

# Price Discrimination

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*Definition: setting different prices for the same good*

- Cost-based price differences are not considered price discrimination (for example, price differences based on transportation costs)
- A firm's *ability* to price discriminate depends on:
  - Arbitrage or resale by different consumer groups
  - Competition from firms providing perfect substitutes
  - knowledge of consumers' willingness to pay

# Basic price discrimination (PD) :

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- If PD is costless to the firm, it will increase profits

*Consumers who value the good the most pay more than if the prices were uniform (equal to all consumers)*

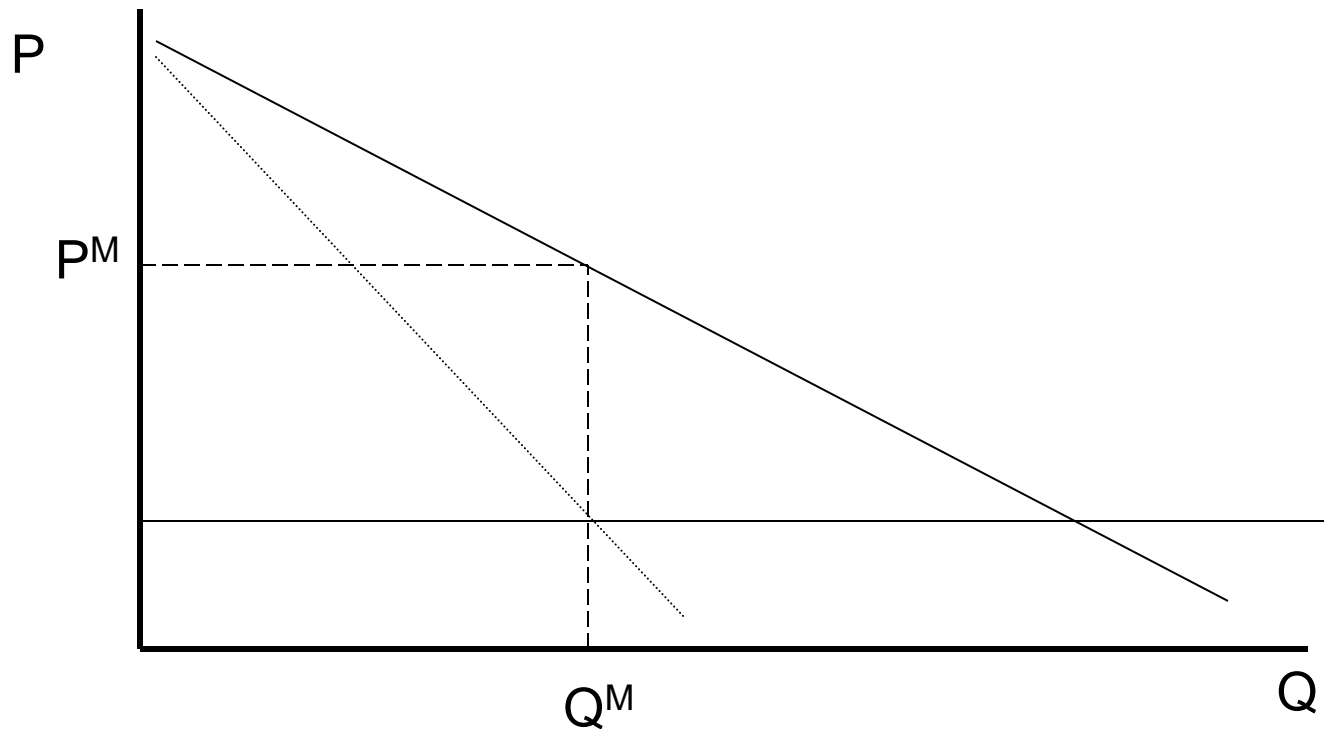
- PD almost always raises the price to some consumers,

*The firm sets a higher price to consumers with lower elasticity*

- PD can benefit consumers by expanding the market

# How do consumers benefit from PD?

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# Examples of price discrimination

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- Senior citizen discounts
- Saturday-night-stay airfares
- Coupons
- Professional and student versions of software
- Contractor/ Architect prices in Home Depot
- Damaged goods (e.g. Intel's 486 chips)
- Bundling (e.g. CAL Basketball-men season tickets)

# PD and “make” reselling good difficult:

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- Most services can not be resold ==> PD greater in services than in trade-able goods
- Warranties only for first time purchaser
- Make product unfit to other uses (other consumer groups)
- High transaction costs (e.g. transportation costs)
- Contractual forbidding of resale (enforceable)
- Government intervention (e.g. marketing orders for oranges)
- Vertical integration (Alcoa example in next slides)

