

12

Price Discrimination

Facts and Tools

1. True or False: A business that price discriminates will generally charge some customers more than marginal cost, and it will generally charge other customers less than marginal cost.

Solution 1. No. Price discrimination has little to do with charging *less* than marginal cost. The goal is to charge some customers a little more than MC and others a lot more than MC.

2. Two customers, Fred and Lamont, walk into a Grady's Used Pickups. Who probably has a more inelastic demand for one of Grady's pickups: people like Lamont, who are good at shopping around, or people like Fred, who know what they like and just buy it?

Solution 2. People like Fred, who make quick, impulsive decisions, have inelastic demand: They don't shop around much and aren't very sensitive to price. Customers like Fred are every business owner's dream.

3. Who probably has more elastic demand for a Hertz rental car: Someone who reserves a car online weeks before a trip, or someone who walks up to a Hertz counter after he walks off an airplane after a 4-hour flight? Who probably gets charged more?

Solution 3. The person who shops in advance probably has a more elastic demand: If Hertz charges too much, it's easy to go to another car rental website and quickly check other prices. But after a long flight, few people are willing to wait in the Hertz line, find out the price is high, and then jump in the National or Enterprise line. This second person probably gets charged more as a result.

4. When arbitrage is easy in a market of would-be price discriminators, who is more likely to get priced out of the market: those with elastic demand or those with inelastic demand?

Solution 4. When arbitrage is easy, it's the person with the elastic demand who is likely to get priced out. Arbitrage turns this back into a normal monopoly market, and at the higher monopoly price, the price might rise above the elastic person's cutoff level.

5. If Congress passed a privacy law making it illegal for colleges to ask for parents' tax returns, would that tend to help students from high-income families or students from low-income families?

Solution 5. That would help students from high-income families. The price would settle down somewhere in between the "sticker price" and the "scholarship price," so the rich families would get a price cut.

6. At your school, what kind of students use coupons to buy their pizza? What kind of students *never* use coupons to buy their pizza?

Solution 6. The careful, price-conscious students (elastic demand) probably use coupons to buy pizza. Students with impaired judgment, a lot of money, or little time on their hands (inelastic demand) probably never use coupons.

7. Where will you see more price discrimination: In monopoly-type markets with just a few firms or in competitive markets with many firms? Why?

Solution 7. In monopoly-type markets: In these markets, individual firms face downward-sloping demand curves, and they want to pick off the customers at different price levels, if possible. But in a competitive market like for socks or fast food, if one firm tried to price discriminate, another firm would just jump in and offer a lower-but-still-profitable price. The power of free entry—key to a competitive market—makes it much harder to lump customers into different price-discrimination categories.

8. When will a monopoly create more output: When it is allowed to perfectly price discriminate or when the government bans price discrimination?

Solution 8. It will create more output when it can perfectly price discriminate. (The answer is more ambiguous when the company can only carve out two categories, as in the pharmaceutical example in the chapter.)

9. Some razors, like Gillette's Fusion and Venus razors, have disposable heads. The razor comes with an initial pack with a razor handle plus three or four heads; after that, you need to buy refills separately.

- Where do you think Gillette gets more revenue: By selling the initial pack or by selling the refills?
- The next time you buy a new razor, are you going to spend more time looking at the price of the razor or at the price of the refills?

Solution 9.

- By selling the refills. A typical person will spend much more money on refills than on the original razor handle.
- You should certainly spend more time looking at the price of the refills, just as you should spend more time looking at the cost of printer cartridges. You may even want to ask your car dealer how much they charge to replace a transmission before you buy a new car there: That's another form of tying.

10. In the United States, who is more likely to poison your alcohol: The private sector or the public sector?

Solution 10. As noted in the chapter, the government already poisons the nation's ethanol supply so that it can't be consumed.

Thinking and Problem Solving

- Subway, the fast-food chain, recently began selling foot-long sandwiches for \$5 each in a promotion. However, six-inch-sandwiches still sell for more than \$2.50 each at Subway. Yet Subway is still able to sell \$5 foot-long sandwiches to some customers and six-inch sandwiches to other customers.
 - Why is it hard to arbitrage foot-longs into six-inch sandwiches? For example, why can't you and your friends buy \$5 foot-longs at Subway, then stand outside the store and sell the six-inch sandwiches for \$3 or \$3.50 each?
 - In many of our price discrimination examples, we think that businesses try to break customers into two groups: "more price sensitive," and "less price sensitive." What kinds of Subway customers fit into the first group? Into the second?

