# CHAPTER 11
# PRICING WITH MARKET POWER

| REVIEW QUESTIONS |
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**1. Suppose a firm can practice perfect, first-degree price discrimination. What is the lowest price it will charge, and what will its total output be?**

When the firm is able to practice perfect first-degree price discrimination, each unit is sold at the reservation price of each consumer, assuming each consumer purchases one unit. Because each unit is sold at the consumer's reservation price, marginal revenue is simply the price of the last unit. We know that firms maximize profits by producing an output such that marginal revenue is equal to marginal cost. For the perfect price discriminator, that point is where the marginal cost curve intersects the demand curve. Increasing output beyond that point would imply that $MR < MC$, and the firm would lose money on each unit sold. For lower quantities, $MR > MC$, and the firm should increase its output.

**2. How does a car salesperson practice price discrimination? How does the ability to discriminate correctly affect his or her earnings?**

The relevant range of the demand curve facing the car salesperson is bounded above by the manufacturer's suggested retail price plus the dealer's markup and bounded below by the dealer's price plus administrative and inventory overhead. By sizing up the customer, the salesperson determines the customer's reservation price. Through a process of bargaining, a sales price is determined. If the salesperson has misjudged the reservation price of the customer, either the sale is lost because the customer's reservation price is lower than the salesperson's guess or profit is lost because the customer's reservation price is higher than the salesperson's guess. Thus, the salesperson's commission is positively correlated to his or her ability to determine the reservation price of each customer.

**4. Give some examples of third-degree price discrimination. Can third-degree price discrimination be effective if the different groups of consumers have different levels of demand but the same price elasticities?**

To engage in third-degree price discrimination, the producer must separate customers into distinct markets (sorting) and prevent the reselling of the product from customers in one market to customers in another market (arbitrage). While examples in this chapter stress the techniques for separating customers, there are also techniques for preventing resale. For example, airlines restrict the use of their tickets by printing the name of the passenger on the ticket. Other examples include dividing markets by age and gender, e.g., charging different prices for movie tickets to different age groups. If customers in the separate markets have the same price elasticities, then from equation 11.2 we know that the prices are the same in all markets. While the producer can effectively separate the markets, there is little profit incentive to do so.

**5. Show why optimal, third-degree price discrimination requires that marginal revenue for each group of consumers equals marginal cost. Use this condition to explain how a firm should change its prices and total output if the demand curve for**

one group of consumers shifted outward, so that marginal revenue for that group increased.

> We know that firms maximize profits by choosing output so marginal revenue is equal to marginal cost. If $MR$ for one market is greater than $MC$, then the firm should increase sales to maximize profit, thus lowering the price on the last unit and raising the cost of producing the last unit. Similarly, if $MR$ for one market is less than $MC$, the firm should decrease sales to maximize profit, thereby raising the price on the last unit and lowering the cost of producing the last unit. By equating $MR$ and $MC$ in each market, marginal revenue is equal in all markets.

> If the quantity demanded increased, the marginal revenue at each price would also increase. If $MR = MC$ before the demand shift, $MR$ would be greater than $MC$ after the demand shift. To lower $MR$ and raise $MC$, the producer should increase sales to this market by lowering price, thus increasing output. This increase in output would increase $MC$ of the last unit sold. To maximize profit, the producer must increase the $MR$ on units sold in other markets, i.e., increase price in these other markets. The firm shifts sales to the market experiencing the increase in demand and away from other markets.

**6. When pricing automobiles, American car companies typically charge a much higher percentage markup over cost for "luxury option" items (such as leather trim, etc.) than for the car itself or for more "basic" options such as power steering and automatic transmission. Explain why.**

> This can be explained as an instance of third-degree price discrimination. In order to use the model of third-degree price discrimination presented in the text, we need to assume that the costs of producing car options is a function of the total number of options produced and the production of each type of options affects costs in the same way. For simplicity, we can assume that there are two types of option packages, "luxury" and "basic," and that these two types of packages are purchased by two different types of consumers. In this case, the relationship across product types $MR_1 = MR_2$ must hold, which implies that:

$$P_1 / P_2 = (1+1/E_2) / (1+1/E_1)$$

> where 1 and 2 denote the luxury and basic products types.

