for the other.
   c. even if cooperation is better than the Nash equilibrium, each person might have an incentive not to cooperate.
   d. rational, self-interested individuals will naturally avoid the Nash equilibrium because it is worse for both of them.

6. Two people facing the prisoners' dilemma may cooperate if they
   a. recognize that the Nash equilibrium is worse for both people than the cooperative equilibrium.
   b. play the game repeatedly and expect noncooperation to be met with future retaliation.
   c. each choose their dominant strategy.
   d. each realize that the strategy they choose is not known to the other until the outcome is realized.

Answers are at the end of the chapter.

18-3 Public Policy toward Oligopolies

One of the **Ten Principles of Economics** in Chapter 1 is that governments can sometimes improve market outcomes. This principle applies to oligopolistic markets, where cooperation leads to production that is too low and prices that are too high from the standpoint of society as a whole. The allocation of resources will be closer to the social optimum if firms in an oligopoly compete rather than cooperate. Let's consider how policymakers can foster competition.

18-3a Restraint of Trade and the Antitrust Laws

The common law can inhibit cooperation among oligopolists. Normally, freedom of contract is an essential part of a market economy. Businesses and households use contracts to arrange mutually advantageous trades, and they rely on the court system to enforce contracts. Yet, for many centuries, judges in England and the United States have deemed agreements among competitors to reduce quantities and raise prices to be contrary to the public good. They have, therefore, refused to enforce such agreements.

The Sherman Antitrust Act of 1890 codified and reinforced this policy in the United States:

> Every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is declared to be illegal . . . Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any person or persons to monopolize

> any part of the trade or commerce among the several States, or with foreign nations, shall be deemed guilty of a misdemeanor, and on conviction thereof, shall be punished by fine not exceeding fifty thousand dollars, or by imprisonment not exceeding one year, or by both said punishments, in the discretion of the court.

The Sherman Act elevated agreements among oligopolists from unenforceable contracts to criminal conspiracies.

The Clayton Act of 1914 further strengthened the antitrust laws. According to this statute, plaintiffs who could prove that they were damaged by an illegal arrangement to restrain trade could sue and recover three times the damages sustained. The purpose of this unusual rule of triple damages is to encourage private lawsuits against conspiring oligopolists.

Today, the U.S. Justice Department and private parties have the authority to bring legal suits to enforce the antitrust laws. As Chapter 16 discussed, these laws are used to prevent mergers that would give a firm excessive market power. These laws are also used to prevent oligopolists from acting together in ways that would make their markets less competitive.

An Illegal Phone Call

Firms in oligopolies have a strong incentive to collude to reduce production, raise prices, and increase profits. The great 18th-century economist Adam Smith was well aware of this potential market failure. In *The Wealth of Nations*, he wrote, "People of the same trade seldom meet together, but the conversation ends in a conspiracy against the public, or in some diversion to raise prices."

For a modern example of Smith's observation, consider this phone conversation between two airline executives in the early 1980s. The call was reported in the *New York Times* on February 24, 1983. Robert Crandall was president of American Airlines, and Howard Putnam was president of Braniff Airways, a major airline at the time. Here's an excerpt:

> **Crandall:** I think it's dumb as hell . . . to sit here and pound the @#$% out of each other and neither one of us making a #$%& dime.
> **Putnam:** Do you have a suggestion for me?
> **Crandall:** Yes, I have a suggestion for you. Raise your $%*& fares 20 percent. I'll raise mine the next morning.
> **Putnam:** Robert, we . . .
> **Crandall:** You'll make more money, and I will, too.
> **Putnam:** We can't talk about pricing!
> **Crandall:** Oh @#$%, Howard. We can talk about any &*#@ thing we want to talk about.

Putnam was right: The Sherman Antitrust Act prohibits competing executives from even talking about fixing prices. When Putnam gave a recording of this conversation to the Justice Department, the Justice Department filed suit against Crandall.