Busy lawyers with 20-minute lunches
 College students
 Health-conscious soccer moms
 Long-haul truck drivers

Solution

1. **a.** It's not an unreasonable idea, at first glance: In front of a busy store, you might be able to sell 50 or 60 sandwiches out in front during a lunch rush, making \$25 to \$60 an hour. But it's probably illegal to sell food on the street in most towns. Plus, people go to Subway to order sandwiches with custom toppings, and you'd have a tough time offering that kind of variety. Product customization is one way to make arbitrage difficult. Of course, you might do a decent business carrying the sandwiches back to your dorm and selling them there, but since even college students value freshness, you'd have to move them very quickly. It's a tough business proposition.
- b.** Busy lawyers and soccer moms probably are less price sensitive: Lawyers are richer, and value convenience above all else. The soccer moms are there to get just the right healthy toppings and may be richer as well. College students and truck drivers want to eat as cheaply as possible so both groups want to get back to watching reruns of the *Simpsons* instead of studying or hauling cargo down the interstate, respectively.
2. A dry cleaner has a sign in its window: "Free internet coupons." The dry cleaner lists its website, and indeed there are good discounts available with the coupons. Most customers don't use the coupons.
 - a.** What probably would be the main difference between customers who use the coupons and those who don't?
 - b.** Some people might think "The dry cleaner offers the coupons to get people in the door to try the place out, but then the customers will pay the normal high price afterward." But the coupons are always there, so even repeat customers can keep using the coupons. Is this a mistake on the business owner's part? Hint: Think about marginal cost.

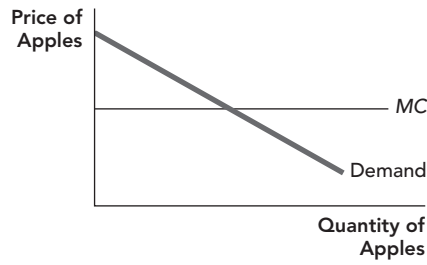
Solution

2. **a.** Those who use the coupons are probably more price sensitive: They're the kind of people who worry about saving a little on dry cleaning. (Those who use the coupons may also be poorer, on average, but that's probably not as important as being price sensitive: Many poor people pay full price, and lots of non-poor people use coupons.)
 Overall message: The kind of people who can't be bothered to carry around coupons probably have pretty inelastic demand for dry cleaning.
- b.** This chapter emphasized that as long as the product's price is above the marginal cost of producing the product, it's good to sell more. The coupon price is probably above marginal cost (just like the drug price in Africa): The impulse shoppers pay the high price, and the careful shoppers pay the low price. As long as both prices are above marginal cost, this is a reasonable business decision.
3. **a.** When will a firm find it easier to price discriminate: before the existence of eBay or afterward?
- b.** Which of the two "principles of price discrimination" does this invoke?

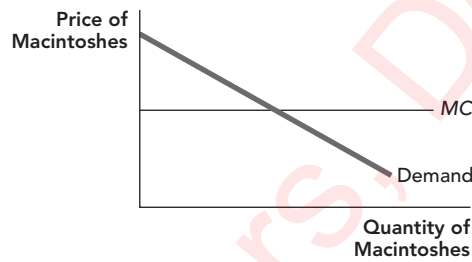
Solution

3. **a.** Before: eBay makes it easy for people who "buy cheap" to resell their products anonymously.
- b.** Arbitrage must be difficult for price discrimination to work.

4. Let's measure the producer and consumer surplus in two markets. The market for apples is perfectly competitive: There are many apple farmers, and each farmer is too small to have control over the price. The other market, for Macintosh computers, is a monopoly where Apple Computer uses computerized information about customers' past spending habits to perfectly predict each customer's willingness to pay for the computer.
- a. In the chart below, mark small x's in the area of consumer surplus, and use shading to mark the area of producer surplus.

