

Pricing with Market Power

EE311

Chayun Tantivasadakarn

Faculty of Economics, Thammasat University

Topics to be Discussed

- Capturing Consumer Surplus
- Price Discrimination
- Peak-Load Pricing
- All-or-nothing pricing
- The Two-Part Tariff
- Bundling
- Tying
- Advertising

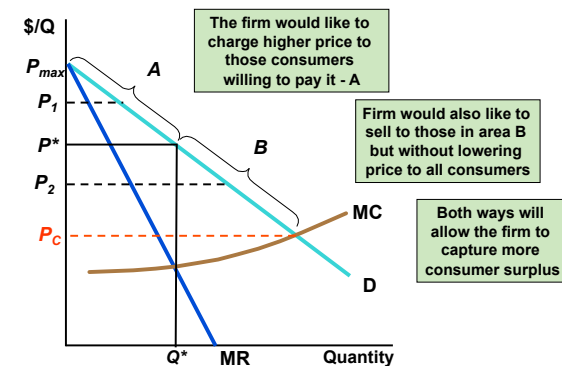
2

Capturing Consumer Surplus

- All pricing strategies we will examine are meant of capturing consumer surplus and transferring it to the producer
- Profit maximizing point of P^* and Q^*
 - But some consumers are willing to pay more than P^* for a good.
 - Raising price will lose some consumers, leading to smaller profits
 - Lowering price will gains some consumers, but lower profits

3

Capturing Consumer Surplus



4

Capturing Consumer Surplus

- **Price discrimination** is the practice of charging different prices to different consumers for similar goods even though their marginal costs are the same.

5

Capturing Consumer Surplus

- Necessary conditions: the firm must
 - face a downward sloping demand or have some market power
 - be able to identify the different consumers and get them to pay different prices
 - be able to prevent the consumers who buy low prices to resell to the consumers who are charged high prices or prevent **arbitrage**

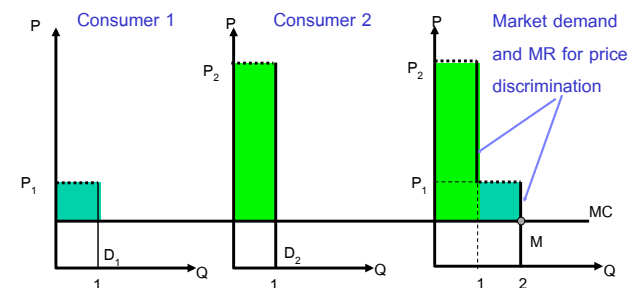
6

Price Discrimination

- **First Degree Price Discrimination**
 - Charge a separate price to each customer or to each unit
 - Charge the maximum or reservation price they are willing to pay.
 - It is also called perfect price discrimination
- Examples: medical services, legal consultation, key money

7

Perfect First-Degree Price Discrimination: simplified case

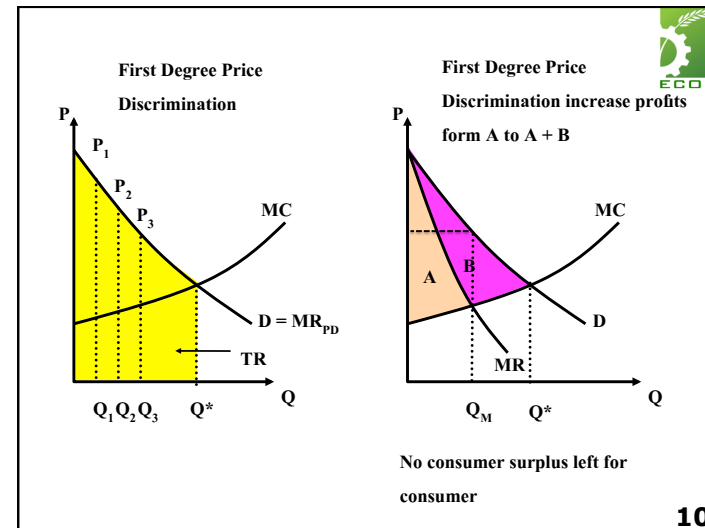


8

Price Discrimination

- If the firm can perfectly price discriminate, each consumer is charged exactly what they are willing to pay.
 - Old MR curve is no longer part of output decision
 - Incremental revenue (MR with price discrimination) is exactly the price at which each unit is sold – the demand curve
 - Additional profit from producing and selling an incremental unit is now the difference between demand and marginal cost

