

20 | MONOPOLY

Purpose: To illustrate price determination in monopoly.

Computer file: **monop.xls**

Instructions and background information:

The RipOff Cable TV Company is a monopoly operating in a medium size mid-western city. The company hires you as a consultant to help them try to improve their profits. The company has provided you with all of the demand and cost data that they possess. These data are summarized in the graphs and tables that are contained in the accompanying spreadsheet.

Current output is 20,000 homes hooked up to the system. Average family income in the market area for the monopolist is \$55,000 per year. The price is the monthly fee per home hooked up to the system. In experimenting with different pricing and output scenarios you can change the current output, the tax (or subsidy) to the industry, and the average income per family. Excel automatically computes price, marginal revenue, average and marginal cost, and some other handy values such as the difference between marginal revenue and marginal cost, and the difference between price (average revenue) and marginal cost.

As an economic consultant you are aware of the rules that can achieve several of the company's objectives. For maximum profit the company should choose an output level at which marginal revenue equals marginal cost. Once that output is determined, price is set according to the demand curve.

A problem with the profit maximizing output is that it is too small from society's point of view. Society ordinarily wants output to be where marginal cost is equal to price, because then the sum of producer and consumer surplus will be maximized. Monopolists when left to their own devices will produce too little of a good from society's point of view, and sell it at too high a price. The loss of surplus when a monopolist maximizes profits is called the "deadweight loss due to monopoly".

Governments often regulate monopolies to try to eliminate the deadweight loss. One method sometimes used is a system of taxes or subsidies, and you are asked to formulate a subsidy plan for the Cable TV Company that will make it choose a pricing and output policy that is in the public interest.

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

- 1) The demand curve the monopolist sees for its product is the same as the market demand curve. In fact the market demand curve is the monopolist's average revenue curve. Average revenue is price!
- 2) The monopolist's own policy variable is output. To maximize total profit, it should choose the output at which $MC = MR$. Price is then set according to the demand curve.
- 3) Monopolists are inefficient in the sense that they do not produce the socially best output, nor set the socially best price. Monopolists produce too little and charge too high a price from society's point of view. The socially best output is the one at which $MC = P$. The monopolist may still earn profits at this output.

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

- 1) Use Goal Seek to find the profit maximizing output. You'll want to have $MR - MC$ equal to zero by changing output.
- 2) Use Goal Seek to find the socially best output. The objective is to make $AR - MC$ equal to zero by changing output.
- 3) In a difficult problem, you're asked to find the subsidy that would make the monopolist produce the socially best output. The trick is to start at the socially best output you found by making price equal to marginal cost. Then use Goal Seek to make $MR - MC$ equal to zero by changing the tax. Be sure you understand why this works!

MATH MAVEN'S CORNER: For the worksheet monopoly, the average revenue curve is given by $AR = aI - b(Q)$, where I is income in dollars, and a and b are randomly chosen parameters. You might want to show that the marginal revenue curve is therefore $MR = aI - 2b(Q)$. The average cost curve is given by $AC = c + d(Q) + eQ^2 + t$, where t is the tax per unit of output, and c , d , and e are randomly chosen parameters. The marginal cost curve is given by $MC = c + 2d(Q) + 3eQ^2 + t$.

MONOPOLY

Questions

Set all variables to their baseline values. Make sure output is set to 20,000 hookups. Record the values of these variables:

- 1) Market price.
- 2) Average cost.
- 3) Profit per unit of output.
- 4) Total profit.

Keep output at 20,000 hookups.

- 5) What is the increase in cost due to one more hookup (MC)?
- 6) What's the added revenue from one more hookup (MR)?
- 7) If one more hookup is added, what's the change in profits?

- 8) At an output of 20,000, should the firm be producing more or less output? [Enter *more or less.*]

Cable company management wants to know how to maximize total profit, and what price to set.

- 9) What's the profit maximizing output?
- 10) What's the profit maximizing price?

- 11) Continuing on from the last problem, what are total profits when profits are maximized?

Cable company management expects consumer incomes to rise to \$60,000. You must advise them on what output to sell if the increase occurs.

- 12) What's the new profit maximizing output?

Continuing on from the last question, record the values of these variables after income rises:

- 13) Market price.
- 14) Total profits.

- 15A) Set all variables to their baseline values. You are visited by staff members from the cable TV regulator's office. These are government officials and you must tell them the truth about the firm's operation. Go on to 15B.

The government officials want to know what output will result in the socially best amount of cable TV services.

- 15B) What's the socially best output?
- 16) What's the socially best price?

- 17) What are total profits when the socially best output and price are set?

The government regulators thank you for your help, but would like you to tell them how large a subsidy the firm would need to produce the socially best output.

18) What per unit subsidy will be required?

19) What price would the firm WANT to charge if they actually received the subsidy?