Two years later, Crandall and the Justice Department reached a settlement in which Crandall agreed to restrictions on his business activities, including his contacts with officials at other airlines. The Justice Department said that the terms of the settlement would "protect competition in the airline industry, by preventing American and Crandall from any further attempts to monopolize passenger airline service on any route through discussions with competitors about the prices of airline services." ●

18-3b Controversies over Antitrust Policy

What kinds of behavior the antitrust laws should prohibit is often controversial. Most commentators agree that price-fixing agreements among competing firms should be illegal. Yet the antitrust laws have been used to condemn some business practices whose effects are less obvious. Here are three examples.

Resale Price Maintenance One example of a controversial business practice is **resale price maintenance**. Imagine that Superduper Electronics sells smartphones to retail stores for $400. If Superduper requires the retailers to charge customers $500, it is said to engage in resale price maintenance. Any retailer that charged less than $500 would violate its contract with Superduper.

At first, resale price maintenance might seem anticompetitive. Like an agreement among cartel members, it prevents the retailers from competing on price. For this reason, the courts have sometimes viewed resale price maintenance as an antitrust violation.

Yet some economists defend the practice. First, they deny that it is aimed at reducing competition. If Superduper Electronics wanted to exert its market power, it would raise the wholesale price rather than control the resale price. What's more, Superduper has no reason to discourage competition among its retailers. Because a cartel of retailers sells less than a group of competitive retailers, Superduper would be worse off if its retailers were a cartel.

Second, resale price maintenance may have a legitimate goal. Superduper may want its retailers to provide customers with a pleasant showroom and a knowledgeable sales force. Yet, without resale price maintenance, some customers would take advantage of one store's service to learn about the smartphone's special features and then buy the item at a discount retailer that does not provide this service. Good customer service can be viewed as a public good among the retailers that sell Superduper products. As Chapter 11 discussed, when one person provides a public good, others can use it without paying for it. In this case, discounters would free ride on the service provided by other retailers, leading to less service than is desirable. Resale price maintenance is one way for Superduper to solve this free-rider problem.

The example of resale price maintenance illustrates an important principle: **Business practices that appear to reduce competition sometimes have legitimate purposes.** This principle makes the application of the antitrust laws all the more difficult. Those in charge of enforcing these laws must determine what kinds of behavior impede competition and reduce economic well-being. Often that job is not easy.

Predatory Pricing Firms with market power typically use it to raise prices above the competitive level. But should policymakers ever be concerned that firms with market power might charge prices that are too low? This question is at the heart of a second debate over antitrust policy.

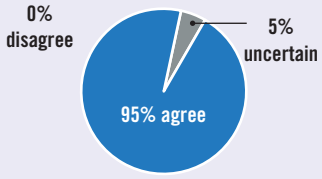
Imagine that a large airline, call it Coyote Air, has a monopoly on some route. Then, Roadrunner Express enters and takes 20 percent of the market, leaving Coyote with 80 percent. In response to this competition, Coyote starts slashing its fares. Some antitrust analysts argue that Coyote's move could be anticompetitive: The price cuts may be intended to drive Roadrunner out of the market so Coyote can recapture its monopoly and raise prices again. Such behavior is called **predatory pricing**.

Although predatory pricing is a common claim in antitrust suits, some economists say that predatory pricing is rarely, if ever, a profitable business strategy. Why? For a price war to drive out a rival, prices must be below cost. Yet if Coyote starts selling

Ask the Experts — Antitrust in the Digital Economy

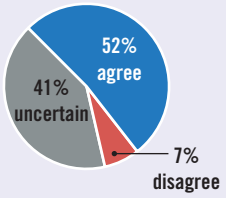
"Google's dominance of the market for internet search arose mainly from a combination of economies of scale and a quality algorithm."

What do economists say?



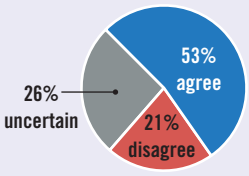
"In light of Google's dominance, its current operating practices could have a substantial negative effect on social welfare in the long run."

What do economists say?



