Chapter 13: Price Discrimination

Outline and Conceptual Inquiries

Price-Discrimination Conditions: No Arbitrage and Different Elasticities
Can you sell your appendectomy to someone else?

Consider First-Degree Price Discrimination
Have you ever been indifferent toward purchasing something?
Application: Intertemporal Price Discrimination for DVD Players
Why are amusement park rides free and park admission prices variable?
Why do automobile companies offer options in packages?

Why Practice Second-Degree Price Discrimination?
Should you buy the larger-size shampoo or not?

When to Third-Degree Price-Discriminate
Are foreign firms offering lower prices in our market because they want to drive our industries output of business?

Combination of Discrimination Techniques

Understanding Quality Discrimination
Application: Sears’ Drills

Appendix to Chapter 13
Auctions
Classification of Auctions
When you are the last bidder in an auction, do you only pay the second highest bid?

© Michael E. Wetzstein, 2012
Summary

1. The two conditions for price discrimination are the ability to segment the market and the existence of different demand elasticities for each market segment. Through price discrimination, a firm has the potential of increasing its profit.

2. First-degree price discrimination occurs when it is possible to sell each unit of a product for the maximum price a consumer is willing to pay. One mechanism for obtaining first-degree price discrimination is with a two-part tariff. By first-degree price-discriminating on entrance fees, a firm can capture consumers’ entire surplus.

3. When a firm is unable to effectively separate consumers by their preferences and then price-discriminate, bundling commodities may offer an alternative to extracting consumers’ surplus.

4. Second-degree price discrimination occurs when a firm sells different units of output for different per-unit prices, and every consumer who buys the same unit amount of the commodity pays the same per-unit price.

5. Third-degree price discrimination occurs when a firm sells output to different consumers for different prices, and every unit of output sold to a given category of consumers sells for the same price.

6. A firm can also increase its profits by discriminating among consumers with different preferences for product quality. In quality discrimination, there is a difference in consumers’ willingness to pay for a given quality of a commodity. Given this difference, firms can increase their profits by offering a product at different levels of quality.

7. (Appendix) An auction can be classified as an English, Dutch, or sealed-bid auction. An English auction is a second-bid auction that will result in a Pareto-efficient allocation. A Dutch auction is a first-bid auction that can result in a Pareto-inefficient allocation. A sealed-bid auction is either a first- or second-bid auction where bidders individually submit written bids prior to some deadline.

8. (Appendix) A first-bid auction will yield a Pareto-efficient allocation when bidders cannot discern differences in their strategies from other bidders’ strategies.

9. (Appendix) Winner’s curse results when a buyer (seller) with the highest estimated error above (below) the true value of a commodity wins. The optimal strategy for bidders is then to
adjust their bids less than their estimated value if they are buyers or more than if they are sellers.

10. *(Appendix)* Monopoly behavior in the form of a reservation price or bidding rings can increase the surplus of agents but possibility results in market inefficiencies.

### Key Concepts

| affiliated | pool |
| arbitrage | reservation price |
| asymmetric information | Revenue Equivalence Theorem |
| auction | sealed bid |
| bid | sealed-bid auctions |
| bidding rings | second-bid auction |
| bundling | second-degree price discrimination |
| complete price discrimination | thin markets |
| Dutch auctions | third-degree price discrimination |
| English auctions | tie-in-sales |
| first-bid auction | two-part tariff |
| first-degree price discrimination | Vickrey auction |
| intertemporal price discrimination | well-developed markets |
| nonlinear pricing | winner's curse |
| perfect price discrimination | |

### Key Equations

\[ MR_1 = MR_2 = \ldots = MR_k = SMC \]

The FOC for a third-degree price-discriminating firm is equating the marginal revenue in each market to the overall marginal cost.
TEST YOURSELF

Multiple Choice

1. Which of the following is a necessary condition for price discrimination?
   a. A perfectly competitive market
   b. The ability to segment the markets with different demand elasticities
   c. Monopoly power in each market segment.

2. Arbitrage exists when
   a. Buyers bid in an auction
   b. The Law of One Price holds
   c. Consumers purchase a product in one market and resell it in another at a higher price
   d. A monopoly captures the entire consumer surplus.

3. Which of the following is a characteristic of first-degree price discrimination?
   a. Output is sold to different consumers at different prices
   b. Output is sold for the maximum price that each consumer is willing to pay
   c. The price of the product differs across the commodity unit and not across consumers
   d. Both a and b.

4. When a firm uses first-degree price discrimination,
   a. Deadweight loss is eliminated
   b. Consumer surplus will rise
   c. The firm will sell fewer units than it would if it did not price-discriminate
   d. All consumers within one market will pay the same price.

5. Which of the following is an example of intertemporal price discrimination?
   a. Discounts for students and senior citizens
   b. Coupons
   c. Lower air fares for vacationers who plan trips over weekends
   d. Lower prices on paperback editions of novels.

6. When a country club charges a membership fee and then charges each member a fee to use the facilities, it is using
   a. A two-part tariff
   b. Arbitrage
   c. Intertemporal price discrimination
   d. Second-degree price discrimination.

