

CHAPTER

“PEOPLE OF THE SAME TRADE SELDOM MEET TOGETHER, EVEN FOR MERRIMENT AND DIVERSION, BUT THE CONVERSATION ENDS IN A CONSPIRACY AGAINST THE PUBLIC, OR IN SOME CONTRIVANCE TO RAISE PRICES.”

—Adam Smith, *The Wealth of Nations*



A MARKET EXAMPLE: OLIGO-RAZOR

You own Oligo-Razor. Oligo-Razor is a manufacturer in a fictionalized U.S. razor market. We'll pretend that there are four firms in this market. Economists would consider our make-believe razor market to be oligopolistic, meaning that it's in between a monopoly (where there is just one firm) and perfect competition (where there are a large number of firms).

Oligo-Razor makes little economic profit since it's in a pricing war with the other three razor firms. Customers consider all razors to be the same and so they buy the cheapest razor. So, all four razor manufacturers compete for customers just on price.

Oligopolistic markets—are in between a monopoly (where there is just one firm) and perfect competition (where there are a large number of firms).

Each firm charges \$6 a razor. At this price you and all the other firms make only a small economic profit. Unfortunately, there is no other price you could set that would earn you higher profit. If you charged a lower price, you would initially increase sales (although you would earn less profit from each sale), but then your three rivals would quickly cut their prices to regain lost customers. If you charged a higher price, you would lose most of your customers to the other three firms. You scheme, therefore, to transform the razor market so that it will provide higher profits to Oligo-Razor.

ANTITRUST OBSTACLES

First you consider buying the other three razor manufacturers, but your lawyer laughs at this idea. Because you are such a large company, the U.S. Department of Justice's Antitrust Division would have to consent to your purchase of the other razor firms. Your lawyer explains that since the Antitrust Division tries to prevent monopolies from forming, it would never approve these purchases.

So you can't buy the other firms. But perhaps all four razor companies could come to an agreement to set higher prices. If the four companies charged \$10 a razor, you could all make substantial economic profits. You therefore ask your lawyer

CHALLENGE TO MARKET EFFECTIVENESS 2: OLIGOPOLIES

LEARNING OBJECTIVES

AFTER READING THIS CHAPTER, YOU SHOULD BE ABLE TO:

- Explain the Prisoners' Dilemma.
- Discuss how oligopolies use product differentiation to escape the Prisoners' Dilemma.
- Identify oligopolies' incentives to innovate.
- Evaluate how antitrust laws affect oligopolies.

to write a letter to the other firms proposing that the four companies agree to sell razors for no less than \$10 each. Your lawyer gags at this idea and says, "You're kidding, right? Please tell me you're just kidding." It seems that agreements among companies to raise prices violate antitrust laws. If your lawyer actually wrote such a letter, both of you would probably go to prison. So you tell your lawyer that of course you were just kidding. But then you ask him how you can legally get the other firms to raise their prices.

AN IMPLICIT AGREEMENT TO RAISE PRICES

Your lawyer explains that although the four razor firms can't legally come to a formal agreement to raise prices, it's perfectly legal for all four firms to just happen to raise prices at the same time. As long as the firms don't discuss or formally coordinate their price increases, no law would be broken if you all near-simultaneously raised prices.

You therefore decide to increase the price of your razors to \$10 each. Unfortunately, none of the other firms increases its price, so after a week you lower your price to \$4 a razor. You lose money at this low price since the average total cost of making a razor is greater than \$4. But the other three firms also lose money when you charge only \$4 a razor because they must now either charge a very low price themselves or lose most of their customers to you.

After charging \$4 a razor for three weeks, you again increase your price to \$10 per razor. This time the other three firms follow your lead and increase their prices to \$10. Although you never talked with them, they figured out that if they didn't match your price increase, you would quickly lower your price again. By raising, lowering, and then raising your price, you sent a clear but legal signal to the other firms that you wanted them all to set a price of \$10. Each razor firm makes higher profits if they all charge \$10 rather than \$6 per razor. Consequently, once the other firms figured out what you were asking of them, they eagerly went along with your implicit request for a joint price increase.

THE CHALLENGE OF MAINTAINING HIGH PRICES

Greed, unfortunately, makes it difficult for the four firms to keep charging high prices. When you all charge \$6 a razor, each firm makes a low profit. When you all charge \$10 per razor, each firm makes a high profit.

But if the other three firms charged \$10 while you charged only \$9 you would earn an *extremely* high profit. Remember that in this market customers care only about price and so will buy the cheapest razor. So if one firm charges a relatively high price of \$9 per razor while the other firms charge even more, the initial firm will get most of the customers while still making a high profit on each razor. Alas, this means that each firm has an incentive to cheat by undercutting the implicit agreement.

Of course, if one firm cheated on the agreement by charging \$9 per razor and the other firms found out, they would lower their prices to at least \$9 and the cheating firm would lose its low-price advantage. But if one firm could cheat without the other three firms finding out, then the cheating firm would increase its profit. Let's see how such cheating might occur.

THE IMPLICIT-AGREEMENT FRAYS

An assistant manager at Oligo-Razor returns from her Maine vacation with some troubling news. One of your rivals is selling razors in a few small Maine towns for below \$10. This rival was no doubt hoping that it could secretly cut prices in a few out-of-the-way areas. By selling razors in these towns for under \$10, the rival captured most of the customers in these markets. And if the price cutting had stayed secret, none of the other razor firms would have lowered their prices in retaliation.

The next piece of bad news comes from the Pelham supermarket chain. Pelham had been buying all its razors for \$10 each. (Pelham resells the razors to its customers for more than \$10.) Pelham used to purchase some razors from each of the four razor firms. But last week Pelham started buying all its razors from just one of your rivals. You call the president of Pelham to ask why he stopped buying your razors. The president at first seems reluctant to answer your question but then confesses that another firm has been giving it a secret \$2-per-razor discount. You feel betrayed by your price-cutting rival and so offer Pelham a \$2.10 per razor discount. Pelham accepts the discount and resumes stocking its shelves with your razors. (Unknown to you, however, Pelham was never offered a discount by any of your rivals. The president of Pelham lied so you would give him a discount.)

You finally get some good news when your top salesman announces that he has won the exclusive contract to sell razors to the Deerfield supermarket chain. Deerfield will even pay \$10 a razor. Your salesman, however, confesses that he promised to give Deerfield a \$3 per item discount on another good that Oligo-Razor sells. So while

technically you are keeping to the implicit agreement to charge \$10 a razor, you are effectively giving Deerfield a razor discount. Oh, well; as long as your rivals don't find out about this discount, they won't retaliate by lowering their prices.

WAL-MART'S ALWAYS LOW PRICES

The four razor firms sell more to Wal-Mart than to anyone else. Wal-Mart became extremely angry when you all raised the price of razors from \$6 to \$10. You figured, however, that since Wal-Mart had to sell razors in its stores, it couldn't hurt you if the four manufacturers kept to the implicit agreement of charging \$10 per razor. But you made a mistake. Wal-Mart is by far the world's largest retailer. Wal-Mart likes low prices; it has unmatched retail market power, and it uses this power to obtain low prices.

Two months after you raise the price of razors, Wal-Mart summons you and representatives from the other three razor companies to its Arkansas headquarters. Wal-Mart informs you that from now on it will pay only \$5.60 per razor. And if you all refuse to sell razors to Wal-Mart for \$5.60 then, Wal-Mart says, it will encourage Chinese businesses to start making razors for Wal-Mart. Since Wal-Mart imports a tremendous number of goods from China, all the razor companies believe that Wal-Mart could completely bypass them and buy just Chinese-made razors. Not willing to lose their Wal-Mart sales, all the razor companies agree to sell razors to Wal-Mart for \$5.60 each. And once Wal-Mart gets this low price, other retailers demand sub-\$6 per razor prices as well.