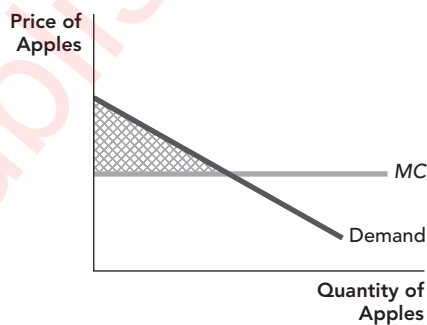


- b. Similarly, in the chart below, mark small x's in the area of consumer surplus, and use shading to mark the area of producer surplus.

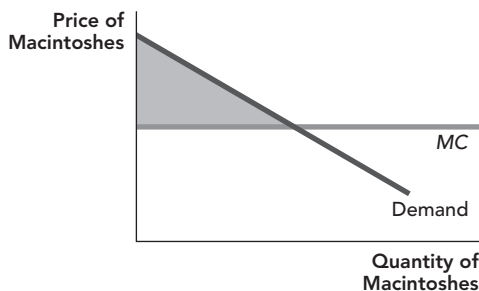


- c. We learned in Chapter 3, Figure 3.7, that a free market maximizes the gains from trade: In other words, a free market maximizes producer surplus plus consumer surplus. Is the total area of "consumer surplus plus producer surplus" the same in parts a and b, or is one larger than the other?

Solution 4. a. (Note: No producer surplus)



- b. (Note: No consumer surplus)



- c. The total area is the same in both cases: One shaded area is all producer surplus and one is all consumer surplus, but they both are just the same triangle.
5. As we saw in this chapter, drug companies often charge much more for the same drug in the United States than in other countries. Congress often considers passing laws to make it *easier* to import drugs from these low-price countries (it also considers passing laws to make it illegal to import these drugs, but that's another story).

If one of these laws passes, and it becomes effortless to buy AIDS drugs from Africa or antibiotics from Latin America—drugs that are made by the same companies and have essentially the same quality controls as the drugs here in the United States—how will drug companies change the prices they charge in Latin America and Africa? Why?

Solution

5. The equilibrium price will rise in Latin America and Africa, because the drug companies will know that much of what they send there will wind up back in the United States.
6. Some people think that *businesses* create monopolies by destroying their competition, and there is certainly some truth to that. But as we learned from Obi-Wan Kenobi, “[Y]ou will find that many of the truths we cling to depend greatly on our own point of view.” For instance, some people (Convenience Shoppers) love shopping at one particular store and will only switch stores when a product is outrageously expensive, while other people (Bargain Shoppers) will gladly spend hours looking through newspaper advertisements searching for the best deal.
- When both kinds of people, the Convenience Shoppers and the Bargain Shoppers, are shopping at the same Wal-Mart, who is more likely to stick to their prearranged shopping list, and who is more likely to splurge on a little something?
 - Which group does Wal-Mart have monopoly power over? Which group does Wal-Mart have no monopoly power over?
 - Does this mean that the same shop can simultaneously be a “monopolist” to some customers and a “competitive firm” to other customers? Why or why not?
 - Does this mean that Darth Vader really *did* kill Anakin Skywalker?

Solution

6. a. The Bargain Shoppers will stick to their prearranged, low-price shopping list. The Convenience Shoppers will splurge.
- b. Wal-Mart has monopoly power over Convenience Shoppers: They will buy whatever looks good. Wal-Mart will have little power over the Bargain Shoppers: When these shoppers walk into Wal-Mart, they only “see” the good with the competitive price.
- c. Yes. If you shop around carefully, Wal-Mart is a “competitive firm” to you. If you buy whatever looks best, Wal-Mart often charges you higher, “monopoly” prices.
- d. It “depends on your own point of view.”
7. Where are you more likely to see businesses “bundling” a lot of goods into one package: In industries with high fixed costs and low marginal costs (like computer games or moviemaking), or in industries with low fixed costs and high marginal costs (like doctor visits, where the doctor’s time is expensive)?

Solution

7. You tend to see bundling in low-marginal-cost industries, when the business has a big incentive to add a little bit more value to the product, since for little extra cost the business can charge a much higher price.

8. Smokey Robinson and Berry Gordy included an insight about price discrimination in the following song, the full lyrics of which you should Google:

Try to get yourself a bargain son/Don't be sold on the very first one/...
My mama told me... "you better shop around."

