Monopoly Behavior

A Scotsman phones a dentist to inquire about the cost for a tooth extraction :

— "85 pounds for an extraction, sir" the dentist replied.

** "85 quid ! Huv ye no'got anythin' cheaper ?„

— "That's the normal charge,” said the dentist.

** "Whit about if ye didn’t use any anesthetic ?„

— "That's unusual, sir, but I could do it and it would knock 15 pounds off"

— "I can't guarantee their professionalism and it'll be painful. But the price could drop by 20 pounds.”

** "How aboot if ye make it a trainin' session, have yer student do the extraction with the other students watchin' and learning,?„

— "It'll be good for the students", mulled the dentist. "I'll charge you 5 pounds but it will be traumatic".

*** " It's a deal,” said the Scotsman. "Can ye confirm an appointment for my wife next*

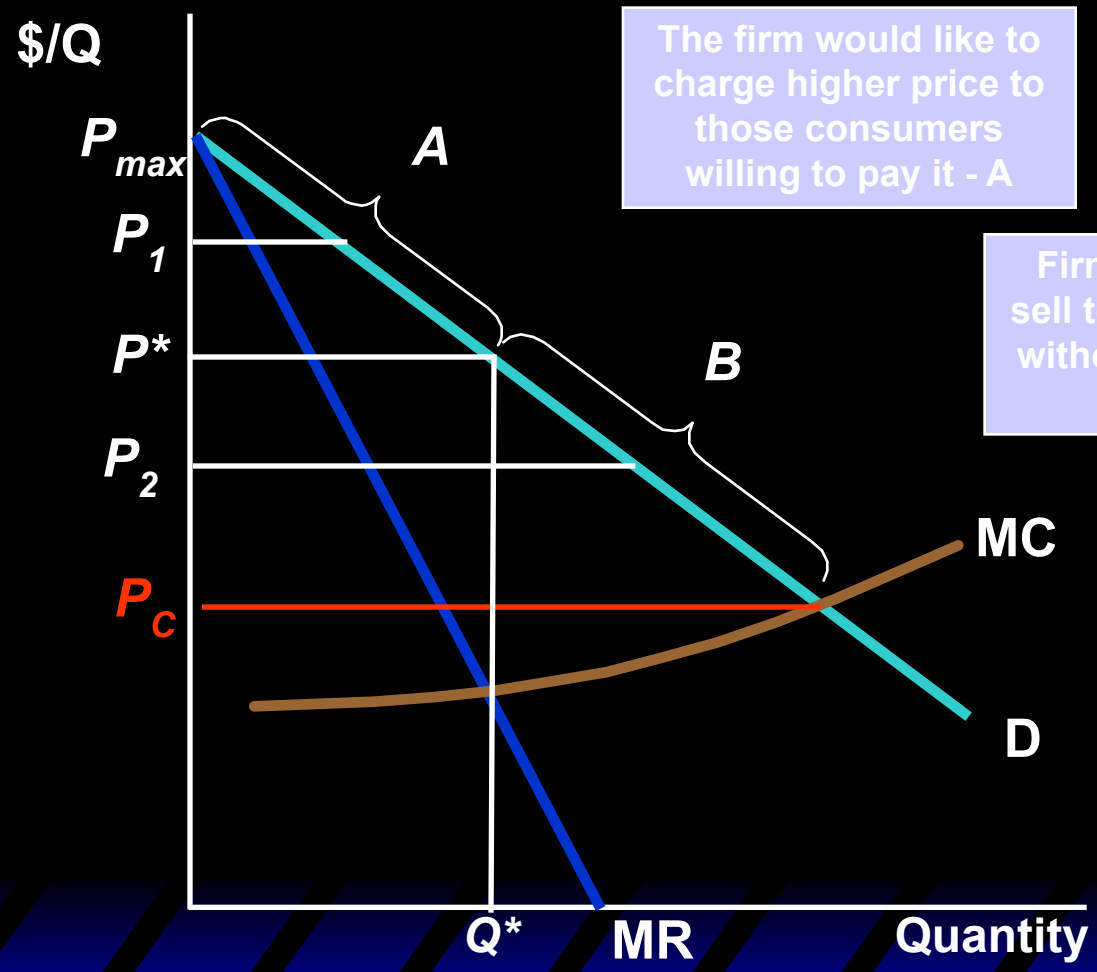
How Should a Monopoly Price?

- So far a monopoly has been thought of as a firm which has to sell its product at the same price to every customer. This is **uniform pricing**.
- Can **price-discrimination** earn a monopoly higher profits?

Capturing Consumer Surplus

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

Capturing Consumer Surplus



The firm would like to charge higher price to those consumers willing to pay it - A

Firm would also like to sell to those in area B but without lowering price to all consumers

Both ways will allow the firm to capture more consumer surplus

Capturing Consumer Surplus

- Price discrimination **is the practice of charging different prices to different consumers for similar goods**
  - **Must be able to identify the different consumers and get them to pay different prices**
- **Other techniques that expand the range of a firm's market to get at more consumer surplus**
  - **Tariffs and bundling**

Price discrimination

- **Price** discrimination **requires the absence of resale**

Types of Price Discrimination

- **1st-degree**: Each output unit is sold at a different price. Prices may differ across buyers.
- **2nd-degree**: The price paid by a buyer can vary with the quantity demanded by the buyer. But all customers face the same price schedule. *E.g.,* bulk-buying discounts.

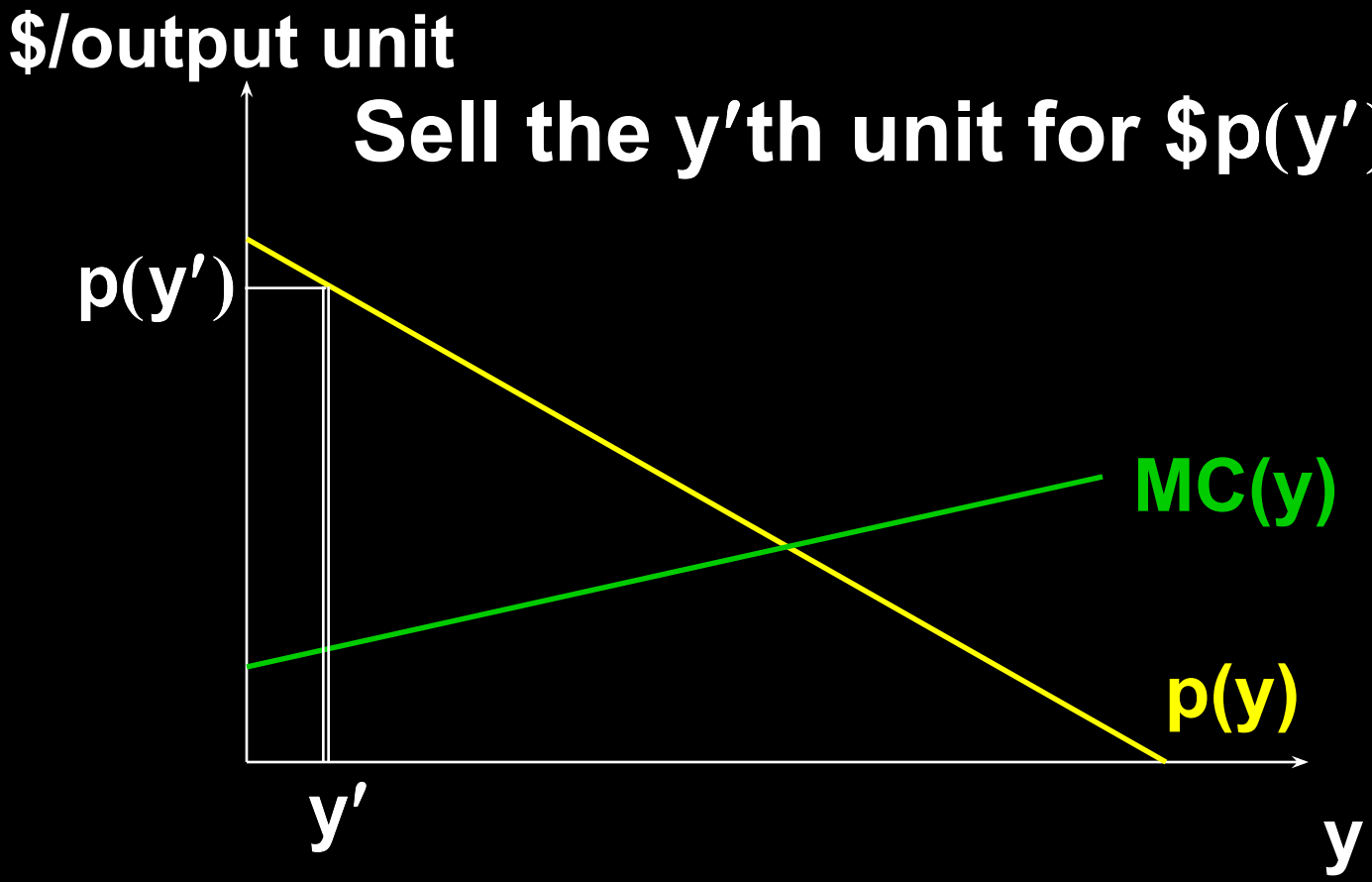
Types of Price Discrimination

- **3rd-degree: Price paid by buyers in a given group is the same for all units purchased. But price may differ across buyer groups.**
  ***E.g.*, senior citizen and student discounts *vs*. no discounts for middle-aged persons.**

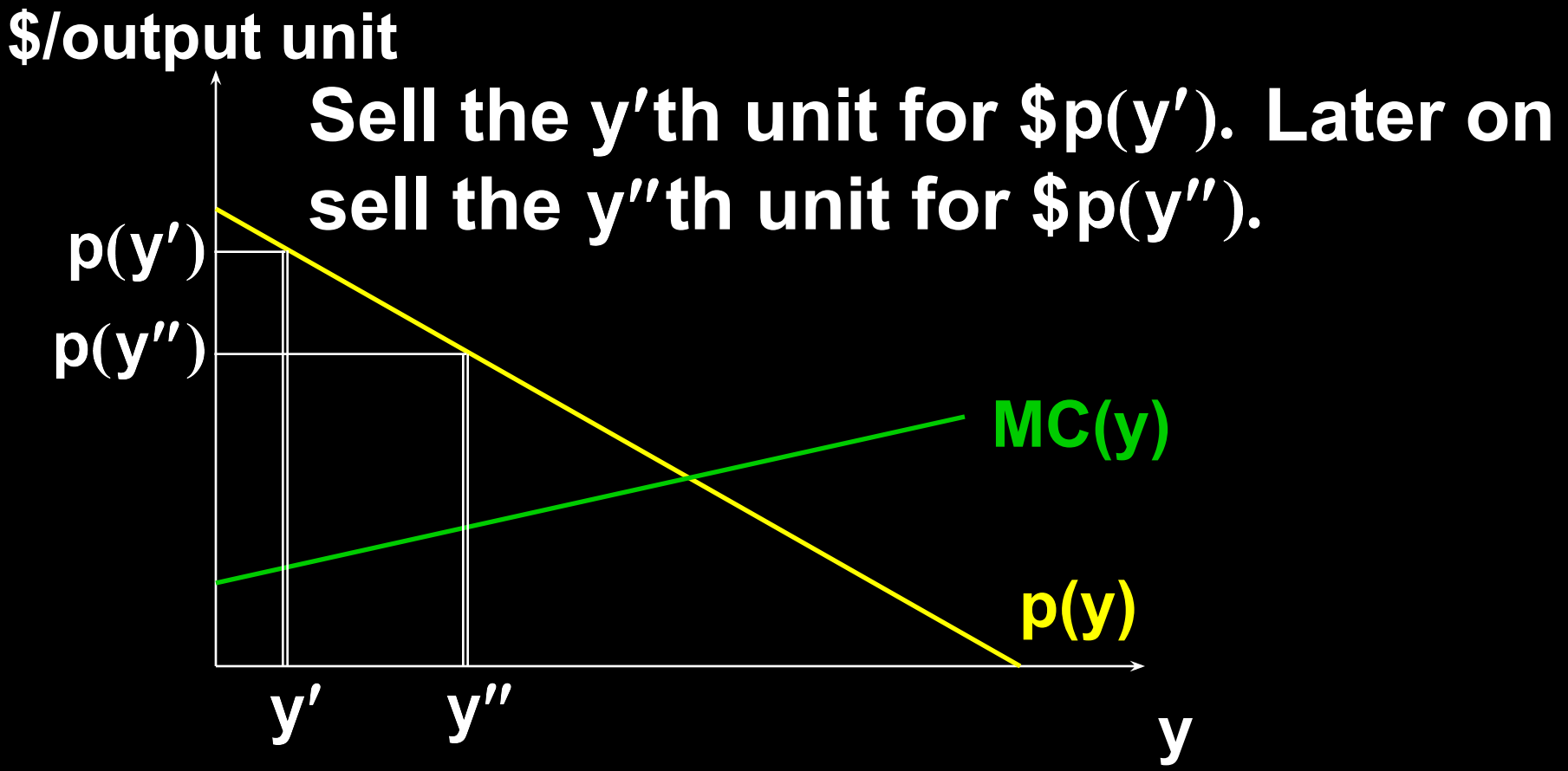
First-degree Price Discrimination

- **Each output unit is sold at a different price. Price may differ across buyers.**
- **It requires that the monopolist can discover the buyer with the highest valuation of its product, the buyer with the next highest valuation, and so on.**