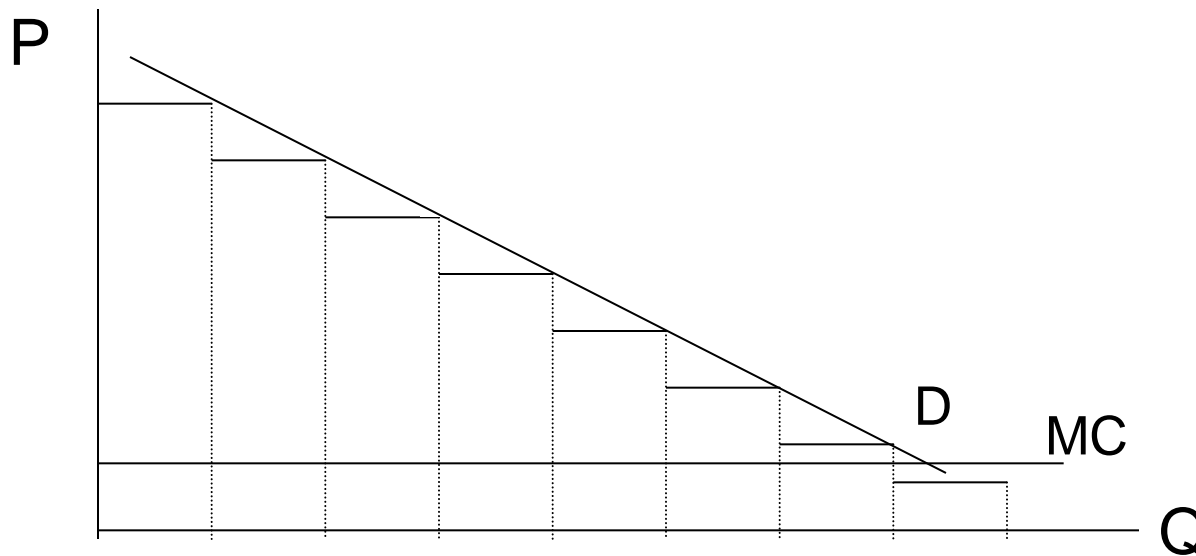
# Types of price discrimination

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1. **First-degree PD**: charge every consumer his or her willingness to pay and firms capture the whole CS.
2. **Third-degree PD**: sort customers into several groups based on observable, exogenous characteristics, and each group of consumers has its own price per unit.
3. **Second-degree PD**: present all customers with a menu of prices and allow the customers to self-select since consumer groups are not observable. Price per unit depends on the number units bought. (*Next lecture*)

# First-degree price discrimination.

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- Each consumer is charged his or her willingness to pay and firm can identify whom to charge the higher prices
- Often done through negotiation/ one-on-one bargaining since it requires detailed knowledge about the willingness to pay of consumers

# 2nd and 3rd-degree price discrimination.

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- The purpose of all methods of price discrimination (PD) is to capture the most of the Consumer Surplus (CS):
  - In first-degree PD the firm extracts all CS and there's no DWL
  - In second and third degree PD the firm fails to capture all CS
- By price discriminating the firm does not decrease revenue on all the first units (on the first consumers served) if it wants to sell additional units (to additional consumers):
  - it can charge different prices for different units
  - it can charge different prices to different consumer groups

# Third-degree PD example:

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- Alcoa was a monopolist in production of aluminum ingots (1988-1930)

- Assume it had two types of customers:

Electric cable (elastic demand because there is copper substitute):  $q_{EC} = 60 - p_{EC}$

Aircraft (inelastic demand because then there were no substitutes for aluminum in the airplane production process):  $q_A = 100 - p_A$

- Assume Alcoa's marginal cost of aluminum ingots is 20.