- What "market" are Smokey Robinson and the Miracles singing about? (The lyrics are clear about this.)
- In this market, if a customer "shops around," what does Mama say the customer will get in return? Note: Robinson and Gordy are quite clear about this.

Solution

- The marriage market.
 - An honest spouse who will provide true love.
- Isn't it surprising that movies, with tickets that rarely cost as much as \$10, often use vastly more economic resources than stage plays where tickets can easily cost \$100? Let's compare a live stage performance of Shakespeare's *Hamlet* with a movie of *Hamlet*.
 - In which field is the marginal cost of one more showing higher: on stage or on screen?
 - "Bundling" in a movie or stage performance might show up in the form of adding special effects, expensive actors, or fancy costumes: Some customers might not be too interested in an Elizabethan revenge drama, but they show up to see Liam Neeson waving an authentic medieval dagger. Is it better to think of these extra expenses as "fixed costs" or "marginal costs?"
 - In which setting will it be easier for a business to cover its total costs: In a "bundled" stage production or in a "bundled" movie production?

Solution

- On screen: Once you've made the film, making extra copies is easy, and showing the movie one extra time per week is even easier. If you want to show a play one more time, though, you have to pay all of the performers and all of the stage hands for a few more hours of labor—and that adds up.
 - These are more like fixed costs: You pay them regardless of how many people see the play or movie.
 - In a bundled movie production: A moviemaker can spread the fixed cost over millions of movie viewers.
- When is a pharmaceutical company more likely to spend \$100 million to research a new drug: when it knows it will be able to charge different prices in different countries or when it knows that it will be required to charge the same price in different countries? Why?

Solution

- When it can charge different prices in different countries. This is because price discrimination always offers the promise of higher profits than a one-price-for-all rule. And the lure of high profits is what brings forth the drug research.
- True or false: A price-discriminating business will be willing to spend money to make a product worse.

Solution

- True: The HP printer story in the chapter is a good example. A car dealer might buy cars that all have good stereo systems and then pay workers to take them out and put in cheap AM radios in order to price discriminate as well.

- Let's calculate the profit from price discrimination. The average daily demand for dinners at Paradise Grille, an upscale casual restaurant, is as follows:

Demand for dinners by senior citizens: $P = 50 - 0.5Q$. $MR = 50 - Q$

Demand for dinners by others: $P = 100 - Q$. $MR = 100 - 2Q$

Marginal cost = 10 in both cases.

- a. What is the profit-maximizing price for each group?
- b. Translate this into real-world jargon: If you owned this restaurant, what “Senior Citizen Discount” would you offer, in percent?
- c. Ignoring fixed costs, how much profit would Paradise Grille make if it did this?
- d. If it became illegal to discriminate on the basis of age, you would face only one demand curve. Adding up these two demand curves turns out to yield:

$$P = 67 - (1/3)Q, MR = 67 - (2/3)Q$$

What is the optimal price and quantity in this unified market? Are the total meals sold in this discrimination-free market higher or lower than in part a?

- e. What is the profit in this discrimination-free market?

Solution 12. a.

Set $MC = MR$ in each case, and solve.

Seniors: $Q = 40; 50 - 0.5(40) = 30 = P$

Others: $Q = 45; 100 - 45 = 55 = P$

$P(\text{senior}) = \$30, P(\text{others}) = \$55.$

- b. You'd offer a $(55 - 30)/55 = 45$ percent discount to seniors.
 - c. Profit = Total revenue – Total variable costs
 $= 30 \times 40 + 55 \times 45 - 10 \times 85 = \$2,825$
 - d. $P = 38, Q = 86.$ In this case, the price is somewhere in between the two prices, and the quantity is actually one dinner higher (a possibility noted in the chapter).
 - e. Profit = \$2,408, \$400 per night less than before, about \$14,000 per year.
13. In the table below, we consider how Alex, Tyler, and Monique would fare under à la carte pricing and under bundling for cable TV when there are two channels: The CW and the Food Network.

Alex and Tyler like to watch *Veronica Mars* so they each place a higher value on the CW than on the Food Network. Monique is practicing to be an Iron Chef in her second life and so she places a higher value on the Food Network than on the CW.