9



First-Degree Price Discrimination

- In practice perfect price discrimination is almost never possible
 - Impractical to charge every customer a different price (unless very few customers)
 - Firms usually does not know reservation price of each customer
- Firms can discriminate imperfectly
 - Can charge a few different prices based on some estimates of reservation prices

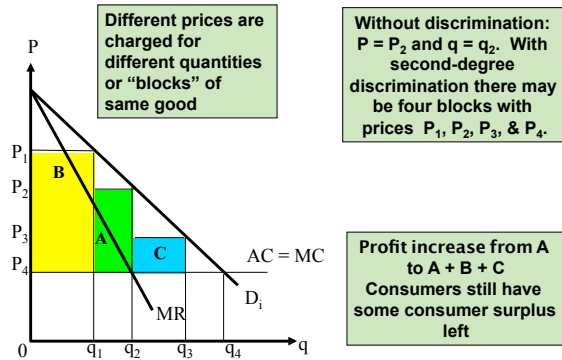
11

Second-Degree Price Discrimination

- Practice of charging different prices per unit for different quantities of the same good or service
 - All customers are facing the same price structure
 - They are charged according to the block of quantity they buy --> **Block pricing**
- Block pricing – the practice of charging different prices for different quantities of “blocks” of a good
- Quantity discounts are not 2-degree price discrimination: all units are charged the same. Since 2-degree price discrimination: the first block is still high price
- Examples: Buy one get another one at a half price

12

Second-Degree Price Discrimination



13

Third-Degree Price Discrimination

- Practice of dividing consumers into two or more groups with separate demand curves and charging different prices to each group
- Each group has its own demand function and price elasticity.
 - The market with lower E_D is charged higher price.
 - The firm must be able to prevent arbitrage

14

Price Discrimination

- Most common type of price discrimination.
- Examples: airlines, discounts to students and senior citizens, premium price for foreigners.
- Some characteristic is used to divide the consumer groups
- Typically elasticities of demand differ for the groups
 - College students and senior citizens are not usually willing to pay as much as others because of lower incomes
 - These groups are easily distinguishable with ID's

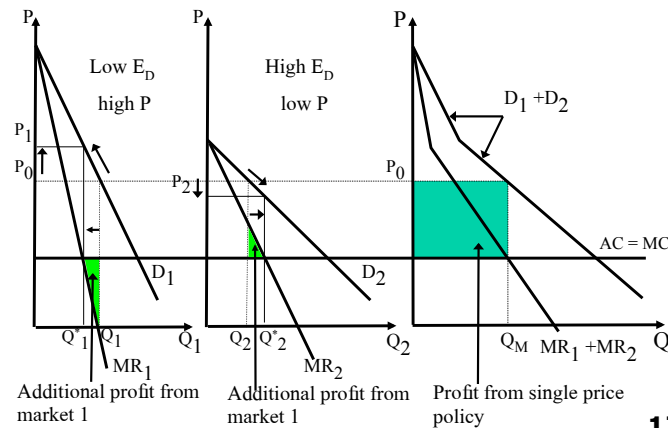
15

Creating Consumer Groups

- If third degree price-discrimination is feasible, how can the firm decide what to charge each group of consumers?
 - Total output should be divided between groups so that MR for each group are equal.
 - Total output is chosen so that MR for each group of consumers is equal to the MC of production