> This means that the higher price is charged for the package with the lower elasticity of demand. Thus the pricing of automobiles can be explained if the "luxury" options are purchased by consumers with low elasticities of demand relative to consumers of more "basic" packages.

## EXERCISES

**1. Price discrimination requires the ability to sort customers and the ability to prevent arbitrage. Explain how the following can function as price discrimination schemes and discuss both sorting and arbitrage:**

**a. Requiring airline travelers to spend at least one Saturday night away from home to qualify for a low fare.**

> The requirement of staying over Saturday night separates business travelers, who prefer to return for the weekend, from tourists, who travel on the

weekend. Arbitrage is not possible when the ticket specifies the name of the traveler.

b. **Insisting on delivering cement to buyers and basing prices on buyers' locations.**

By basing prices on the buyer's location, customers are sorted by geography. Prices may then include transportation charges. These costs vary from customer to customer. The customer pays for these transportation charges whether delivery is received at the buyer's location or at the cement plant. Since cement is heavy and bulky, transportation charges may be large. This pricing strategy leads to "based-point-price systems," where all cement producers use the same base point and calculate transportation charges from this base point. Individual customers are then quoted the same price. For example, in *FTC v. Cement Institute*, 333 U.S. 683 [1948], the Court found that sealed bids by eleven companies for a 6,000-barrel government order in 1936 all quoted $3.286854 per barrel.

c. **Selling food processors along with coupons that can be sent to the manufacturer to obtain a $10 rebate.**

Rebate coupons with food processors separate consumers into two groups: (1) customers who are less price sensitive, i.e., those who have a lower elasticity of demand and do not request the rebate; and (2) customers who are more price sensitive, i.e., those who have a higher demand elasticity and do request the rebate. The latter group could buy the food processors, send in the rebate coupons, and resell the processors at a price just below the retail price without the rebate. To prevent this type of arbitrage, sellers could limit the number of rebates per household.

d. **Offering temporary price cuts on bathroom tissue.**

A temporary price cut on bathroom tissue is a form of intertemporal price discrimination. During the price cut, price-sensitive consumers buy greater quantities of tissue than they would otherwise. Non-price-sensitive consumers buy the same amount of tissue that they would buy without the price cut. Arbitrage is possible, but the profits on reselling bathroom tissue probably cannot compensate for the cost of storage, transportation, and resale.

e. **Charging high-income patients more than low-income patients for plastic surgery.**

The plastic surgeon might not be able to separate high-income patients from low-income patients, but he or she can guess. One strategy is to quote a high price initially, observe the patient's reaction, and then negotiate the final price. Many medical insurance policies do not cover elective plastic surgery. Since plastic surgery cannot be transferred from low-income patients to high-income patients, arbitrage does not present a problem.

**2. If the demand for drive-in movies is more elastic for couples than for single individuals, it will be optimal for theaters to charge one admission fee for the driver of the car and an extra fee for passengers. True or False? Explain.**

True. Approach this question as a two-part tariff problem where the entry fee is a charge for the car plus the driver and the usage fee is a charge for each additional passenger other than the driver. Assume that the marginal cost of showing the movie is zero, i.e., all costs are fixed and do not vary with the number of cars. The theater should set its entry fee to capture the consumer

surplus of the driver, a single viewer, and should charge a positive price for each passenger.

3. **In Example 11.1, we saw how producers of processed foods and related consumer goods use coupons as a means of price discrimination. Although coupons are widely used in the United States, that is not the case in other countries. In Germany, the use of coupons is prohibited by law.**

**a.     Does prohibiting the use of coupons in Germany make German *consumers* better off or worse off?**

In general, we cannot tell whether consumers will be better off or worse off. Total consumer surplus can increase or decrease with price discrimination, depending on the number of different prices charged and the distribution of consumer demand. Note, for example, that the use of coupons can increase the market size and therefore increase the total surplus of the market. Depending on the relative demand curves of the consumer groups and the producer's marginal cost curve, the increase in total surplus can be big enough to increase both producer surplus and consumer surplus. Consider the simple example depicted in Figure 11.3.a.

