

Review Session Handout #10

Chapter 12: Pricing Strategies: Price Discrimination and Bundling

Introduction to Microeconomics: Markets, Strategy, and Real-World Cases

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Exercise R10.1. A theme park sells day tickets to two groups it can tell apart: tourists and local residents, who show a resident card at the gate. Tickets carry the buyer's name, so they cannot be resold. The following table lists how many tickets each group buys per day at each of six prices; both schedules are straight lines. Each visitor costs the park \$10 to serve, the park never fills, and there is no fixed cost.

Price	\$50	\$45	\$40	\$35	\$30	\$25
Tourist tickets	300	350	400	450	500	550
Local tickets	0	100	200	300	400	500

Part (a). If the park can charge each group a different price, find the profit-maximizing price for each group and the number of tickets each group buys.

The park earns the price minus the \$10 cost on each ticket. Profit from each group at each price is as follows.

Price	\$50	\$45	\$40	\$35	\$30	\$25
Profit from tourists	\$12,000	\$12,250	\$12,000	\$11,250	\$10,000	\$8,250
Profit from locals	\$0	\$3,500	\$6,000	\$7,500	\$8,000	\$7,500

For example, at \$45 the park earns $(\$45 - \$10) \times 350 = \$12,250$ from tourists. The best price for tourists is \$45, at which they buy 350 tickets. The best price for locals is \$30, at which they buy 400 tickets.

Part (b). Compute the profit from each group and the park's total profit.

Profit from tourists is $(\$45 - \$10) \times 350 = \$12,250$, and profit from locals is $(\$30 - \$10) \times 400 = \$8,000$. Total profit is

$$\$12,250 + \$8,000 = \$20,250.$$

Part (c). If the park must charge everyone a single price, find the best single price and the number of tickets sold.

With a single price, the park sells to both groups at that price, so it adds the two groups' tickets at each price:

Price	\$50	\$45	\$40	\$35	\$30	\$25
Total tickets	300	450	600	750	900	1,050
Profit	\$12,000	\$15,750	\$18,000	\$18,750	\$18,000	\$15,750

The best single price is \$35, at which the park sells 750 tickets (450 to tourists and 300 to locals) and earns $(\$35 - \$10) \times 750 = \$18,750$.

Part (d). Compare the park's total profit with different prices for each group and with a single price. Which group pays more when the park charges different prices, and is this consistent with the rule of Section 12.4?

Charging each group its own price earns $\$20,250 - \$18,750 = \$1,500$ more than the best single price. Tourists pay more (\$45 against \$30 for locals). To check the rule of Section 12.4, compute each group's price elasticity of demand at its chosen price, using a 1 percent price increase:

- Tourists buy 50 fewer tickets for each \$5 increase, or 10 fewer per dollar. A 1 percent increase, from \$45 to \$45.45, cuts their tickets by 4.5, from 350, a fall of $\frac{4.5}{350} \approx 1.29$ percent. Their elasticity is about 1.29.
- Locals buy 100 fewer tickets for each \$5 increase, or 20 fewer per dollar. A 1 percent increase, from \$30 to \$30.30, cuts their tickets by 6, from 400, a fall of $\frac{6}{400} = 1.5$ percent. Their elasticity is 1.5.

Tourists have the less elastic demand at the chosen prices (about 1.29 against 1.5), so they pay the higher price, as the rule of Section 12.4 predicts.

Remark. Compared with the single price of \$35, tourists pay \$10 more and 100 fewer of them visit, while locals pay \$5 less and 100 more of them visit. The total number of tickets is 750 in both cases, but the park earns \$1,500 more by charging the higher price to the less price-sensitive group.

Exercise R10.2. A gym uses a two-part tariff: a monthly membership fee plus a charge per visit. A typical member's demand for visits is a straight line: the price she would pay starts at \$10 per visit and falls by \$0.50 for each extra visit per month. Each visit costs the gym \$2 to provide, and the gym charges \$2 per visit, equal to this marginal cost.

Part (a). How many visits does the member make per month?

She visits as long as the price she would pay is at least the \$2 charge. The price she would pay falls from \$10 to \$2, a drop of \$8, after $\frac{\$8}{\$0.50} = 16$ visits, so she makes 16 visits per month.