While flying home you realize how clever and ruthless Wal-Mart is. \$5.60 is just slightly above the marginal cost of making a razor. If Wal-Mart had demanded a price a smidgen lower than \$5.60 the razor companies would have been better off not selling razors to Wal-Mart. Wal-Mart obviously spent the last two months determining your costs. (Perhaps this is why they hired away your chief accountant 50 days ago.) Wal-Mart used this knowledge to figure out the lowest possible price at which you would still be willing to sell them razors. In your anger you think of Wal-Mart as a parasite that determined exactly how much blood it could regularly suck from its host without killing it. (Of course, Wal-Mart considers the four razor companies to be monopolist wannabees that feebly attempted to use their market power to rip off customers.)

USING TRADE BARRIERS TO COUNTER WAL-MART'S CHINESE STRATEGY

You formulate a long-term plan to beat Wal-Mart. The four razor companies make large contributions to many congressmen and so have considerable political influence. If you could all use this influence to get the United States to impose a large tariff on Chinese razors, you could again force Wal-Mart to pay \$10 per razor.

The razor employee unions, furthermore, should be willing to provide political help. Many unions hate Wal-Mart since the retail giant employs little union labor. Furthermore, you will tell your unions that if the government doesn't impose a steep tariff on Chinese razors, you will have to move your razor factories to China. (Just to make this threat believable, you consider starting a small factory in China and firing a few U.S. employees on the pretext that their jobs are now being done by the Chinese.) The unions, therefore, should be willing to use all their political power to try to prevent any future importation of Chinese razors. But it will take several years before you have any chance of getting this tariff implemented. Until then, you seek a way to make substantial economic profits.



WHY YOU DIFFERENTIATE YOUR RAZORS

Wal-Mart has power over you because customers consider all razors to be perfect substitutes for each other. Consequently, Wal-Mart can replace your razors with Chinese-made razors without upsetting shoppers.

Similarly, price competition in the razor business is usually so fierce because customers believe all razors to be alike. If all razors are perceived to be identical, then the customers will buy the cheapest razor. Such customer behavior provides a powerful incentive for each firm to sell the lowest-priced razor. But when all firms seek to offer the cheapest razor, the price of razors gets pushed down to a level where no firm makes much of a profit.

You decide, therefore, to differentiate your razors. You don't want customers going to the store looking for a mere razor. Instead you want them going to the store looking for an *Oligo-Razor*. Then, even if your razors cost a dollar more than your rivals' most of your customers will stick with Oligo-Razors. Similarly, if customers go to Wal-Mart intent on buying Oligo-Razors then Wal-Mart couldn't easily replace your products with cheap Chinese imports.

HOW YOU DIFFERENTIATE YOUR RAZORS

To differentiate your razor, you first get your engineers to change the shape of the blade to offer a sharper cut. Next you hire a design firm to make your razor stylish and elegant. Then you get your marketing people to come up with a snappy brand name. Finally, you fund a big-budget advertising campaign that associates your brand name with your razor's superior performance and chic design. No longer, you hope, will customers think of other razors as strong substitutes for Oligo-Razors.

Your attempts at product differentiation succeed only partially. Modern Americans are so bombarded with advertisements that many are immune to their effects. So while some customers are willing to pay a bit more for your razor than others, most customers still consider all razors to be about the same. Consequently, despite your best efforts, many shavers still just buy the lowest-priced razor.

COMPLICATED PRICING

You decide, therefore, to confuse customers by making it difficult for them to calculate which razor really is the cheapest. Customers need to buy both razors and blades. Normally, customers can use any company's blades in any other company's razor. Consequently, customers seeking low prices buy the cheapest razors and the cheapest blades. But now you deliberately make your razor incompatible with other companies' blades. After today, only Oligo-Razor blades will fit inside of Oligo-Razors. You further decide to sell your razor for a very low price (below its average total cost) while you sell your blades for a much higher price than competitors' blades. Consequently, customers have trouble figuring out which shaving system is really the cheapest. Furthermore, customers who buy razors without checking the price of blades will mistakenly think that your product sells for the lowest price.

INCOMPATIBILITY AND LOCK-IN

By making your razor incompatible with other firms' blades you also lock existing customers into your product line. Once a customer has paid for your razor, he will have to buy another razor if he switches to another firms' blades. Incompatibility, therefore, makes other firms' razor blades poor substitutes for Oligo-Razor blades. Furthermore, after a customer has bought an Oligo-Razor, he would be disappointed if a store, such as Wal-Mart, didn't sell Oligo-Razor blades.

CONCLUSION TO THE OLIGO-RAZOR STORY

Your attempts to get all razor firms to raise their prices failed. You were, however, able to use product differentiation, complicated pricing, and incompatibility to make other shaving systems imperfect substitutes for your own. Consequently, you have reduced the ferocious price competition that used to limit your profits.

CONFESSIONS OF AN ECONOMIST

You have just finished reading a long story about an oligopolistic firm. Unfortunately, when discussing oligopolies, all economic theorists really have are plausible stories.

Economists have excellent theories to explain what happens in perfectly competitive and monopolistic markets. Sadly, we have more difficulty determining what happens in markets that lie between perfect competition and monopoly. This is because we can't be sure when oligopolistic firms will compete and when they will cooperate.

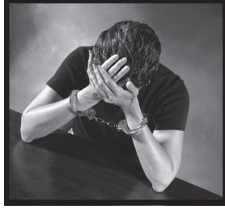
Imagine that if the market for razors were a monopoly, then the monopolist would earn \$1 billion a year in profits. If the market were perfectly competitive, as we learned in Chapter 9, intense competition would drive long-run profits to zero. But if the razor market were oligopolistic, then the firms could collectively earn anywhere between \$1 billion and zero. If the firms manage to completely cooperate, they will collectively earn the same as a monopolist would have. But to the extent that the oligopolistic firms compete, their profits dissipate, perhaps even going to zero.

Why, you must ask, wouldn't oligopolistic firms figure this all out and decide to cooperate? Well, market forces put tremendous pressure on oligopolies to compete. Sometimes oligopolists can find ways to lesson or resist this pressure. But other times oligopolists capitulate to the pressure and compete away their profits. Unfortunately for economists, we don't have a reliable theory that tells us when oligopolists succeed in cooperating. But economists do understand the forces that often thwart oligopolists' efforts at such cooperation. And the starting point for understanding these forces is the Prisoners' Dilemma.

| Industry | Percent of U.S. Market Controlled by Largest Four Firms in the Industry ¹ |
|--|--|
| Breweries | 90.5 |
| Cigarette manufacturing | 95.3 |
| Electric lamp bulb and part manufacturing | 89.6 |
| Light truck and utility vehicle manufacturing | 96.7 |
| Guided missile and space vehicle manufacturing | 95.3 |

A Few Oligopolistic Industries

Source: "Concentration Ratios: 2002", U.S. Census Bureau, 2002.



THE PRISONERS' DILEMMA

Although the Prisoners' Dilemma is a "game" that applies to oligopolies, the game, as its name implies, concerns prisoners. Here's how the Prisoners' Dilemma story goes:

The police arrest two criminals guilty of both murder and illegal weapons' possession. The police can easily prove that both men violated weapons laws and could consequently imprison each criminal for one year. If the police could also establish that the criminals committed murder, however, they could send the men to the electric chair. Unfortunately, the police can't establish that either criminal committed murder unless at least one of them confesses.

- If both criminals keep quiet, at worst they'll get one year in jail.
- If either criminal confesses, both men could be sentenced to death.

The captured criminals realize the game they're in, so you might think that neither would ever confess. In the Prisoners' Dilemma story, however, the police create incentives for the men to turn on each other.

The police put the criminals, whom I will name Adam and Ben, in separate rooms. They tell Adam the following:

If Ben confesses, then

- Adam gets the death penalty if he doesn't confess.
- Adam gets life in prison if he does confess.

The police need only one man to confess to convict either criminal of murder. If Adam believes that Ben would confess, then Adam would himself benefit from confessing. If Ben confesses, then by confessing himself, Adam gets life in prison rather than the electric chair. (Assume that both Adam and Ben prefer life in prison to receiving the death penalty.) In their efforts to induce a confession, the police have now made some progress. If Adam believes that Ben will confess, then it will be in Adam's self-interest also to confess.