In this case there are two consumer groups with two different demand curves. Assuming marginal cost is zero, without price discrimination, consumer group 2 is left out of the market and thus has no consumer surplus. With price discrimination, consumer 2 is included in the market and collects some consumer surplus. At the same time, consumer 1 pays the same price under discrimination in this example, and therefore enjoys the same consumer surplus. The use of coupons (price discrimination) thus increases total consumer surplus in this example.

Furthermore, although the net change in consumer surplus is ambiguous in general, there is a transfer of consumer surplus from price-insensitive to price-sensitive consumers. Thus, price-sensitive consumers will benefit from coupons, even though on net consumers as a whole can be worse off.
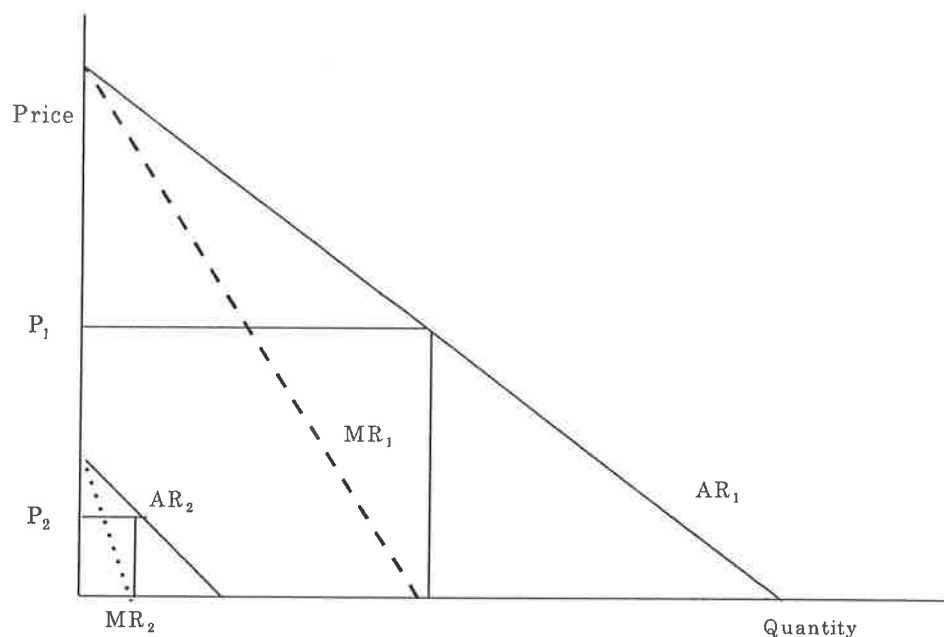
Figure 11.3.a

**b.    Does prohibiting the use of coupons make German *producers* better off or worse off?**

> Prohibiting the use of coupons will make the German producers worse off, or at least not better off. If firms can successfully price discriminate (i.e. they can prevent resale, there are barriers to entry, etc.), price discrimination can never make a firm worse off.

**4. Suppose that BMW can produce any quantity of cars at a constant marginal cost equal to $15,000 and a fixed cost of $20 million. You are asked to advise the CEO as to what prices and quantities BMW should set for sales in Europe and in the U.S. The demand for BMWs in each market is given by:**

$$Q_E = 18{,}000 - 400\ P_E \quad \text{and} \quad Q_U = 5500 - 100P_U$$

**where the subscript $E$ denotes Europe, the subscript $U$ denotes the United States, and all prices and costs are in thousands of dollars. Assume that BMW can restrict U.S. sales to authorized BMW dealers only.**

**a.    What quantity of BMWs should the firm sell in each market, and what will the price be in each market? What will the total profit be?**

> With separate markets, BMW chooses the appropriate levels of $Q_E$ and $Q_U$ to maximize profits, where profits are:
>
> $$\pi = TR - TC = \left(Q_E P_E + Q_U P_U\right) - \left\{\left(Q_E + Q_U\right)15 + 20{,}000\right\}.$$
>
> Solve for $P_E$ and $P_U$ using the demand equations, and substitute the expressions into the profit equation: