

Ec 11 Homework 6
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Winter 2007

CALTECH



1. Consider a monopolist with cost $c = 3q$
 - a. If demand is given by $q = 50 - 2p$, what is the monopoly price and quantity? What are the profits?
 - b. Repeat part a for demand given by $q = 10 / p$
2. The government wishes to impose a tax, of fraction t , on the profits of a monopolist. How does this affect the monopolist's optimal output quantity?
3. If demand has constant elasticity, what is the marginal revenue of the monopolist?
4. Determine whether the following are direct price discrimination, indirect price discrimination, or not price discrimination, and why
 - a. Student discounts at local restaurants
 - b. Financial aid at colleges
 - c. Matinee discount at the movies
 - d. Home and professional versions of Microsoft's operating system
 - e. Lower airline fares for weekend flights
 - f. Buy one, get one free specials
5. For each of the following, state whether you would expect peak load pricing to equalize the quantity demanded across periods or impose the entire cost of capacity on the peak period. Explain why.
 - a. Hotels in Miami
 - b. Electricity

1. Consider a monopolist with cost $c = 3q$
 - a) If demand is given by $q = 50 - 2p$, what is the monopoly price and quantity? What are the profits?

The monopolist earns $pq - c = \left(\frac{50 - q}{2}\right)q - 3q$. The first order condition gives

$$0 = 22 - q$$

So $q = 22$, $p = 14$, and profit is 242.

- b) Repeat part a for demand given by $q = 10 / p$

In this case we have a demand with elasticity equal to one, which means that the marginal revenue is equal to zero, so there is no output.

2. The government wishes to impose a tax, of fraction t , on the profits of a monopolist. How does this affect the monopolist's optimal output quantity?

With a tax percentage on profits of t , the monopolist now wants to maximize,

$$(1 - t)(p(q)q - c(q))$$

which has the same maximizing q as $(p(q)q - c(q))$ and so this tax does not affect quantity.

3. If demand has constant elasticity, what is the marginal revenue of the monopolist?

For constant elasticity we have $q = a p^{-\epsilon}$, and so marginal revenue is given by $p + q$

$p'(q)$. This solves for $\left(\frac{a}{q}\right)^{1/\epsilon} - \frac{1}{\epsilon} a^{1/\epsilon} q^{-1/\epsilon}$.

4. Determine whether the following are direct price discrimination, indirect price discrimination, or not price discrimination, and why
 - a) Student discounts at local restaurants

Direct price discrimination

- b) Financial aid at colleges

Direct price discrimination

- c) Matinee discount at the movies

Not price discrimination, matinee is a different product.

- d) Home and professional versions of Microsoft's operating system

Not price discrimination, different product

- e) Lower airline fares for weekend flights

Indirect price discrimination for leisure fliers

- f) Buy one, get one free specials

Indirect price discrimination, discount on quantity

5. For each of the following, state whether you would expect peak load pricing to equalize the quantity demanded across periods or impose the entire cost of capacity on the peak period. Explain why.

- a) Hotels in Miami

Most people probably want to go to Miami in the winter, but cheaper hotel rates at other times of year could entice them to change their vacation plans or attract different people (like college students on spring break), so balancing of the load may occur.

- b) Electricity

The capacity cost would probably be paid in the peak period, since most people are only at home and awake during certain hours of the day and cannot easily switch their electricity usage to other times.