The police then remind Adam that they already have enough evidence to convict him on weapons charges even if neither confesses. The police tell Adam that

If Ben does not confess, then

- Adam gets one year in prison if he doesn't confess.
- Adam goes free if he does confess.

If Ben does not cooperate with the police, Adam still benefits from confessing. Adam, therefore, should always confess, since regardless of what Ben does, Adam benefits from confessing.

Having been so successful with Adam, the police use the same strategy on Ben. Ben consequently finds it in his self-interest to confess. The police, therefore, have induced both men to confess and put them in jail for life.

Figure 11.1 illustrates the Prisoners' Dilemma. The result is counterintuitive. If both men had kept quiet, they would have gotten only one year in jail. By talking, both criminals get life. Shouldn't the men understand the game they are in and adopt different strategies? No! If Adam thinks that Ben is not going to confess, Adam is still better off talking. Even if Adam could somehow convince Ben to stay silent, Adam would still want to confess.

Wouldn't Adam fear that his confessing would cause Ben to confess? No! The police separate the criminals. When Ben decides whether to cooperate, he has no way of knowing if Adam confessed. The police are certainly not going to tell Ben that he should not confess because his brave partner stayed silent. Ben's confession or lack of confession

| | | Ben | |
|------|-------------|--|---|
| | | Confess | Stay silent |
| Adam | Confess | Adam gets life in prison. Ben gets life in prison. <i>Adam and Ben will end up here.</i> | Adam goes free. Ben is executed. |
| | Stay silent | Adam is executed. Ben goes free. | Adam gets one year in prison. Ben gets one year in prison. |

FIGURE 11.1

THE PRISONERS' DILEMMA

Adam and Ben both simultaneously decide whether to confess or stay silent. The two prisoners end up in the box corresponding to their choices. So if Adam stays silent and Ben confesses, the parties are in the box on the lower left where Adam is executed and Ben goes free.

In the Prisoners' Dilemma game, each person is individually better off confessing. So if both Ben and Adam are rational and self-interested, they will both confess and spend their lives in prison.

will have no bearing on whether Adam talks. Consequently, each prisoner benefits from cooperating with the police, even though this causes them to both receive life sentences. The key result in the Prisoners' Dilemma is that even though all the prisoners realize that the outcome is going to be bad, they still confess, guaranteeing that the bad outcome is achieved. Of course, the police are pleased with the results of the Prisoners' Dilemma.

What if the two criminals made an agreement never to confess if caught by the police? If someone is about to commit a murder, he should always make such an agreement. This agreement, of course, shouldn't prevent him from cooperating if caught. Rather, he should make the agreement to keep his naive co-criminal quiet and then confess to escape punishment. True, this means that his partner in crime dies. But so what? She is, after all, a murderer.

DEFINITION OF A PRISONERS' DILEMMA GAME

The Prisoners' Dilemma game applies to far more groups than murderers being interrogated by the police. Generally, those stuck in a Prisoners' Dilemma game can take an action which is either selfish or altruistic. Individually, each player is better off being selfish. Yet the players are all also better off if everyone is altruistic than if everyone is selfish. Figure 11.2 illustrates the general Prisoners' Dilemma game.

FIGURE 11.2

PRISONERS' DILEMMA GAME

In this general Prisoners' Dilemma game, both players are always individually better off being selfish. Yet both players are also better off if they are both altruistic than if they are both selfish.

| | | Person Two | |
|------------|------------|--|--|
| | | Selfish | Altruistic |
| Person One | Selfish | Person One does badly. Person Two does badly. | Person One does <u>extremely</u> well. Person Two does <u>very</u> badly. |
| | Altruistic | Person One does <u>very</u> badly. Person Two does <u>extremely</u> well. | Person One does well. Person Two does well. |

STUDENTS' DILEMMA

Let's see how the Prisoners' Dilemma relates to students studying for an exam that will be graded on a curve. Imagine that 35 students are enrolled in a sociology class. The professor announces that he will curve the final exam, and regardless of how the class performs, he will award 10 A's, 10 B's, 10 C's, 3 D's, and 2 F's. None of the students in the class care about sociology and so their goal is to get a good grade without studying too much. Each student's class grade is determined entirely by the final exam.

To keep everything simple, assume that each student can study either zero or 40 hours for the final. Further assume that any given student would get the exact same grade if (1) everyone in the class, including him, doesn't study or if (2) everyone in the class, including that student, studies 40 hours. If, however, everyone else studies zero hours and you study 40 you will get an A, but if everyone else studies 40 hours and you study zero you get an F.

The students in the class would be best off if they could come to a binding agreement not to study for the final. Alas, if no one else studies, each student is better off studying himself. (Assume that a student would prefer to study 40 hours and get an A rather than not study and get an F.) So even if all the students agreed not to study, each student would have an incentive to cheat on the agreement and study for 40 hours.

In classes with curved exams, students are often in a studying Prisoners' Dilemma. When exams are curved, every student harms his classmates by studying. Consequently, the students would often be best off if they could come to some binding agreement not to study. But if no one else studies, you can earn a very high grade by studying yourself. And if everyone else studies, you have to study or you will fail. The Prisoners' Dilemma, therefore, compels students to study and would cause them to cheat on any agreement they made not to study.

Of course students in economics classes are never in a Prisoners' Dilemma. Economics is such an interesting and useful field that students always gain tremendous benefit from studying economics regardless of how such studying affects their grade.

ATHLETES' STEROID DILEMMA

Professional athletes face a Prisoners' Dilemma when deciding whether to use performance-enhancing drugs. Drugs like steroids increase athletic ability. Unfortunately, such drugs have harmful medical side effects. For a top athlete, however, it might be rational to take such drugs. It could be worth suffering the side effects of steroids to win an Olympic medal or get a multimillion-dollar professional football contract. Alas, when all athletes use steroids, none receives a competitive advantage.

Figure 11.3 shows a Prisoners' Dilemma game in which two equally matched runners compete for a prize. They each can take steroids, which would make them faster but would also give them health problems. Since the athletes have equal ability, if only one runner takes steroids, he will win. If it were worth enduring the health problems to win, then either athlete would be willing to take steroids if the other doesn't. Furthermore, if one athlete takes them and the other doesn't, then the abstainer loses. Therefore, it might well be in the interest of either athlete to take the steroids if the other does. Of course, if both runners take steroids then neither is helped in their competition. If, however, they both take the drug, then they both have to suffer the drug's negative side effects. The athletes would be better off if neither took steroids than if both injected them. Unfortunately, the Prisoners' Dilemma might cause them both to use the drugs. To reduce the harm caused by this Prisoners' Dilemma, many sports associations forbid the use of performance-enhancing drugs. Regrettably, as with all attempts to restrict the Prisoners' Dilemma, the players have incentives to cheat and so athletes often find ways around drug restrictions.

If winning is more important than avoiding health problems, then both athletes will individually always be better off using steroids. Yet the athletes are in a Prisoners' Dilemma game because they are both better off if neither uses steroids than if both use steroids.

"We may, sooner than we think, have to conclude that we can't force Olympic athletes to be drug-free any more than we could force them to remain amateurs. Never forget a survey taken in 1995, when U.S. athletes were asked: If we could give you a drug that would guarantee you a gold medal, would you take it even if you understood it would kill you within five years? More than half of America's swiftest and strongest said, 'Gimme the drug.'"²

| | | Athlete Two | |
|-------------|--------------------|---|--|
| | | Use steroids | Don't use steroids |
| Athlete One | Use steroids | Both athletes have an equal chance of winning. | Athlete One wins. |
| | Don't use steroids | Athlete Two wins. Athlete Two suffers health problems. | Both athletes have an equal chance of winning. |

FIGURE 11.3

THE PRISONERS' DILEMMA APPLIED TO ATHLETES

Most people who take steroids don't do so because they were forced to by the Prisoners' Dilemma. Rather, they take them because they are deluded. It might be worth the risk of taking steroids if they give you a chance at an Olympic gold medal. Even with the aid of steroids, however, the vast majority of people have absolutely no chance of ever entering the Olympics or making a living playing sports. When a college student takes steroids to improve his likelihood of becoming a professional athlete, he is almost certainly risking his long-term health for a trivial chance at fulfilling an unrealistic dream.