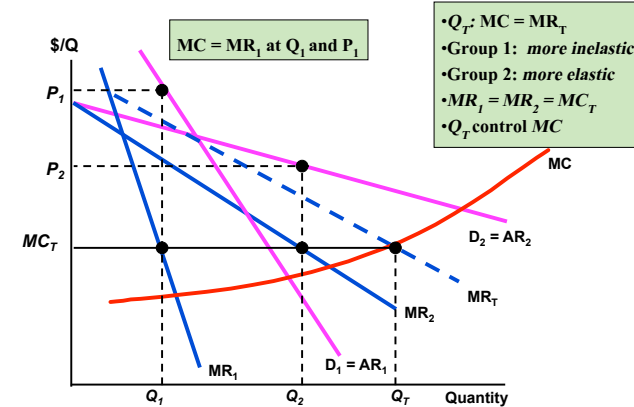
16

Third Degree Price Discrimination



17

Third-Degree Price Discrimination



18

Third-Degree Price Discrimination

- Algebraically
 - P₁: price first group
 - P₂: price second group
 - C(Q_T) = total cost of producing output
 - Q_T = Q₁ + Q₂
 - Profit: $\pi = P_1 Q_1 + P_2 Q_2 - C(Q_T)$

19

Third-Degree Price Discrimination

- Firm should increase sales to each group until incremental profit from last unit sold is zero
- Set incremental Δ for sales to group 1 = 0

$$\frac{\Delta \pi}{\Delta Q_1} = \frac{\Delta(P_1 Q_1)}{\Delta Q_1} - \frac{\Delta C}{\Delta Q_1} = 0$$

$$\frac{\Delta(P_1 Q_1)}{\Delta Q_1} = MR_1 \quad \frac{\Delta C}{\Delta Q_1} = MC$$

20

Third-Degree Price Discrimination



- First group of consumers:
 - $MR_1 = MC$
- Can do the same thing for the second group of consumers
- Second group of customers:
 - $MR_2 = MC$
- Combining these conclusions gives
 - $MR_1 = MR_2 = MC$

21

Third-Degree Price Discrimination



- Recall that $MR = P(1+1/E_d)$
 - $MR_1 = P_1(1+1/E_{d1})$
 - $MR_2 = P_2(1+1/E_{d2})$
 - $MR_1 = MR_2$ or $P_1(1+1/E_{d1}) = P_2(1+1/E_{d2})$

$$\frac{P_1}{P_2} = \frac{(1+1/E_2)}{(1+1/E_1)}$$

Price is higher for the market with lower E_d and
price is lower for the market with higher E_d

22

Third-Degree Price Discrimination



- Example
 - $E_1 = -2$ & $E_2 = -4$
 - P_1 should be 1.5 times as high as P_2

$$\frac{P_1}{P_2} = \frac{(1 - 1/4)}{(1 - 1/2)} = \frac{3/4}{1/2} = 1.5$$

23

The Economics of Coupons and Rebates



- Those consumers who are more price elastic will tend to use the coupon/rebate more often when they purchase the product than those consumers with a less elastic demand.
- Coupons and rebate programs allow firms to price discriminate.
- About 20 – 30% of consumers use coupons or rebates.

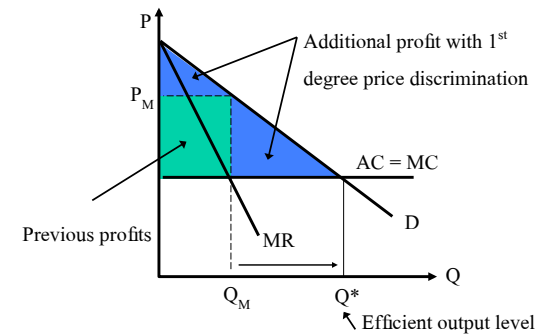
24

Impacts of Price Discrimination

- Worsen distribution of income because consumer surplus is less
- Improve economic efficiency because output is closer to the point where $D = MC$
- Consumer in the lower income group may be able to afford the good
- help to recover losses from high fixed costs