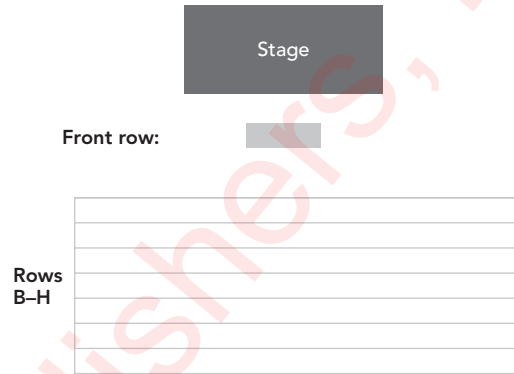
	Maximum Willingness to Pay		
	Alex	Tyler	Monique
The CW	10	15	3
The Food Network	7	4	9
The Bundle	15	19	12

- a. If the channels are priced individually, the most profitable prices for the cable operator turn out to be 10 for the CW and 7 for the Food Network. At these prices, who buys what channel and how much profit is there?
- b. Let's just check to see if these prices really are profit maximizing. What would profit be if the cable company raised CW to a price of 11 and Food Network to a price of 8?
- c. At these prices, how much total consumer surplus would there be for the three of them? (Recall that consumer surplus is just each customer's willingness to pay minus the amount each person actually paid.)
- d. Now consider what happens under bundling: Customers get a take-it-or-leave-it offer of both channels or nothing at all. The profit-maximizing bundle price turns out to be 12, and at that price, Alex, Tyler, and Monique all subscribe. How much consumer surplus is there at this price? How much profit? And, most important, what would profit equal if the cable company raised the price to 13 instead?

- Solution** 13. **a.** At these prices, Alex and Tyler subscribe to the CW and Alex and Monique subscribe to the Food Network. Monique misses *Veronica Mars* and Tyler misses *Flay v. Morimoto* on *Iron Chef*. Since marginal cost is zero, total profits for the cable operator are $\$34 = \$10 \times 2 + \$7 \times 2$.
- b.** Tyler would be the only customer for the CW, yielding a profit of 11, and Monique would be the only customer buying Food Network, yielding an additional profit of 8. The total profit would be 19, far less than 34. Price hikes lose some customers, something you really want to avoid when the marginal cost of serving one more customer is zero.
- c.** Total consumer surplus is $7 = 5 + 2$. Alex values the CW at 10 and pays 10, Tyler values the CW at 15 and pays 10 giving a consumer surplus of 5. The 2 comes from Monique: She pays 7 but would have been willing to pay 9; Alex pays exactly as much as he'd be willing to get the Food Network: 7, so he experiences no consumer surplus.
- d.** Profit increases to 36 and so does consumer surplus, which increases to $10 = 3 + 7$. If the cable company raised the price to 13, they'd lose Monique, and only earn a profit of 26.

Challenges

1. Consider the following seating arrangement for a concert hall:



The front row only seats two people. Rows B–H, about 50 feet back from the front row, seat 20 people per row.

- a.** Would these front-row seats sell for more or for less than the front-row seats at a typical concert hall? Why?
- b.** Why don't we see concert halls set up like this?

- Solution** 1. **a.** They would sell for much more. There are only two really good seats in the house, creating more competition between the same number of patrons. Certainly, somebody in town would be willing to pay quite a lot for these seats.
- b.** Because the “real estate” is worth too much in the concert hall: The marginal cost of putting in some more chairs is quite low, and you can fill them up with a lot of folks. Sure, you lost the ability to charge a massive amount for just two seats, but the concert hall makes it up on volume. And, as the next question shows, there are other, cheaper ways to make concertgoers feel special. Giving just a few excellent seats isn't the best way.

2. At the Kennedy Center for the Performing Arts in Washington, DC, if you make a \$120 donation per year, you are allowed to go to a small room before the concert and drink free coffee and eat free cookies. If you make a donation of \$1,200 per year, you are allowed to go to a *different* small room before the concert and drink the *same* free coffee and eat the *same* free cookies. There are always a lot of people in both rooms before the concert: Why doesn't everybody just pay the \$120 instead of the higher price?

Solution

2. There's more than one answer here. One reason is probably because some people want to show that they are able to pay \$1,200 per year, and showing up in the special room is an easy way to prove it. Also, some people like to show that they care about music enough to pay \$1,200 per year to support the Kennedy Center. So demonstrating that you are "rich" and that you "care" are worth enough for people to spend an extra \$1,080 per year.