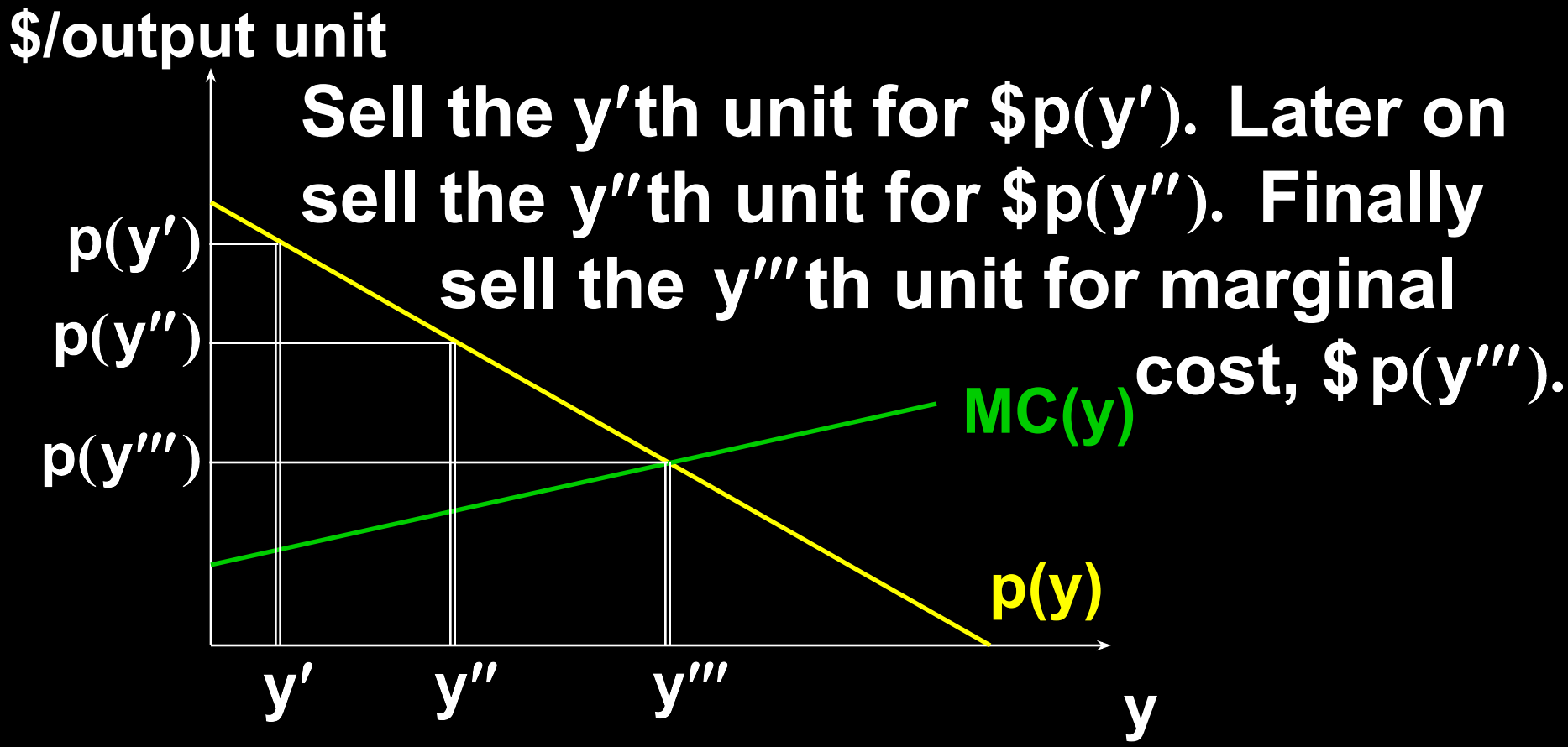
First-degree Price Discrimination



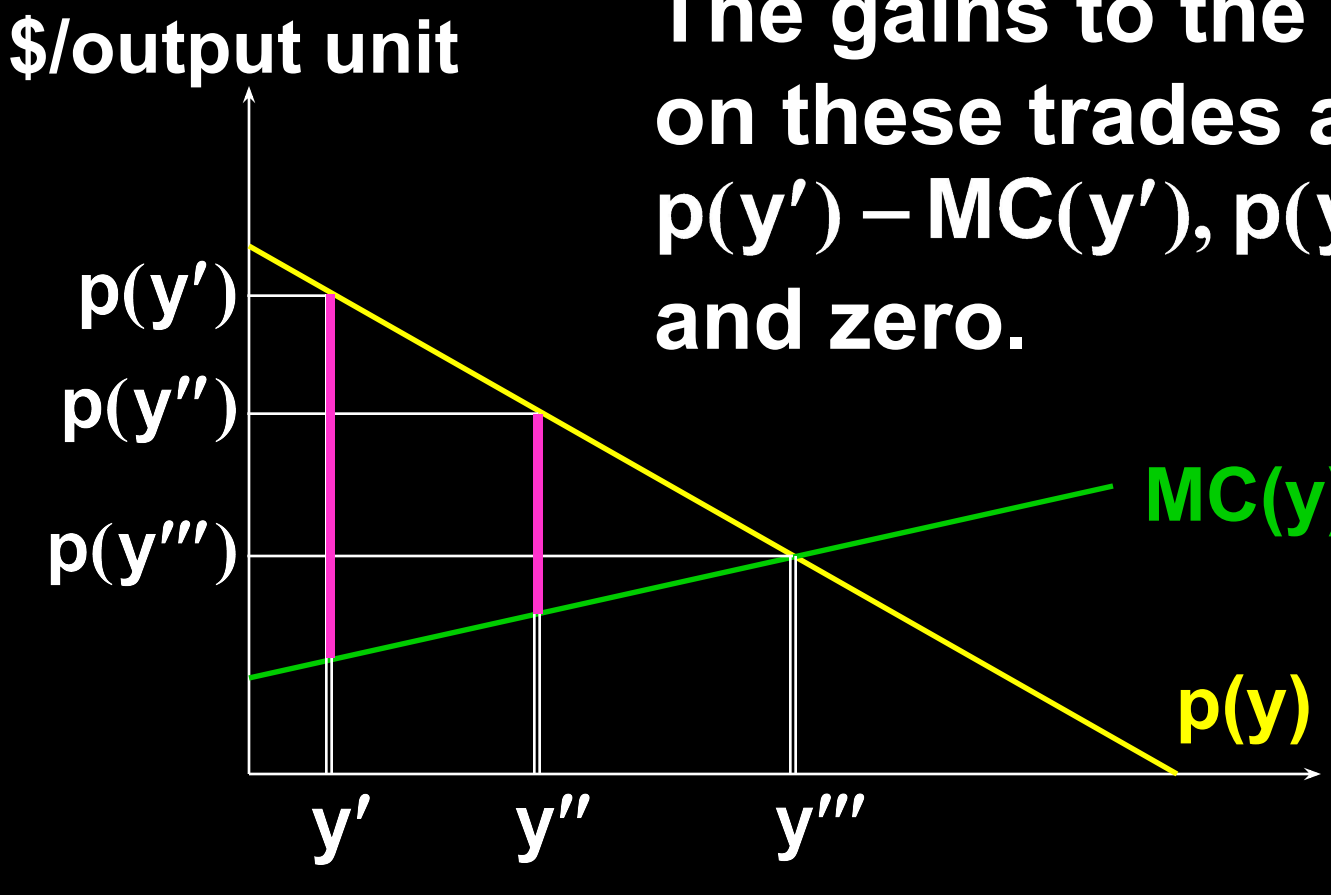
First-degree Price Discrimination



First-degree Price Discrimination



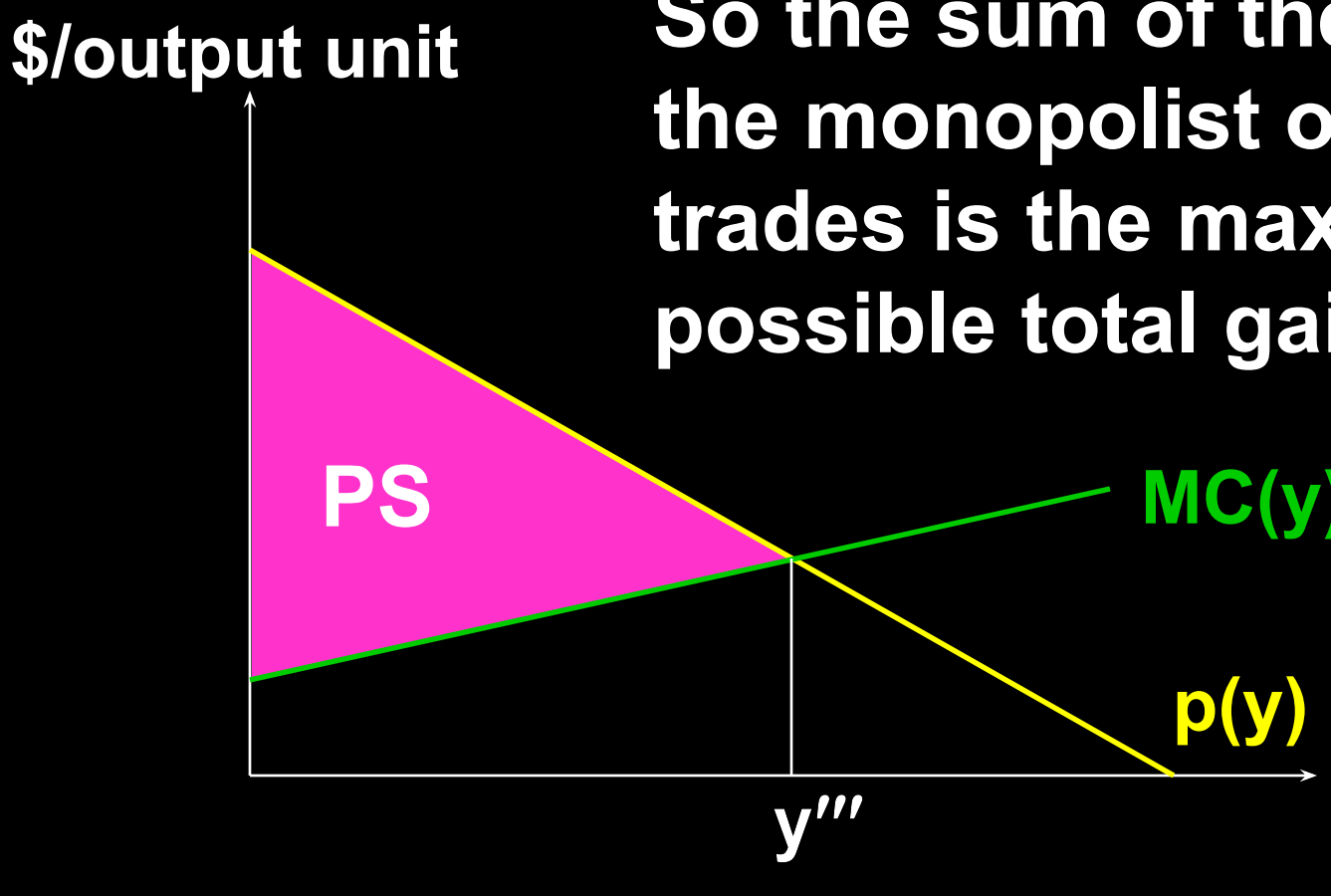
First-degree Price Discrimination



The gains to the monopolist on these trades are: $p(y') - MC(y')$, $p(y'') - MC(y'')$ and zero.

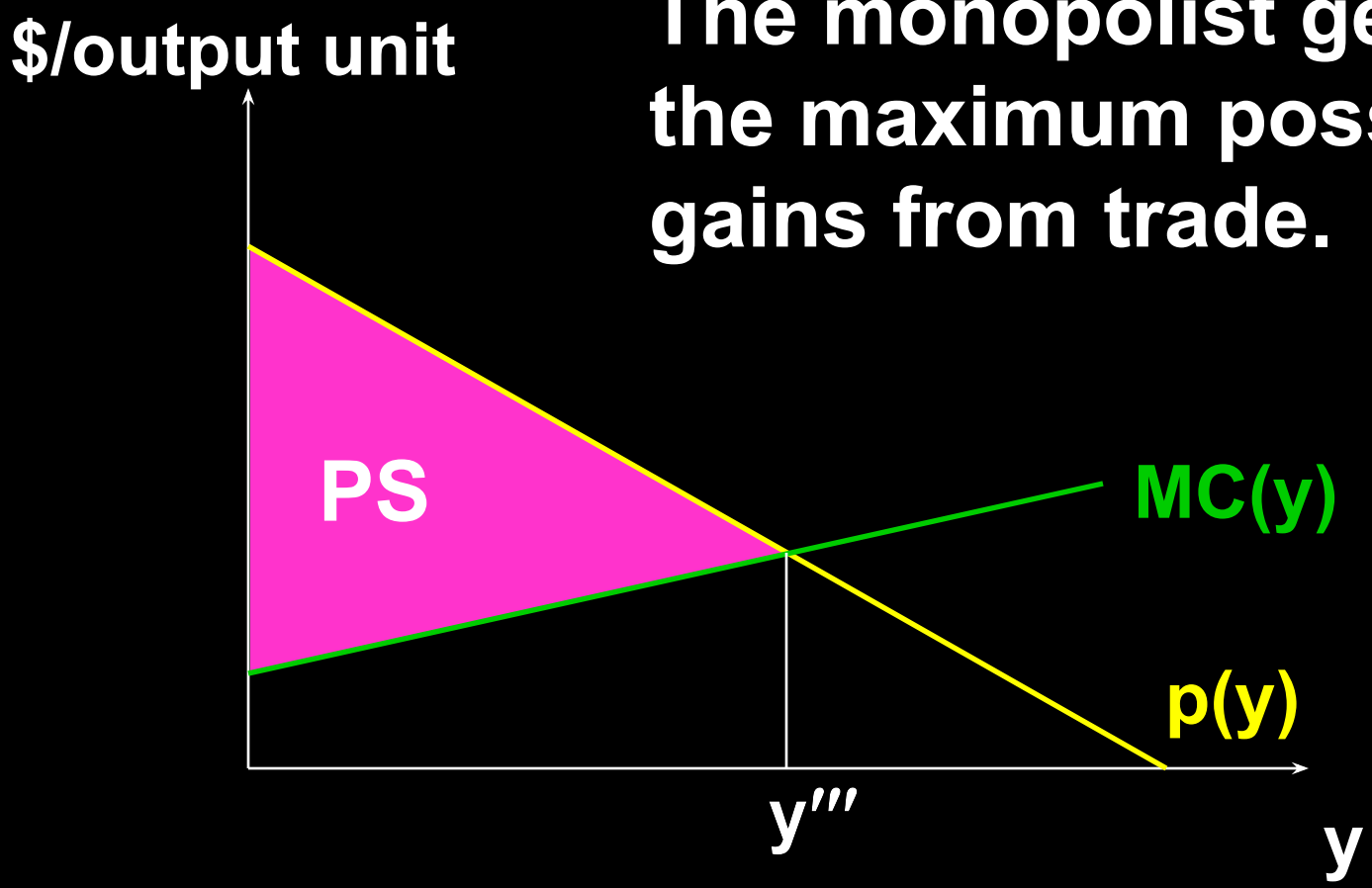
The consumers' gains are zero.

First-degree Price Discrimination



So the sum of the gains to the monopolist on all trades is the maximum possible total gains-to-trade.

First-degree Price Discrimination



The monopolist gets the maximum possible gains from trade.

First-degree price discrimination is Pareto-efficient.

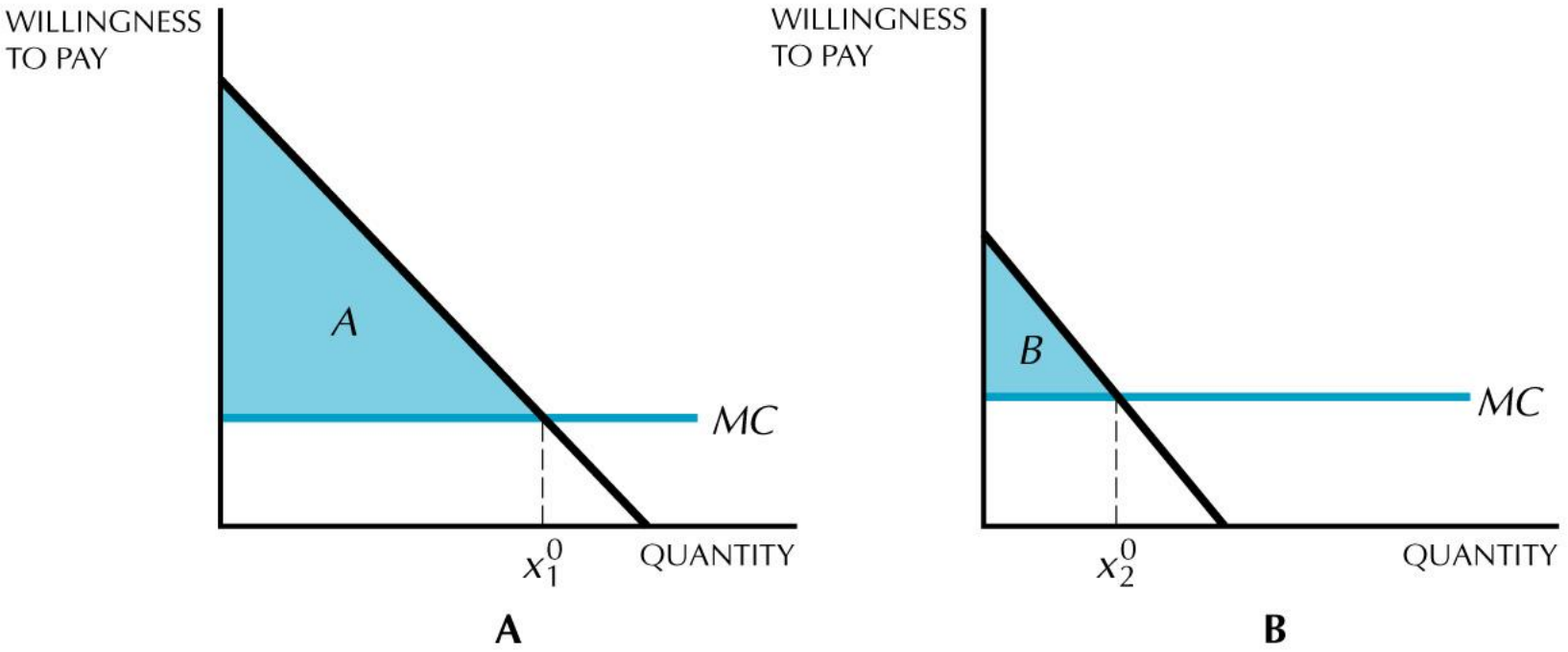


FIGURE 25.2 **First-degree price discrimination with smooth demand curves**

Intermediate Microeconomics, 7th Edition

First-degree Price Discrimination

- **First-degree price discrimination gives a monopolist all of the possible gains-to-trade, leaves the buyers with zero surplus, and supplies the efficient amount of output.**

First-Degree Price Discrimination

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

First-Degree Price Discrimination

- Examples of imperfect price discrimination where the seller has the ability to segregate the market to some extent and charge different prices for the same product:
  - Lawyers, doctors, accountants, priests, policemen
  - Car salesperson (15% profit margin)
  - Colleges and universities (differences in financial aid)

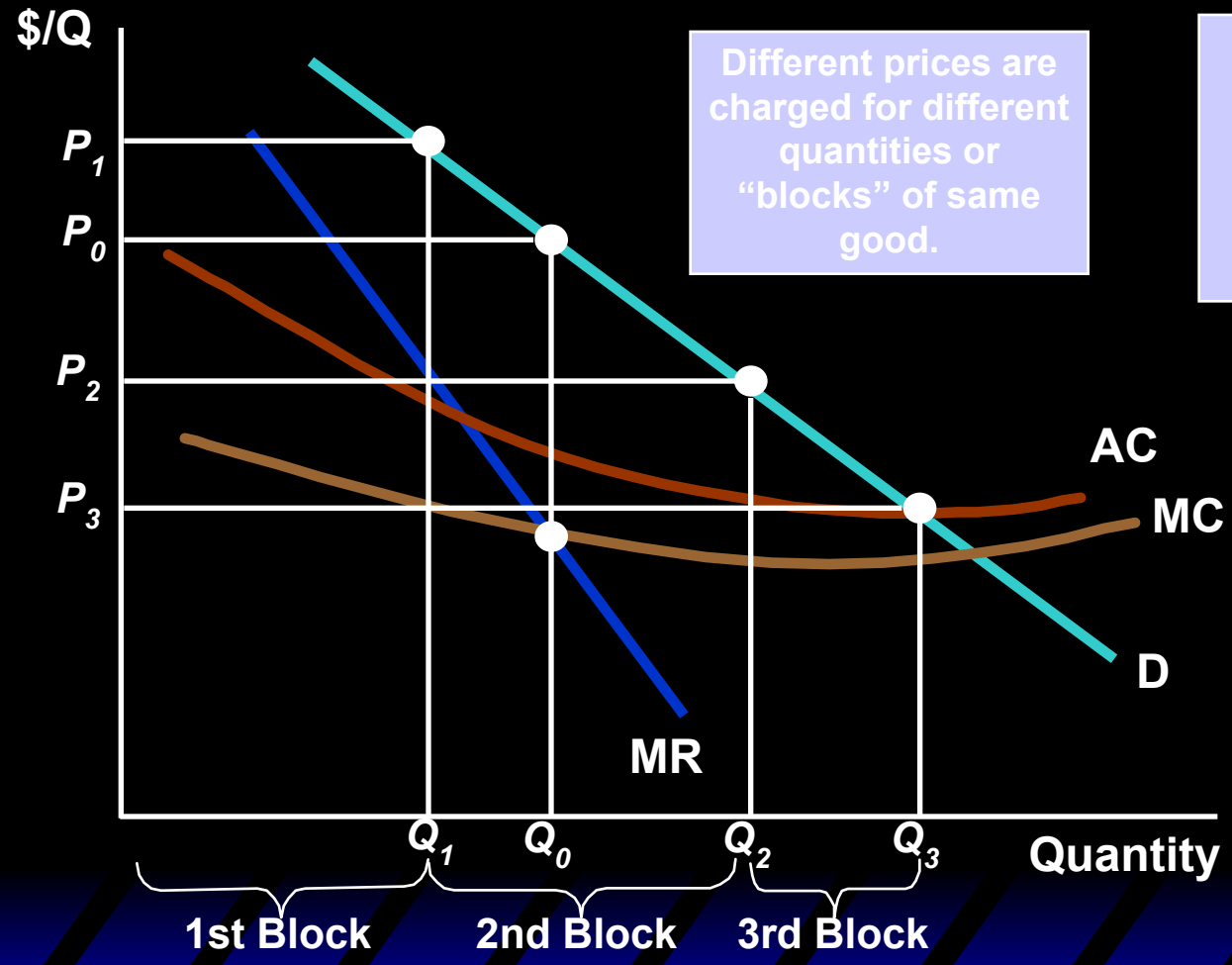
Second-Degree Price Discrimination

- In some markets, consumers purchase many units of a good over time
  - Demand for that good declines with increased consumption
    - Electricity, water, heating fuel
  - Firms can engage in second-degree price discrimination
    - Practice of charging different prices per unit for different quantities of the same good or service

Second-Degree Price Discrimination

- Quantity discounts are an example of second-degree price discrimination
  - Ex: Buying in bulk at Sam's Club
- Block pricing – the practice of charging different prices for different quantities of "blocks" of a good
  - Ex: electric power companies charge different prices for a consumer purchasing a set block of electricity

Second-Degree Price Discrimination



Different prices are charged for different quantities or "blocks" of same good.

Without discrimination: $P = P_0$ and $Q = Q_0$. With second-degree discrimination there are three blocks with prices P_1, P_2, & P_3.

Second-Degree Price Discrimination

Self selection

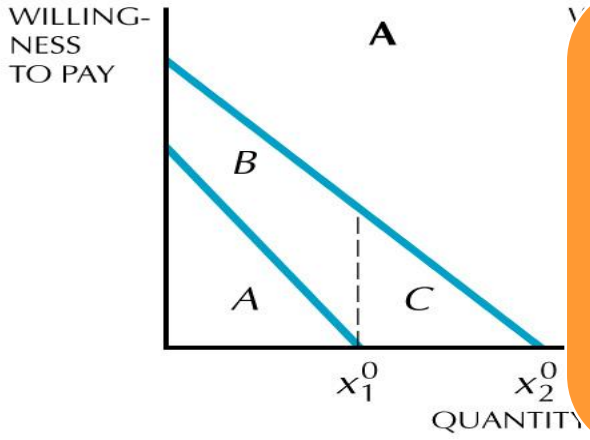


FIGURE 25.3 Second-degree price discrimination

Second-Degree Price Discrimination

Self selection

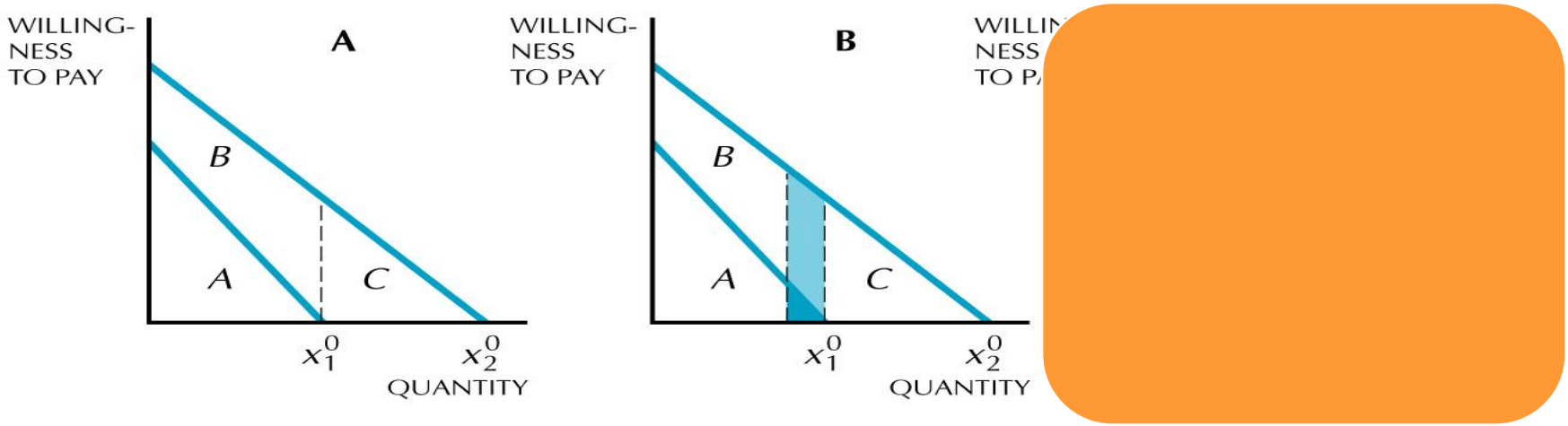


FIGURE 25.3 Second-degree price discrimination

Second-Degree Price Discrimination

Self selection

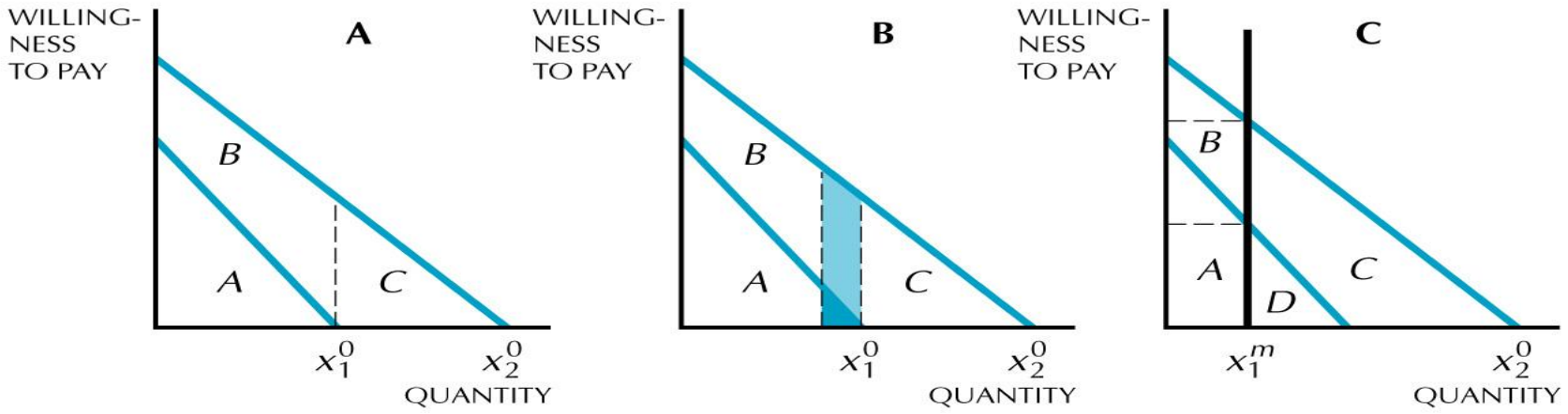


FIGURE 25.3 Second-degree price discrimination

Second-Degree Price Discrimination

Self selection

In practice, the monopolist often encourages self-selection by adjusting *quality* rather than *quantity*.