# Optimal discriminatory prices.

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- Assume possible to prevent reselling of aluminum ingots between different customer types.
- To solve optimal PD, set  $MR_t = MR_c = MC=20$ .
- $p_{EC} = 40$ ;  $q_{EC} = 20$ ;  $\pi_{EC} = 40 \cdot 20 - 20 \cdot 20 = 400$ .
- $p_A = 60$ ;  $q_A = 40$ ;  $\pi_A = 60 \cdot 40 - 20 \cdot 40 = 1600$ .
- Total profits for Alcoa = 2000
- Aircraft companies have lower elasticity of demand and are charged the higher price:

$$\varepsilon_A = -(dq/dp)/(q/p) = 1 \cdot 60/40 = 1.5$$

$$\varepsilon_{EC} = -(dq/dp)/(q/p) = 1 \cdot 40/20 = 2$$

# Optimal simple (nondiscriminatory) prices.

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- First aggregate the demand across the two markets:

$$q_{EC} = 60 - P$$

$$q_A = 100 - P$$

$$Q = 160 - 2P \Rightarrow P = 80 - .5Q \text{ for } P \leq 60$$

$$P = 100 - Q \text{ for } P > 60$$

- Set  $MR = MC$ :

$$MR = 80 - Q \text{ for } Q \geq 40 \Rightarrow Q^* = 60, P^* = 50, \pi = 1800$$

$$MR = 100 - 2Q \text{ for } Q < 40$$

# Comparing PD & simple pricing.

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## *Discrimination:*

$$p_A = 60$$

$$q_A = 40$$

$$p_{EC} = 40$$

$$q_{EC} = 20$$

$$q_A + q_{EC} = 60$$

$$\pi = 2000$$

## *Simple pricing:*

$$p_A = p_{EC} = 50$$

$$q_A = 50$$

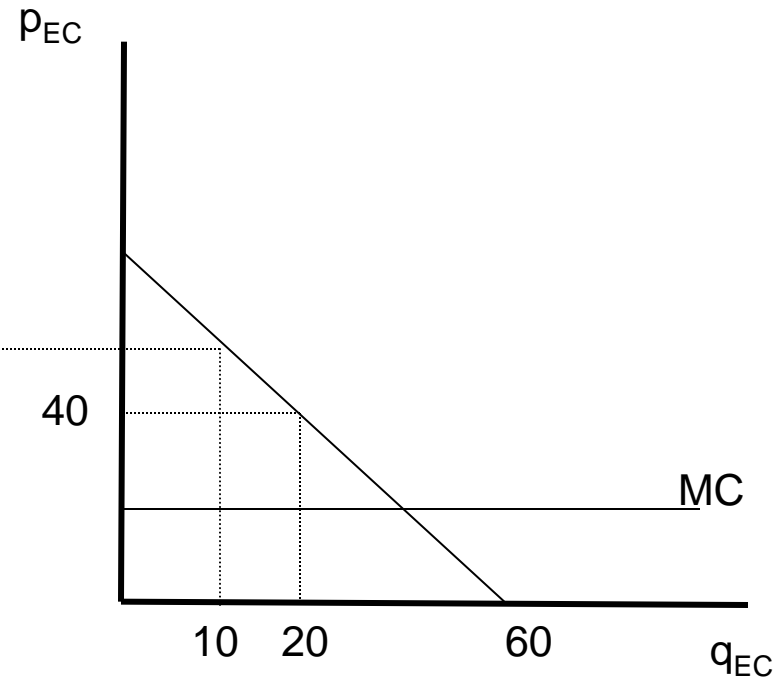
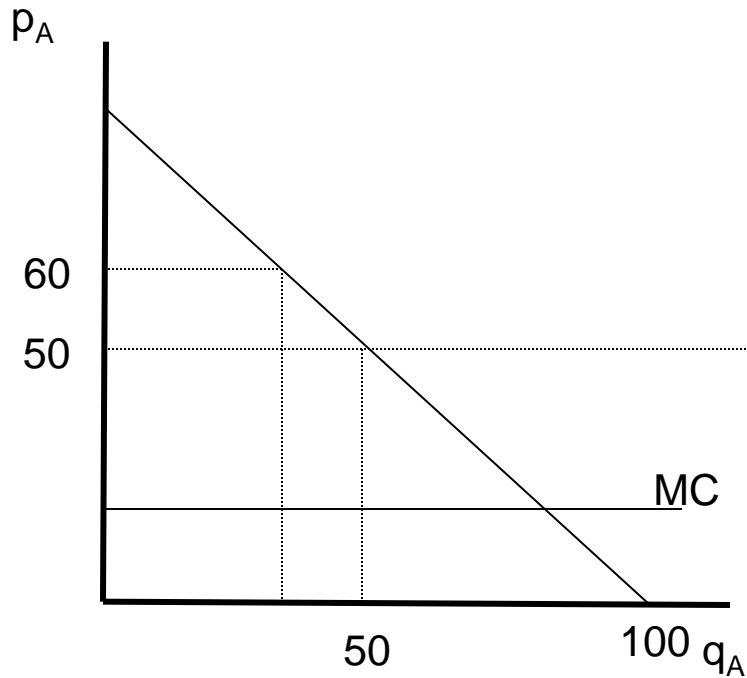
$$q_{EC} = 10$$

$$q_A + q_{EC} = 60$$

$$\pi = 1800$$

# PD versus simple pricing graphically.

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# **Alcoa vertically integrated into “ .....” markets since explicit PD was not possible**

