# Economics 101A (Lecture 19) 

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## Outline

# 1. Market Equilibrium in The Long-Run II 

2. Profit Maximization: Monopoly
3. Price Discrimination
4. Oligopoly?

# 1 Market Equilibrium in the LongRun 

- Special cases:
- Constant cost industry
- Cost function of each company does not depend on number of firms
- Increasing cost industry
- Cost function of each company increasing in no. of firms
- Ex.: congestion in labor markets


# - Decreasing cost industry 

- Cost function of each company decreasing in no. of firms
- Ex.: set up office to promote exports


# 2 Profit Maximization: Monopoly 

- Nicholson, Ch. 11, pp. 358-365 (Ch. 9, pp. 248255, 9th)
- Nicholson, Ch. 14, pp. 491-499 (Ch. 13, pp. 385393, 9th)
- Perfect competition. Firms small
- Monopoly. One, large firm. Firm sets price $p$ to maximize profits.
- What does it mean to set prices?
- Firm chooses $p$, demand given by $y=D(p)$
- (OR: firm sets quantity $y$. Price $\left.p(y)=D^{-1}(y)\right)$
- Write maximization with respect to $y$
- Firm maximizes profits, that is, revenue minus costs:

$$
\max _{y} p(y) y-c(y)
$$

- Notice $p(y)=D^{-1}(y)$
- First order condition:

$$
p^{\prime}(y) y+p(y)-c_{y}^{\prime}(y)=0
$$

or

$$
\frac{p(y)-c_{y}^{\prime}(y)}{p}=-p^{\prime}(y) \frac{y}{p}=-\frac{1}{\varepsilon_{y, p}}
$$

- Compare with f.o.c. in perfect competition
- Check s.o.c.
- Elasticity of demand determines markup:
- very elastic demand $\rightarrow$ low mark-up
- relatively inelastic demand $\rightarrow$ higher mark-up
- Graphically, $y^{*}$ is where marginal revenue $\left(p^{\prime}(y) y+p(y)\right)$ equals marginal cost $\left(c_{y}^{\prime}(y)\right)$
- Find $p$ on demand function
- Example.
- Linear inverse demand function $p=a-b y$
- Linear costs: $C(y)=c y$, with $c>0$
- Maximization:

$$
\max _{y}(a-b y) y-c y
$$

- Solution:

$$
y^{*}(a, b, c)=\frac{a-c}{2 b}
$$

and

$$
p^{*}(a, b, c)=a-b \frac{a-c}{2 b}=\frac{a+c}{2}
$$

- S.O.C.
- Figure
- Comparative statics:
- Change in marginal cost $c$
- Shift in demand curve $a$


## - Monopoly profits

- Case 1. High profits
- Case 2. No profits
- Welfare consequences of monopoly
- Too little production
- Too high prices
- Graphical analysis


## 3 Price Discrimination

- Nicholson, Ch. 14, pp. 503-509 (Ch. 13, pp. 397404, 9th)
- Restriction of contract space:
- So far, one price for all consumers. But:
- Can sell at different prices to differing consumers (first degree or perfect price discrimination).
- Self-selection: Prices as function of quantity purchased, equal across people (second degree price discrimination).
- Segmented markets: equal per-unit prices across units (third degree price discrimination).


### 3.1 Perfect price discrimination

- Monopolist decides price and quantity consumer-byconsumer
- What does it charge? Graphically,
- Welfare:
- gain in efficiency;
- all the surplus goes to firm


### 3.2 Self-selection

- Perfect price discrimination not legal
- Cannot charge different prices for same quantity to $A$ and $B$
- Partial Solution:
- offer different quantities of goods at different prices;
- allow consumers to choose quantity desired
- Examples (very important!):
- bundling of goods (xeroxing machines and toner);
- quantity discounts
- two-part tariffs (cell phones)
- Example:
- Consumer A has value $\$ 1$ for up to 100 photocopies per month
- Consumer B has value $\$ .50$ for up to 1,000 photocopies per month
- Firm maximizes profits by selling (for $\varepsilon$ small):
- 100 photocopies for $\$ 100-\varepsilon$
- 1,000 photocopies for \$500-
- Problem if resale!


### 3.3 Segmented markets

- Firm now separates markets
- Within market, charges constant per-unit price
- Example:
- cost function $T C(y)=c y$.
- Market A: inverse demand function $p_{A}(y)$ or
- Market B: inverse function $p_{B}(y)$
- Profit maximization problem:

$$
\max _{y_{A}, y_{B}} p_{A}\left(y_{A}\right) y_{A}+p_{B}\left(y_{B}\right) y_{B}-c\left(y_{A}+y_{B}\right)
$$

- First order conditions:
- Elasticity interpretation
- Firm charges more to markets with lower elasticity
- Examples:
- student discounts
- prices of goods across countries:
* airlines (US and Europe)
* books (US and UK)
* cars (Europe)
* drugs (US vs. Canada vs. Africa)
- As markets integrate (Internet), less possible to do the latter.


## 4 Oligopoly?

- Extremes:
- Perfect competition
- Monopoly
- Oligopoly if there are $n$ (two, five...) firms
- Examples:
- soft drinks: Coke, Pepsi;
- cellular phones: Sprint, AT\&T, Cingular,...
- car dealers
- Firm $i$ maximizes:

$$
\max _{y_{i}} p\left(y_{i}+y_{-i}\right) y_{i}-c\left(y_{i}\right)
$$

where $y_{-i}=\sum_{j \neq i} y_{j}$.

- First order condition with respect to $y_{i}$ :

$$
p_{Y}^{\prime}\left(y_{i}+y_{-i}\right) y_{i}+p-c_{y}^{\prime}\left(y_{i}\right)=0
$$

- Problem: what is the value of $y_{-i}$ ?
- simultaneous determination?
- can firms $-i$ observe $y_{i}$ ?
- Need to study strategic interaction


## 5 Next Lecture

- Game theory
- Back to oligopoly:
- Cournot
- Bertrand