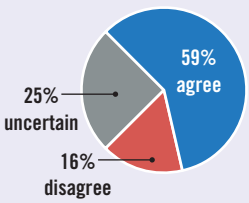
"The nature of the market dominance of technology giants in the digital economy warrants either the imposition of some kind of regulation or a fundamental change in antitrust policy."

What do economists say?



"Requiring Facebook to divest WhatsApp and Instagram is likely to make society better off."

What do economists say?



Source: IGM Economic Experts Panel, November 3, 2020, December 22, 2020.

cheap tickets at a loss, it had better be ready to fly more planes because low fares will attract more customers. Roadrunner, meanwhile, can respond to Coyote's predatory move by cutting back on flights. As a result, Coyote ends up bearing more than 80 percent of the losses, putting Roadrunner in a good position to survive the price war. As in the old Roadrunner–Coyote cartoons, the predator suffers more than the prey.

Economists debate whether predatory pricing should concern antitrust policymakers. When, if ever, is predatory pricing a profitable strategy? Are the courts capable of distinguishing between competitive and predatory price cuts? These are hard questions.

Bundling A third example of a controversial business practice is **bundling**. Suppose that Makemoney Movies produces two new films—*Superheroes* and *Hamlet*. If Makemoney offers theaters the two films together at a single price, rather than separately, the studio is said to be bundling its two products.

When the practice of bundling movies was challenged, the Supreme Court banned it. The court reasoned as follows: Imagine that *Superheroes* is a blockbuster and *Hamlet* is an unprofitable art film. The studio could use the high demand for *Superheroes* to force theaters to buy *Hamlet*. Bundling, the court concluded, could be a mechanism for a firm to expand its market power.

In 1963, the economist George Stigler offered a rebuttal to this argument. Imagine that theaters are willing to pay $200,000 for *Superheroes* and nothing for *Hamlet*. Then the most that a theater would pay for the two movies together is $200,000—the same as it would pay for *Superheroes* by itself. Forcing the theater to accept a worthless movie as part of the deal does not increase its willingness to pay. Makemoney cannot increase its market power simply by bundling the two movies together.

Stigler suggested another explanation for why bundling exists: It is a form of price discrimination. Suppose there are two theaters. City Theater is willing to pay $150,000 for *Superheroes* and $50,000 for *Hamlet*. Country Theater is just the opposite: It is willing to pay $50,000 for *Superheroes* and $150,000 for *Hamlet*. If Makemoney charges separate prices for the two films, its best strategy is to charge $150,000 for each film, and each theater chooses to show only one film. Yet if Makemoney offers the two movies as a bundle, it can charge each theater $200,000 for the movies. If different theaters value the films differently, bundling may allow the studio to increase profit by charging a combined price closer to the buyers' total willingness to pay.

Bundling remains a controversial business practice. The Supreme Court's argument that bundling allows a firm to extend its market power to other goods may not be well founded, at least in its simplest form. Yet economists have proposed more elaborate theories for how bundling can impede competition. Given the current state of economic knowledge, debate continues whether bundling is generally adverse for society.

Case Study

The Microsoft Case

A particularly important and controversial antitrust case was the U.S. government's suit against the Microsoft Corporation, filed in 1998. The case did not lack drama. It pitted one of the world's most powerful regulatory agencies (the U.S. Justice Department) against one of the world's richest men (Bill Gates). Testifying for the government was a prominent economist (MIT professor Franklin Fisher). Testifying for Microsoft was another prominent economist (MIT professor Richard Schmalensee, a former student of Franklin Fisher). At stake was the future of one of the world's most valuable companies (Microsoft) in one of the economy's fastest-growing industries (software).

Bundling was a central issue in the Microsoft case—in particular, whether Microsoft should be allowed to integrate its Internet Explorer browser into its Windows operating system. The government said that Microsoft was bundling these two products together to extend its power in the market for operating systems to the unrelated market of Internet browsers. Allowing Microsoft to incorporate such products into its operating system, the government argued, would deter other software companies from entering the market and offering new products.