ECONOMICS MAJORS AND THE PRISONERS' DILEMMA

Economics majors tend to play the Prisoners' Dilemma game differently than other students do. In a large experiment involving students playing 267 Prisoners' Dilemma games for real money, economics majors chose the selfish action 60.4 percent of the time while noneconomics majors chose the selfish action only 38.8 percent of the time.³ There are four possible reasons for this:

1. Only the smartest students major in economics.
2. Studying economics increases the intelligence of students more than studying other disciplines does.
3. Only the most self-interested students choose economics as their major.
4. Studying economics increases students' selfishness more than studying other disciplines does.

Question: Which companies do you think are better managed: those run by people who choose the selfish or altruistic actions in oligopolistic Prisoners' Dilemma games?

THE PRICING PRISONERS' DILEMMA

Oligopolists often find themselves in a Prisoners' Dilemma with respect to pricing. Imagine that two firms produce the exact same product and can each set either a high or low price. If both firms set a high price, they earn a high profit. If both firms set a low price, they earn zero profit. So you might think that the two firms would never both set a low price. But let's assume these firms are in a Prisoners' Dilemma.

If one firm sets a low price while the other sets a high price, then the low-pricing firm will win all the customers and make an *extremely* high profit. In contrast, the firm setting a high price (while its rival charges a low price) gets no customers and so loses money. (The firm loses money because it still has to pay its fixed costs.) Figure 11.4 summarizes the game the two firms are in.

If you and another firm play the game just once, then you each have an incentive to charge low prices. If your opponent is charging a high price, then

- You earn an *extremely* high profit if you charge a low price.
- You earn a high profit if you charge a high price.

So you make a greater profit charging a low price. If the other firm is charging a low price, then

- You make zero profit if you charge a low price.
- You make a negative profit if you charge a high price.

So you again make a greater profit charging a low price.

Consequently, regardless of what the other firm does, you are better off charging a low price. Of course, if both firms follow this logic they will both charge a low price and earn zero profit. But firms trapped in a pricing Prisoners' Dilemma might

| | | Firm Two | |
|----------|------------------|--|--|
| | | Set a low price | Set a high price |
| Firm One | Set a low price | Firm One earns zero profit. Firm Two earns zero profit. | Firm One earns an <i>extremely</i> high profit. Firm Two earns a negative profit. |
| | Set a high price | Firm One earns a negative profit. Firm Two earns an <i>extremely</i> high profit. | Firm One earns a high profit. Firm Two earns a high profit. |

FIGURE 11.4

HIGH PRICE/LOW PRICE DILEMMA

still earn zero profit even though they fully understand the nature of their dilemma.

Oligopolists often face a pricing Prisoners’ Dilemma. When a few firms sell the same product, they all have incentives to lower their price to capture more customers. When all firms charge a low price, however, none earns a high profit per good sold or captures most of the customers by being the only firm to charge a low price. But if all the other firms are charging a low price, your firm needs to as well or it will have no customers.

USING THE PRISONERS’ DILEMMA

You run a company that’s being charged “too much” by its suppliers. You should first look for other suppliers. After all, if you’re being charged high prices, then your suppliers are making significant economic profits and so other companies should be eager to sell to you. Perhaps firms that make related goods could tweak their manufacturing processes to start making the inputs you need.

If, however, you can’t find another supplier, you should plunge your current suppliers into a pricing Prisoners’ Dilemma. Pretend that you buy 1,000 wing nuts a week from each of two suppliers. Both suppliers sell wing nuts for \$10 each. For simplicity assume that each supplier makes wing nuts at zero cost.

A Prisoners’ Dilemma must involve both a reward and a punishment. To create a Prisoners’ Dilemma for the wing-nut suppliers, you should reward a firm if it is the only company to lower prices and punish a firm only if it does not offer a discount. Currently, both firms sell you 1,000 wing nuts a week for \$10 each, making a profit of \$10,000 a week. To create a Prisoners’ Dilemma, you should announce that if one firm cuts its price to \$6 per wing nut you will buy all your wing nuts from this firm, giving it a profit of \$12,000 a week. Consequently, if one firm does not cut its price the other is better off charging you \$6. If both firms cut their price to \$6, you will continue to buy 1,000 wing nuts from both firms. Figure 11.5 shows the Prisoners’ Dilemma game you have created. If the suppliers can’t escape your Prisoners’ Dilemma, they will both lower their price to \$6 per wing nut.

| | | Firm Two | |
|----------|-------------|---|---|
| | | Charge \$6 | Charge \$10 |
| Firm One | Charge \$6 | <p>You buy 1,000 wing nuts a week from each firm.</p> <p>Firm One earns \$6,000 a week in profit.</p> <p>Firm Two earns \$6,000 a week in profit.</p> | <p>You buy 2,000 wing nuts a week from Firm One and none from Firm Two.</p> <p>Firm One earns \$12,000 a week in profit.</p> <p>Firm Two makes zero profit.</p> |
| | Charge \$10 | <p>You buy no wing nuts from Firm One and 2,000 a week from Firm Two.</p> <p>Firm One makes zero profit.</p> <p>Firm Two earns \$12,000 a week in profit.</p> | <p>You buy 1,000 wing nuts a week from each firm.</p> <p>Firm One earns \$10,000 a week in profit.</p> <p>Firm Two earns \$10,000 a week in profit.</p> |

FIGURE 11.5
PRISONERS' DILEMMA FOR SUPPLIERS

ESCAPING THE PRISONERS' DILEMMA THROUGH COLLUSION

Firms trapped in a pricing Prisoners' Dilemma do have a few potential means of escape, the most straightforward being collusion. Consider again the Prisoners' Dilemma games of Figures 11.4 and 11.5. Ideally the firms would come to a binding agreement whereby they both agree to charge high prices. If the Prisoners' Dilemma game is played only once, however, firms should always violate any agreement to charge high prices.

But if a Prisoners' Dilemma is played repeatedly, the participants can sometimes successfully collude. For example, imagine that two firms play a pricing Prisoners' Dilemma game each week: each week they set the price of their product. Both firms could agree always to charge high prices. If one firm cheated by setting a low price, it would suspect that the other firm would punish it in the future by charging a low price itself. When several firms in the same market explicitly agree to charge high prices, they form a cartel.

CARTELS

Cartels are organizations of producers who explicitly collude to charge high prices. The most famous example of a cartel is OPEC, the Organization of Petroleum Exporting Countries. OPEC consists of countries including Iran, Iraq, and Saudi Arabia. OPEC controls about two-thirds of the world's readily accessible oil reserves. OPEC was able to raise the price of oil from \$2 per barrel in 1972 to over \$12 per barrel in 1974. OPEC, however, was harmed by the elasticity in both the supply and demand of oil. The high price of oil induced firms to look for oil in non-OPEC countries. OPEC went from supplying 50 percent of the world's oil in 1974 to 30 percent by 1985. OPEC was further hurt by consumers responding to high oil prices by purchasing more fuel-efficient products. As OPEC discovered, not even cartels can evade the Laws of Supply and Demand.

Criminal Cartels Criminal organizations often form cartels to increase the price of illegal products. The Mafia, for example, might control the trade of cocaine and prostitution in a city. Anyone who supplies cocaine or prostitutes would have to pay the Mafia tribute and accept Mafia-dictated prices. The Mafia could increase criminals' profits by reducing price competition among criminals. By the Law of Demand, when the Mafia raises the price of illegal goods, it decreases the quantity demanded of these goods. A successful criminal cartel, therefore, should actually reduce crime.

COLLUDING TO KEEP DOWN WAGES⁴

In both South Africa in the early 20th century and the U.S. South shortly after the Civil War, employers tried to keep down the wages of black workers. South African mines relied on black workers. When one mine wanted to increase its workforce, it would offer black workers from another mine higher wages. To keep its workers from being hired away, therefore, the second mine had to raise its wages as well. Such competition for black labor harmed mine owners. The mine owners pressured the government to solve their problem. The government responded by passing the Native Labour Regulation Act. This act made it illegal for anyone to attract black miners by offering them higher wages than they currently received. The Native Labour Regulation Act succeeded in reducing price competition among miners and so kept down the wages of black workers.