As a result, low-end consumers are offered lower quality and end up with zero consumers surplus. High end consumers get high quality and end up with some surplus (otherwise, they would choose low quality)

Third-degree Price Discrimination

- **Price paid by buyers in a given group is the same for all units purchased. But price may differ across buyer groups.**

Third-degree Price Discrimination

- **A monopolist manipulates market price by altering the quantity of product supplied to that market.**
- **So the question "What discriminatory prices will the monopolist set, one for each group?" is really the question "How many units of product will the monopolist supply to each group?"**

11.2 PRICE DISCRIMINATION

Third-Degree Price Discrimination

- **third-degree price discrimination** Practice of dividing consumers into two or more groups with separate demand curves and charging different prices to each group.

Creating Consumer Groups

If third-degree price discrimination is feasible, how should the firm decide what price to charge each group of consumers?

1. We know that however much is produced, total output should be divided between the groups of customers so that marginal revenues for each group are equal.
2. We know that *total* output must be such that the marginal revenue for each group of consumers is equal to the marginal cost of production.

Third-Degree Price Discrimination

Creating Consumer Groups

$$\pi = P_1Q_1 + P_2Q_2 - C(Q_T)$$

$$\frac{\Delta\pi}{\Delta Q_1} = \frac{\Delta(P_1Q_1)}{\Delta Q_1} - \frac{\Delta C}{\Delta Q_1} = 0$$

$$\text{MR}_1 = \text{MC}$$

$$\text{MR}_2 = \text{MC}$$

$$\text{MR}_1 = \text{MR}_2 = \text{MC} \qquad \textbf{(11.1)}$$

Determining Relative Prices

$$\text{MR} = P(1 + 1/E_d)$$

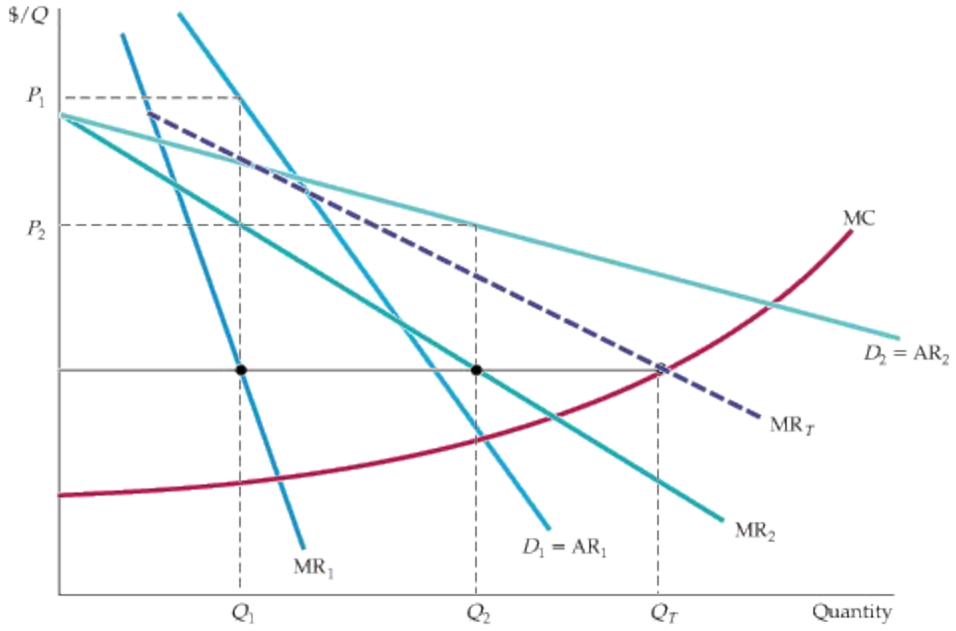
$$\frac{P_1}{P_2} = \frac{(1 + 1/E_2)}{(1 + 1/E_1)} \qquad \textbf{(11.2)}$$

11.2 PRICE DISCRIMINATION

Third-Degree Price Discrimination

Figure 11.5

Third-Degree Price Discrimination



Consumers are divided into two groups, with separate demand curves for each group. The optimal prices and quantities are such that the marginal revenue from each group is the same and equal to marginal cost.

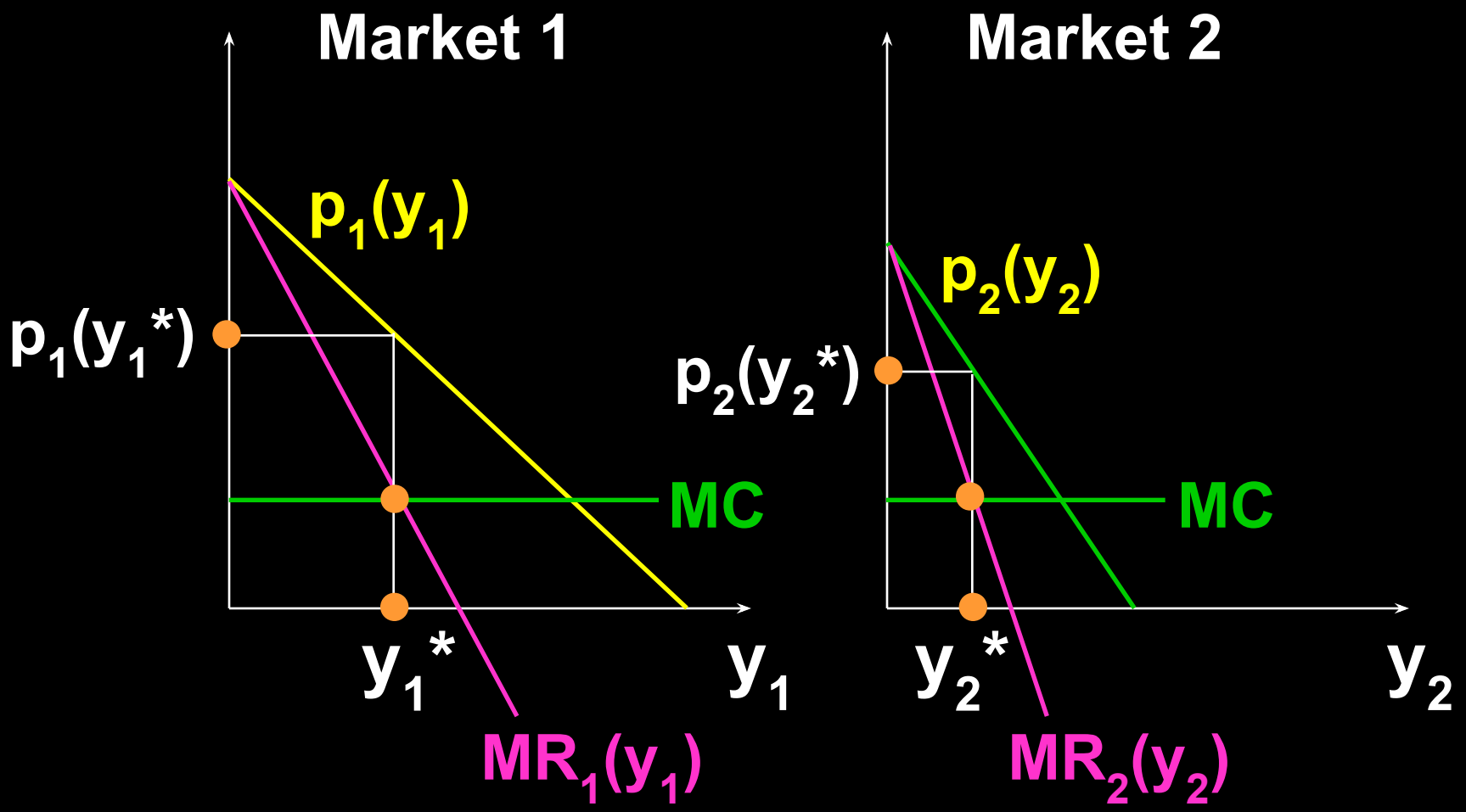
Here group 1, with demand curve D_1, is charged P_1,

and group 2, with the more elastic demand curve D_2, is charged the lower price P_2.

Marginal cost depends on the total quantity produced Q_T.

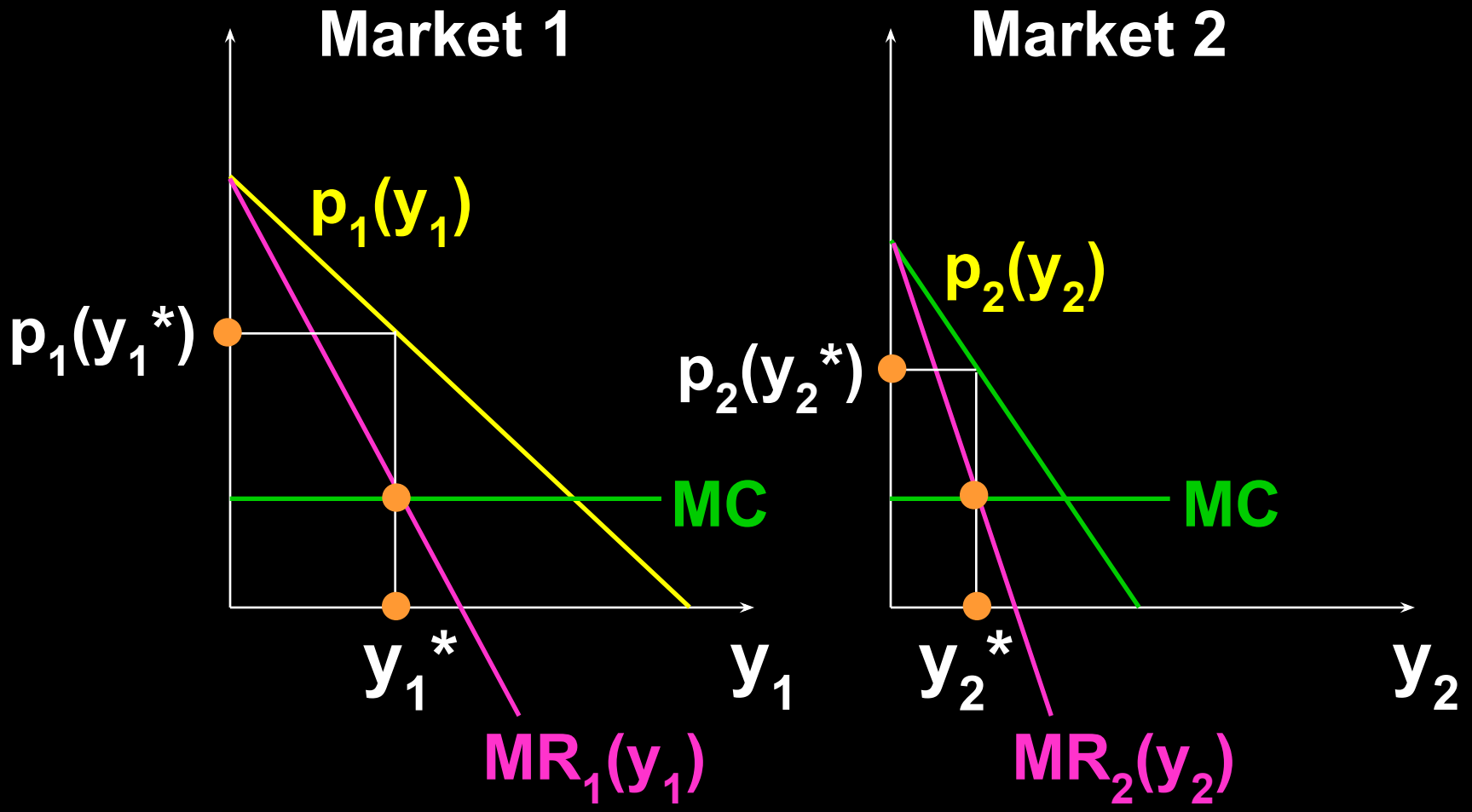
Note that Q_1 and Q_2 are chosen so that $MR_1 = MR_2 = MC$.

Third-degree Price Discrimination



$$MR_1(y_1^*) = MR_2(y_2^*) = MC$$

Third-degree Price Discrimination



$MR_1(y_1^*) = MR_2(y_2^*) = MC$ and $p_1(y_1^*) \neq p_2(y_2^*)$.

Third-degree Price Discrimination

- **In which market will the monopolist cause the higher price?**

Third-degree Price Discrimination

- In which market will the monopolist cause the higher price?
- Recall that

$$MR_1(y_1) = p_1(y_1)\left[1 + \frac{1}{\varepsilon_1}\right]$$

and

$$MR_2(y_2) = p_2(y_2)\left[1 + \frac{1}{\varepsilon_2}\right].$$

Third-degree Price Discrimination

- In which market will the monopolist cause the higher price?
- Recall that

$$MR_1(y_1) = p_1(y_1)\left[1 + \frac{1}{\varepsilon_1}\right]$$

and

$$MR_2(y_2) = p_2(y_2)\left[1 + \frac{1}{\varepsilon_2}\right].$$

- But, $MR_1(y_1^*) = MR_2(y_2^*) = MC(y_1^* + y_2^*)$

Third-degree Price Discrimination

So $$p_1(y_1^*)\left[1+\frac{1}{\varepsilon_1}\right]=p_2(y_2^*)\left[1+\frac{1}{\varepsilon_2}\right].$$

Third-degree Price Discrimination

So $$p_1(y_1^*)\left[1+\frac{1}{\varepsilon_1}\right]=p_2(y_2^*)\left[1+\frac{1}{\varepsilon_2}\right].$$

Therefore, $p_1(y_1^*) > p_2(y_2^*)$ if and only if

$$1+\frac{1}{\varepsilon_1} < 1+\frac{1}{\varepsilon_2}$$

Third-degree Price Discrimination

So $$p_1(y_1^*)\left[1+\frac{1}{\varepsilon_1}\right]=p_2(y_2^*)\left[1+\frac{1}{\varepsilon_2}\right].$$

Therefore, $p_1(y_1^*) > p_2(y_2^*)$ if and only if

$$1+\frac{1}{\varepsilon_1} < 1+\frac{1}{\varepsilon_2} \quad \Rightarrow \quad \varepsilon_1 > \varepsilon_2.$$

Third-degree Price Discrimination

So $$p_1(y_1^*)\left[1+\frac{1}{\varepsilon_1}\right]=p_2(y_2^*)\left[1+\frac{1}{\varepsilon_2}\right].$$

Therefore, $p_1(y_1^*) > p_2(y_2^*)$ if and only if

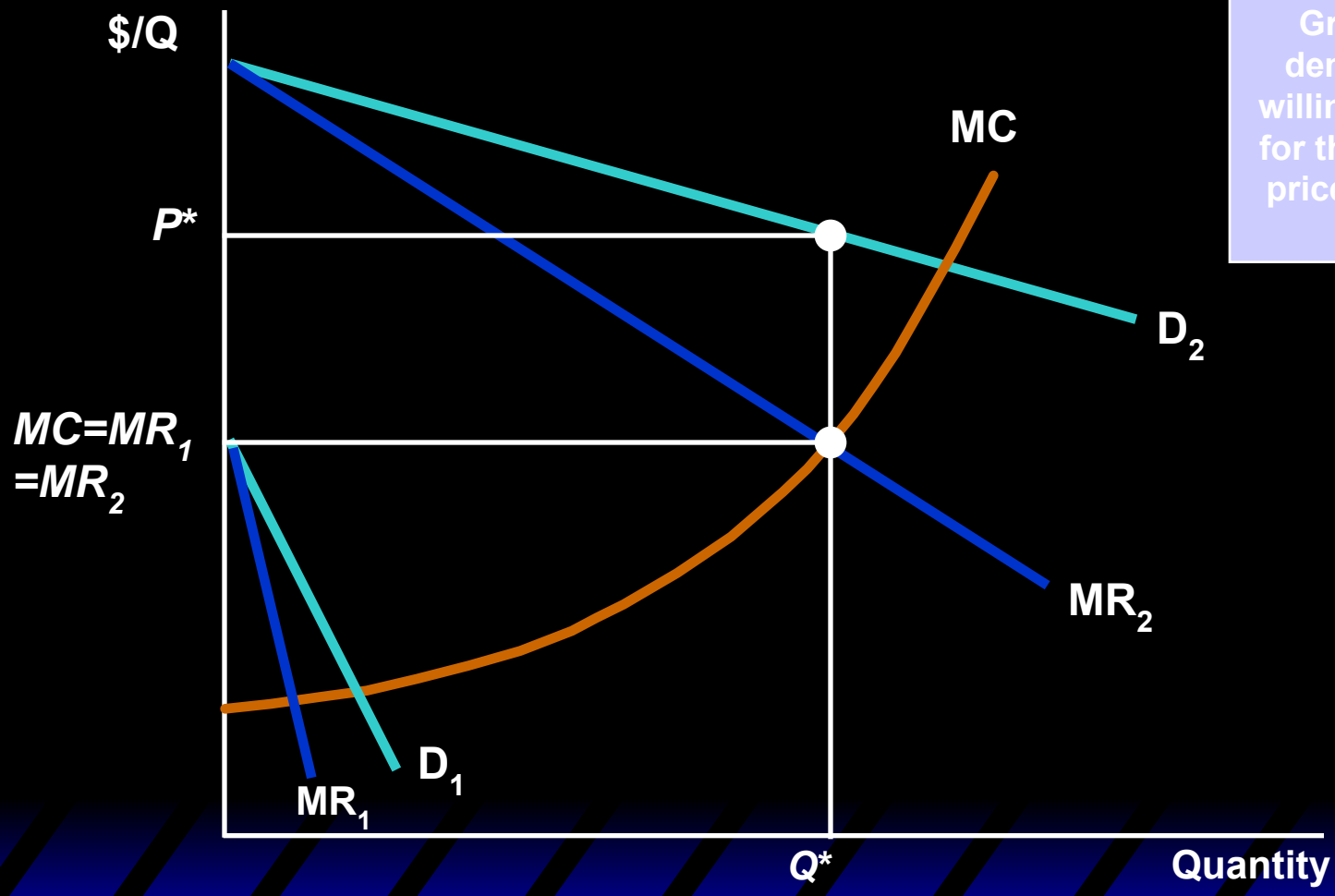
$$1+\frac{1}{\varepsilon_1} < 1+\frac{1}{\varepsilon_2} \quad \Rightarrow \quad \varepsilon_1 > \varepsilon_2.$$

The monopolist sets the higher price in the market where demand is least own-price elastic.