Microsoft said that putting new features into old products is a natural part of technological progress. By the 1990s, cars included CD players and air conditioners, which were once sold separately, and cameras came with built-in flashes. The same was true with operating systems. Over time, Microsoft added many features to Windows that were previously stand-alone products. This has made computers more reliable and easier to use because consumers could be confident that the pieces worked together. The integration of Internet technology, Microsoft argued, was the natural next step.

One point of disagreement concerned the extent of Microsoft's market power. Noting that more than 80 percent of new personal computers used a Microsoft operating system, the government argued that the company was effectively a monopoly and was trying to expand its influence into new markets. Microsoft replied that the software market was always changing and that Microsoft's Windows was constantly being challenged by competitors, such as the Apple Mac and Linux operating systems. It also argued that the low price it charged for Windows—about $50 then, or only 3 percent of the price of a typical computer—was evidence that its market power was severely limited.

Like many large antitrust suits, the Microsoft case became a legal morass. In November 1999, after a long trial, Judge Penfield Jackson ruled that Microsoft had great monopoly power and that it had illegally abused that power. In June 2000, after hearings on possible remedies, he ordered that Microsoft be broken up into two companies—one that sold the operating system and one that sold applications software. A year later, an appeals court overturned Jackson's breakup order and handed the case to a new judge. In September 2001, the Justice Department announced that it no longer sought a breakup of the company and wanted to settle the case quickly.

The two sides reached a settlement in November 2002. Microsoft accepted some restrictions on its business practices, and the government accepted that a browser would remain part of the Windows operating system. But the settlement did not end Microsoft's antitrust troubles. In subsequent years, the company contended with several private antitrust suits, as well as suits brought by the European Union alleging a variety of anticompetitive behaviors.

Technological development has relegated the dispute over the once-mighty Explorer browser to the level of a historical footnote. In June 2021, Microsoft said it was retiring Explorer, which had lost most of its market share, replacing it with a new browser called Edge. Some analysts credited the Justice Department's settlement with Microsoft as a crucial step that allowed browsers like Google Chrome and Apple Safari to grow and ultimately supplant Explorer. ●

AP IMAGES/LAURA RAUCH

"Me? A monopolist? Now just wait a minute . . ."

In the News

Amazon in the Crosshairs

The Washington, D.C., attorney general takes aim at the giant online retailer.

A New Antitrust Case Cuts to the Core of Amazon's Identity

By Gilad Edelman

"I founded Amazon 26 years ago with the long-term mission of making it Earth's most customer-centric company," Jeff Bezos testified before the House Antitrust Subcommittee last summer. "Not every business takes this customer-first approach, but we do, and it's our greatest strength."

Bezos' obsession with customer satisfaction is at the center of Amazon's self-mythology. Every move the company makes, in this account, is designed with only one goal in mind: making the customer happy. If Amazon has become an economic juggernaut, the king of ecommerce, that's not because of any unfair practices or sharp elbows; it's simply because customers love it so much.

The antitrust lawsuit filed against Amazon on Tuesday directly challenges that narrative. The suit, brought by Karl Racine, the Washington, DC, attorney general, focuses on Amazon's use of a so-called most-favored-nation clause in its contracts with third-party sellers, who account for most of the sales volume on Amazon. A most-favored-nation clause requires sellers not to offer their products at a lower price on any other website, even their own. According to the lawsuit, this harms consumers by artificially inflating prices across the entire internet, while preventing other ecommerce sites from competing against Amazon on price. "I filed this antitrust lawsuit to put an end to Amazon's ability to control prices across the online retail market," Racine said in a press conference announcing the case.

For a long time, Amazon openly did what DC is alleging; its "price parity provision" explicitly restricted third-party sellers from offering lower prices on other sites. It stopped in Europe in 2013, after competition authorities in the UK and Germany began investigating it. In the US, however, the provision lasted longer, until Senator Richard Blumenthal wrote a letter to antitrust agencies in 2018 suggesting Amazon was violating antitrust law. A few months later, in early 2019, Amazon dropped price parity.