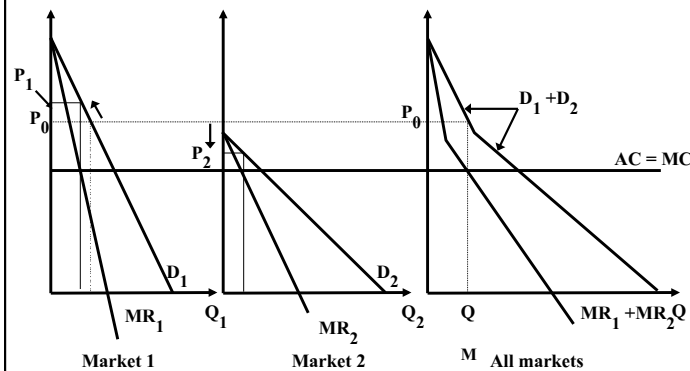
25

Improve efficiency but more inequality



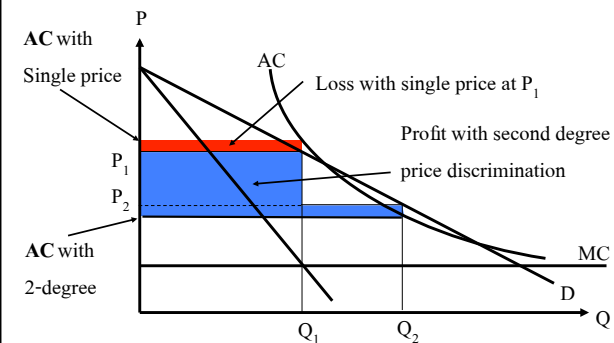
26

Consumers in market 2 have higher welfare; firm has higher profit



27

Price Discrimination and Economies of Scale



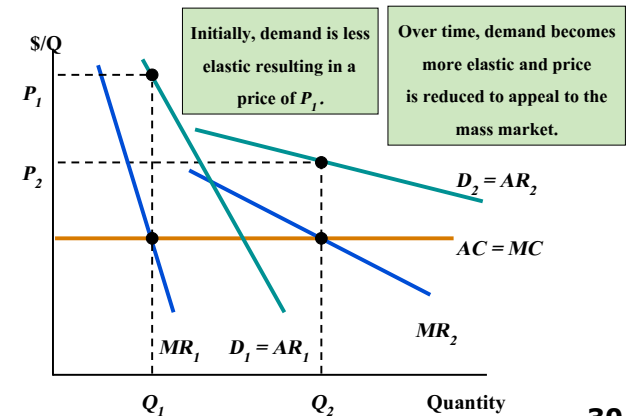
28

Other Types of Price Discrimination

- Intertemporal Price Discrimination
 - Practice of separating consumers with different demand functions into different groups by charging different prices at different points in time
 - It is a kind of 3-degree price discrimination
 - Initial release of a product, the demand is inelastic
 - Hard back v. paperback book
 - New release movie
 - Technology: Cellular handset

29

Intertemporal Price Discrimination



30

Peak-Load Pricing

- Peak-Load Pricing
 - Practice of charging higher prices during peak periods when capacity constraints cause marginal costs to be higher.
- Demand for some products may peak at particular times.
 - Electricity: day time £4/unit, night time £1/unit
 - Rental rate for resorts during high season is higher than the off season

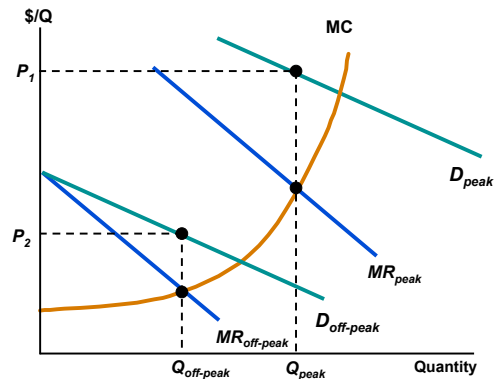
31

Peak-Load Pricing

- Objective is to increase efficiency by charging customers close to marginal cost
 - Increased MR and MC would indicate a higher price.
- MCs differ for different time periods for peak-load pricing
 - Price and sales in each market are independent
- With third-degree price discrimination, the MR for all markets was equal