No Sales to Smaller Market

- **Even if third-degree price discrimination is possible, it may not be feasible to try to sell to both groups**
  - **It is possible that the demand for one group is so low that it would not be profitable to lower price enough to sell to that group**

No Sales to Smaller Market



Group one, with demand D_1, is not willing to pay enough for the good to make price discrimination profitable.

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**

The Economics of Coupons and Rebates

- About 20 – 30% of consumers use coupons or rebates
- Firms can get those with higher elasticities of demand to purchase the good who would not normally buy it
- Table 11.1 shows how elasticities of demand vary for coupon/rebate users and non-users

Price Elasticities of Demand: Users vs. Nonusers of Coupons

	Price Elasticity	
Product	**Nonusers**	**Users**
Toilet tissue	–0.60	–0.66
Stuffing/dressing	–0.71	–0.96
Shampoo	–0.84	–1.04
Cooking/salad oil	–1.22	–1.32
Dry mix dinners	–0.88	–1.09
Cake mix	–0.21	–0.43
Cat food	–0.49	–1.13
Frozen entrees	–0.60	–0.95
Gelatin	–0.97	–1.25
Spaghetti sauce	–1.65	–1.81
Creme rinse/conditioner	–0.82	–1.12
Soups	–1.05	–1.22
Hot dogs	–0.59	–0.77

Airline Fares

- **Differences in elasticities imply that some customers will pay a higher fare than others**
- **Business travelers have few choices and their demand is less elastic**
- **Casual travelers and families are more price-sensitive and will therefore be choosier**

Elasticities of Demand for Air Travel

	Fare Category		
Elasticity	First Class	Unrestricted Coach	Discounted
Price	–0.3	–0.4	–0.9
Income	1.2	1.2	1.8

Airline Fares

- There are multiple fares for every route flown by airlines
- They separate the market by setting various restrictions on the tickets
  - Must stay over a Saturday night
  - 21-day advance, 14-day advance
  - Basic restrictions – can change ticket to only certain days
  - Most expensive: no restrictions – first class

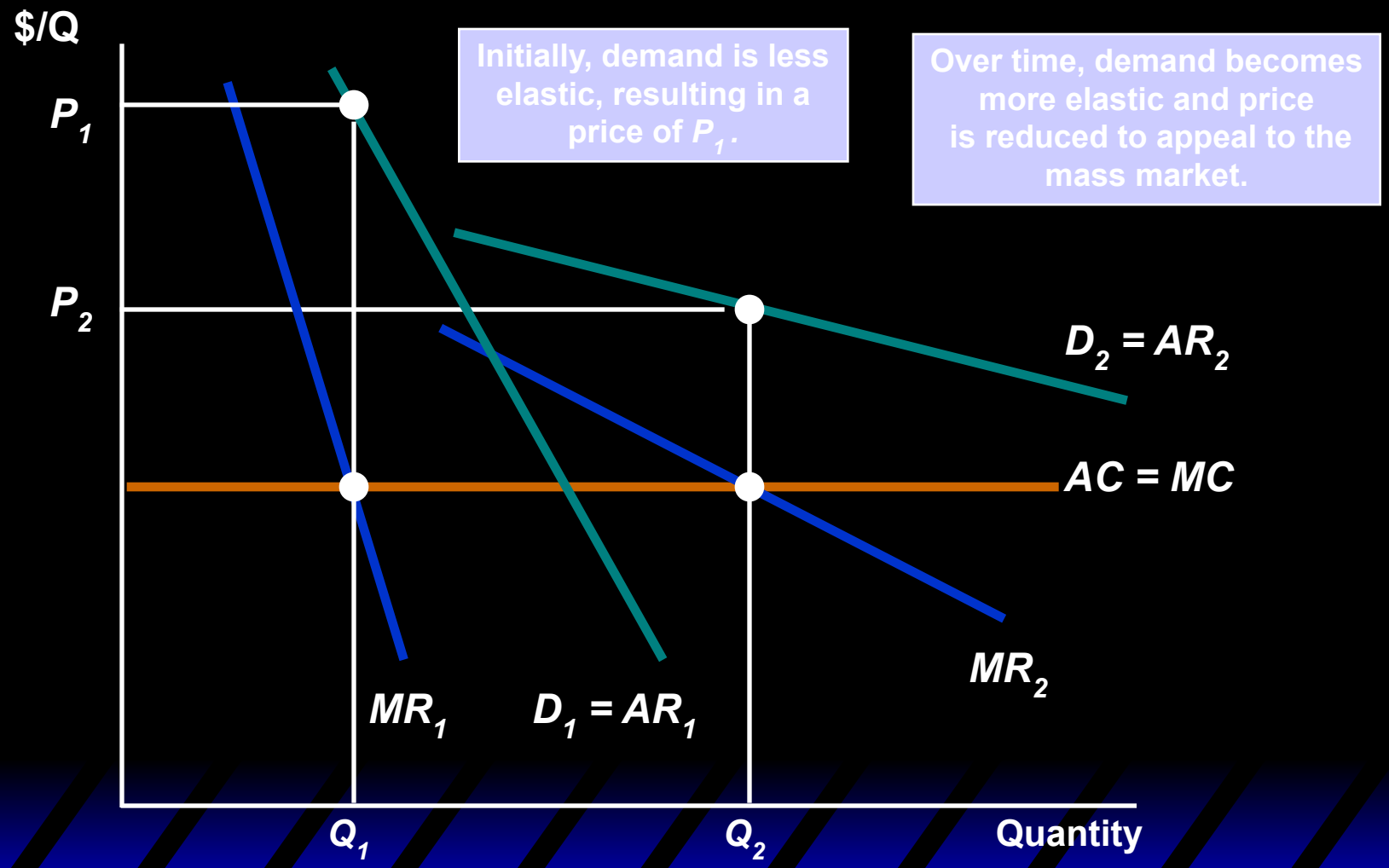
Other Types of Price Discrimination

- **Intertemporal Price Discrimination**
  - **Practice of separating consumers with different demand functions into different groups by charging different prices at different points in time**
  - **Initial release of a product, the demand is inelastic**
    - **Hard back vs. paperback book**
    - **New release movie**
    - **Technology**

Intertemporal Price Discrimination

- **Once this market has yielded a maximum profit, firms lower the price to appeal to a general market with a more elastic demand**
- **This can be seen graphically looking at two different groups of consumers – one willing to buy right now and one willing to wait**

Intertemporal Price Discrimination



Other Types of Price Discrimination

- **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**
  - **Rush hour traffic**
  - **Electricity - late summer afternoons**

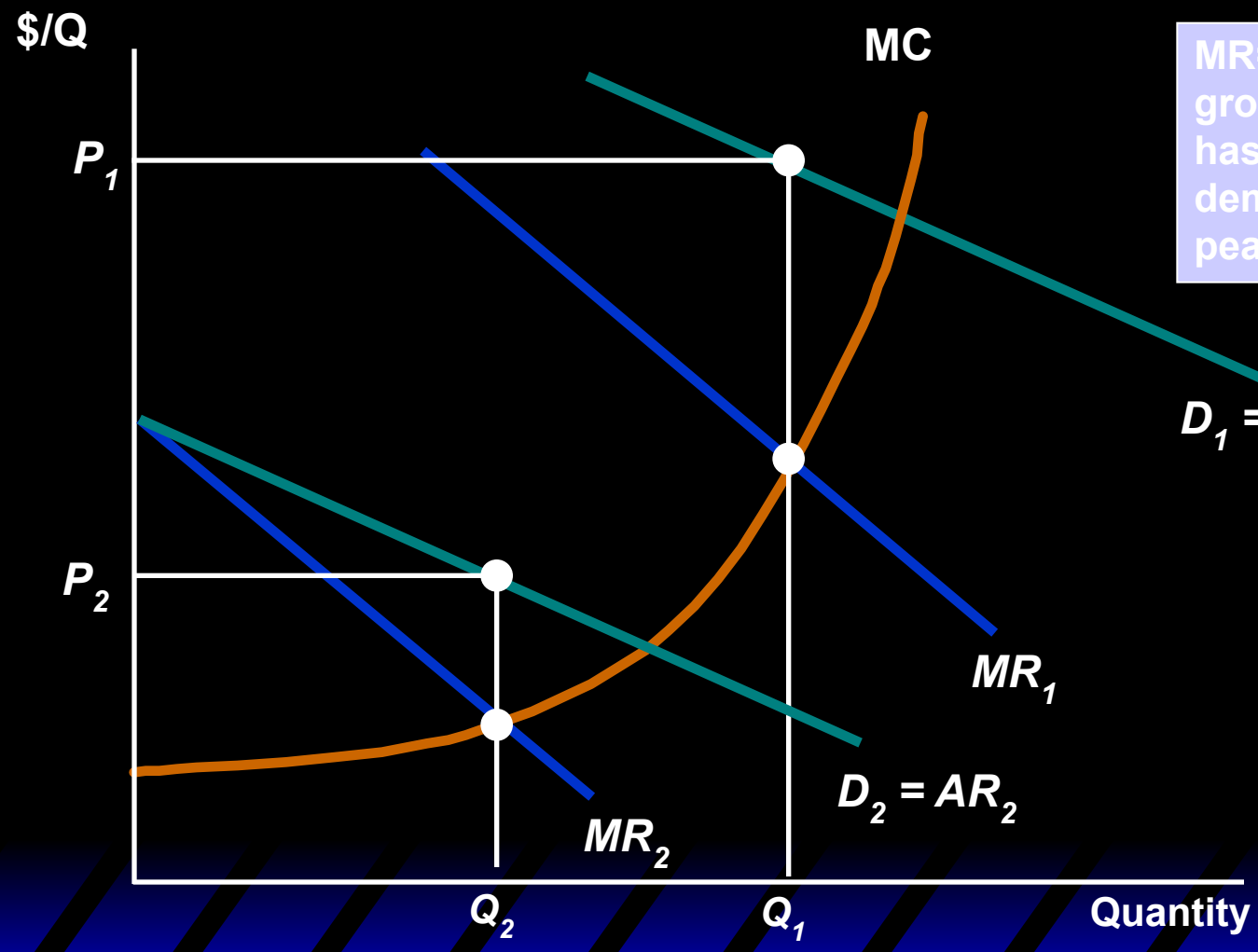
Peak-Load Pricing

- Objective is to increase efficiency by charging customers close to marginal cost
  - Increased MR and MC would indicate a higher price
  - Total surplus is higher because charging close to MC
  - Can measure efficiency gain from peak-load pricing

Peak-Load Pricing

- With third-degree price discrimination, the MR for all markets was equal
- MR is not equal for each market because one market does not impact the other market with peak-load pricing
  - Price and sales in each market are independent
  - Ex: electricity, movie theaters

Peak-Load Pricing



MR=MC for each group. Group 1 has higher demand during peak times.

How to Price a Best-Selling Novel

- How would you arrive at the price for the initial release of the hardbound edition of a book?
  - Hardback and paperback books are ways for the company to price discriminate
  - How does the company determine what price to sell the hardback and paperback books for?
  - How does the company determine when to release the paperback?

How to Price a Best-Selling Novel

- Company must divide consumers into two groups:
  - Those willing to buy the more expensive hardback
  - Those willing to wait for the paperback
- Have to be strategic about when to release paperback after hardback
  - Publishers typically wait 12 to 18 months

How to Price a Best-Selling Novel

- Publishers must use estimates of past books to determine how much to sell a new book for
- Hard to determine the demand for a NEW book
- New books are typically sold for about the same price, to take this into account
- Demand for paperbacks is more elastic so we should expect it to be priced lower

Two-Part Tariffs

- A two-part tariff is a lump-sum fee, p_1, plus a price p_2 for each unit of product purchased.
- Thus the cost of buying x units of product is

$$p_1 + p_2 x.$$

Two-Part Tariffs

- **Should a monopolist prefer a two-part tariff to uniform pricing, or to any of the price-discrimination schemes discussed so far?**
- **If so, how should the monopolist design its two-part tariff?**

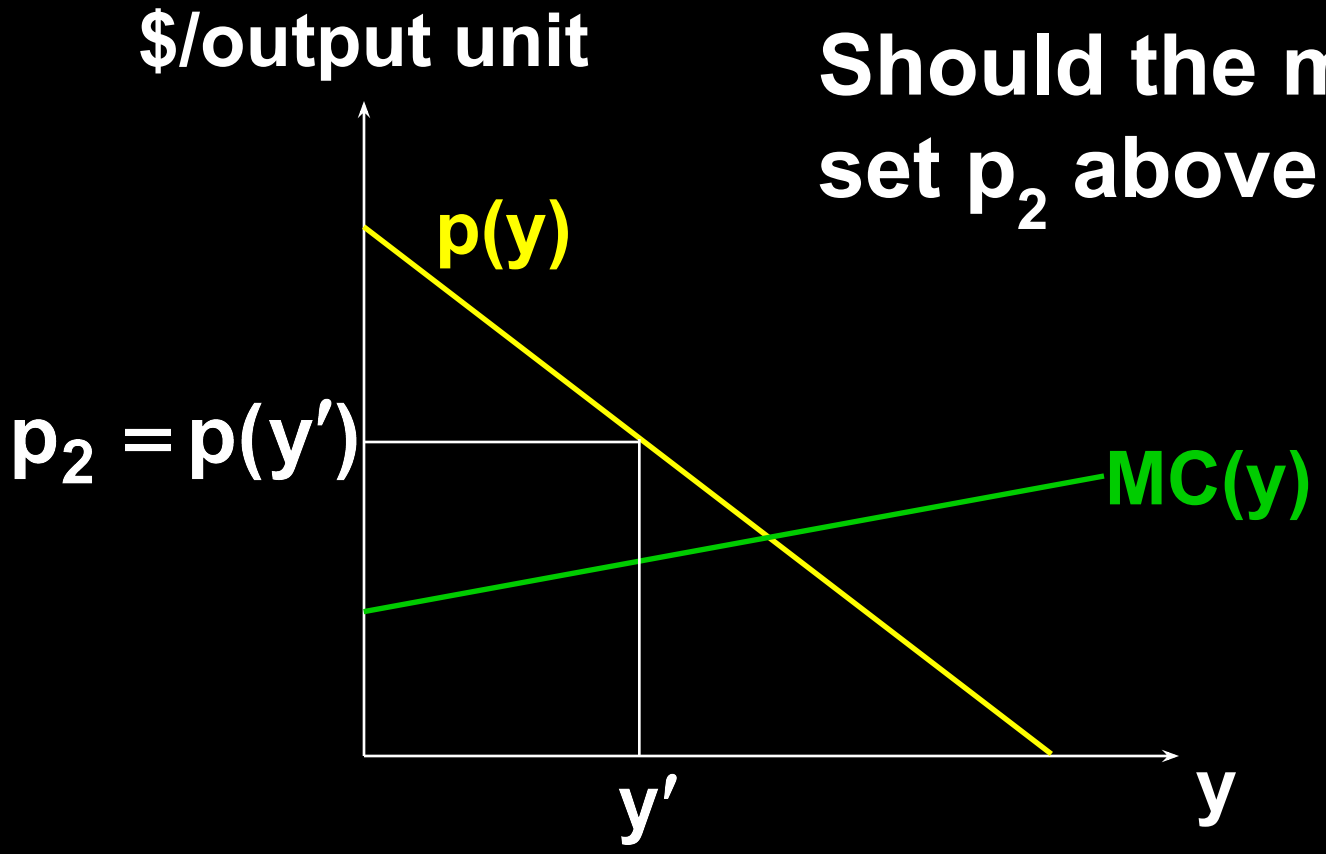
Two-Part Tariffs

- $p_1 + p_2 x$
- **Q: What is the largest that p_1 can be?**

Two-Part Tariffs

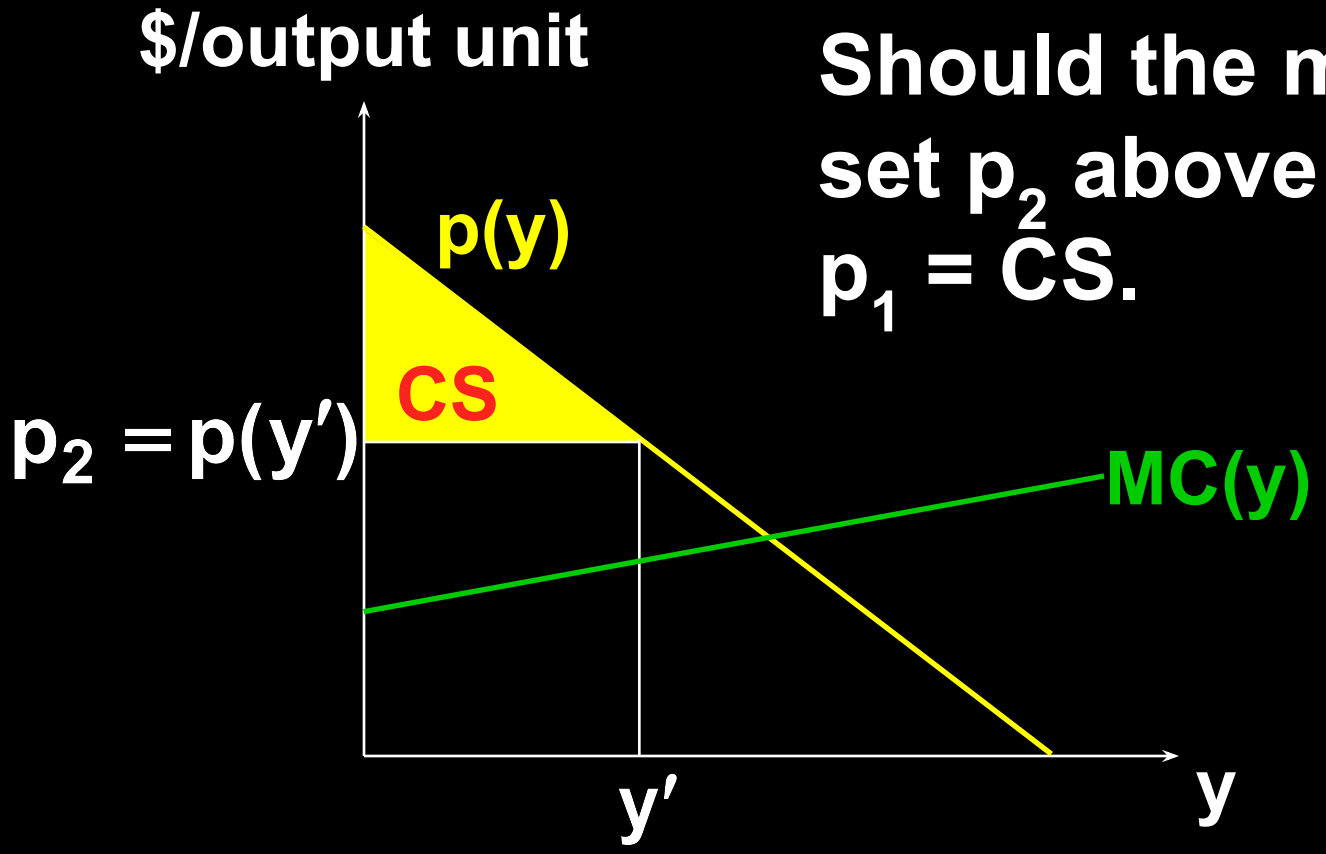
- $p_1 + p_2 x$
- Q: What is the largest that p_1 can be?
- A: p_1 is the "market entrance fee" so the largest it can be is the surplus the buyer gains from entering the market.
- Set p_1 = CS and now ask what should be p_2?

Two-Part Tariffs



Should the monopolist set p_2 above MC?

