CHAPTER 7

PRICING WITH MARKET POWER

CHAPTER SUMMARY

This chapter extends the analysis in previous chapters to examine pricing decisions in greater detail. It starts by reviewing the benchmark case of charging one price to all customers. It then examines more sophisticated pricing policies that can be used to increase profits.

CHAPTER OUTLINE

PRICING OBJECTIVE

BENCHMARK CASE: SINGLE PRICE PER UNIT
  Profit Maximization
  Relevant Costs
  Price Sensitivity

Estimating the Profit-Maximizing Price
  Linear Approximation
  Cost-Plus Pricing
  Markup Pricing
  On the Importance of Assumptions

Potential for Higher Profits
  Managerial Application—Parker Hannifin Increases Profits by Adopting and Economically Sound Pricing Policy
  Managerial Application—Microsoft’s Market Power and Pricing

HOMOGENEOUS CONSUMER DEMANDS

  Block Pricing
    Managerial Application—Block Pricing at Hickey-Freeman

  Two-Part Tariffs

PRICE DISCRIMINATION — HETEROGENEOUS CONSUMER DEMANDS

  Managerial Application—Two-Part Pricing for Capital Goods
  Managerial Application—As Cigarette Prices Soar, A Gray Market Booms

Exploiting Information about Individual Demands
  Personalized Pricing
    Managerial Application—Tuition Pricing
  Group Pricing
    Managerial Application—Virtual Vineyards
  Managerial Application—Pricing of Books

Using Information about the Distribution of Demands

  Menu Pricing
  Coupons and Rebates
    Managerial Application—Harry Potter: An Example of Price Discrimination
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BUNDLING
Managerial Application—Bundling Videogames

OTHER CONCERNS
Multiperiod Considerations
  Future Demand
    Managerial Application—Early Use of the Free Sample
    Managerial Application—Apple Apologizes for Its Pricing of iPhones
  Future Costs
  Storable Products
Strategic Interaction
Legal Issues
  Managerial Application—Market Segmentation
  Managerial Application—Apple Settles Antitrust Case by Lowering iTune Prices in Britain

IMPLEMENTING A PRICING STRATEGY

SUMMARY

TEACHING THE CHAPTER

A popular teaching tool is to ask students to discuss during class several examples of alternative pricing schemes they encounter and then discuss the characteristics of these goods, and their markets, that allow for such pricing schemes to exist. This exercise provides a good opportunity to relate back to the material earlier in the text on the topic of demand and elasticity. The Managerial Applications throughout the chapter are also good discussion starters.

This chapter presents many topics that are usually of interest to students. Students often recognize that the single-price model presented in chapter 6 does not apply for many of the goods they purchase so they are typically interested in understanding how alternative pricing schemes can be implemented. The material is relatively straightforward, however, some students might struggle with the mathematical examples in the text. Instructors will want to spend more or less time on this content based on the relevance to their particular course and their students’ backgrounds. The Self-Evaluation Problems or the Review Questions, both located at the end of the chapter, could be assigned as a group exercise during class to determine whether students understand the material (particularly the mathematical questions), or could be covered during class by the instructor.

There are three Analyzing Managerial Decisions scenarios in this chapter. The first, “Profit Potential for a Microbrewery”, asks students to calculate the profit-maximizing price when only a single price is charged to all customers and then asks students to consider alternative pricing policies that might increase profits. This scenario is a relatively straight-forward application of microeconomic theory, particularly for students with prior coursework in intermediate microeconomics or managerial economics.
The second scenario, “Cell Phone Pricing”, focuses on implementing a pricing scheme when the seller is unable to distinguish high demand customers from relatively low demand customers. The goal is to have customers self-select into the appropriate monthly cell phone plan. This problem is more complex than the first scenario, so instructors may want to cover a problem of this type in class or assign such a problem as a group assignment.

The final scenario, “iTunes Music Pricing”, is a comprehensive problem asking students to consider many of the key concepts in the chapter. Students are asked to consider not only what pricing schemes might currently be offered but also to consider how the strategy might change in the future. (See the Solutions Manual for the answers to these problems).

**REVIEW QUESTIONS**

7–1. Macrosoft is a new producer of word processing software. Recently it announced it is giving away its product to the first 100,000 customers. Using the concepts from this chapter, explain why this might be an optimal policy.

    There are often network externalities for software products--demand is higher when there are more users. Given that people exchange documents, it is advantageous to use compatible software. Therefore, Macrosoft might be giving the product away to create a large base of users to increase future demand. With higher demand it will be able to charge higher prices.