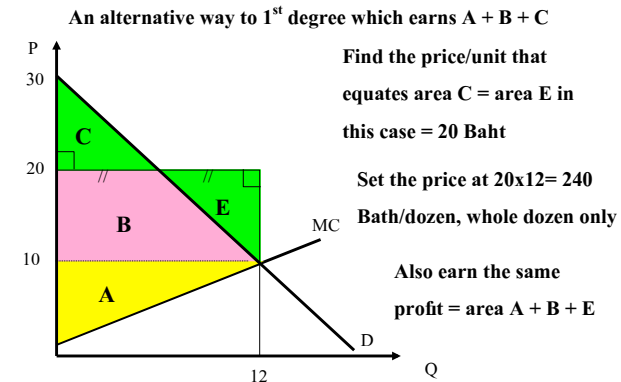
32

Peak-Load Pricing



33

All-or-nothing pricing



34

The Two-Part Tariff

- Form of pricing in which consumers are charged both an entry and usage fee.
 - EX: amusement park, golf course, telephone service
- An entry fee is charged upfront for right to use/buy the product
- An additional usage fee is charged for each unit the consumer wishes to consume
 - Pay a fee to be a member of a golf course and then pay another fee for each game you play.

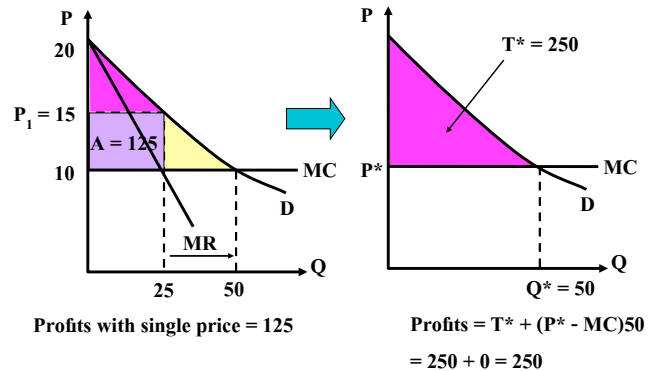
35

The Two-Part Tariff

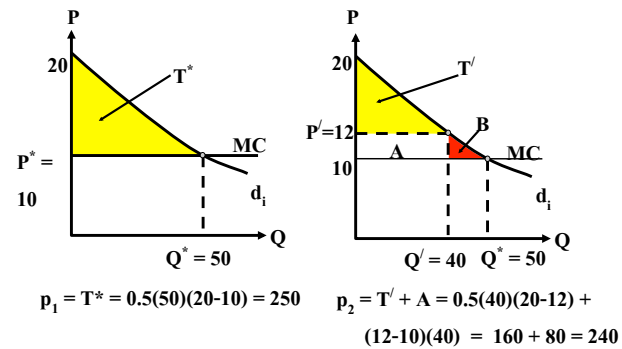
- Pricing decision is setting the entry fee (T) and the usage fee (P).
- Choosing the trade-off between free-entry and high-use prices or high-entry and zero-use prices.
- Single Consumer
 - Assume firm knows consumer demand
 - Firm wants to capture as much consumer surplus as possible

36

Two-part Tariff



Two-Part Tariff with a Single Consumer



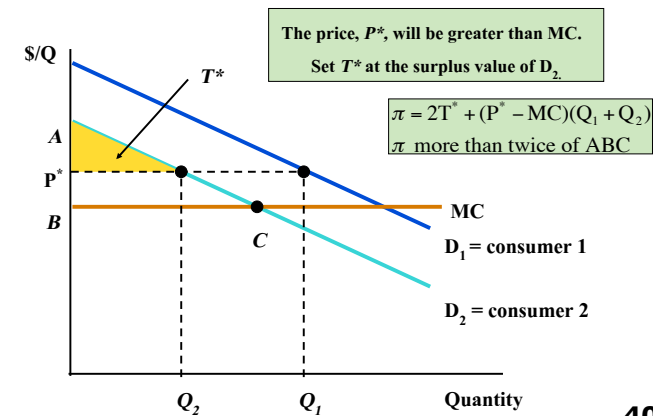
38

Two-Part Tariff with Two Consumers

- Two consumers, but firm can only set one entry fee and one usage fee.
- Will no longer set usage fee equal to MC.
 - Could make entry fee no larger than CS of consumer with smallest demand
- Firm should set usage fee above MC
- Set entry fee equal to remaining consumer surplus of consumer with smaller demand
- Firm needs to know demand curves

39

Two-Part Tariff with Two Consumers



40

The Two-Part Tariff

- Rule of Thumb
 - Similar demand: Choose P close to MC and high T
 - Dissimilar demand: Choose high P and low T .
 - Ex: Disneyland in California and Disney world in Florida have a strategy of high entry fee and charge nothing for ride.