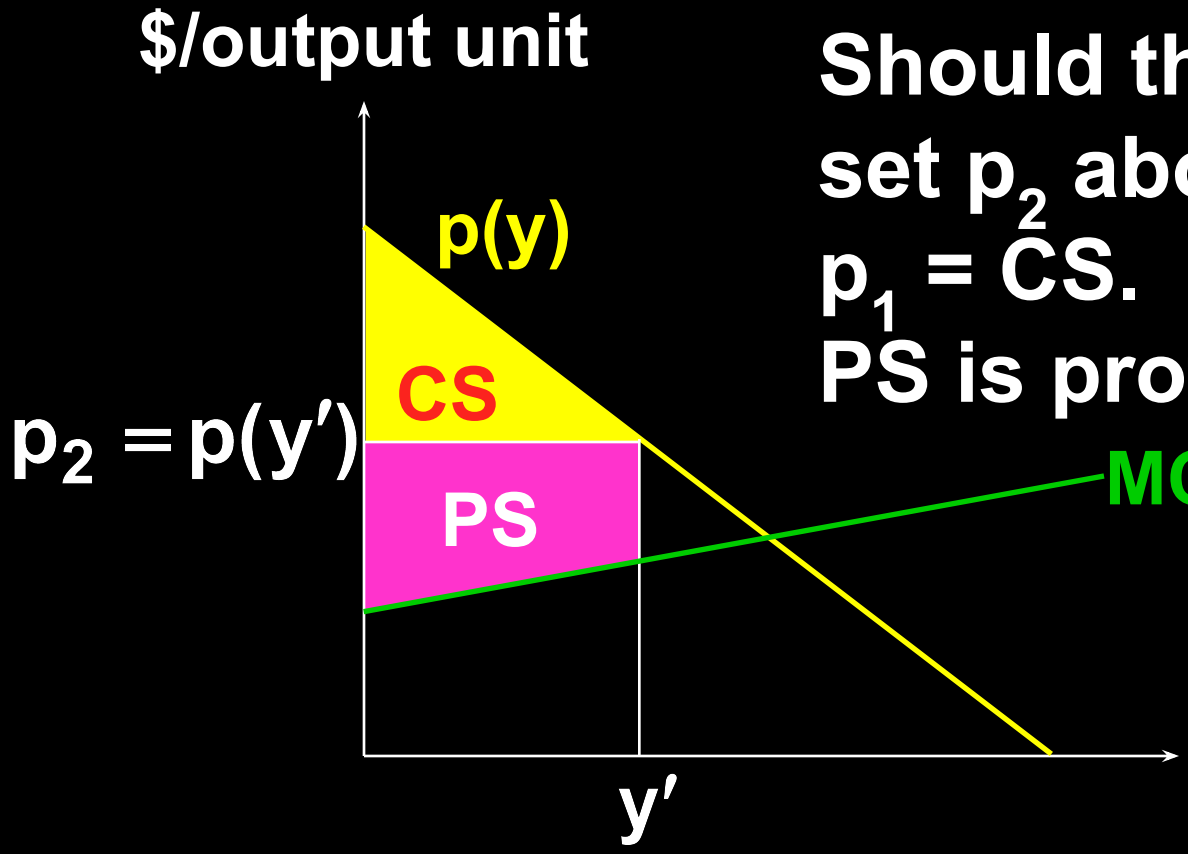
Two-Part Tariffs



Should the monopolist set p_2 above MC?

p_1 = CS.

Two-Part Tariffs

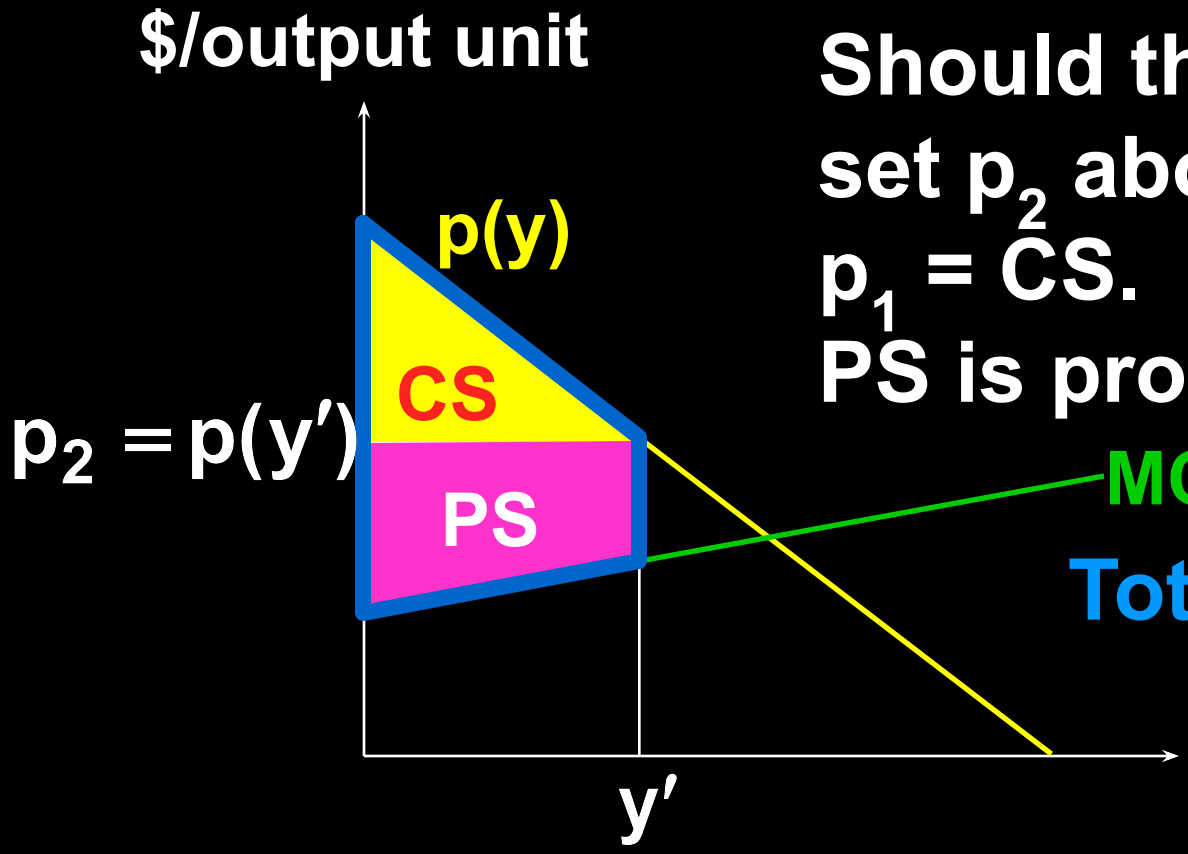


Should the monopolist set p_2 above MC?

p_1 = CS.

PS is profit from sales.

Two-Part Tariffs

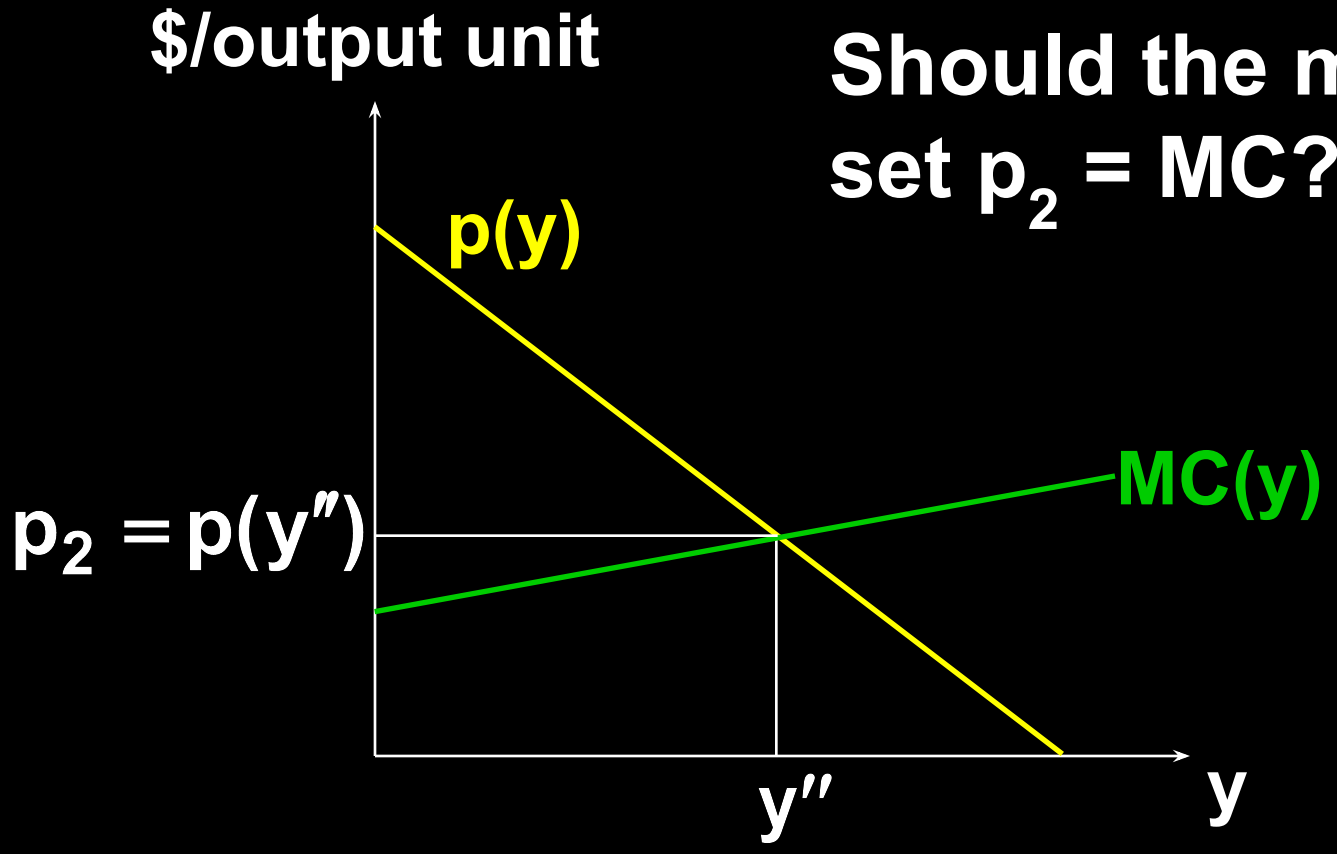


Should the monopolist set p_2 above MC?

p_1 = CS.

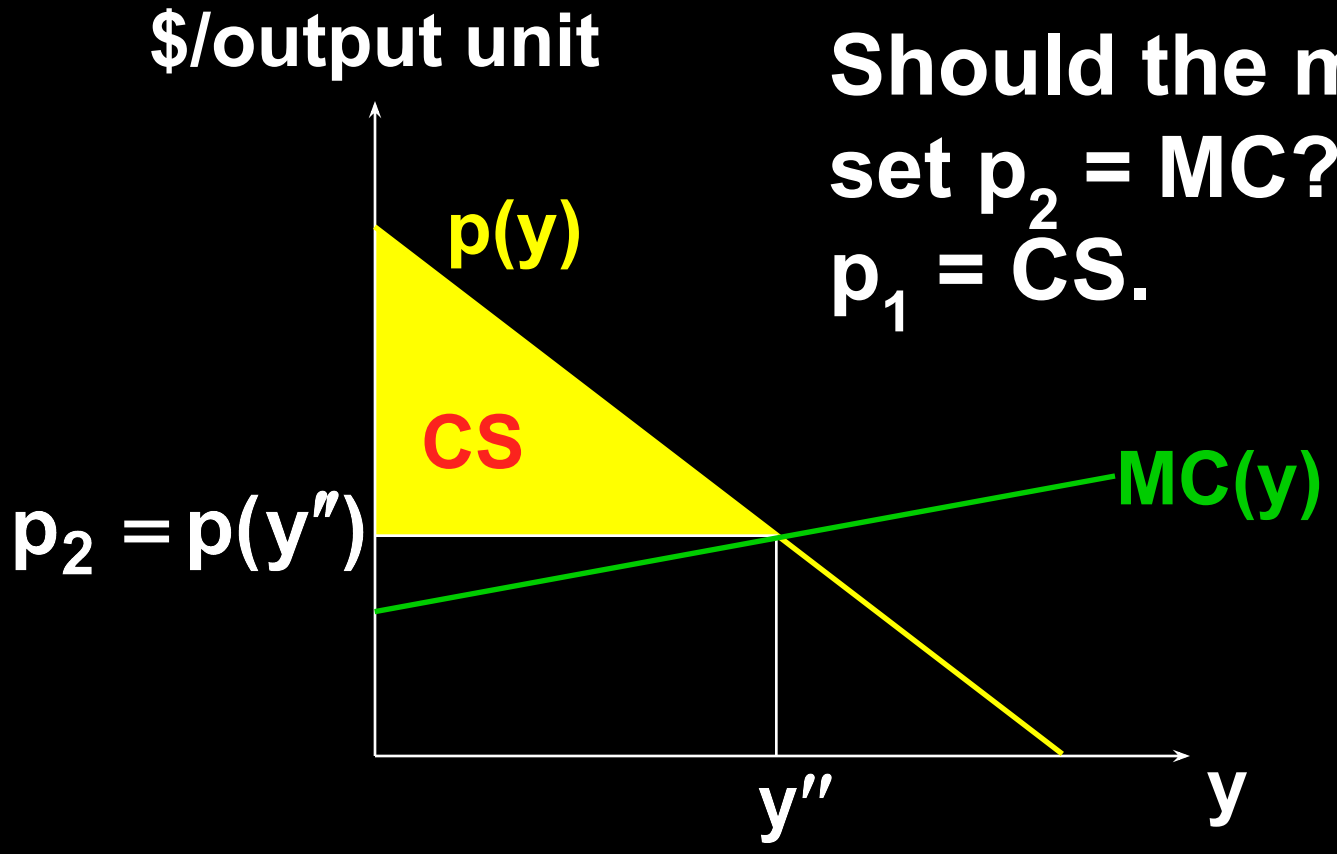
PS is profit from sales.

Two-Part Tariffs



Should the monopolist set p_2 = MC?

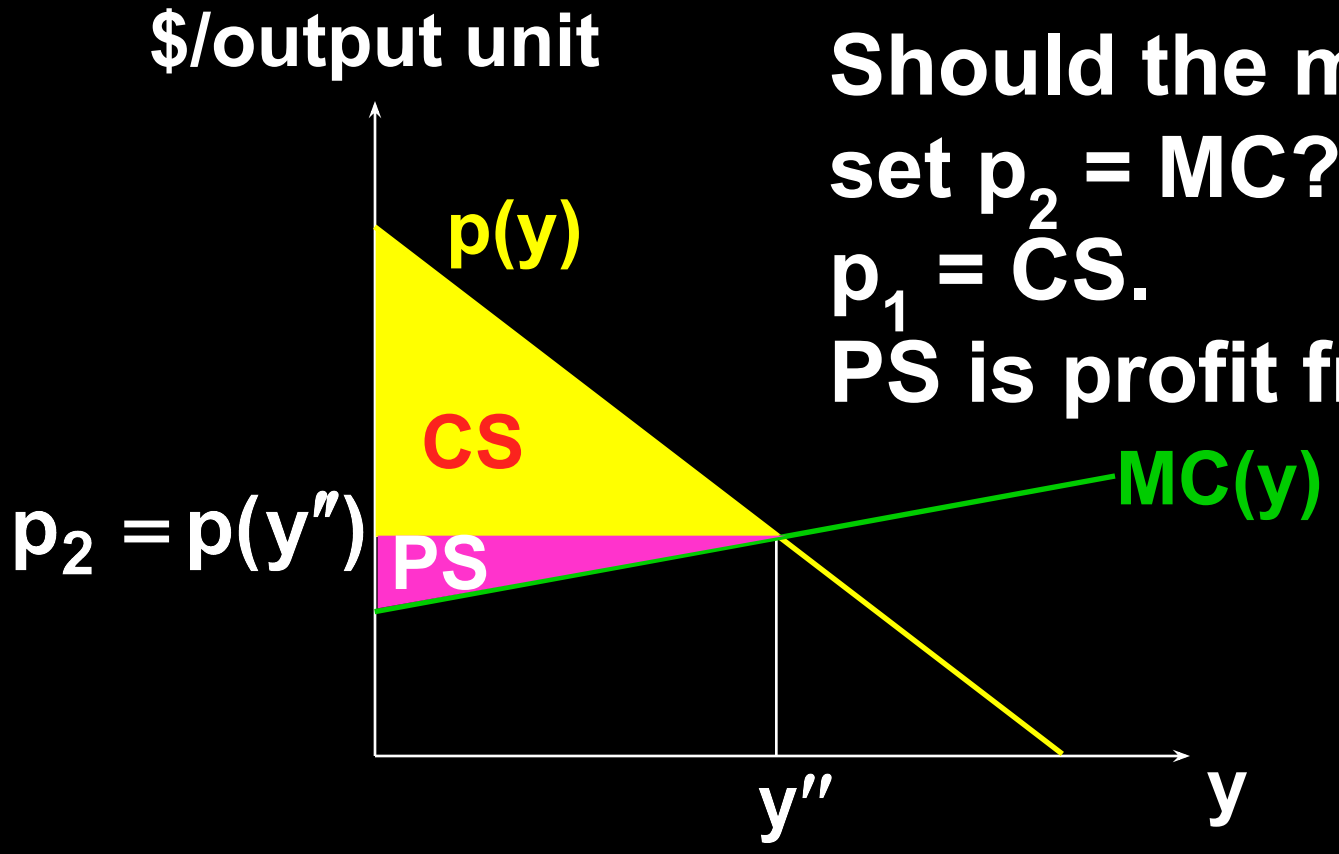
Two-Part Tariffs



Should the monopolist set p_2 = MC?

p_1 = CS.

Two-Part Tariffs

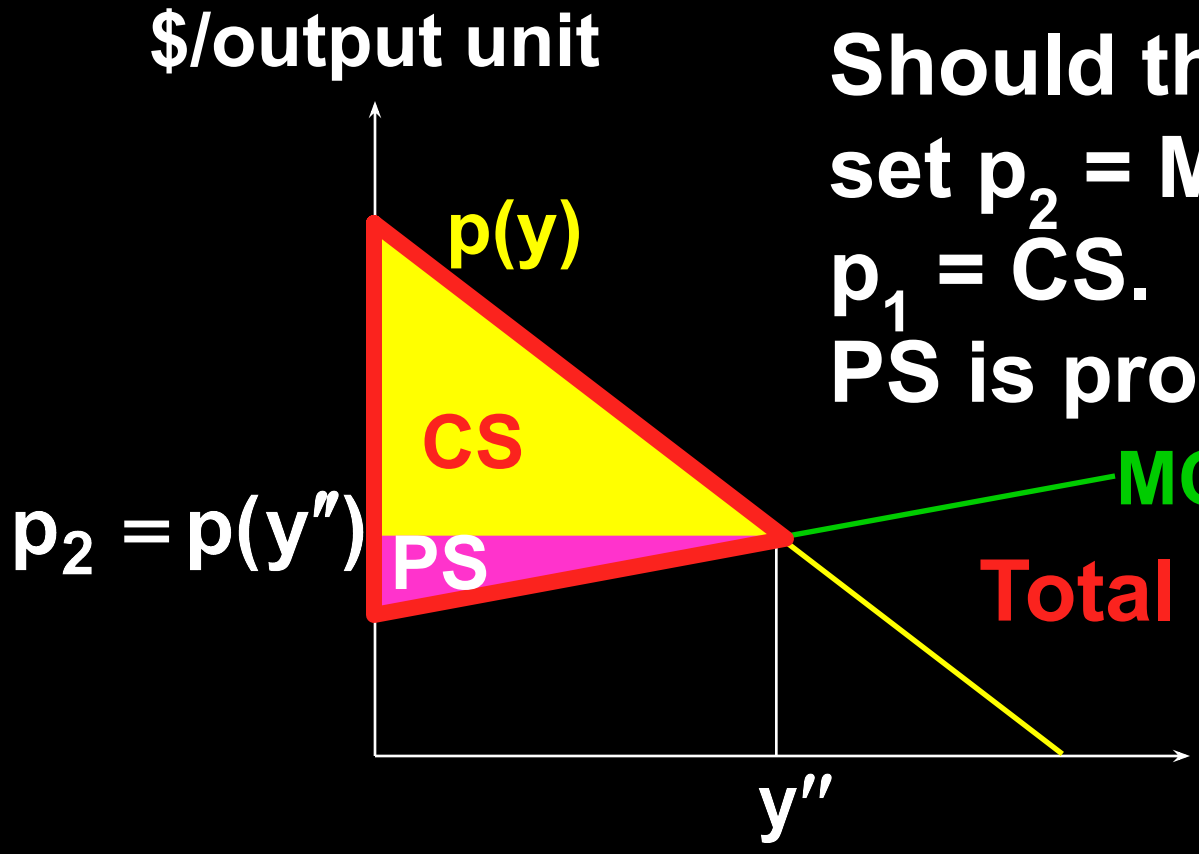


Should the monopolist set p_2 = MC?

p_1 = CS.