But that wasn't the end of the story. The DC lawsuit alleges that Amazon simply substituted a new policy that uses different language to accomplish the same result as the old rule. Amazon's Marketplace Fair Pricing Policy informs third-party sellers that they can be punished or suspended for a variety of offenses, including "setting a price on a product or service that is significantly higher than recent prices offered on or off Amazon." This rule can protect consumers when used to prevent price-gouging for scarce products, as happened with face masks in the early days of the pandemic. But it can also be used to **inflate** prices for items that sellers would prefer to offer more cheaply. The key phrase is "off Amazon." In other words, Amazon reserves the right to cut off sellers if they list their products more cheaply on another website—just as it did under the old price parity provision. According to the final report filed by the House Antitrust Subcommittee last year, based on testimony from third-party sellers, the new policy "has the same effect of blocking sellers from offering lower prices to consumers on other retail sites."

The main form that this price discipline takes, according to sellers who have spoken out against Amazon either publicly or in anonymous testimony, is through manipulating access to the Buy Box—those Add to Cart and Buy Now buttons at the top right of an Amazon product listing. When you go to buy something, there are often many sellers trying to make the sale. Only one can "win the Buy Box," meaning they're the one who gets the sale when you click one of those buttons. Because most customers don't scroll down to see what other sellers are offering the product, winning the Buy Box is crucial for anyone trying to make a living by selling on Amazon . . .

Jason Boyce, a longtime Amazon seller turned consultant, explained to me how this works. He and his partners were excited when the last third-party seller contract they signed with Amazon, to sell sporting goods on the site, didn't include the

QuickQuiz

7. The antitrust laws aim to
   a. facilitate cooperation among firms in oligopolistic industries.
   b. encourage mergers to take advantage of economies of scale.
   c. discourage firms from moving production facilities overseas.
   d. prevent firms from acting in ways that reduce competition.

8. Antitrust enforcement is controversial mainly because
   a. cooperative domestic firms are best equipped to deal with international competitors.
   b. some business practices that seem anticompetitive may have legitimate purposes.
   c. excessive competition can drive some firms out of business, causing job losses.
   d. vigorous enforcement can reduce business profitability, lowering shareholder value.

Answers are at the end of the chapter.

price parity provision. "We thought, 'This is great! We can offer discounts on Walmart, and Sears, and wherever else,'" he said. But then something odd happened. Boyce (who spoke with House investigators as part of the antitrust inquiry) noticed that once his company lowered prices on other sites, sales on Amazon started tanking. "We went to the listing, and the Add to Cart button was gone, the Buy Now button was gone. Instead, there was a gray box labeled 'See All Buying Options.' You could still buy the product, but it was an extra click. Now, an extra click on Amazon is an eternity—they're all about immediate gratification." Moreover, his company's ad spending plummeted, which he realized was because Amazon doesn't show users ads for products without a Buy Box. "So what did we do? We went back and raised our prices everywhere else, and within 24 hours everything came back. Traffic improved, clicks improved, and sales came back." . . .

Boyce's experience illustrates something important about most-favored-nation clauses: On their own, they aren't illegal. The problem comes when they're used by a company with a dominant share of the market. If a store wants to feature a certain brand on its shelves in exchange for an agreement not to sell more cheaply at a rival chain, the brand can decide whether the deal is worth it. But in the case of Amazon, according to sellers like Boyce, there is no real choice. The DC attorney general's lawsuit points out that Amazon accounts for somewhere between 50 and 70 percent of the US online retail market, and it notes that "a staggering 74 percent [of consumers] go directly to Amazon when they are ready to buy a specific product." It accuses Amazon of using its price policy to maintain that monopoly power by preventing rival platforms from using lower prices to eat into its market share.

RVLSOFT/SHUTTERSTOCK.COM

In a statement emailed to reporters, Amazon did not exactly deny that it punishes sellers who offer lower prices elsewhere. Rather, it suggested that this is ultimately good for the consumer. "The DC attorney general has it exactly backward—sellers set their own prices for the products they offer in our store," the company said. "Amazon takes pride in the fact that we offer low prices across the broadest selection, and like any store we reserve the right not to highlight offers to customers that are not priced competitively. The relief the AG seeks would force Amazon to feature higher prices to customers, oddly going against core objectives of antitrust law."