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- Explicit PD was not possible although was more profitable than uniform pricing .
- This was due to the fact that aluminum ingots were easy to handle and thus easy to resell.
- BTW, who would resell to whom if Alcoa did PD explicitly?
- Alcoa forward integrated into (bought customers in) some industries in order to PD. How?

# Antitrust and price discrimination.

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- US law<sup>(\*)</sup> forbids “discriminat[ing] in price between different purchasers” where the effect “may be substantially to lessen competition” unless (two statutory defenses):
  - 1. price differences are based on costs, or
  - 2. price differences were needed to “meet the competition.”
- Two types of PD forbidden:
  - “Primary-line PD”: PD by charging a lower price in a market where there are rival firms than in a market where there are no rivals.
  - “Secondary-line PD”: if it harms competition in the firm’s customers’ market

## **(\*)The Robinson-Patman Act.**

# Enforcement - PD cases:

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## – Gasoline (secondary-line PD)

Between 1972 and 1981, Texaco sold gasoline at its retail tank wagon prices to independent Texaco retailers but granted substantial discounts to distributors Gull and Dompier. During the relevant period, the stations supplied by the distributors increased their sales volume dramatically, while independent Texaco retailers' sales suffered a corresponding decline. In 1976, these last ones filed suit against Texaco under the Robinson-Patman Act amendment to the Clayton Act (Act), alleging that the distributor discounts violated 2(a) of the Act, which, among other things, forbids any person to "discriminate in price" between different purchasers of commodities, where the effect of such discrimination is substantially to "injure . . . competition with any person who either grants or knowingly receives the benefit of such discrimination, or with customers of either of them." The jury awarded respondents actual damages.

## – McCormick Spice (Secondary-line PD)

McCormick & Company, Inc. is the global leader in the manufacture, marketing and distribution of spices, seasonings and flavors to the entire food industry -- to foodservice and food processing businesses as well as to retail outlets. It signed a settlement agreement negotiated with the Federal Trade Commission's Bureau of Competition to resolve the Commission's price discrimination claims under the Robinson-Patman Act (Feb 3, 2000)

# Next lecture: Nonlinear pricing.

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Why do cell phone providers set a monthly fee plus a per minute charge?

<b>Anytime Calling Plans</b>	<b>Sprint Nickel AnyTime<sup>SM</sup></b>	<b>Sprint 7c AnyTime<sup>SM</sup> Online</b>	<b>Sprint Sense AnyTime<sup>SM</sup></b>
	Our lowest per-minute rate, anytime, day or night	Online only offer! 7¢ a minute with reduced monthly fee options.	A lower monthly fee for less-frequent callers
<b>24/7 State-to-State Long Distance Rate</b>	<b>5¢/min</b>	<b>7¢/min</b>	<b>10¢/min</b>
<b>Monthly Fee*</b>	<b>\$8.95</b>	<b>\$5.95</b> with monthly discounts (see below)	<b>\$4.95</b>
<b>In-state Long Distance</b>	<input type="text"/> ¢/min	<input type="text"/> ¢/min	<input type="text"/> ¢/min
<b>In-state Local Toll</b>	<input type="text"/> ¢/min	<input type="text"/> ¢/min	<input type="text"/> ¢/min

# Second-degree PD example.

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Type of Consumer	# of cons	Willingness to pay for ticket	
		(unrestricted)	(restricted)
Tourist	10	\$350	\$300
Businessperson	10	\$800	\$400

Strategy 1: Offer only restricted tickets at price \$300

$$\rightarrow \text{Total revenue} = \$300 \cdot 10 + \$300 \cdot 10 = \$6,000$$

Strategy 2: Offer only unrestricted tickets at price \$800

$$\rightarrow \text{Total revenue} = \$800 \cdot 10 = \$8,000$$

Strategy 3: Offer restricted tickets at price \$300, unrestricted at price \$800

$$\rightarrow \text{Total revenue} = \$300 \cdot 10 + \$800 \cdot 10 = \$11,000$$