41

Example: Cellular Rate Plans

- Market power exists because consumers face switching costs
 - When sign up with a firm, must sign a contract with high costs to break
 - Telephone numbers may not be portable
 - Network externalities
- Plans often exist of monthly cost plus free for extra minutes
- Companies can combine third-degree price discrimination with two-part tariff

42

Bundling

- Bundling is packaging two or more products to gain a pricing advantage.
- Conditions necessary for bundling
 - Heterogeneous customers
 - Price discrimination is not possible
 - Demands must be negatively correlated

43

Bundling

	Movie 1	Movie 2	Combine
Theater A	\$12,000	\$3,000	\$15,000
Theater B	\$10,000	\$4,000	\$14,000

- Renting the movies separately would result in each theater paying the lowest reservation price for each movie:
 - Maximum price Movie 1 = \$10,000
 - Maximum price Movie 2 = \$3,000
- Total Revenue = \$26,000

44

Bundling

- If the movies are bundled:
 - Theater A will pay \$15,000 for both
 - Theater B will pay \$14,000 for both
- If each were charged the lower of the two prices, total revenue will be \$28,000.
- The movie company will gain more revenue (\$2000) by bundling the movie

45

Relative Valuations

- More profitable to bundle because relative valuation of two films are reversed
- Demands are negatively correlated
 - A pays more for Movie 1 (\$12,000) than B (\$10,000).
 - B pays more for Movie 2 (\$4,000) than A (\$3,000).

46

Relative Valuations

- If the demands were positively correlated (Theater A would pay more for both films as shown) bundling would not result in an increase in revenue.

	Movie 1	Movie 2	Combine
Theater A	\$12,000	\$4,000	\$16,000
Theater B	\$10,000	\$3,000	\$13,000

47

Bundling

- If the movies are bundled:
 - Theater A will pay \$16,000 for both
 - Theater B will pay \$13,000 for both
- If each were charged the lower of the two prices, total revenue will be \$26,000, the same as by selling the films separately since $(10,000) \times 2 + (3,000) \times 2 = 26,000$.

48

Mixed Bundling

- Practice of selling two or more goods both as a package and individually.
- This differs from **pure bundling** when sell products only as a package.
- Mixed bundling is good strategy when
 - Demands are somewhat negatively correlated
 - Marginal production costs are significant

49

Mixed Versus Pure Bundling

	Movie 1 (AC = 20)	Movie 2 (AC = 30)
A	10	90
B	50	50
C	60	40
D	90	10

$$\text{If } P_1 = 10, p = (10-20)4 = -40$$

$$\text{If } P_1 = 50, p = (50-20)3 = 90$$

$$\text{If } P_1 = 60, p = (60-20)2 = 80$$

$$\text{If } P_1 = 90, p = (90-20)1 = 70$$

$$P_1 = 50 \text{ gives the highest } p$$

$$\text{If } P_2 = 40, p = (40-30)3 = 30$$

$$\text{If } P_2 = 50, p = (50-30)2 = 40$$

$$\text{If } P_2 = 90, p = (90-30)1 = 60$$

$$P_2 = 90 \text{ gives the highest } p$$

50

Mixed Bundling – Example

- Demands are perfectly negatively correlated but significant marginal costs
- Four customers under three different strategies
 - Selling good separately, $P_1 = \$50$, $P_2 = \$90$, profit = 150
 - Selling goods only as a bundle, $P_B = \$100$, profit = $(100-50)4 = \$200$
 - Mixed bundling:
 - Sold individually with $P_1 = P_2 = \$89.95$
 - Sold as a bundle with $P_B = \$100$
 - Profit $= (89.95-20) + (89.95-30) + (100-50)2 = 129.9 + 100 = 229.9$

