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ECON 2316

Lecture 18:
Price Discrimination

From last time, game theory

Market Demand: $Q = 100 - P$
- 2 firms (identical)

$TC_1 = TC_2 = 10 + q^2$

→ Cournot equilibrium
- inverse demand → $P = 100 - Q$
$= 100 - q_1 - q_2$

$MC_1 = MC_2 = 2q$

$TR_1 = Pq_1 = (100 - q_1 - q_2)q_1 = 100q_1 - q_1^2 - q_1 q_2$

$MR_1 = 100 - 2q_1 - q_2$

$MR_1 = MC_1 \Rightarrow 100 - 2q_1 - q_2 = 2q_1$ q_1 reaction function

$100 - q_2 = 4q_1 \Rightarrow \boxed{q_1 = 25 - 0.25q_2}$

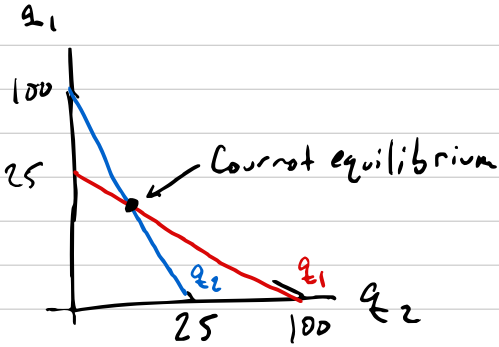
$TR_2 = Pq_2 = (100 - q_1 - q_2)q_2 = 100q_2 - q_1 q_2 - q_2^2$

$MR_2 = 100 - q_1 - 2q_2$

$MR_2 = MC_2 \Rightarrow 100 - q_1 - 2q_2 = 2q_2$

$\Rightarrow 100 - q_1 = 4q_2 \Rightarrow \boxed{q_2 = 25 - 0.25q_1}$

q_2 reaction function



$$q^* = 25 - \frac{q^*}{4} \Rightarrow \frac{5}{4} q^* = 25$$

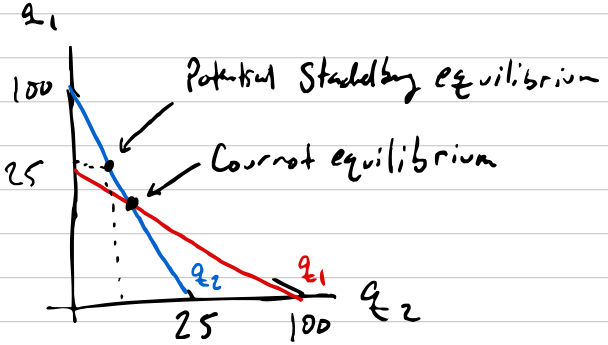
$$\boxed{q^* = 20}$$

$$P = 100 - Q = 100 - 2(20) = 60$$

In Stackelberg, firm 1 moves first

- $q_1^{st} > q_2^{st}$
- $q_1^{Stack} > q_1^{Cour}$
- $q_2^{st} < q_2^{Cour}$
- $P^{st} \leq P^{Cour}$ ← probably

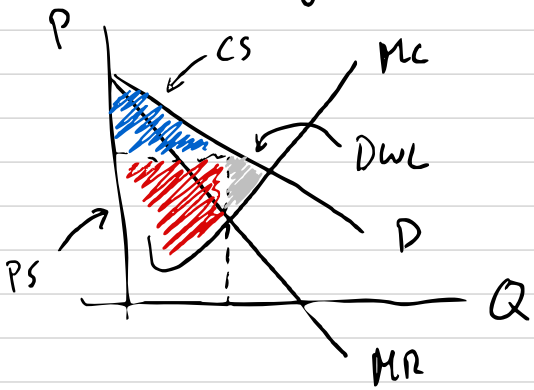
To solve Stackelberg, find q_1 as if q_2 is a monopoly. Then find q_2's reaction. Sub in q_2 reaction function when finding TR_1



Pricing with Market Power

- We are now able to charge some consumers a different price than others

Recall, a monopoly



Price discrimination is used to capture CS and/or DWL

Price discrimination
- Charging different prices for similar goods
- "Similar" implies no difference in production costs