But this logic relies on a very idiosyncratic definition of "priced competitively." When someone goes to Amazon to buy something, they want the site to show them the best deal available **on Amazon**. If Jenny's Bike Supply has the best deal on Amazon for chain locks, then it's the best deal, regardless of whether Jenny is also selling the locks for an even better price on eBay. If Amazon makes it harder to buy the lock from Jenny in this scenario, the only thing it accomplishes is forcing customers to settle for the second-best deal. And, of course, it will probably succeed in forcing Jenny to raise prices on eBay. What it won't do is result in **lower** prices on Amazon.

All of which makes the DC lawsuit a narrower and potentially more winnable case than some of the other antitrust litigation that has been brought against tech companies. ■

Questions to Discuss

1. Have you ever bought anything from Amazon? If so, do you think you got a good price and good service?
2. Do you think Amazon should be barred from favoring sellers that offer Amazon customers their lowest prices? Why or why not?

Source: *Wired*, May 25, 2021.

18-4 Conclusion

Oligopolies would like to act like monopolies, but self-interest drives them toward competition. Where oligopolies end up on this spectrum depends on the number of firms in the oligopoly and the extent to which the firms cooperate. The story of the prisoners' dilemma shows why oligopolies can fail to maintain cooperation, even when cooperation is in their best interest.

Policymakers regulate the behavior of oligopolists through the antitrust laws. The proper scope of these laws is the subject of ongoing debate. There is little doubt that price fixing among competing firms reduces economic welfare and is an appropriate target for regulators, but some business practices that appear to reduce competition may have legitimate, if subtle, purposes. As a result, policymakers need to be careful when they use the substantial powers of the antitrust laws to place limits on firm behavior.

Chapter in a Nutshell

- Oligopolists maximize their total profits by forming a cartel and acting like a monopolist. Yet, if oligopolists make decisions about production levels individually, the result is a greater quantity and a lower price than under the monopoly outcome. The larger the number of firms in the oligopoly, the closer the quantity and price will be to the levels that would prevail under perfect competition.
- The prisoners' dilemma shows that self-interest can prevent people from maintaining cooperation, even when cooperation is in their mutual interest. The logic of the prisoners' dilemma applies to many situations, including arms races, common-resource problems, and oligopolies.
- Policymakers use the antitrust laws to prevent oligopolies from engaging in behavior that reduces competition. The application of these laws can be controversial because some behavior that can appear to reduce competition may have legitimate business purposes.

Key Concepts

oligopoly, p. 359
game theory, p. 359
collusion, p. 361
cartel, p. 361
Nash equilibrium, p. 362
prisoners' dilemma, p. 365
dominant strategy, p. 365

Questions for Review

1. If a group of sellers could form a cartel, what quantity and price would they try to set?
2. Compare the quantity and price of an oligopoly with that of a monopoly.
3. Compare the quantity and price of an oligopoly with that of a perfectly competitive market.
4. How does the number of firms in an oligopoly affect the outcome in the market?
5. What is the prisoners' dilemma, and what does it have to do with oligopoly?
6. Give two examples other than oligopoly that can be explained by the logic of the prisoners' dilemma.
7. What kinds of behavior do the antitrust laws prohibit?

Problems and Applications

1. A large share of the world supply of diamonds comes from Russia and South Africa. Suppose that the marginal cost of mining diamonds is constant at $1,000 per diamond and the demand for diamonds is described by the following schedule:

Price	Quantity
$8,000	5,000 diamonds
7,000	6,000
6,000	7,000
5,000	8,000
4,000	9,000
3,000	10,000
2,000	11,000
1,000	12,000

   a. If there were many suppliers of diamonds, what would the price and quantity be?
   b. If there were only one supplier of diamonds, what would the price and quantity be?
   c. If Russia and South Africa formed a cartel, what would the price and quantity be? If the countries split the market evenly, what would South Africa's production and profit be? What would happen to South Africa's profit if it increased its production by 1,000 while Russia stuck to the cartel agreement?
   d. Use your answers to part (c) to explain why cartel agreements are often not successful.