    It is also expensive for a person to change software programs (having to learn new commands, etc.). The company may be trying to encourage people to switch so that they will be “locked in” when it comes to purchasing new editions. Users will be willing to pay a somewhat higher price for the new edition rather than switching to a new product because of the switching costs.

7–2. The local space museum has hired you to assist them in setting admission prices. The museum’s managers recognize that there are two distinct demand curves for admission. One demand curve applies to people ages 12 to 64, whereas the other is for children and senior citizens. The two demand curves are:

    \[ P_A = 9.6 - 0.08Q_A \]

    \[ P_{CS} = 4 - 0.05Q_{CS} \]

    where \( P_A \) is the adult price, \( P_{CS} \) is the child/senior citizen price, \( Q_A \) is the adult quantity, and \( Q_{CS} \) is the child/senior citizen quantity. Crowding is not a problem at the museum, so managers consider marginal cost to be zero.
a. What price should they charge to each group to maximize profits?

<table>
<thead>
<tr>
<th>Adults</th>
<th>Children/Senior Citizens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set MR = MC</td>
<td></td>
</tr>
<tr>
<td>9.6 - .16QA = 0</td>
<td>4 - .1QCS = 0</td>
</tr>
<tr>
<td>QA = 60</td>
<td>QCS = 40</td>
</tr>
<tr>
<td>Find Price</td>
<td></td>
</tr>
<tr>
<td>PA = 9.6 - 0.08 × 60</td>
<td>PCS = 4 - 0.05 × 40</td>
</tr>
<tr>
<td>PA = $4.8</td>
<td>PCS = $2</td>
</tr>
</tbody>
</table>

b. How many adults will visit the museum? How many children and senior citizens?

60 adults 40 children and senior citizens

c. What are the museum’s profits?

Profits = TR – TC

= 4.8 × 60 + 2 × 40 - 0

= $368

7–3. Textbook publishers have traditionally produced both United States and international editions of most leading textbooks. The United States version typically sells at a higher price than the international edition. (a) Discuss why publishers use this pricing plan. (b) Discuss how the Internet might affect the ability of companies to implement this type of policy.

a. The demand for textbooks in certain foreign markets is more elastic than in the United States (i.e., consumers are more price sensitive). The policy is likely a form of price discrimination (group pricing).

b. The internet potentially makes it more likely that books sold outside of the United States will be resold in the United States, thus making it more difficult to sustain price differentials (consider the example of cigarettes in the text). A necessary condition for price discrimination is the ability to limit resale among consumers.
7–4. Suppose in Table 7.2 (Product Bundling) that the professional user values *Expedia Streets* at $15 rather than $30. Keep all other valuations the same. Discuss how this change affects the optimal pricing strategy.

In this case there are no gains from bundling. The sum of the minimum reservation price is the same as the minimum reservation price for the bundle. To sell both products to both types of users you can either set the prices at $15 and $10 for *Streets* and *Planner* respectively, or price the bundle at $25. Profits are the same in either case.

7–5. Explain why perfect personalized pricing is typically more profitable than menu pricing. Why then do companies use menu pricing?

In the limit, personalized pricing extracts the maximum profit from each consumer. With menu pricing, typically some of the consumers obtain surplus. If the firm tries to extract the maximum surplus from each customer by pricing menu options in a particular way, some of the consumers are likely to be able to select different options to obtain surplus. This ability to self-select from the menu typically makes it impossible to extract all consumer surplus.

7–6. In the example in this chapter, the linear approximation method produced the profit-maximizing price, whereas the markup pricing rule did not. Does this imply that the linear rule is always better than the markup rule? Explain.

In the example, the underlying demand curve was linear. Thus, the linear approximation method worked well (perfectly). If the demand curve is highly nonlinear the technique will not work well. If the demand curve is isoelastic (or if the current elasticity is close to that at the optimal price), the markup pricing rule will dominate.

7–7. Why do companies grant discounts to senior citizens and students?

Presumably, it is a form of price discrimination. Senior citizens and students are likely to have more elastic demand for products than the average consumer. Thus, it can be optimal to charge them a lower price, while charging other customers a higher price. Note that the other customers are not subsidizing senior citizens and students. All customers are paying at least marginal cost for the product.
7–8. You own a theater with 200 seats. The demand for seats is \(Q = 300 - 100P\). You are charging $1.25 per ticket and selling tickets to 175 people. Your costs are fixed and do not depend on the number of people attending. Should you cut your price to fill the theater? Explain. What other pricing policies might you use to increase your profits?

Revenue is maximized at the point where marginal revenue equals zero. In this problem, \(MR = 3 - .02Q\). Thus, it is optimal to sell 150 tickets at a price of $1.50 a ticket. This policy produces $225 in revenue. The current policy produces $218.75 in revenue. The theater might be able to increase revenue through price discrimination. For example, it might price tickets to the general public at $1.50. It could then entice other people who are not willing to pay the $1.50 through policies such as senior citizen or student discounts.

7–9. The Snow City Ski Resort caters to both out-of-town skiers and local skiers. The demand for ski tickets for each market segment is independent of the other market segments. The marginal cost of servicing a skier of either type is $10. Suppose the demand curves for the two market segments are:

- Out of town: \(Q_o = 600 - 10P\)
- Local: \(Q_l = 600 - 20P\)

a. If the resort charges one price to all skiers, what is the profit-maximizing price? Calculate how many lift tickets will be sold to each group. What is the total profit?

Add the two demand curves together to get the total demand curve: \(Q = 1200 - 30P\). Note: at prices above $30 the local customers will not buy any tickets and so the total demand curve for prices above $30 is simply the out-of-town demand curve. Rearrange the demand curve so that price is on the left side of the equation. The optimal number of tickets sold is found by setting marginal revenue (40 – .0333Q) equal to marginal cost ($10). Price can be found by substituting this quantity into the demand curve. The optimal quantity is 450 tickets (100 local; 350 nonlocal), price = $25, and profits = $6,750.

b. Which market segment has the highest price elasticity at this outcome?

The local skiers have more elastic demand. The point elasticity for the local-skier market is 5 versus .714 for the out-of-town market.

Note: point elasticities are covered in the appendix to chapter 4; the student could also calculate arc elasticities.
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c. If the company sells tickets at different prices to the two market segments, what is the optimal price and quantity for each segment? What are the total profits for the resort?

To answer this question the student would solve for the optimal quantity in each market by setting marginal revenue in the market equal to marginal cost. Prices are found by substituting these quantities into the relevant demand curves. Profits are found by subtracting the total costs ($10 \times \text{the number of tickets sold}$) from total revenue (collected from both markets). Snow City should charge $35 to out-of-town skiers and sell 250 tickets. The price and quantity for local skiers are $20 and 200 tickets. Total profits are $8,250.

d. What techniques might the resort use to implement such a pricing policy? What must the resort guard against, if the pricing policy is to work effectively?

Snow City might implement the pricing policy by selling tickets to local customers at locations that are not frequented by out-of-town skiers (for example, local super markets). Other techniques also might be feasible. Snow City must guard against resale between local and out-of-town skiers. For example, they might want to make the tickets nontransferable and require an ID. Also, Snow City must worry about out-of-town skiers finding out about the price difference and hence going to the locations that sell discount tickets. To guard against this possibility, Snow City might want only to sell the discount tickets off season when the out-of-towners are not around.

7–10. All consumers have identical demand for a product. Each person's demand curve is $P = 30 - 2Q$. The marginal cost of production is $2. Devise a two-part tariff that will exhaust all consumer surplus.

The company could charge marginal cost of $2 and an up-front fee equal to the consumer surplus. At a $2 price, the quantity sold is 14. Consumer surplus is equal to the area of the triangle below the demand curve, but above marginal cost (see Figure 7.5). The resulting up-front charge is $196.

7–11. Xerox sells both copiers and a toner for their copiers. While customers are not required to buy Xerox toner, most do because specified machines use toner only for that machine. The Xerox toner and machines are closely designed and non-Xerox toner in Xerox machines produces inferior copies. Evaluate the statement: “Xerox makes 75 percent of its profits selling toner and 25 percent of its profits selling machines.”
Presumably Xerox is pricing the two products to maximize total profits. Given the joint nature of the products it is difficult to allocate profits meaningfully between the two products. For example, the toner might be priced above cost to extract additional profits from heavy users who might value Xerox copy machines (which are of relatively high quality) highly. This might be better than simply charging a higher price for copy machines to all buyers. The profits, however, are related to the demand for the copy machines (not just the toner).

7–12. Some tennis clubs charge an up-front fee to join and a per-hour charge for court time. Others do not charge a membership fee but charge a higher per-hour fee for court time. Consider clubs in two different locations. One is located in a suburban area where the residents tend to be of similar age, income, and occupation. The other is in the city with a more diverse population. Which of the locations is more likely to charge a membership fee? Explain.

Two-part pricing is most likely to be optimal when consumers are relatively homogeneous. In this case, the up-front fee will be used to extract the consumer surplus. If demands are heterogeneous, setting a high up-front fee will extract surplus from some customers but discourage potential customers with lower valuations from purchasing the product. Thus, you might expect to see the two-part pricing at the suburban location with a more heterogeneous customer base.

7–13. Consider three firms: a shoe store at the mall, an automobile dealership, a house painting firm.

a. Which firm would you expect to engage in the most price discrimination? Why?

House painting firms are in a fairly good position to price discriminate. The product cannot be resold among consumers. The painter has an opportunity to observe the prospective buyer and make an assessment about the willingness to pay before quoting a price. It can be expensive for the buyer to obtain additional quotes (in terms of time). Automobile dealers also are able to judge the willingness to pay before negotiating the final deal. Cars, however, are becoming more of a commodity and it is becoming easier to comparison shop. The typical shoe store quotes a price to all customers and while it can engage in menu pricing, personalized pricing is more difficult. Cars and shoes also can be resold among consumers.

b. How has the internet changed the pricing policies of these businesses?
The internet is unlikely to have a large impact on the ability of house painters to price discriminate. However, it could make it easier for the consumer to identify potential painters to make competitive quotes. The internet makes it relatively easy to obtain detailed cost estimates on cars and to obtain prices from a variety of dealers. These factors have made price discrimination more difficult for automobiles. An internet store specializing in shoes has the technology to make certain price options available to consumers based on purchase histories, etc. This might increase the ability to price discriminate. On the other hand it can make it easier to comparison shop, thus limiting market power.

7-14. Cellwave is a cellular phone company. Answer the following questions relating to its pricing policies:

a. When Cellwave started out it sold to a group of homogenous retail customers. Each person’s monthly demand for cell phone minutes was given by $P = \$2 - .02Q$, where $P$ = the price per minute and $Q$ = the quantity of minutes purchased each month. Cellwave’s marginal cost is 10 cents per minute. Suppose that Cellwave charges a single per minute price to all customers (independent of the number of minutes they use each month). What is the profit-maximizing price? Depict this choice on a graph. On a per customer basis, what are the company’s profit, consumer surplus, and the deadweight loss?

**Optimal quantity is where MR = MC: 2 - .04Q = .10; Q* = 47.5 minutes; P* = $1.05 per minute;**

![Graph](image.png)

Per customer basis: profit = ($1.05-.10) × 47.5 = $45.125; Consumer surplus = $22.56; DWL = $22.56;
b. Suppose that Cellwave chooses to charge a two-part tariff (with a monthly fixed charge and a per minute rate) rather than a single per minute price. What two-part tariff extracts the entire consumer surplus? What are the company’s profits (on a per customer basis)? How many minutes does each customer use per month? What is the deadweight loss?

The optimal two-part tariff will charge 10 cents/minute (the marginal cost) and an upfront fee equal to the entire consumer surplus $= \frac{1}{2} \times (2 - .10) \times 95 = \$90.25$. The profits are $\$90.25$ per customer. Each consumer uses 95 minutes per month and there is no deadweight loss.

c. After several years of operation, Cellwave developed a new group of business customers (in addition to its old customer base). The business customers had homogenous demands. Each of these customer’s monthly demand for cell phone minutes was given by $P = 2 - .004Q$. Graph the two demand curves for the two customer groups on the same figure along with the marginal cost. Suppose that Cellwave wants to menu price by offering two plans with different monthly fixed charges. Each plan would allow free calls up to some maximum limit of minutes per month. No calls are allowed beyond these maximums. Assume that Cellwave designs a plan that extracts all consumer surplus from the retail customers. Shade the area of the graph that shows how much consumer surplus must be given to each business customer to make the plan work. Explain why.

Each business customer must get at least the area of the abc triangle as consumer surplus or he will not buy the high-end plan. This is the surplus that he would receive if he purchases the low end plan. If the high-end plan is priced too high, he will buy the low-end plan instead and the menu plan will not work.
7-15. The Hewl-Pact Company produces a popular printer that prints over 100 pages per minute. It recently announced that it was introducing a lower priced model of the printer that can print 30 pages per minute. While not revealed to the public, it turns out that it costs the company more to produce the lower priced product. The two models are identical except for a $20 internal part for the low-priced model that slows the printer from 100 to 30 pages per minute. Provide an economic explanation for why the company decided to produce a new lower priced, but more costly, model of the printer.