PS is profit from sales.

Two-Part Tariffs

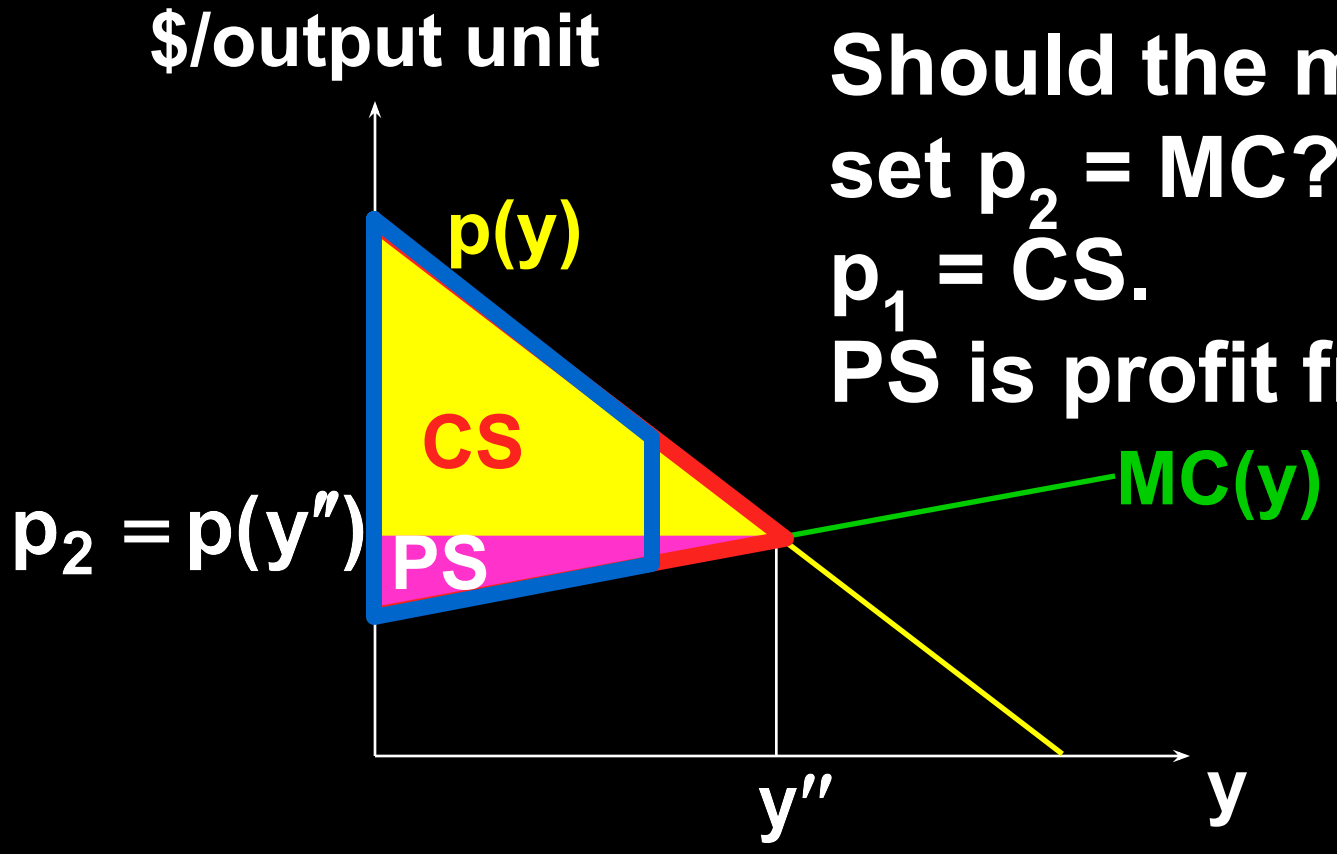


Should the monopolist set p_2 = MC?

p_1 = CS.

PS is profit from sales.

Two-Part Tariffs

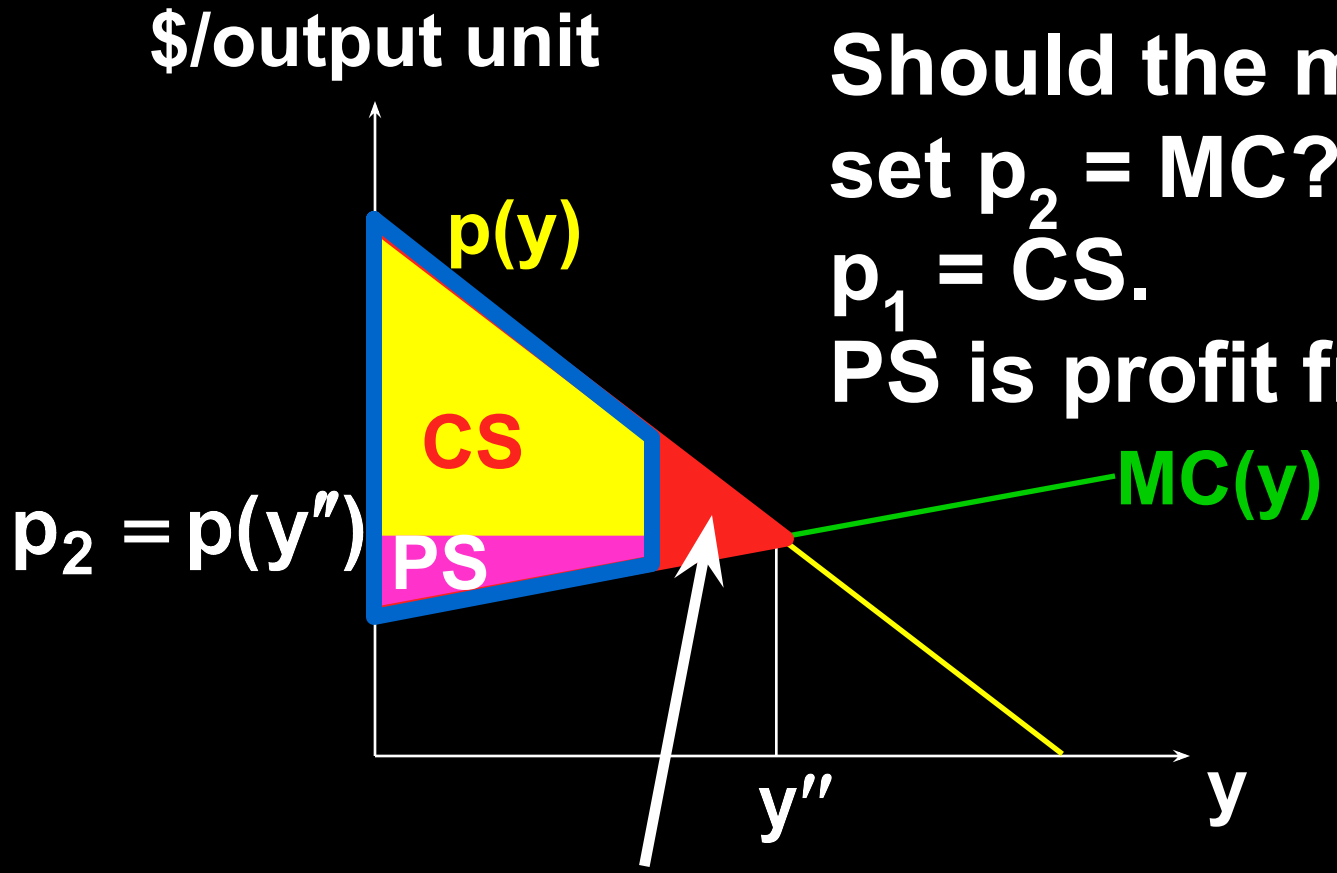


Should the monopolist set p_2 = MC?

p_1 = CS.

PS is profit from sales.

Two-Part Tariffs



Should the monopolist set p_2 = MC?

p_1 = CS.

PS is profit from sales.

Additional profit from setting p_2 = MC.

Two-Part Tariffs

- **The monopolist maximizes its profit when using a two-part tariff by setting its per unit price p_2 at marginal cost and setting its lump-sum fee p_1 equal to Consumers' Surplus.**

Two-Part Tariffs

- **A profit-maximizing two-part tariff gives an efficient market outcome in which the monopolist obtains as profit the total of all gains-to-trade.**

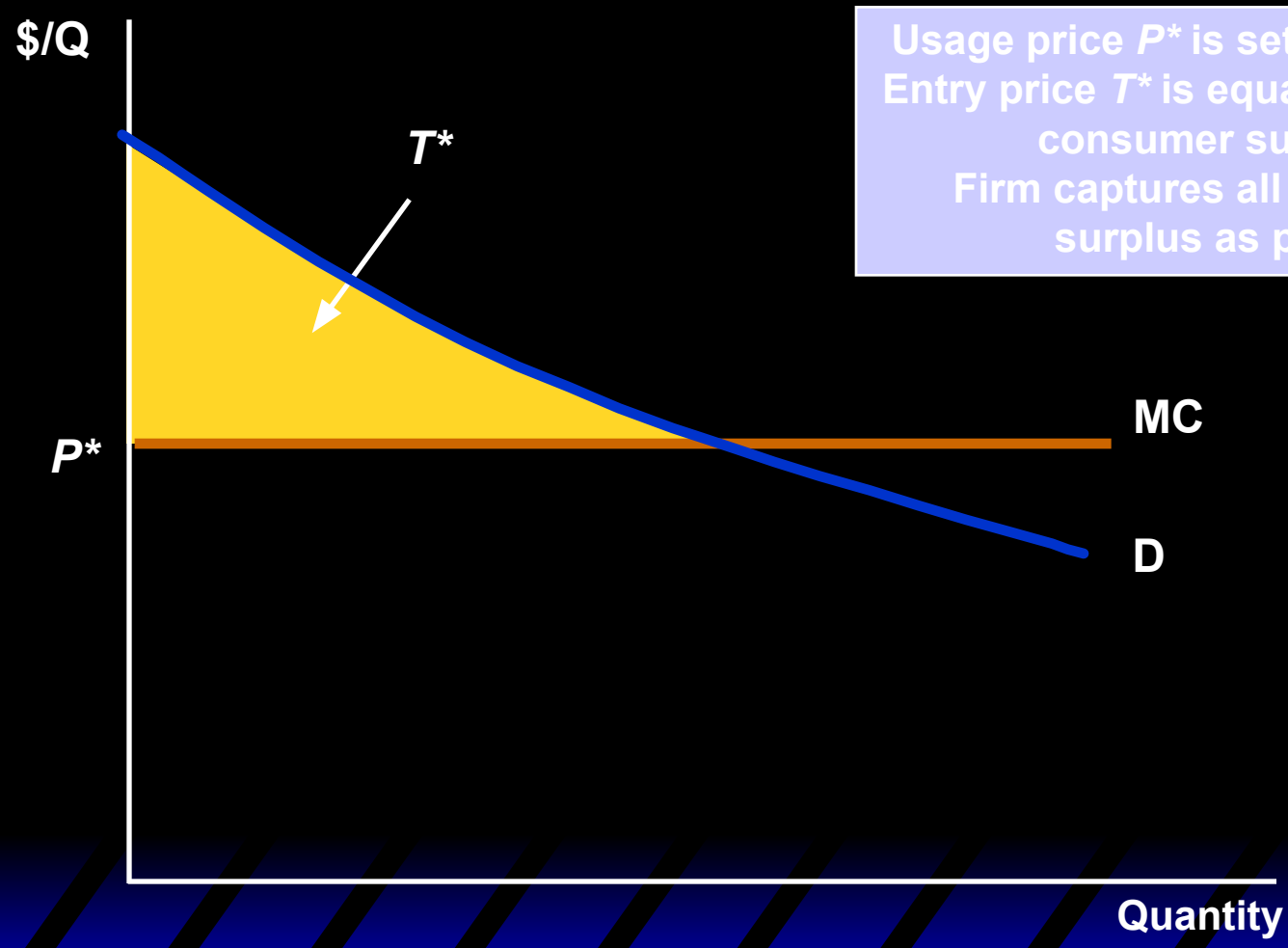
The Two-Part Tariff

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

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

Two-Part Tariff with a Single Consumer

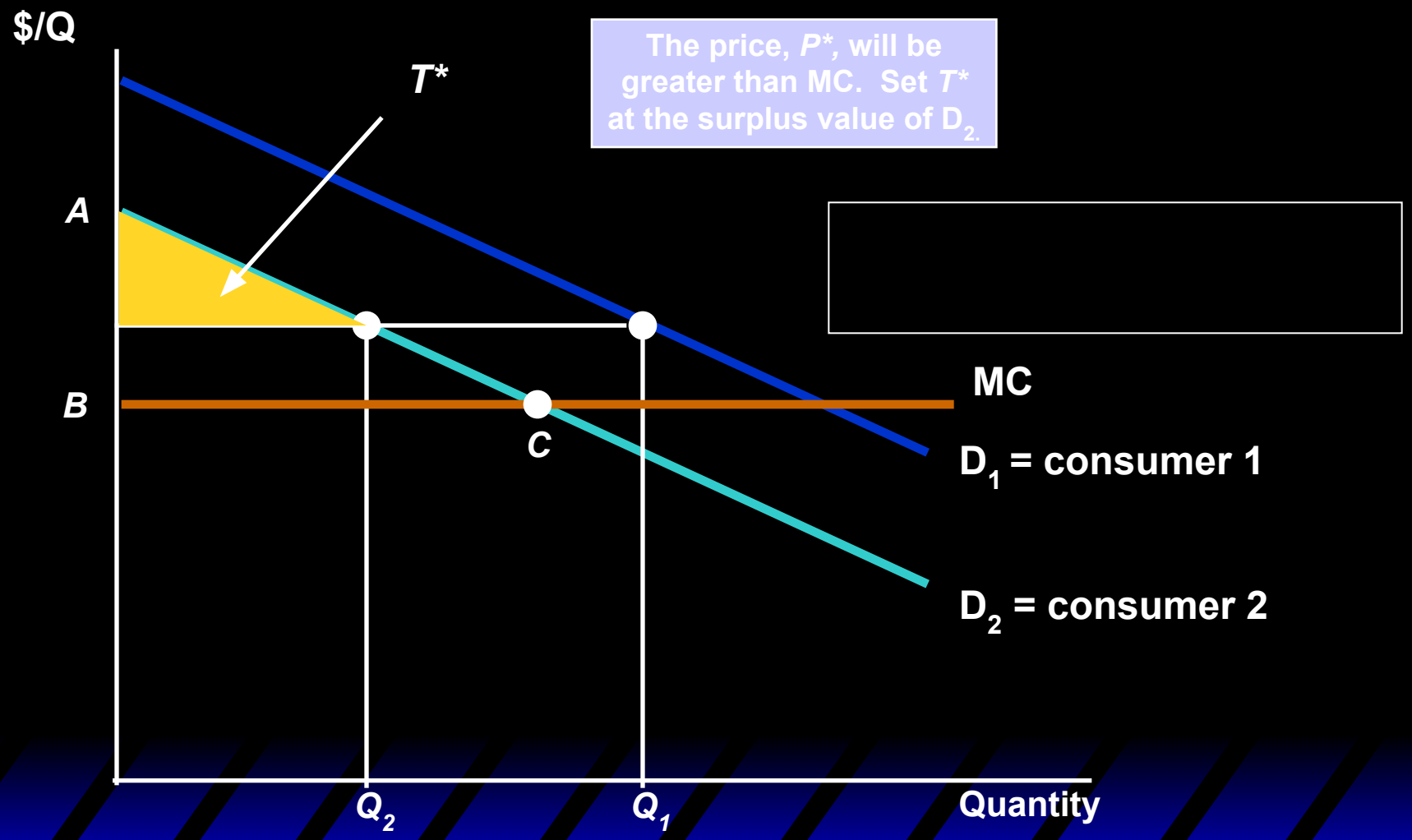


Usage price *P** is set equal to MC.
Entry price *T** is equal to the entire consumer surplus.
Firm captures all consumer surplus as profit.

Two-Part Tariff with Two Consumers

- **Two consumers, but firm can only set one entry fee and one usage fee**
- **Does it make sense to set usage fee equal to MC and entrance fee equal to CS of the consumer with the smaller demand?**

Two-Part Tariff with Two Consumers



Two-Part Tariff with Two Consumers

- **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**

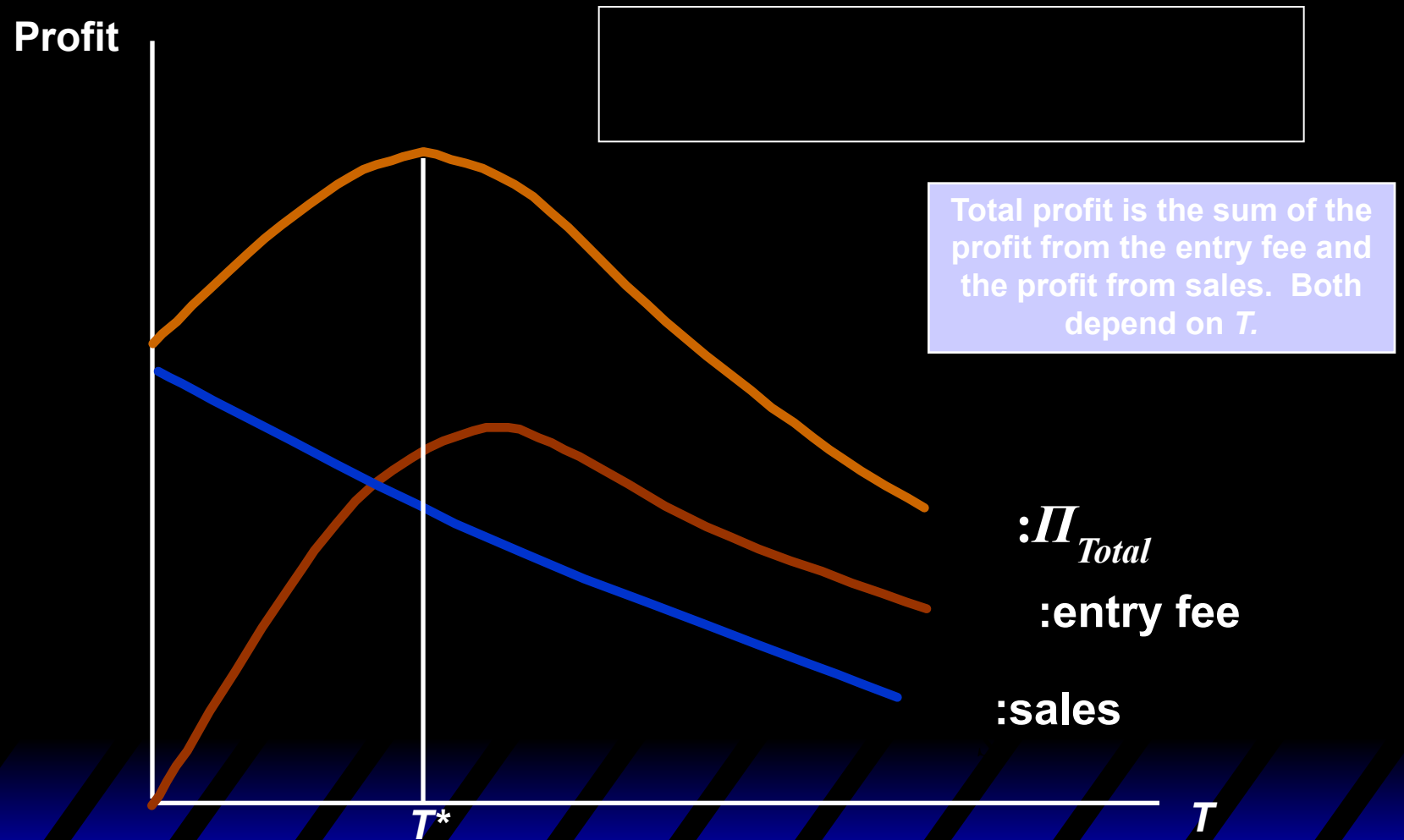
The Two-Part Tariff with Many Consumers

- No exact way to determine P* and T*
- Must consider the trade-off between the entry fee T* and the use fee P*
  - Low entry fee: more entrants and more profit from sales of item
  - As entry fee becomes smaller, number of entrants is larger and profit from entry fee will fall

