

I/O this year, consists of 14.271, 14.272, and 14.273.
 I/O is inherently theoretical: "Should we break up Microsoft?"
 ° Empirical I/O is useful for 1) deciding which theories are more correct, and 2) measure the parameters of the model

1) usually corresponds to reduced form models
 2) corresponds to the structural approach.

271 is mostly theoretic, but it will have some empirical papers to get us used to empirical studies

272 - antitrust and regulation

273 - structural, empirical estimation

Should take all three courses.

Short, weekly problem sets. First one is due 9/13.

Monopoly pricing

Firm cost $c(x)$

Inverse demand $p(x)$

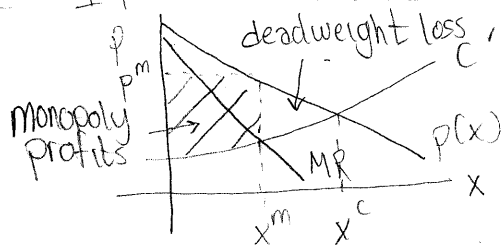
$$\max_x x p(x) - c(x)$$

$$(x): \underbrace{p(x) + x p'(x)}_{MR} = \underbrace{c'(x)}_{MC}$$

$$\Leftrightarrow \underbrace{\frac{p(x) - c'(x)}{p(x)}}_{\text{markup}} = - \frac{x p'(x)}{p(x)} = \underbrace{-\frac{1}{\epsilon}}_{\text{Lerner Index}}$$

where $\epsilon = \frac{p(x)}{x p'(x)}$ - elasticity of demand

If $\epsilon < 1$, the FOC will not have a solution.



- 1] Since deadweight loss is positive, we have that monopolies are inefficient
- 2] Product quality problems as well.
- 3] Efficiency of production problems.
- 4] Rent-seeking
- 5] Distributional concerns - we will ignore these aspects.

Product quality

Continuum of consumers, unit mass

Types $\theta \sim U[0, 1]$

Consumer of type θ gets $v(s; \theta) - p$ if buys 1 unit of quality s at price p , zero otherwise

Firm has constant marginal cost $c(s)$. (constant wrt quantity but not quality.)

Firm chooses only one s .

$$\max_{q, s} q [v(s, 1-q) - c(s)]$$

why is this the price?

$$(s): \frac{\partial v(s^m, 1-q^m)}{\partial s} = \frac{dc(s^m)}{ds}$$

marginal value of quality for marginal consumer marginal cost of quality.

Social planner

$$\max_{q, s} \int_{1-q}^1 (v(s, \theta) - c(s)) d\theta$$

$$C(s) : \int_{1-q}^1 \frac{\partial v}{\partial s}(s^{FB}, \theta) d\theta = \frac{\partial C}{\partial s}(s^{FB})$$

$$\Leftrightarrow \frac{\partial C(s^{FB})}{\partial s} = \underbrace{\int_{1-q}^1 \frac{\partial v}{\partial s}(s^{FB}, \theta) d\theta}_q$$

marginal value of quality
for the average consumer.

Observations

1] s^m and s^{FB} differ for two reasons:

- marginal vs average consumer
- marginal consumer is different
- often go in opposite directions

2] In a homogeneous population model ($v(s, \theta) = v(s)$) the monopolist always produces the optimal quantity.

Durable goods

Monopolist sells durable good to continuum of consumers.
Two periods. A consumer of type θ gets utility

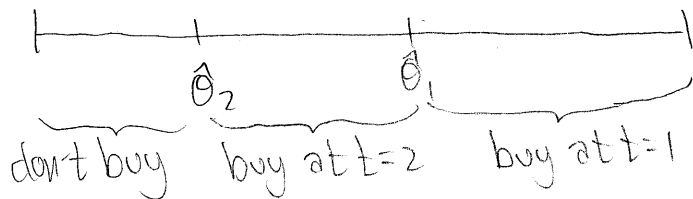
$$u = \begin{cases} 2\theta - p_1 & \text{if buys at } t=1 \\ \theta - p_2 & \text{if buys at } t=2 \\ 0 & \text{if not buy} \end{cases}$$

Suppose $\theta \sim F(\theta)$ on $[0, 1]$

Marginal cost is c

Claim: Solution is usually to set p^m in the first period and set $p_2 \geq p^m/2$ to sell 0 units at $t=2$

Proof: Chooses $\hat{\theta}_2, \hat{\theta}_1$ cutoff values s.t.



To sell to $\hat{\theta}_2$ type at $t=2$, set $p_2 = \hat{\theta}_2$

To sell to $\hat{\theta}_1$ type at $t=1$, set $p_1 = \hat{\theta}_2 + \hat{\theta}_1$

$$\max_{\theta_1, \theta_2} (\theta_2 - c) [F(\theta_1) - F(\theta_2)] + (\theta_1 + \theta_2 - c) [1 - F(\theta_1)]$$

$\theta_1 \geq \theta_2$

Ignore $\theta_1 \geq \theta_2$ constraint now.

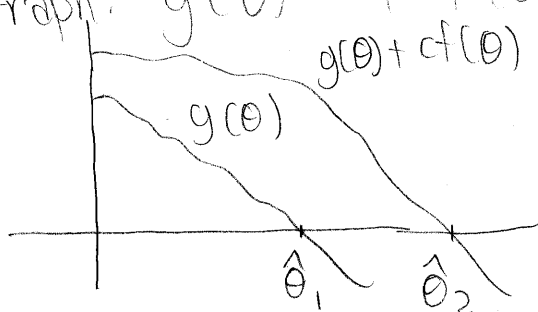
$$\max_{\theta_1, \theta_2} \underbrace{\theta_1 [1 - F(\theta_1)]}_{\text{first pd rental income}} + \underbrace{\theta_2 [1 - F(\theta_2)]}_{\text{second pd rental income}} - \underbrace{c [1 - F(\theta_2)]}_{\text{second pd cost of production}}$$

no first pd cost of production

$$(\theta_1): 1 - F(\theta_1) - \theta_1 f(\theta_1) = 0$$

$$(\theta_2): 1 - F(\theta_2) - \theta_2 f(\theta_2) + c f(\theta_2) = 0$$

Graph: $g(\theta) = 1 - F(\theta) - \theta f(\theta)$



This implies $\hat{\theta}_2 \geq \hat{\theta}_1$, which contradicts $\theta_1 \geq \theta_2$.

The solution must always have $\hat{\theta}_1 = \hat{\theta}_2$
(ie sell once and shutdown the market.)

Intuition:

$MC = c$ in 2nd period
0 in 1st period if will produce later.

Sources of price declines in practice

- 1] Different preferences: some people value having good earlier.
- 2] Learning by doing on cost side
- 3] Commitment problems - will discuss this next class.
 - Coase conjecture - monopolist sells goods at marginal cost if the commitment problem becomes severe.

Read: Chevalier and Goolsbee