After the freeing of slaves at the end of the U.S. Civil War, white landowners tried to keep down the wages of newly freed blacks. White landowners formed planters' associations whose members pledged not to pay high wages or to lure away black workers from other employers. Fortunately for the blacks, these collusive agreements failed. To attract additional labor, white landowners frequently paid relatively high wages and thus increased the wages paid by most landowners.

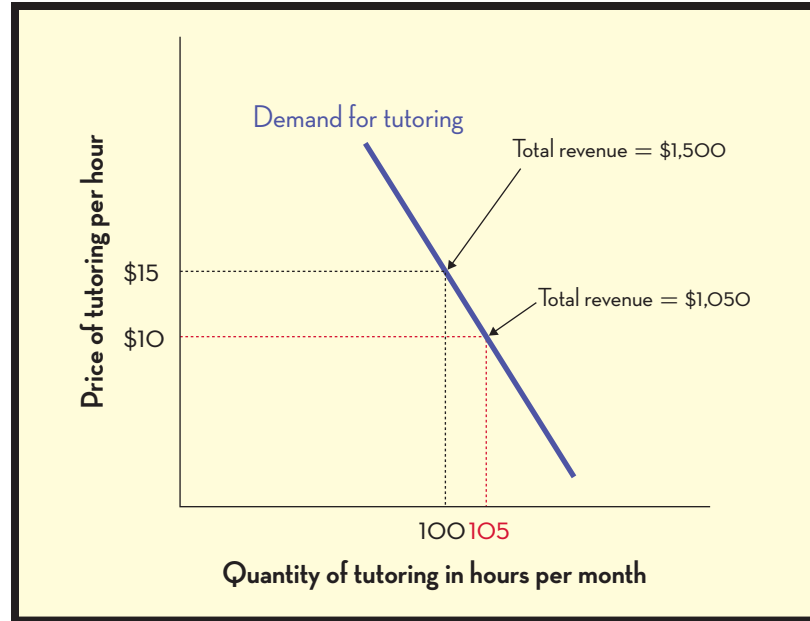
Both South African mine owners and Southern landowners tried to collude to lower black wages. The South Africans, however, had much greater success because they got the government to outlaw competition.

A TUTORING CARTEL

Imagine that you and four fellow classmates offer private economics tutoring at your college. Further assume that the opportunity cost of your time is \$10 per hour, so each of you is better off tutoring a student as long as you receive more than this amount. Figure 11.6 on page 286 shows the market demand curve for tutoring. If each of you accepts any tutoring job that pays at least \$10 per hour, you will work until the price goes down to \$10 and so, according to Figure 11.6, you will all work a total of 105 hours. At a rate of \$10 per hour, the tutors will collectively earn revenue of $\$10(105) = \$1,050$ per month. But now imagine that all five tutors collectively agree to work for \$15 an hour. By the Law of Demand this will diminish how many people want your services. According to Figure 11.6 you five will now sell only 100 hours of tutoring per month. But at \$15 per hour, the tutors will earn revenues of $\$15(100) = \$1,500$ per month. So by colluding to raise prices, the tutors can earn greater revenue while working fewer hours.

ANTITRUST LAWS AND COLLUSION

In many countries including the United States, it's a violation of antitrust laws for firms to come to an agreement to charge high prices. And although the antitrust police probably won't come after you if you start a small tutoring cartel, they do vigorously

FIGURE 11.6MARKET DEMAND
CURVE FOR
TUTORING

pursue larger cartels. A major purpose of antitrust laws, therefore, is to keep firms in a pricing Prisoners' Dilemma.

But antitrust laws can only prevent firms from making explicit agreements to keep high prices. If two or more firms just happen to charge high prices, they don't violate antitrust laws. Consequently, firms facing a Prisoners' Dilemma can't legally come to a formal agreement to keep high prices. They can both charge high prices in the hope that other firms will follow. Consider firms who set prices each month and so every month are in a pricing Prisoners' Dilemma. Each firm might reason as follows:

This month I will make a higher profit if I charge a low price because by setting a low price I will steal most of my rival's customers. But if I charge a low price this month, then next month my rival will almost certainly lower its price. I would much rather charge a high price this month than cause my rival to charge a low price in the future. Therefore, I will avoid the Prisoners' Dilemma and so forgo the chance to make an extremely high profit this month. I hope my rival is smart enough to do the same so we will both escape the Prisoners' Dilemma. Unfortunately, I can't mention any of this to my rival without violating antitrust laws.

THE DIFFICULTY OF USING COLLUSION TO ESCAPE THE PRICING PRISONERS' DILEMMA

As the story at the beginning of this chapter shows, firms often have difficulty using implicit collusion to escape a pricing Prisoners' Dilemma. Imagine that several firms have come to an implicit agreement to charge no less than \$10 for their product. Since the firms are in a pricing Prisoners' Dilemma, each would benefit if it alone lowered prices. Each firm, therefore, has an incentive to offer secret discounts to customers. Whenever a firm is worried that its rival may be offering secret discounts, it will suspect that any loss of customers is due to its rivals giving illicit discounts. Mistrust and greed, therefore, can easily destroy implicit agreements by firms to maintain high prices. Oligopolists, however, have found a few ways of reducing their own incentives to offer secret discounts to consumers.

USING “PRO-CONSUMER” POLICIES TO PROMOTE COLLUSION

Imagine you are in charge of buying office paper for your firm. Before buying the paper you get a “most favored customer” promise from the supplier. Under the promise, the paper supplier legally promises that the price you are paying for its paper is not higher than the price any other customer is paying. While “most favored customer” promises seem pro-consumer, they actually harm customers.

If all firms in an industry issue “most favored customer agreements,” then they can’t secretly cut prices for just a few customers. These legally binding promises, therefore, makes it easier for oligopolists to overcome their pricing Prisoners’ Dilemma and so maintain high prices.

Price-matching pledges, like “most favored customer” promises, can also harm customers. Imagine that Best Buy promises to match all its rivals’ prices. So, if Circuit City sells a certain type of television for \$1,209, then Best Buy pledges that it will sell the same television for no more than \$1,209. Circuit City has much less incentive to lower its price if it knows that Best Buy must immediately match any price cut. Price matching pledges can, therefore, prevent firms from lowering prices.

THE SOCIAL HARM OF COLLUSION

By the Law of Demand, when oligopolists maintain high prices they reduce sales. In the last chapter, we examined why monopolists sometimes reduce the wealth of society. Oligopolists that collude can cause social harm similar to what occurs when monopolists set high prices. Consider the following simple example:

| Customer Type | Value of an Electric Razor |
|---------------|----------------------------|
| A | \$100 |
| B | 50 |

Assume that the marginal cost of making an electric razor is only \$40. If the oligopolists were to compete fully, they would sell razors to both Customer Types A and B. But if razor manufacturers were to collude and set the price of razors at \$100, then Type B customers won’t buy razors. Since it costs only \$40 to make an extra razor and since customers in Type B value razors at \$50, then each time a razor is sold to a Type B customer, \$10 of wealth is created. Consequently, if the razor manufacturers collude to raise the price of razors above \$50, they will prevent the creation of an amount of wealth equal to \$10 multiplied by the number of Type B customers.

Generally, when oligopolists collude they raise prices above marginal costs. Consequently, customers whose valuation of the good lies between the good’s price and the good’s marginal cost won’t purchase the product. Yet if these customers bought the good at a price they found acceptable, the wealth of society would have been higher. By raising prices above marginal cost, therefore, colluding oligopolists reduce the wealth of society.

OVERCOMING THE WEALTH-DESTROYING EFFECT OF COLLUSION

This chapter has already discussed how greed can destroy collusive agreements. A firm's desire for additional profits will often cause it to violate implicit or explicit agreements to keep high prices. Markets, therefore, reduce (but don't eliminate) the harm caused by oligopolies that collude to increase prices. Later in this chapter we will see how the government sometimes mitigates, but sometimes also magnifies, the wealth-destroying effects of collusion.