The Two-Part Tariff with Many Consumers

- To find optimum combination, choose several combinations of P and T
- Find combination that maximizes profit
- Firm's profit is divided into two components
  - Each is a function of entry fee, T assuming a fixed sales price, P

Two-Part Tariff with Many Different Consumers



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**

The Two-Part Tariff With a Twist

- Entry price (T) entitles the buyer to a certain number of free units
  - Gillette razors sold with several blades
  - Amusement park admission comes with some tokens
  - On-line fees with free time
- Can set higher entry fee without losing many consumers
  - Higher entry fee captures either surplus without driving them out of the market
  - Captures more surplus of large customers

Polaroid Cameras

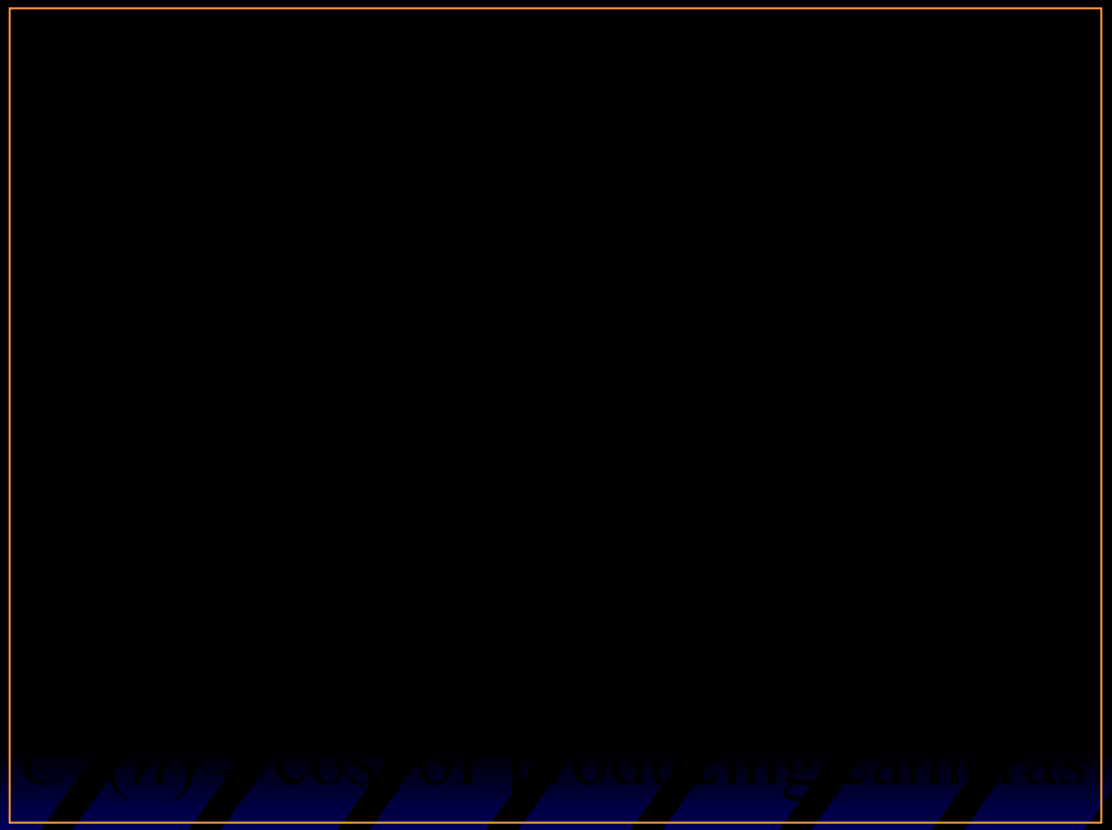
- In 1971, Polaroid introduced the SX-70 camera
- Polaroid was able to use two-part tariff for pricing of camera/film
  - Allowed them greater profits than would have been possible if camera used ordinary film
- Polaroid had a monopoly on cameras and film

Polaroid Cameras

- Buying camera is like entry fee
- Unlike an amusement park, for example, the marginal cost of providing an additional camera is significantly greater than zero
- It was necessary for Polaroid to have monopoly
  - If ordinary film could be used, the price of film would be close to MC
  - Polaroid needed to gain most of its profits from sale of film

Polaroid Cameras

- **Analytical framework:**



Polaroid Cameras

- **In the end, the film prices were significantly above marginal cost**
- **There was considerable heterogeneity of consumer demands**

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

Bundling

- When film company leased “Gone with the Wind,” it required theaters to also lease “Getting Gertie’s Garter”
- Why would a company do this?
  - Company must be able to increase revenue
  - We can see the reservation prices for each theater and movie

Bundling

	Gone with the Wind	Getting Gertie's Garter
Theater *A*	$12,000	$3,000
Theater *B*	$10,000	$4,000

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

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

Relative Valuations

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

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**

	Gone with the Wind	Getting Gertie's Garter
Theater *A*	$12,000	$4,000
Theater *B*	$10,000	$3,000

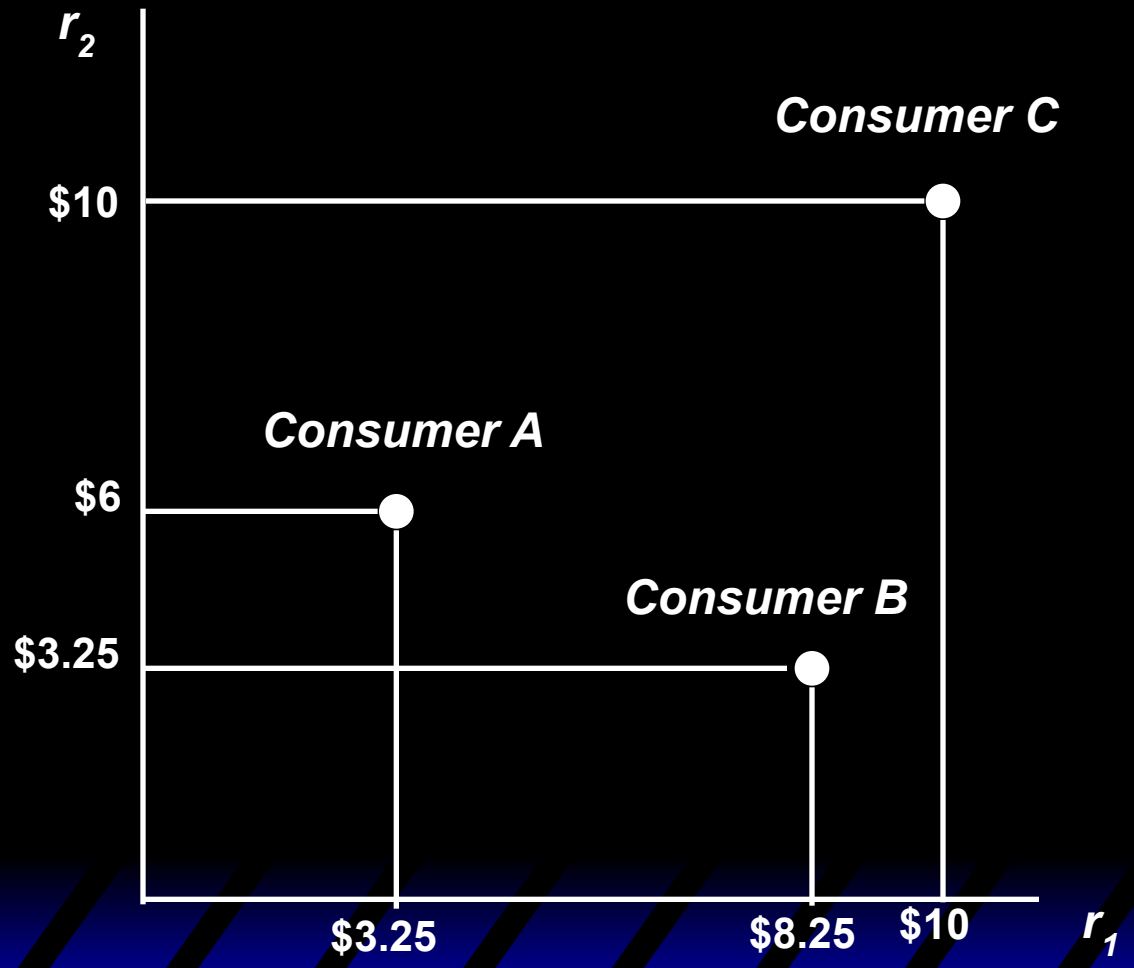
Bundling

- 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

Bundling

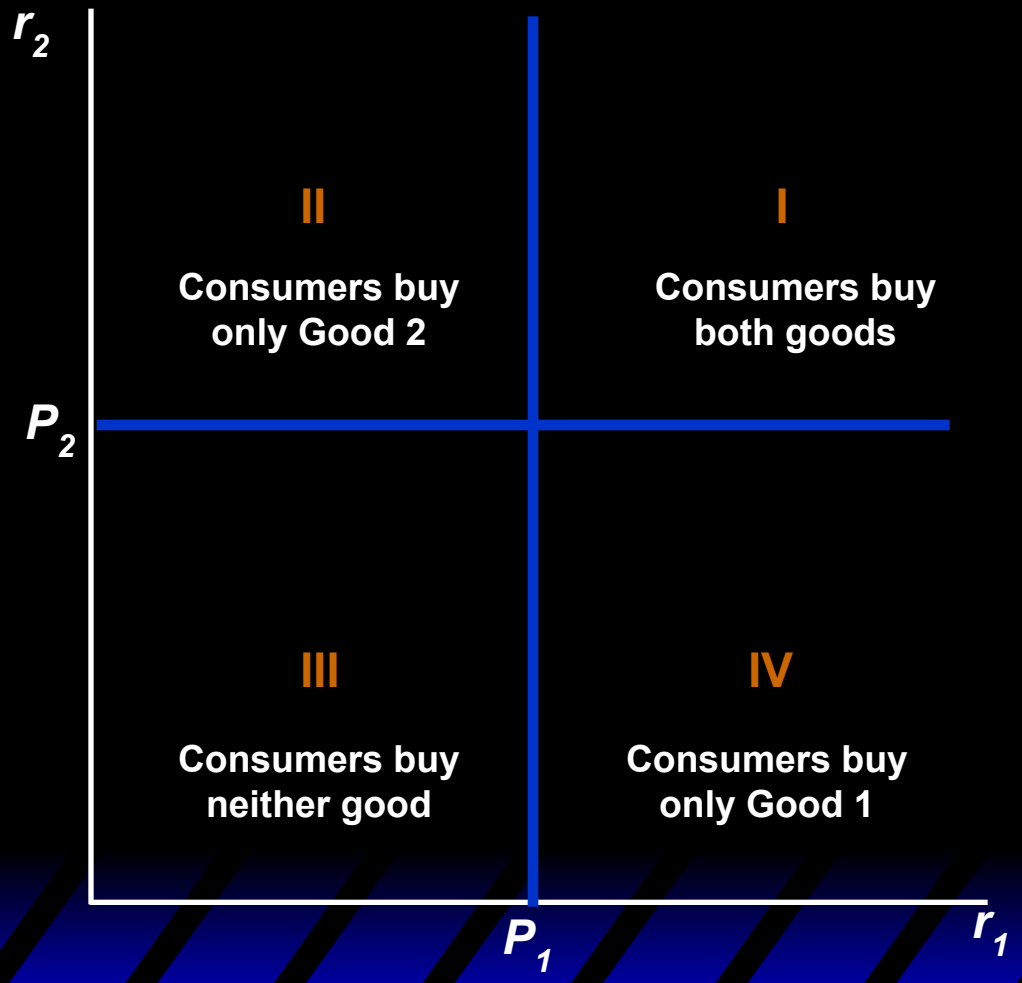
- Bundling Scenario: Two different goods and many consumers
  - Many consumers with different reservation price combinations for two goods
  - Can show graphically the preferences of consumers in terms of reservation prices and consumption decisions given prices charged
  - r_1 is reservation price of consumer for good 1
  - r_2 is reservation price of consumer for good 2

Reservation Prices



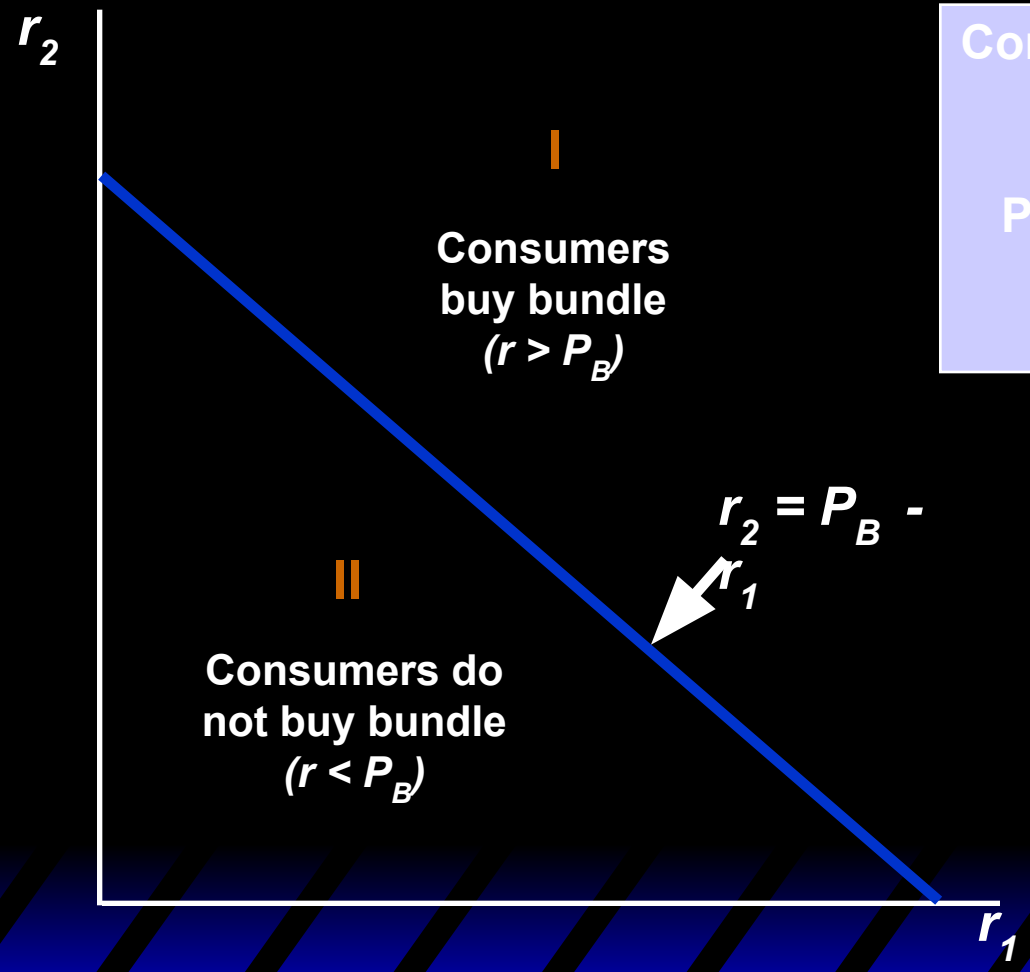
For example, Consumer *A* is willing to pay up to $3.25 for good 1 and up to $6 for good 2.

Consumption Decisions When Products are Sold Separately



Consumers fall into four categories based on their reservation price.

Consumption Decisions When Products are Bundled



Consumers buy the bundle when $r_1 + r_2 \geq P_B$ (P_B = bundle price).

$P_B = r_1 + r_2$ or $r_2 = P_B - r_1$

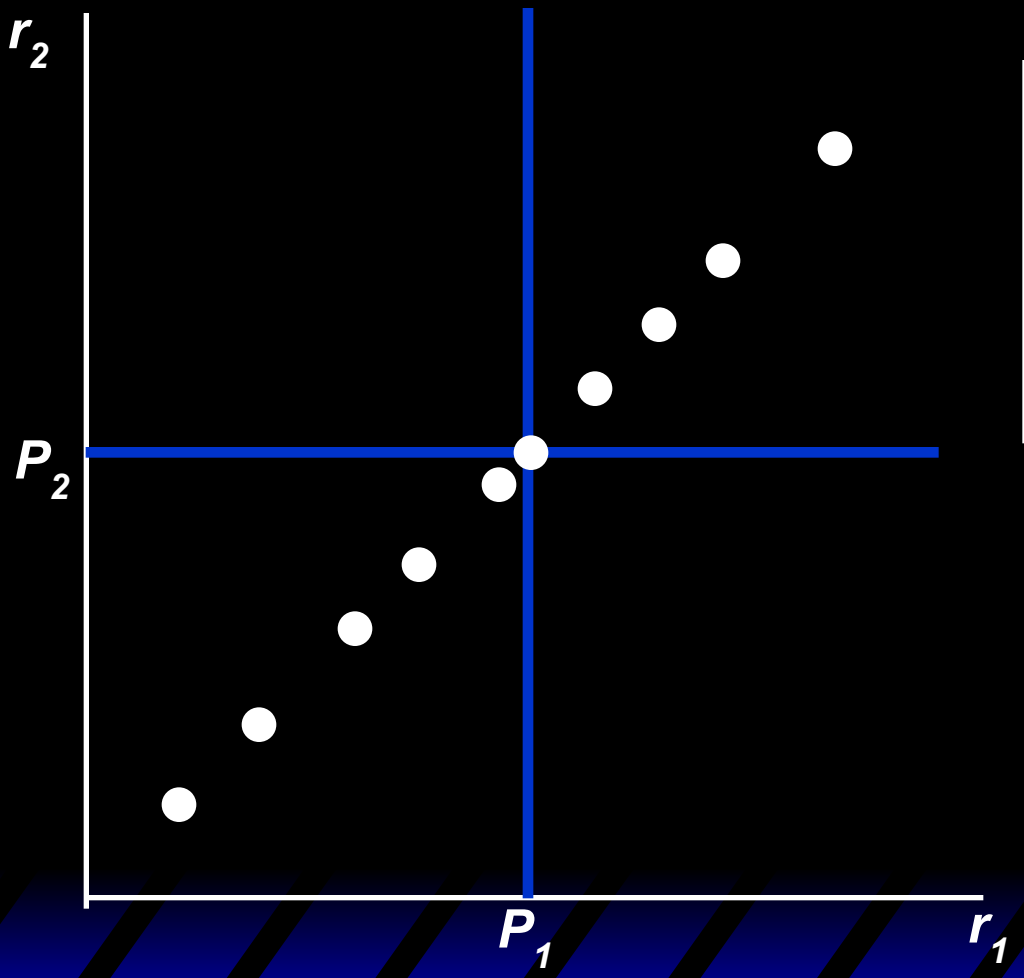
Region 1: $r > P_B$

Region 2: $r < P_B$

Consumption Decisions When Products are Bundled

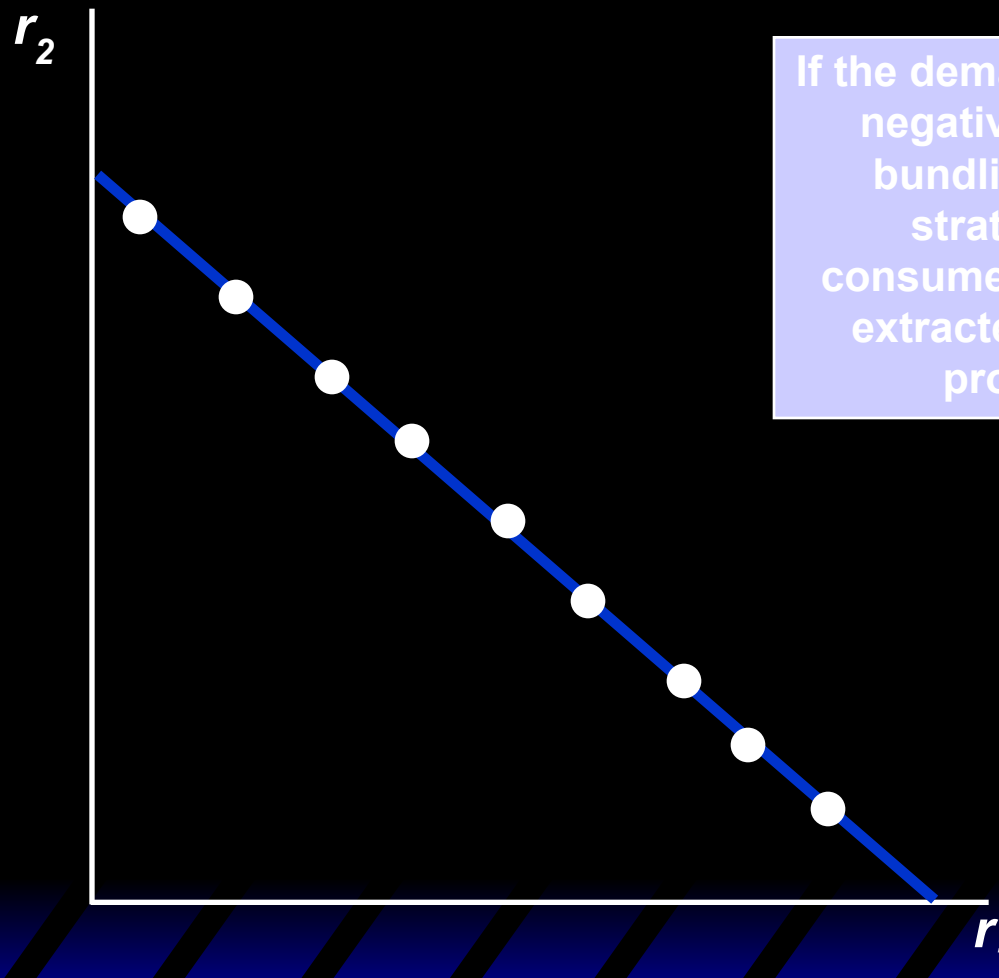
- The effectiveness of bundling depends upon the degree of negative correlation between the two demands
  - Best when consumers who have high reservation price for Good 1 have a low reservation price for Good 2 and vice versa
  - Can see graphically looking at positively and negatively correlated prices