3 conditions for price discrimination
- Must have some market power - some control over price
- Must be able to identify how demand differs over groups
  - consumer surplus
- Must be able to segment consumers
  - Secondary exchange must be overly costly (ex. buying a coffee for 25¢ and then selling it for $1 is secondary exchange)

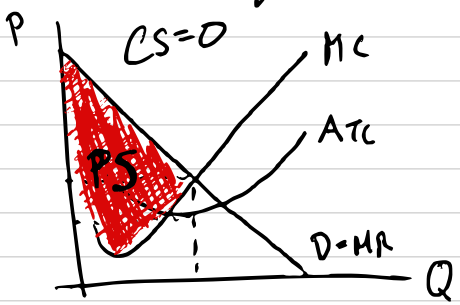
First degree
- every consumer gets a different price
- ex. tuition

Third degree
- different prices to different groups

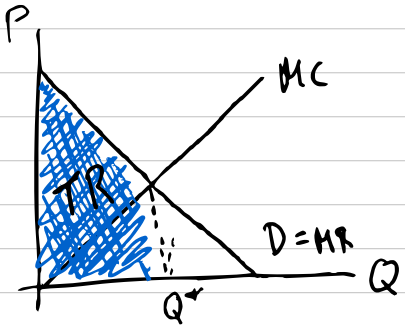
Second degree
- Consumers "choose" how much they pay

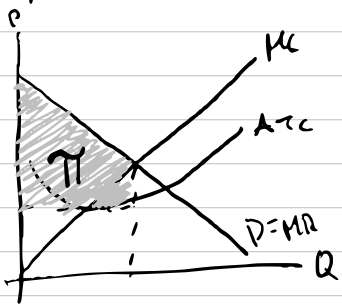
First Degree Price Discrimination

- Charged their reservation price / willingness to pay
- Monopolist captures all CS
- Economic surplus is maximized
  - allocative efficiency!



- 1st degree PD aka perfect price discrimination

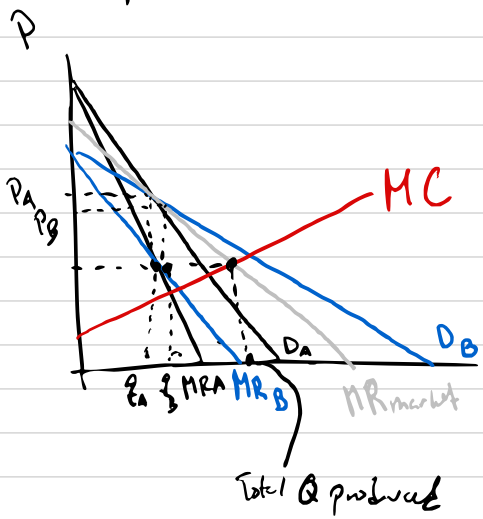




Third Degree Price Discrimination

- Divide consumers into groups w/ separate demand curves
- Division usually happens based on price elasticities

2 Major Principles
1. MR is equal between groups
2. MR for each group should be equal to MC for market production



- Each market MC = both marginal revenues
- Prices determined by inverse demand for each group.
- Note: relative prices are determined by relative price elasticities

Recall: Lerner index: $\frac{P - MC}{P} = \frac{1}{-\varepsilon_d^P}$

→ for each consumer type, $P = \frac{MC}{1 + \frac{1}{\varepsilon_D^P}}$

$$\frac{P_A}{P_B} = \frac{1 + \frac{1}{\varepsilon_B}}{1 + \frac{1}{\varepsilon_A}}$$

← Relationship between prices for different groups of consumers.

The following is clear:

$$ES(\text{competition}) = E(\text{first degree PD}) > ES(3^{rd}\text{ degree PD})$$

Sources of inefficiency in 3rd degree PD
- Price exceeds MC for every unit
- Consumption inefficiency - high value consumers may want to consume more than just one unit
- Search / transportation costs for lower price

- Intertemporal price discrimination
  - different prices at different times