

# Market Concentration and Power

- What can the data tell us about  $\theta$ ?
- If we had data on marginal costs, we should be able to estimate  $\theta$  easily.
- Because then we could get  $L$ , and having estimated  $H$  (easy),  $\epsilon$  (hard) we can obtain  $\theta$  from:

$$\theta = L\epsilon/H$$

- The problem is data on marginal costs is seldom available.
- It's sometimes easier to take the reverse approach:
- Estimate  $\theta, H, \epsilon$  and recover  $L$ .

# Market Concentration and Power

- One way to estimate  $\theta$  is with a “proxy” for marginal costs—that is a variable highly correlated with it.
- For example, if total marginal cost is production marginal cost plus sales tax:

$$MC = c + t$$

- where  $c$  is the unobserved production marginal cost and  $t$  is the sales tax, which can be observed.
- Note total marginal cost is perfectly correlated with sales tax: a one dollar change in  $t$  implies a one dollar change in  $MC$ .
- Therefore a change in price in response to a change in sales tax is the same as the change in price in response to a change in marginal cost.
- This can be useful, because knowing the derivative of price with respect to marginal cost can help us identify (estimate)  $\theta$ .

# Market Concentration and Power

- Assuming linear demand, constant marginal cost, and letting  $\varepsilon$  denote the derivative of price with respect to marginal cost,

$$\theta = \frac{1 - \varepsilon}{\varepsilon} \frac{1}{H}$$

- An alternative approach is to see how price changes in response to shifts in the demand curve:

$$p = a + s - Q$$

- where  $s$  denotes a shift in the intercept.

- Now let  $\chi$  denote the derivative of price with respect to the demand intercept; we can show:

$$\theta = \frac{\chi}{1 - \chi} \frac{1}{H}$$

- On the one hand several problems with this analysis:(linearity, stationarity)
- On the other it illustrates the method of identifying the parameters describing firm behavior, and can lead the way to adopting more sophisticated statistical methods.

# Price Discrimination

- There are several examples of firms setting different prices for the same good (at least approximately the same.)
- This practice (whatever the reason) is known as price discrimination.
- In this chapter we will consider cases where a firm is able to discriminate between consumers by setting different prices in different market segments.
- We'll begin by discussing conditions under which a firm can do this.
- We know a firm cannot do this in a perfectly competitive market, because the law of one price must prevail
- For more than one price to prevail in equilibrium, one of two market features must prevail

# Price Discrimination

- One is asymmetric information (chapter 12) and the other is high transaction costs of buying and selling, for resales to be profitable.
- Generically speaking, price discrimination will require the absence of resale for some reason.
- As we learned before there are many types of price discrimination.
- One classification takes into account the information that firms have about buyers.

- Sometimes firms have information about a customer's willingness to pay, and charge prices accordingly. This is referred to as third degree price discrimination.
- In other cases the seller has information about heterogeneity of buyers' preferences but cannot view characteristics of the each buyer.
- Still it is possible to discriminate between different buyers by offering a menu of selling contracts that have clauses as well as prices.

# Price Discrimination

- This type, where we allow for self selection, is second degree price discrimination.
- Lastly, first-degree price discrimination is when the seller sets different for each buyer and each unit purchased by each buyer, thus extracting all of the consumer surplus.
- This situation (perfect discrimination) , although rare, will be useful to study from a welfare analysis point of view.
- The most common type is third degree, which we will spend the most time analyzing.
- As mentioned, it usually corresponds to situations where the seller divides buyers into groups, setting different prices, known as market segmentation.
- The simplest model consists of a monopolist selling to two separate markets.

# Price Discrimination

- The profit function is of

$$\Pi(p_1, p_2) = p_1 D_1(p_1) + p_2 D_2(p_2) - C(D_1(p_1) + D_2(p_2))$$

- where  $p_i$  is price in market  $i$ .
- Profit maximization implies

$$MR_1 = MR_2 = MC$$

- This implies the segmented elasticity rule:

$$p_1 \left(1 - \frac{1}{\epsilon_1}\right) = p_2 \left(1 - \frac{1}{\epsilon_2}\right) = MC$$

- Where  $\epsilon_i$  denotes the elasticity of demand in market  $i$
- So under third degree price discrimination, the monopolist would charge a lower price in the segments with greater price elasticity.

# Price Discrimination

- In many cases the consumer must decide not only whether to participate in the market but how much to buy.
- These settings can lead to second degree price discrimination, where the seller charges different prices according to the quantity consumed.
- This is what we refer to as nonlinear pricing.
- A simple example of nonlinear pricing is a two part tariff.
- This will comprise of a fixed part  $f$ , which each consumer must pay regardless of quantity purchased, and a variable part  $p$ , proportional to the quantity purchased.
- Would a monopolist want to set a two part tariff, and if so, what would  $f$  and  $p$  be?

# Price Discrimination

- To simplify, assume all consumers have the same demand curve  $D(p)$  and the monopolist had constant marginal cost.
- If the monopolist set a single price, we know what it is from chapter 5.
- Now allow for a two part tariff- whatever  $p$  is  $f$  should be set to the consumer surplus,  $CS(p)$ , the area under the demand curve.
- So we can denote variable profit by  $\pi(p)$  which is

$$\pi(p) = (p - c)D(p)$$

- Now setting the highest fixed fee the consumers are willing to pay, total profits are given by

$$\Pi(p) = \pi(p) + f = \pi(p) + CS(p)$$

- Which is equal to total surplus, so the variable price that maximizes total profits is the efficient price.