Note that most charities and political campaigns have various "donor levels" in order to price discriminate: The higher up you go, the bigger they print your name at the entrance.

3. a. In competitive markets in the long run, if there are two kinds of steaks, "regular" and "high-quality Angus beef," and the regular beef sells at a lower price, what do we know about the average cost of producing the "high-quality Angus beef"? Why do we know this?
b. How is this different from the HP printer story in this chapter?

Solution

3. a. In a competitive market, we know that Price = Average cost in the long run. So the Angus beef must cost more to make.
b. In the HP market, HP presumably is not competitive enough for $P = AC$ to be true. Instead, it's a monopoly-type market where you might actually spend *more* to make a *worse* product.

4. Let's consider the previous question about movies as bundles. Amanda and Yvonne are thinking of going out to the movies. Amanda likes action flicks more, but Yvonne likes a little bit of romance. Warner Bros. is trying to decide what kind of movies to make this year. Should it make one movie for release this summer, an action flick with a romantic subplot, or should it make two movies for release this summer: an action flick and a romantic drama?

Here's their willingness to pay for the separate kinds of movies. As you can see, both Amanda and Yvonne are annoyed by the idea of a hybrid movie: Each would rather see their favorite kind of movie.

Maximum Willingness to Pay for a Movie Ticket		
	Amanda	Yvonne
Pure Action	\$10	\$2
Pure Romance	\$2	\$10
Action + Romance	\$9	\$9

Now, let's look at this from Warner Bros. point of view. You're the mid-level executive who has to decide which project to greenlight. Your marketing people have figured out that there are 5 million people like Amanda and 5 million people like Yvonne in the United States, and they'll only see one film per summer. To make things simple, assume that the marginal cost of showing the movie one more time is zero, and that ticket prices are fixed at \$8.

- a. If the cost of producing any of the three films is \$30 million, what should it do: Make the two films or just the one hybrid film? Of course, the right way to find the answer is to figure out which choice would generate the most profit for Warner Bros.
- b. Of course, the hybrid might cost a bit more to make. What if the hybrid costs \$40 million to make, the pure action flick \$30 million, and the romance a mere \$15 million? What's the best choice now: one hybrid or two pure films?
- c. Let's see how much prices would have to change for the answer to this question to change. Holding all else equal, how low would the cost of the pure romance film have to fall before the two-movie deal would get the green light?
- d. (Hard) There's an underlying principle here: The "unbundled" two-movie deal won't get the green light unless its total cost is less than what? The answer is not a number—it's an idea. Is this likely to happen in the real world? Why or why not?

Solution

4. a. It should make the hybrid film. If it made both films, it would have to pay the fixed cost twice but get the same number of customers.
 - b. It's still the same: Just make the hybrid. \$45 million is more than \$40 million.
 - c. The cost of the romance would have to fall below \$10 million before both movies would get produced.
 - d. The two-movie deal will get made if and only if its total cost is less than the cost of the hybrid film. This is unlikely to happen in the real world very often, since movies have high fixed costs.
5. Think about the kind of 40-year-old who pulls out a faded, obviously expired student ID to get a discount ticket at a movie theater: What can you predict about his or her willingness to pay for a full-price movie? Is the movie theater making a mistake when it lets him or her pay the student price?

Solution

5. This person probably has a low willingness to pay: He or she has no shame. This kind of person probably wouldn't go to the movies if it weren't for the low student price, so the theater is happy to have a little extra revenue from him. It's better than no revenue at all.
6. We mentioned that airlines charge much more for flights booked at the last minute than for flights booked well in advance, even for exactly the same flight. This is because people who tend to book at the last minute tend to have inelastic demand. Think of other characteristics that airlines use to vary their pricing: Do you think these characteristics are correlated with business travel or any other sort of inelastic demand? (If you don't fly too often, just ask someone who does: "What's the key to getting the lowest possible airfare?")

Solution

6. Airlines charge more if the traveler does not want to stay over the weekend, they charge more for travelers to be able to change their flights, and they charge more for a combination of one-way trips than for return flights. Each of these characteristics is plausibly correlated with business travel or inelastic demand. Business travelers are less likely than vacationers, for example, to want to stay over a weekend, more likely to want to change flights at the last minute, and more likely to want to travel on a circuit of cities rather than from one city to another and back.