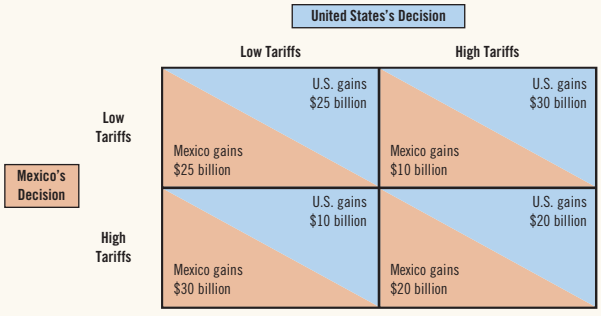
2. Some years ago, the *New York Times* reported that "the inability of OPEC to agree last week to cut production has sent the oil market into turmoil . . .

[leading to] the lowest price for domestic crude oil since June 1990."

a. Why were the members of OPEC trying to agree to cut production?
b. Why do you suppose OPEC was unable to agree on cutting production? Why did the oil market go into "turmoil" as a result?
c. The newspaper also noted OPEC's view "that producing nations outside the organization, like Norway and Britain, should do their share and cut production." What does the phrase "do their share" suggest about OPEC's desired relationship with Norway and Britain?

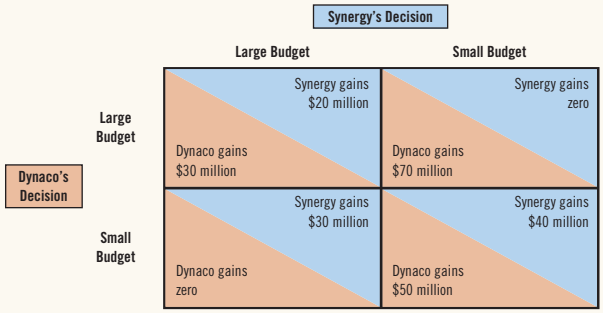
3. This chapter discusses companies that are oligopolists in the markets for the goods they sell. Many of the same ideas apply to companies that are oligopolists in the markets for the inputs they buy.
   a. If sellers who are oligopolists try to increase the price of goods they sell, what is the goal of buyers who are oligopolists?
   b. Major league baseball team owners have an oligopoly in the market for baseball players. What is the owners' goal regarding players' salaries? Why is this goal difficult to achieve?
   c. Baseball players went on strike in 1994 because they would not accept the salary cap that the owners wanted to impose. If the owners were already colluding over salaries, why did they feel the need for a salary cap?

4. Consider trade relations between the United States and Mexico. Assume that the leaders of the two countries believe the payoffs to alternative trade policies are as follows:



   a. What is the dominant strategy for the United States? For Mexico? Explain.
   b. Define **Nash equilibrium**. What is the Nash equilibrium for trade policy?
   c. In 1993, the U.S. Congress ratified the North American Free Trade Agreement, in which the United States and Mexico agreed to reduce trade barriers simultaneously. Do the perceived payoffs shown here justify this approach to trade policy? Explain.
   d. Based on your understanding of the gains from trade (discussed in Chapters 3 and 9), do you think that these payoffs actually reflect a nation's welfare under the four possible outcomes?

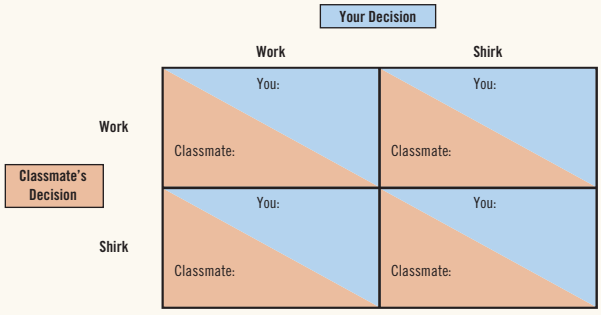
5. Synergy and Dynaco are the only two firms in a specific high-tech industry. They face the following payoff matrix as they determine the size of their research budget:



   a. Does Synergy have a dominant strategy? Explain.
   b. Does Dynaco have a dominant strategy? Explain.
   c. Is there a Nash equilibrium for this scenario? Explain. (Hint: Look closely at the definition of Nash equilibrium.)