MORE ON ESCAPING THE PRISONERS' DILEMMA

PRODUCT DIFFERENTIATION

Competition for Brides Firms often resort to product differentiation when they can't escape a pricing Prisoners' Dilemma through collusion. To understand the value of product differentiation, consider a tale of marriage market competition. Imagine that in ancient times there lived two young and equally desirable maidens named Aphrodite and Venus. Many noble men sought to marry the maidens. Aphrodite considered all of her suitors to be about the same. Consequently, Aphrodite announced that she would marry the man who promised to pay her family the highest bride-price.

Venus, by contrast, recognized many differences among her suitors. Venus chose her husband by considering both her suitors' personal qualities and the size of the bride price these suitors offered.

Since Aphrodite judged her suitors based only on money, each suitor knew that, to win her hand in marriage, he had to offer her family the most money. Aphrodite's suitors, therefore, had a tremendous incentive to promise a high bride-price.

The discriminating Venus received a much lower bride-price than the nondiscerning Aphrodite. Venus compared her suitors across many dimensions. The suitor promising the highest bride-price knew he wouldn't necessarily wed Venus. So the benefit of offering the highest bride-price to Venus was much lower than the benefit of being the highest bidder for Aphrodite.

Differentiation and Competition for Customers Just as our imaginary suitors competed for wives, firms compete for customers. When, like Aphrodite, customers care only about money, firms have a huge incentive to offer customers the best (meaning lowest) price. In contrast, when customers, similar to Venus, base their choice on more than just price, then firms don't have the same pressure to compete exclusively on the basis of price (in this case, by offering to sell for the lowest price). Oligopolists, therefore, often try to convince customers that their product is different from their rivals.

Let's imagine that there are three makers of plasma televisions in two different types of market competition.

Situation One—All firms sell exactly the same type of plasma televisions and compete just on price.

Situation Two—One firm makes 40-inch televisions, the second firm makes 50-inch televisions, and the third manufactures 60-inch sets.

In Situation One all firms face tremendous pressure to charge low prices. Each firm would have few sales if it charged more than a rival, while each firm would have huge

sales if it charged a little bit less than everyone else. As a result, competition could easily drive down prices to where each firm made zero profit.

In Situation Two, the three plasma makers compete with each other only indirectly. If one firm cuts prices, it would attract far fewer of its rivals' customers than it would in Situation One. As a result, each firm's price elasticity of demand is lower. The firms, therefore, have a much better chance of escaping their pricing Prisoners' Dilemma in Situation Two than Situation One.

Oligopolists sometimes use style rather than quality to differentiate their wares. For example, many DVD players have essentially the same features. Firms, however, stop customers from buying just the cheapest DVD player by stylistically distinguishing their DVD machines. If customers judge competing products on their looks as well as price, firms have diminished incentives to charge low prices.

Advertising and Brand Names It's not enough, however, just to differentiate your product. You also have to inform customers about your differentiation. Firms thus spend billions on advertising touting their products' special qualities. They hire celebrity spokespersons and formulate snappy jingles so customers might remember why their products are worth buying even if they cost a bit more than competing goods.

USING CONFUSING PRICES TO ESCAPE THE PRISONERS' DILEMMA

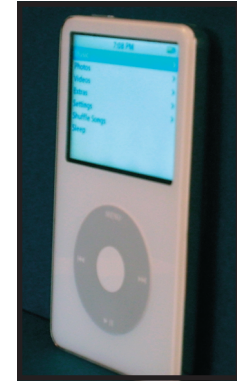
You're offered a choice between two long-distance services. The first plan charges you five cents a minute and the second charges you six. Obviously, you should go with the first, cheaper, plan. Long-distance providers, however, rarely offer such a stark choice. They present complicated pricing plans that make it difficult to compare long-distance packages.⁵

Complication reduces the damage of price competition. When firms compete directly on price, it's easy for customers to compare. Consequently, there is a massive incentive for every firm to undercut its rivals. When everyone uses complicated pricing schemes, however, the benefits to undercutting your rivals diminish since customers will be challenged to find the low-cost provider.

Airlines achieve complicated pricing through frequent-flyer programs. Frequent-flyer miles effectively change the price of airline tickets. They make it difficult to determine which airline offers the lowest price and consequently reduce the benefit to firms of undercutting their rivals.

Complication reduces the harm of a pricing Prisoners' Dilemma. With complicated pricing, customers can't easily discern which firm is charging the least. Consumers, therefore, won't flock to the low-priced firm. Also, when prices are complicated, firms don't get as significant a benefit from offering the lowest prices. So complicated prices both (a) reduce the incentive for firms to cut prices and (b) reduce the harm to one firm if a rival decreases its price.

Confusing Pricing and Rationality This textbook has assumed that consumers make rational decisions. Does the above analysis on confusing pricing contradict this? No! Everyone, including rational people, has limited amounts of time. It might take a certain rational person three hours to figure out which of five cell phone plans offers the lowest rate. Rather than spend this time to save a few dollars, a rational person might instead intelligently guess which plan is the best for him. This rational consumer knows he might pick the wrong plan, but it's not worth the three-hour cost to him to eliminate any chance of error.



APPLE'S IPOD IS SOLD WITH STYLE.

Confusing Pricing as Price Discrimination⁶ Recall from the last chapter that supermarkets use coupons to price discriminate. Only price-sensitive customers will take the time to use coupons. As a result, coupons allow stores to charge higher prices to price-insensitive customers. Confusing pricing has a similar effect.

Imagine that five cell phone companies each offer five plans. Price-sensitive consumers will take the time to find the plans that are the best for them. In contrast, price-insensitive consumers will guess at which plan is the best. As a result, confusing pricing causes price-insensitive customers to pay, on average, higher prices.

OLIGOPOLIES' INCENTIVE TO INNOVATE

Oligopolies probably have greater incentives to innovate than any other type of firm. Unlike firms in perfect competition, an oligopolist's innovation won't be immediately copied by competitors. Unlike monopolists, oligopolies face direct competition and so must often innovate to survive. But their willingness to engage in disruptive innovation is the primary reason oligopolists usually innovate more than monopolists do.

DISRUPTIVE INNOVATION

Imagine that your firm spent \$1 billion developing a drug called Memory-27 that improves the memory of Alzheimer's patients by 27 percent. (Alzheimer's disease gradually destroys the memory of its victims.) One of your scientists, however, comes up with an idea for another drug named Memory-28 that would improve Alzheimer patients' memory by 28 percent. Unfortunately, a patient wouldn't benefit from taking both drugs. So once someone took Memory-28 he would receive no additional memory gain from also taking Memory-27. Developing Memory-28 would cost your pharmaceutical company another \$1 billion. Should you develop Memory-28?

Since it's a bit better, Memory-28 would destroy the market for Memory-27. But since it's just a *bit* better, developing Memory-28 wouldn't significantly increase the demand for your firm's memory products. Sure, if you could develop Memory-28 for free, you would do it. But spending \$1 billion to develop Memory-28 is probably a bad investment.

Now, however, imagine that the scientist who proposed Memory-28 quits to take a job with another pharmaceutical firm. This second firm currently has no memory drugs. The second firm is therefore vastly more interested in developing Memory-28 than your firm because developing Memory-28 wouldn't reduce the demand for any of its products. If the market for memory-improving drugs were a monopoly, however, there wouldn't exist any other firms with the capacity to make Memory-28, so this slightly better drug would remain undeveloped.

Developing Memory-28 would be an example of disruptive innovation. Disruptive innovation reduces the value of existing products or services. In general, firms are reluctant to develop innovations that reduce the value of their current products by cannibalizing sales. In monopolistic markets, therefore, innovation is limited because disruptive innovation would usually harm the monopolist's product line. In oligopolistic markets, however, firms are usually willing to develop innovations that harm rival firms but not themselves.

Disruptive Innovation Benefits Society Disruptive innovation is almost always wealth-enhancing. Although it can reduce the value of individual firms, it usually increases the wealth of society by giving it better products.

