

23 | PRICE DISCRIMINATION

Purpose: To illustrate price discrimination in monopoly

Computer file: **prdisc.xls**

Instructions and background information:

Price discrimination is a device some firms use to increase profits by charging different consumers different prices for the same commodity. Examples are commonplace. A college or university may charge a different tuition rate for first year students than fourth year students for the same course. The local electric company may charge commercial and residential users different rates per kilowatt-hour of service, even though the cost of provision is the same for both. Colleges will often sell tickets to college-sponsored sporting events at lower prices to students than to the general public.

For price discrimination to be accomplished, the firm must have some way of keeping speculators from buying up the good or service at the low price, and simply reselling it at the high price. Very often, it is a characteristic of the good that determines whether price discrimination is possible. In the case of electric service, for example, it is simply too costly for commercial users, who usually buy at a lower price, to save up power and then resell it to residential users. When colleges sell tickets to students at reduced prices, they often have to take measures to prevent resale, such as invoking laws against “scalping”, or requiring identification in addition to a ticket to gain entry.

For this problem set, we take the example of a local cable television provider, the RipOff Cable TV Co., who sells to two groups of consumers. One group consists of residential customers, while the other group is composed of commercial users, for example, operators of restaurants, bars, or other business establishments. Output of the firm is the total number of hookups it provides. For any total quantity sold, how does the RipOff Cable TV Co. set prices and sales levels in the two markets in which it operates? We assume the firm wants to maximize the total revenue it receives for any level of total output. We’ll get to the question of how to choose total output, and therefore the level of total costs, later on.

To maximize total revenue from the sale of hookups the output should be allocated between the two markets so that marginal revenue is the same in each. The reasoning is that if marginal revenue were higher in one market, say the residential market, then total receipts could be increased by moving some output from the commercial to the residential market.

Once outputs are chosen to make marginal revenue the same in the two markets, price in each market will be determined by its demand curve. There is a relationship

between the prices charged and the elasticities of demand in the two markets. The more inelastic the demand, the higher the price charged.

To decide on the total output where profits are maximized, the firm should produce where marginal cost equals marginal revenue. Of course, in general there is only one marginal cost curve while there are two marginal revenue curves, so we must be careful to take that into account in comparing MR and MC. In this problem set, marginal cost is assumed to be constant, so determination of total output will be fairly simple.

In the spreadsheet there are only two variables you can choose, sales to the residential market, and total sales to both markets together. Sales to the commercial market are automatically computed as the difference between total sales and residential sales. Use the Goal Seek facility in Excel to solve most of the problems.

Here are some things to learn and watch for as you do the problems:

- 1) Price discrimination allows a firm to increase the total revenue from sales compared to charging all customers the same price.
- 2) A price discriminating firm must have some way to keep the markets separate. If it's easy for consumers to buy the good and simply resell it in the higher priced market, price discrimination will be impossible.
- 3) Price will be higher in the market with the more inelastic demand, not necessarily the larger demand. Think about this, and try computing elasticity in the two markets when price discrimination takes place.

Here are some hints to help you get the answers quicker:

- 1) Questions 15) and 16) are difficult. To find the conditions under which profit is maximized, operate on the residential market first, determining the output at which $MR = MC$. Then, with the residential market in equilibrium, try to set $MR = MC$ in the commercial market by changing the *total* quantity.

MATH MAVEN'S CORNER: The marginal revenue curve for the residential market is given by $MR_r = A Q_r^B$, where A and B are parameters that are unique to your problem. The marginal revenue curve for the commercial market is the same functional form, but with different parameters.

PRICE DISCRIMINATION

Questions

Record the following values when all variables are at their baseline values:

- 1) Quantity in the residential market.
- 2) Price in the residential market.
- 3) Quantity in the commercial market.
- 4) Price in the commercial market

Following on from the previous question:

- 5) What are RipOff's total receipts from both markets together?

The firm's objective is to maximize total revenue. Be sure to set variables to their baseline values. To maximize total revenue

- 6) What quantity should it sell in the residential market?
- 7) What price should it charge there?

Continuing from the previous question,

- 8) What quantity will be sold in the commercial market?
- 9) What price will be charged there?

- 10) When RipOff is maximizing total revenue, how much are its receipts from both markets together? [Compare to question 5.]

With total quantity still at its baseline value, suppose RipOff is ordered to sell to all customers at the same price.

- 11) What price does it charge?

When RipOff must charge everyone the same price (as in the last question),

- 12) What is the company's total revenue? [Compare to questions 5 and 10.]

Increase total sales from 3,000 to 4,000. If RipOff can price discriminate between the residential and commercial customers,

- 13) What's the new residential price?
- 14) What's the new commercial price?

Suppose that Ripoff's marginal cost is constant at \$7.00 per hookup.

- 15) If the firm can price discriminate, and wants to maximize profit, what price will it charge in the residential market?

Continuing on from the last question:

- 16) What price will it charge in the commercial market?

Suppose a tax of \$2.00 per hookup is now imposed on all hookups sold by RipOff. This raises MC to \$9.00.

- 17) How much will price INCREASE in the residential market?
- 18) How much will price INCREASE in the commercial market?