Part (b). Compute her consumer surplus from those visits.

Consumer surplus is the triangle above the \$2 charge and below her demand curve, with base 16 visits and height $\$10 - \$2 = \$8$:

$$\frac{1}{2} \times 16 \times \$8 = \$64.$$

Part (c). What is the highest monthly membership fee she is willing to pay?

She is willing to pay a fee up to her consumer surplus, \$64 per month. At that fee she is just willing to join: the fixed fee captures her surplus, while the \$2 charge per visit keeps her visiting.

Part (d). With a \$64 membership fee, compute the gym's total revenue and profit per member.

Revenue per member is the fee plus the visit charges:

$$\$64 + 16 \times \$2 = \$64 + \$32 = \$96.$$

The cost of serving her is $16 \times \$2 = \$32$, so profit per member is $\$96 - \$32 = \$64$.

Part (e). Compare this profit with what the gym would earn if it charged only a price per visit, with no membership fee. Explain why the two-part tariff is more profitable.

Charging only a price per visit, the gym acts as a monopolist on her demand curve. Marginal revenue starts at \$10 and falls twice as fast as the price, by \$1 per visit, so it reaches the \$2 marginal cost at 8 visits. The price she would pay for 8 visits is $\$10 - 8 \times \$0.50 = \$6$. Revenue is $8 \times \$6 = \$48$, cost is $8 \times \$2 = \$16$, and profit is \$32 per member. The two-part tariff earns \$64, twice as much.

Remark. With a single price of \$6 per visit, the member makes only 8 visits, and 8 visits that she values above their \$2 cost are lost, a deadweight loss of $\frac{1}{2} \times 8 \times (\$6 - \$2) = \$16$. Her consumer surplus is $\frac{1}{2} \times 8 \times (\$10 - \$6) = \$16$, and the gym's profit is \$32. With the two-part tariff, a \$2 charge per visit leads her to make all 16 visits worth at least their cost, so no surplus is lost, and the membership fee transfers the whole \$64 of surplus to the gym.

Exercise R10.3. A concert hall sells two season passes, one for a classical series and one for a jazz series, to 500 retirees and 500 college students. Each retiree values the classical pass at \$220 and the jazz pass at \$120. Each student values the classical pass at \$100 and the jazz pass at \$150. The hall's seats are never full, so selling one more pass costs it nothing.

Part (a). If the two passes are sold separately, find the best price for each pass and the hall's total profit.

Since an extra pass costs nothing, profit equals revenue. The hall considers pricing each pass at one of the two groups' values.

- Classical pass: at \$220 only retirees buy, for $\$220 \times 500 = \$110,000$; at \$100 everyone buys, for $\$100 \times 1,000 = \$100,000$. The best price is \$220.
- Jazz pass: at \$150 only students buy, for a revenue of $\$150 \times 500 = \$75,000$; at \$120 everyone buys, for a revenue of $\$120 \times 1,000 = \$120,000$. The best price is \$120.

Total profit from selling separately is $\$110,000 + \$120,000 = \$230,000$.

Part (b). If the two passes are sold only as a bundle, what is each group's value for the bundle? Find the best bundle price and the hall's total profit.

A retiree values the bundle at $\$220 + \$120 = \$340$, and a student at $\$100 + \$150 = \$250$. At \$340 only retirees buy, for $\$340 \times 500 = \$170,000$; at \$250 everyone buys, for $\$250 \times 1,000 = \$250,000$. The best bundle price is \$250, and profit is \$250,000.

Part (c). Which strategy is more profitable? Explain why bundling helps here.

Bundling earns $\$250,000 - \$230,000 = \$20,000$ more, about 8.7 percent more than selling separately. Bundling helps because the two groups' values are negatively correlated: retirees value the classical pass more (\$220 against \$100), while students value the jazz pass more (\$150 against \$120). Adding the two values brings the groups closer together: the bundle values (\$340 and \$250) differ by much less, in proportion, than the classical values (\$220 and \$100). A single bundle price of \$250 then sells to everyone while capturing most of what each group is willing to pay. Selling separately, the hall must either price the classical pass low and give up revenue from retirees, or price it high and lose the students, and the same choice arises for the jazz pass.