Innovation is the most important wealth-creating activity firms engage in. But, as we will see in Chapter 13, because of something called *technological spillovers*, firms usually spend less on innovation than would be socially optimal. So oligopolists' relative willingness to conduct disruptive innovation benefits society.

The following are examples of disruptive innovation:

- **Bell Telephone**—Telephone service decimated the market for telegraphs.
- **Black & Decker**—It offered cheap electronic tools for homeowners and disrupted the market for professional tools.
- **Charles Schwab**—This firm offered discount stock brokerage service and so disrupted the traditional full-service (expensive) brokerage market.
- **Dell Inc.**—By selling computers directly to consumers, it was initially able to sell products at a lower price than other computer manufacturers who sold their products through stores. Dell forced other manufacturers to find ways to lower their prices.
- **eBay**—This online auction firm challenged traditional retailing companies.
- **Expedia**—Online travel agencies such as Expedia have disrupted the walk-in travel agencies by offering lower prices.
- **Kodak**—Its simple-to-use camera allowed amateurs to take pictures and so disrupted the market for professional photography.
- **Linux**—This open source, not-for-profit operating system has disrupted the market for operating systems.
- **McDonald's**—By selling fast, inexpensive food, it disrupted the market for mom-and-pop diners.
- **Pixar**—Digital animation produced by firms such as Pixar has almost destroyed the traditional noncomputer-created animation market that had been dominated by Disney.
- **University of Phoenix**—By providing cheap, online college education, it is currently disrupting the college market.
- **Yahoo Email**—E-mail providers such as Yahoo have disrupted the market for traditional mail and have (sadly) facilitated the partial replacement of junk mail by spam.

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THE PRISONERS' DILEMMA AND DISRUPTIVE OLIGOPOLISTIC INNOVATION

Oligopolists, however, sometimes collude to avoid disruptive innovation. For example, consider the situation of the big three U.S. car companies (General Motors, Ford, and Chrysler) before they faced significant foreign competition. Each company could have won more customers through innovation. Such innovation might have led to safer, more reliable, and more fuel-efficient cars.

Imagine that you own one of the automobile firms. If none of the other firms innovates, your firm will gain many customers through innovation. Furthermore, if another firm innovates, you will have to innovate or suffer a devastating loss of demand. Consequently, regardless of what the other firms do, your firm receives higher profits from innovating. But since innovation is expensive, you're better off if no one innovates than if everyone innovates. Once the Japanese started selling cars in the

Generally, just as oligopolies benefit from colluding to maintain high prices, they can also benefit from colluding to reduce innovation expenditures. But colluding to suppress innovation is far more dangerous than colluding to set high prices.

Consider three oligopolistic firms in a market. First assume they all collude to charge high prices. If a new firm enters their market and charges low prices, then the old firms could quickly lower their prices to compete successfully with the new firm. But now assume that the three old firms collude to eliminate innovation in their market. A new firm, however, secretly spends a few years innovating and developing better products than the old firms sell. Once the new firm enters the market and starts selling its innovative products, it will take the old firms a few years of innovation to produce products comparable to the new firm's goods. Of course, the old firms might not survive the next few years.

ANTITRUST LAWS

Antitrust laws prohibit firms from colluding or attempting to acquire monopolies. These laws can reduce the deadweight loss caused by monopolies and oligopolies. Antitrust laws, however, are not written and enforced by a benevolent, all-knowing economist wizard. Rather, antitrust laws are enacted and interpreted by imperfect government agents. Sometimes these agents help consumers, but sometimes antitrust law enforcement harms consumers and destroys wealth.

BENEFICIAL ANTITRUST ENFORCEMENT

The 1899 court decision *The United States v. Addyston Pipe and Steel Corporation* presents an ideal example of when antitrust laws should apply. In this case, six manufacturers of cast-iron pipes formed an explicit agreement to jointly set prices. The manufacturers attempted to increase prices by eliminating price competition. Such an agreement would have created a deadweight loss by restricting output below its socially optimal level. The court invalidated the price-setting agreement. In the United States, courts will almost always void agreements among firms that eliminate price competition. Organizations, however, often present consumer-oriented justifications for restricting price competition.

In the 1978 case *National Society of Professional Engineers v. The United States*, the engineering association argued that price competition among engineers harms consumers. The National Engineering Society had a code of ethics forbidding members from competing on price. The Society claimed that if engineers competed on price, they might offer cheap but low-quality services. The Society claimed that consumers should pick the best, not the cheapest, engineer.

Economists, however, believe that consumers are smart enough to understand trade-offs between price and quality. In circumstances in which all engineers could competently complete a task, rational consumers will hire the cheapest engineer. In tasks that require great skill, many consumers will pay more for excellence. In *National Society of Professional Engineers v. The United States*, the U.S. Supreme Court took the position most economists would favor and ruled against the engineering society. The ruling reduced the prices that consumers pay for engineers. The Supreme Court, therefore, forced engineers back into a pricing Prisoners' Dilemma and so reduced their profits.

SHOULD ANTITRUST LAWS BE USED AGAINST THE NCAA?7

College athletic programs have been remarkably successful at eliminating price competition for star players. Top college football and basketball players receive free housing, food, and tuition. But the National College Athletic Association (NCAA) rules forbid colleges from giving players cash salaries. Colleges claim that these salary bans actually benefit athletes. Colleges, however, certainly benefit from not having to pay their players salaries.

Some college football and basketball games attract large audiences and generate significant revenue. If colleges competed on the basis of salaries for athletes, some players would undoubtedly make in excess of \$100,000 per year.

Any college that paid salaries to athletes would be expelled from the NCAA leagues and would therefore not be able to play games against other college teams. Do you think that antitrust laws should be applied against the NCAA to force colleges to compete on prices for athletes?

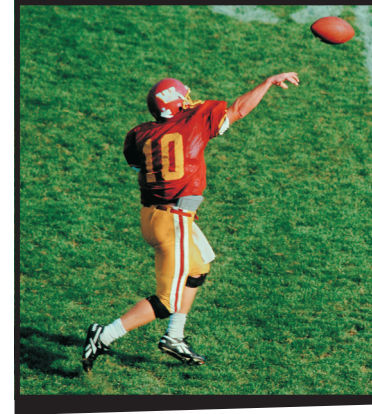
Colleges with mediocre teams could benefit from top schools' refusal to pay athletes. If around 10 of these colleges started paying athletes, they could attract the best players. These schools would be kicked out of the NCAA, but they could play against each other. Since these schools would attract the top players, they would have the most interesting games, and their sports revenues would significantly increase. The Prisoners' Dilemma would then force other colleges to pay their athletes. These first schools, however, would probably have a few glory years where only they would get the best amateur athletes money could buy.

Reputation is the most important recruiting tool colleges have. The top athletes want to go to schools with the best programs. Normally, it's nearly impossible for schools with mediocre teams to recruit the best players. Many of the best players hope to eventually play professionally, so they want to get practice playing on teams that also have excellent athletes. If a few schools started paying students, they could attract a large number of top players, and so they could overcome the barriers to recruiting that their mediocre reputations create. Once other schools start paying, however, these schools would still benefit from having a good reputation and so they might be able to continue recruiting top talent. Of course, the colleges that currently have the best players would be devastated if the schools with mediocre teams started paying players.

HARMFUL ANTITRUST RULINGS

The IBM Antitrust Case In 1969 the U.S. government brought an antitrust case against computer-maker IBM. The government claimed that IBM had an illegal computer monopoly. In 1982 the government dropped the case, admitting that it was without merit. During its 13 years, however, the case generated 66 million pages of documents. Many of these documents were written by lawyers who were paid far more per hour than computer engineers. Imagine how much better computers would be today if IBM had devoted the resources it spent fighting the government to researching and creating computing technology instead.

By the early 1990s IBM utterly lost its dominance of the computer market to Microsoft and Intel. So to recap: the government spent 13 years trying to prove that IBM unfairly monopolized the computer market. Eventually the government itself realized that its antitrust claim was misguided. Shortly after the government dropped its antitrust case, the market terminated IBM's dominance of the computer industry.