6. You and a classmate are assigned a project on which you will receive one combined grade. You each want to receive a good grade, but you also want to avoid hard work. In particular, here is the situation:
   - If both of you work hard, you both get an A, which gives each of you 40 units of happiness.
   - If only one of you works hard, you both get a B, which gives each of you 30 units of happiness.
   - If neither of you works hard, you both get a D, which gives each of you 10 units of happiness.
   - Working hard costs 25 units of happiness.

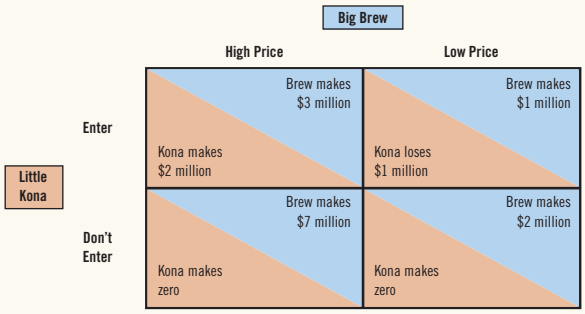
   a. Fill in the following payoff matrix:



   b. What is the likely outcome? Explain your answer.
   c. If you get this classmate as your partner on a series of projects throughout the year rather than only once, how might that change the outcome you predicted in part (b)?
   d. Another classmate cares more about good grades: She gets 50 units of happiness for a B and 80 units

of happiness for an A. If this classmate were your partner (but your preferences remained the same), how would your answers to parts (a) and (b) change? Which of the two classmates would you prefer as a partner? Would she also want you as a partner?

7. A case study in the chapter describes a phone conversation between the presidents of American Airlines and Braniff Airways. Let's use game theory to analyze the interaction between the two companies. Suppose that each company can charge either a high price for tickets or a low price. If one company charges $300, it earns low profit if the other company also charges $300 and high profit if the other company charges $600. On the other hand, if the company charges $600, it earns very low profit if the other company charges $300 and medium profit if the other company also charges $600.
   a. Draw the payoff matrix for this game.
   b. What is the Nash equilibrium in this game? Explain.
   c. Is there an outcome that would be better than the Nash equilibrium for both airlines? How could it be achieved? Who would lose if it were achieved?
8. Two athletes of equal ability are competing for a prize of $10,000. Each is deciding whether to take a dangerous performance-enhancing drug. If one athlete takes the drug and the other does not, the one who takes the drug wins the prize. If both or neither take the drug, they tie and split the prize. Taking the drug imposes health risks that are equivalent to a loss of X dollars.
   a. Draw a 2×2 payoff matrix describing the decisions the athletes face.
   b. For what X is taking the drug the Nash equilibrium?
   c. Does making the drug safer (that is, lowering X) make the athletes better or worse off? Explain.
9. Little Kona is a small coffee company that is considering entering a market dominated by Big Brew. Each company's profit depends on whether Little Kona enters and whether Big Brew sets a high price or a low price:



   a. Does either player in this game have a dominant strategy?
   b. Does your answer to part (a) help you figure out what the other player should do? What is the Nash equilibrium? Is there only one?
   c. Big Brew threatens Little Kona by saying, "If you enter, we're going to set a low price, so you had better stay out." Do you think Little Kona should believe the threat? Why or why not?
   d. If the two firms could collude and agree on how to split the total profits, what outcome would they pick?

QuickQuiz Answers

1. **d** 2. **c** 3. **a** 4. **d** 5. **c** 6. **b** 7. **d** 8. **b**