7. Bundling is used
   a. When the Law of One Price does not hold
   b. To package products at a combined price
   c. To reduce firms’ costs and improve efficiency
   d. To prevent resale of products.
8. A local bank sells two services: checking accounts and online banking. Sara is willing to pay $10 per month for a checking account and $5 per month for unlimited use of online banking. Brian is willing to pay $6 for a checking account and $6 for unlimited use of online banking. What is the profit-maximizing price to charge for a bundled good of checking with online banking?
   a. $11
   b. $12
   c. $15
   d. $27.

9. Which of the following is a characteristic of second-degree price discrimination?
   a. Price differs across consumers and not across the commodity unit
   b. Output is sold for a maximum price that each consumer is willing to pay
   c. Price differs across the commodity unit and not across consumers
   d. All are correct.

10. Which of the following is a characteristic of third-degree price discrimination?
    a. Output is sold for a maximum price that each consumer is willing to pay
    b. Price differs across consumers and not across the commodity unit
    c. Price differs across the commodity unit and not across consumers
    d. All are correct.

11. Suppose the price elasticity of demand for movies differs in two markets (students and faculty). Students’ price elasticity of demand is −1.5, while the faculty’s is −1.2. If the movie theater can price-discriminate, it can maximize profits by
    a. Charging the same price to both students and offering discount coupons
    b. Charging a higher price to students than to faculty
    c. Charging a lower price to students than to faculty
    d. Selling a bundle of tickets at a lower per ticket price.

12. Refer back to Question 11. For maximum profit, the ratio of the student to the faculty price is
    a. $\frac{1}{2}$
    b. $\frac{2}{3}$
    c. 1
    d. 2.
**Short Answer**

1. What are the necessary conditions for a firm to price-discriminate?
2. Explain the differences between first-, second- and third-degree price discrimination.
3. Graphically illustrate the demand facing a monopoly firm. If the firm practices first-degree price discrimination, how much output will it sell? Show the areas of consumer surplus, producer surplus and the deadweight loss.
4. Explain a two-part tariff using an example.
5. Assume that a software firm sells two types of software: an operating system and a web browser. Hazel is willing to pay $100 for an operating system and $35 for a web browser. Tony is willing to pay $125 for an operating system and $20 for a web browser.
   a. If the firm is unable to bundle these pieces of software, what are the profit-maximizing prices for the two systems and level of revenue?
   b. If the firm is able to bundle, what is the profit-maximizing bundled price and level of revenue?
   c. If the firm could perfectly price-discriminate, what would be the level of revenue?
6. Young’s Market has decided to practice second-degree price discrimination. Explain how self-selection can create a problem for it seeking to maximize profits. How can the market overcome this obstacle?
7. Suppose a firm is able to separate its consumers in two markets \( q_1 \) and \( q_2 \) with different demand price elasticities. Explain how the firm can determine the appropriate prices to charge these two markets.
8. Why may a firm practice quality discrimination?
9. (Appendix) Explain the difference among English, Dutch, and sealed-bid auctions.
10. (Appendix) What is a “winner’s curse?”
Problems

1. Suppose a firm faces a demand for output of \( Q^D = 24 - \frac{1}{2}p \). Its short-run total cost curve is \( STC = 7Q^2 + 100 \). If the firm practices perfect price discrimination, determine
   a. The profit-maximizing level of output.
   b. Consumer and producer surplus along with the deadweight loss.

2. Suppose Tim’s demand function for rounds of golf at the country club is \( q^D = 12 - 2p \).
   Assuming that the country club can provide rounds of golf at a constant marginal cost of $4, what is the maximum membership fee Tim would be willing to pay?

3. Assume that a monopoly’s demand is \( Q^D = 15 - \frac{1}{4}p \), with a short-run total cost function of \( STC = Q^2 + 10Q + 25 \).
   a. If the firm does not price-discriminate, determine its profit-maximizing level of output and price, along with its profit.
   b. Suppose the firm decides to use second-degree price discrimination by setting price equal to short-run marginal cost for large-volume purchases and a higher price for low-volume purchases. Determine the profit-maximizing quantities of large- and small-volume units the firm will sell and the associated prices. What is its level of profit?
   c. Is the self-selection constraint satisfied?

4. Suppose the short-run total cost curve for a firm is \( STC = 10Q + 250 \). It supplies output in two markets with demand functions \( q_1 = 150 - 3p_1 \) and \( q_2 = 200 - 5p_2 \).
   a. If the firm can prevent resale between the two markets, how much should it supply and what price should it charge in each market? What is the firm’s total profit?
   b. Determine the price elasticity of demand in each market at the profit-maximizing output and price.
   c. Find the levels of consumer surplus, producer surplus, and deadweight loss in each market.
   d. Now, suppose the firm cannot charge different prices in the two markets. What will be the price and quantity sold in each market? What happens to the firm’s profit? Calculate the consumer surplus, producer surplus, and deadweight loss.