Predatory Pricing⁸ Antitrust laws sometimes sacrifice the interests of customers to promote the welfare of firms. For example, antitrust laws occasionally punish firms for charging low prices. Nothing plausible in economic theory says that low prices harm consumers. Many lawyers, however, believe in the theory of predatory pricing. According to predatory pricing theory, firms initially charge low prices to drive other firms out of their market. Then, when the predatory firm becomes a monopolist it raises prices, thereby damaging consumers.

But predatory pricing theory doesn't hold up to scrutiny. Economists have never found any examples of successful predatory pricing, nor do we expect to. If a predatory firm did manage to drive away other businesses by charging low prices, then we would expect these or other firms to return to the market when the predatory firm started charging high prices. Furthermore, economists believe that if predatory pricing were a problem, then the antitrust police should wait for a predatory firm to start charging high prices before seeking to punish it. But predatory pricing litigation always seeks to punish firms when they charge low, not high prices.

In Chapter 7 we saw how governments impose trade tariffs to raise the price of goods. Since firms like high prices, they sometimes induce a government to force consumers to pay these high prices. We should therefore not be surprised that firms sometimes use antitrust laws to increase the prices that consumers must pay. Remember that firms desperately seek to avoid pricing Prisoners' Dilemmas. Antitrust laws are supposed to keep firms stuck in these dilemmas. But firms sometimes use their influence with lawmakers to subvert antitrust laws.

Always Guilty of Something By aggressively using laws against predatory pricing, price gouging, and collusion, a government can find some way of criminalizing a firm's pricing decisions. Imagine, for example, that a politician sets out to prosecute the owner of a gas station.

If the gas station charges less than its competitors, then the firm can be accused of predatory pricing. The politician could claim that the gas station is setting a low price to drive its competitors out of business so it can obtain an illegal monopoly.

If the gas station charges more than its competitors, then the firm can be charged with price gouging. Recall from Chapter 3, governments sometimes criminalize so-called price gouging. A firm engages in pricing gouging when it sets a price higher than what politicians deem fair.

If the gas station charges the same price as its competitors, then the firm can be prosecuted for engaging in collusion. It's not illegal for two firms just to happen to choose the same price. But governments sometimes use similar pricing as evidence that firms must have illegally colluded. This all means that firms can't afford to make enemies of some powerful politicians, for such politicians have the ability to punish firms.

QUESTIONS YOU SHOULD BE ABLE TO ANSWER AFTER READING THIS CHAPTER:

- 1 What is an oligopolistic market? (page 272)
- 2 What is the Prisoners' Dilemma? (pages 278-279)
- 3 Why do both criminals confess in the Prisoners' Dilemma? (pages 278-279)
- 4 How does the Prisoners' Dilemma relate to students studying for a class? (page 280)

- 5 How does the Prisoners' Dilemma relate to steroid use among athletes? (pages 280-281)
- 6 What is the pricing Prisoners' Dilemma? (pages 282-283)
- 7 How can a firm utilize the Prisoners' Dilemma? (pages 283-284)
- 8 How can firms use collusion to escape the pricing Prisoners' Dilemma? (page 285)
- 9 What are cartels? (page 285)
- 10 Why might the Mafia reduce crime? (page 285)
- 11 Why might tutors form a cartel? (page 285)
- 12 Why do antitrust laws often force firms to resort to implicit collusion? (pages 285-286)
- 13 What obstacles often prevent firms from implicitly colluding? (page 286)
- 14 How can oligopolistic collusion destroy wealth? (page 287)
- 15 Why do oligopolistic firms often try to differentiate their products? (pages 288-289)
- 16 How can oligopolistic firms differentiate their products? (pages 288-289)
- 17 How does product differentiation lessen the harm to firms from the pricing Prisoners' Dilemma? (pages 288-289)
- 18 Why do firms advertise? (page 289)
- 19 How can confusing prices help oligopolies? (page 289)
- 20 Why do oligopolies have tremendous incentives to innovate? (page 290)
- 21 What is disruptive innovation? (page 290)
- 22 Why are oligopolies more likely than monopolists to engage in disruptive innovation? (page 290)
- 23 How does the Prisoners' Dilemma relate to disruptive oligopolistic innovation? (page 291)
- 24 Why is it more dangerous for firms to collude to suppress innovation than for firms to collude to increase prices? (page 292)
- 25 What were the facts behind *The United States v. Addyston Pipe and Steel*? (page 292)
- 26 What were the facts behind *National Society of Professional Engineers v. The United States*? (page 292)
- 27 What happened in the 1969 IBM antitrust case? (page 293)
- 28 What is predatory pricing and why do economists believe that antitrust laws should not be used against firms that charge low prices? (page 294)

STUDY PROBLEMS

1 Which of the following are Prisoners' Dilemma games? (Firm one's profit is the top number while Firm two's profit is the bottom number in each square.)

| | | | | | |
|--------|-------------|--------------------|----------------|--------------------|--------------------|
| | | Firm 2 | | Firm 2 | |
| | | High prices | Low prices | High prices | Low prices |
| Firm 1 | High prices | \$1,000 \$1,000 | \$0 \$1,500 | \$1,000 \$1,000 | \$0 \$1,500 |
| | Low prices | \$1,500 \$0 | \$500 \$500 | \$1,500 \$0 | \$2,500 \$2,500 |
| | | Firm 2 | | Firm 2 | |
| | | High prices | Low prices | High prices | Low prices |
| Firm 1 | High prices | \$1,000 \$1,000 | \$0 \$0 | \$5,000 \$5,000 | \$800 \$6,500 |
| | Low prices | \$0 \$0 | \$500 \$500 | \$6,500 \$800 | \$3,000 \$3,000 |

- 2 Imagine that a politician believes oligopolies are cheating customers by colluding to charge high prices. To monitor oligopolies' behavior, this politician forces all oligopolies to publish the prices they charge all their customers. Why might this politician have increased oligopolistic price collusion?
- 3 Imagine that the only two candidates for a political office agree to limit their campaign spending. Explain how these candidates have just overcome a Prisoners' Dilemma. Do the candidates have an incentive to cheat on their agreement?
- 4 Plastic surgery is expensive and entails some health risk. Plastic surgery sometimes does, however, improve one's prospects in the dating market. Describe how the existence of plastic surgery might create a Prisoners' Dilemma for single people.
- 5 Assume that the razors made by two firms used to be exactly the same. If the firms differentiate their razors, what would happen to the razors' cross-elasticity of demand?

- 6 Your firm has already developed drug Memory-27. Let X equal the fixed cost of developing Memory-28. The marginal cost of producing one more pill of either Memory-27 or Memory-28 is \$2. If Memory-28 has not been developed then 10 million people would pay at most \$2,000 each for one pill of Memory-27. If Memory-28 is developed then 10 million people would pay \$2100 each for one pill of Memory-28. Assume that if Memory-28 is developed the government will ban the sale of Memory-27 because it will be an inferior product. For what values of X should your firm develop Memory-28? For what values of X will some other firm develop Memory-28?
- 7 Antipolygamy laws make it illegal for a man to have more than one wife. Antipolygamy laws, therefore, reduce competition among men for wives. Do such laws benefit or harm men? Do such laws benefit or harm women? Consider the effect on both high status and low status males and females.
- 8 Under which situation are lawyers in Cincinnati better off: (a) legal clients perceive all Cincinnati lawyers to be of the same quality or (b) legal clients perceive Cincinnati lawyers to be of differing quality, but the clients disagree over which lawyers are the best and worst?
- 9 Why do oligopolists often attempt to differentiate their products from rivals? Relate your answer to what happens in the long run in perfect competition.
- 10 There are three other firms besides yours in an oligopolistic market. Until now all four of you have successfully used confusing pricing. Could you increase your profits by luring customers with a simple pricing plan?
- 11 A city is considering enacting a law forbidding stores from being open on Sundays. In what ways would such a law help stores? Keep in mind that without the law a store could always choose not to be open on Sundays.
- 12 Assume that only two firms make Zeronos. These two firms decide to divide the market. One firm agrees to sell to only men and the other firm to only women. Why might the firms do this?