51

Bundling in Practice

- Car purchasing
 - Bundles of options such as electric locks with air conditioning
- Vacation Travel
 - Bundling hotel with air fare
- Cable television
 - Premium channels bundled together

52

Tying or Tie-in-sales



- Practice of using monopoly power on one good (Tying product) to force customers to purchase another (Tied product).
 - Xerox machines and the paper
 - IBM mainframe and computer cards
- Allows the seller to meter the customer's demand and discriminate against the heavy user.
- Extract surplus by selling expensive tied products

53

Tying



- McDonald's
 - requires franchisees to buy material
 - Allows them to protect their brand name.
- Microsoft
 - tying Internet Explorer with Windows
 - to extend market power

54

Advertising



- It is one of the non-price competition strategies.
- Successful advertising will increase demand and may lower the price elasticity.
- Advertising increase the fixed cost.
- It may have a short term effect, but less effective in the long run.

55

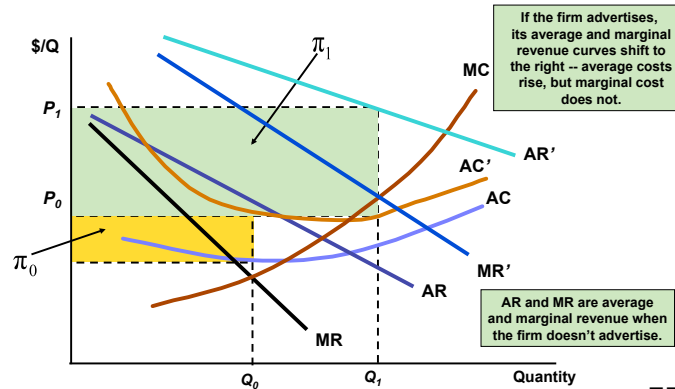
Advertising



- Assumptions
 - Firm sets only one price for product
 - Firm knows quantity demanded depends on price and advertising expenditure dollars, A
 $Q(P,A)$
 - We can show the firm's cost curves, revenue curves, and profits under advertising and no advertising

56

Effects of Advertising



57

Advertising

- Choosing Price and Advertising Expenditure

$$\pi = PQ(P, A) - C(Q) - A$$

$$\frac{\Delta \pi}{\Delta A} = P \frac{\Delta Q}{\Delta A} - MC \frac{\Delta Q}{\Delta A} - 1 = 0$$

$$[P - MC] \frac{\Delta Q}{\Delta A} = 1$$

Full marginal cost of Ad.

58

Advertising

- A Rule of Thumb for Advertising

$$(P - MC) \frac{\Delta Q}{\Delta A} = 1$$

$$\frac{P - MC}{P} \left[\frac{A}{Q} \frac{\Delta Q}{\Delta A} \right] = \frac{A}{PQ}$$

Ad. to sales ratio

59

Advertising

- A Rule of Thumb for Advertising

$$\frac{A}{Q} \frac{\Delta Q}{\Delta A} = E_A = \text{Adv. elasticity of demand}$$

$$\frac{(P - MC)}{P} = - \frac{1}{E_P}$$

$$\frac{A}{PQ} = - \frac{E_A}{E_P} = \text{Rule of Thumb}$$

advertising-to-sales ratio should be equal to minus the ratio of the advertising and price elasticities of demand.

60

Advertising



- An Example
 - $TR(Q) = \$1 \text{ million/yr}$
 - \$10,000 budget for A (advertising--1% of revenues)
 - $E_A = .2$ (increase budget \$20,000, sales increase by 20%)
 - $E_p = -4$ (markup price over MC is substantial)
- The firm in our example should increase advertising
 - $A/PQ = -(.2/-4) = 5\%$
 - Increase budget to \$50,000

61

Advertising – In Practice



- Estimate the level of advertising for each of the firms
 - Supermarkets
 - $E_p = -10$; $E_A = 0.1$ to 0.3
 - Convenience stores
 - $E_p = -5$; E_A very small
 - Designer jeans
 - $E_p = -3$ to -4 ; $E_A = 0.3$ to 1
 - Laundry detergents
 - $E_p = -3$ to -4 ; E_A very large

62