Reservation Prices



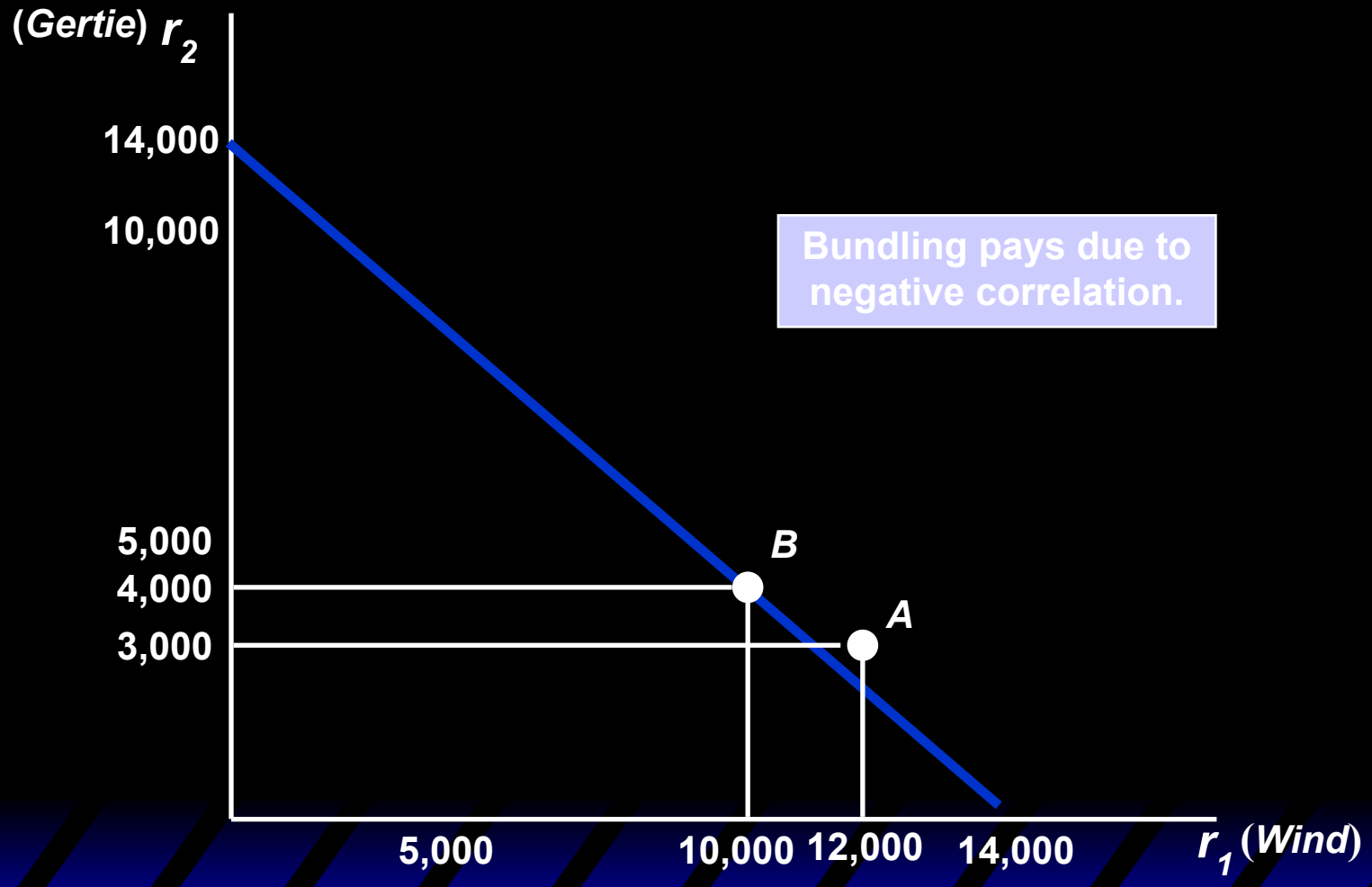
If the demands are perfectly positively correlated, the firm will not gain by bundling. It would earn the same profit by selling the goods separately.

Reservation Prices



If the demands are perfectly negatively correlated, bundling is the ideal strategy – all the consumer surplus can be extracted and a higher profit results.

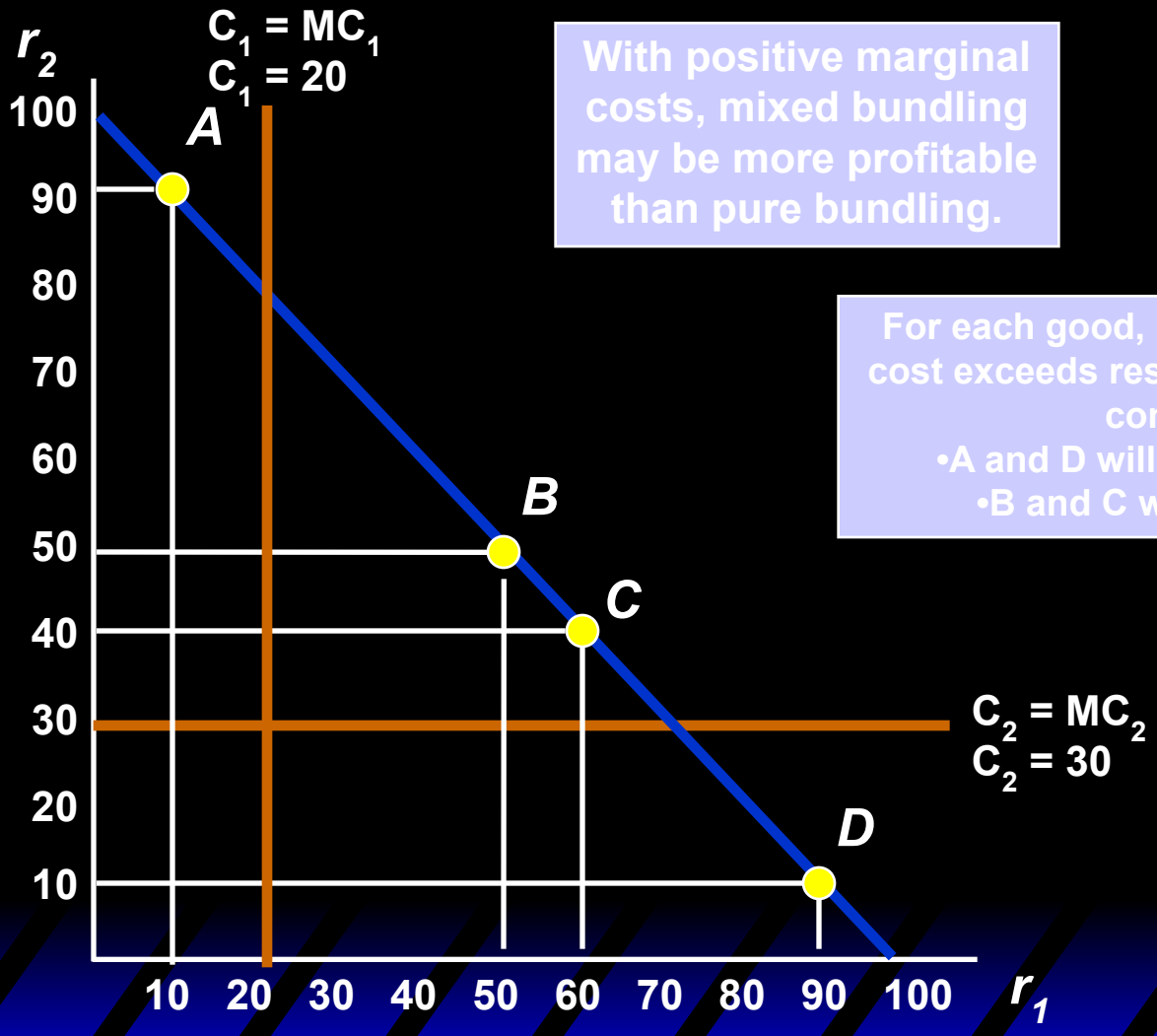
Movie Example



Mixed Bundling

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

Mixed Versus Pure Bundling



With positive marginal costs, mixed bundling may be more profitable than pure bundling.

For each good, marginal production cost exceeds reservation price of one consumer.

- A and D will buy individually
- B and C will buy bundle

Mixed Bundling – Example

- Demands are perfectly negatively correlated but significant marginal costs
- Four customers under three different strategies
  - Selling good separately, $P_1 = \$50$, $P_2 = \$90$
  - Selling goods only as a bundle, $P_B = \$100$
  - Mixed bundling:
    - Sold individually with $P_1 = P_2 = \$89.95$
    - Sold as a bundle with $P_B = \$100$

Mixed Bundling – Example

- **We can see the effects under different scenarios in the following table:**

	P_1	P_2	P_B	Profit
Sell separately	$50	$90	—	$150
Pure bundling	—	—	$100	$200
Mixed bundling	$89.95	$89.95	$100	$229.90

Bundling

- If MC is zero, mixed bundling can still be more profitable if consumer demands are not perfectly negatively correlated
- Example:
  - Reservation prices for consumers B and C are higher
  - Compare the same three strategies
  - Mixed bundling is the more profitable option since everyone will end up buying

Mixed Bundling with Zero Marginal Costs

A and D purchase individually.
B and C purchase bundled.
Profits are highest with mixed bundling.

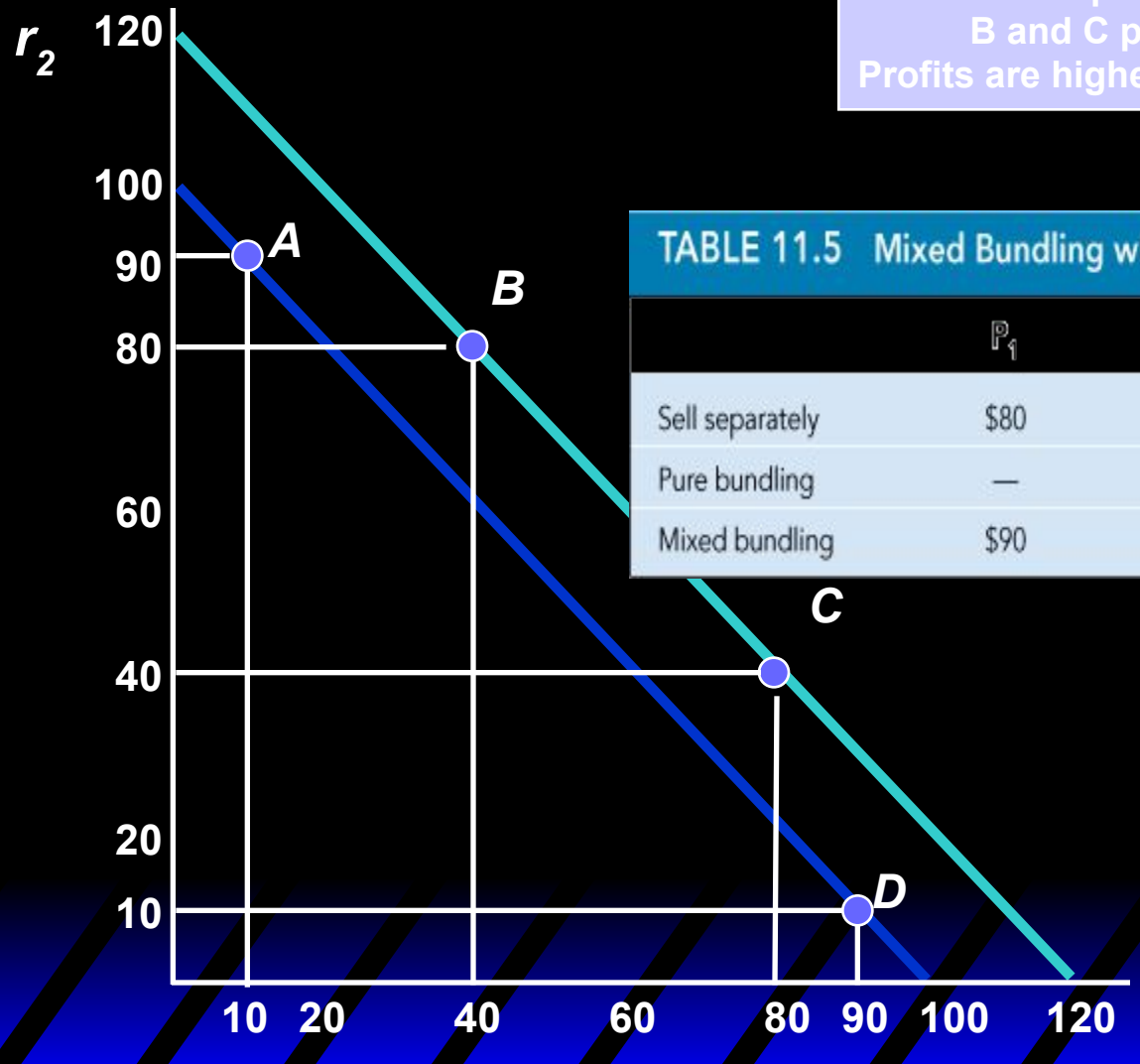


TABLE 11.5 Mixed Bundling with Zero Marginal Costs

	P_1	P_2	P_B	Profit
Sell separately	$80	$80	—	$320
Pure bundling	—	—	$100	$400
Mixed bundling	$90	$90	$120	$420

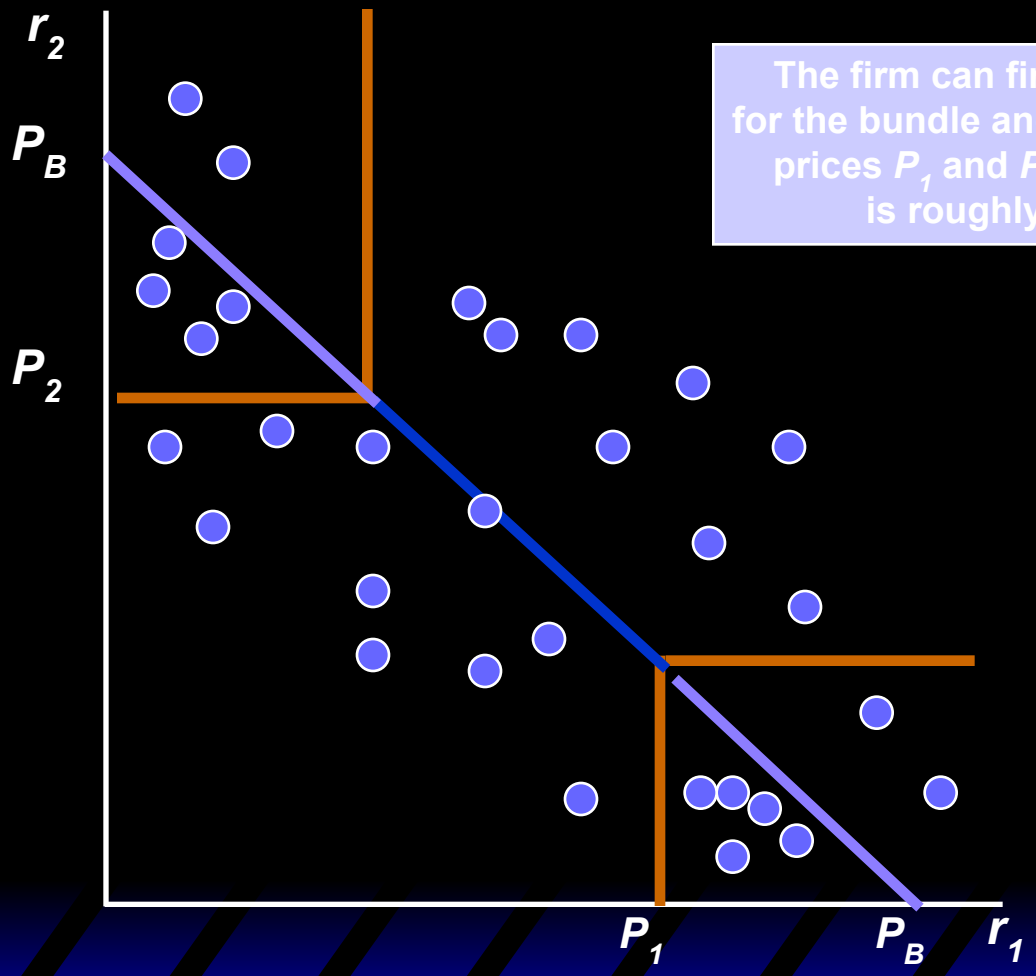
Bundling in Practice

- 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

Bundling

- Mixed Bundling in Practice
  - Use of market surveys to determine reservation prices
  - Design a pricing strategy from the survey results
- Can show graphically using information collected from consumers
  - Consumers are separated into four regions
  - Can change prices to find max profits

Mixed Bundling in Practice



The firm can first choose a price for the bundle and then try individual prices P_1 and P_2 until total profit is roughly maximized.

A Restaurant's Pricing Problem

Individual Item	Price	Meal (Includes Soda and Fries)	Unbundled Price	Price of Bundle	Savings
Grilled Chicken	$3.29	Grilled Chicken	$6.43	$4.78	$1.65
Filet-O-Fish	$1.99	Filet-O-Fish	$5.13	$4.28	$0.85
Cheeseburger	$0.89	Two Cheeseburgers	$4.92	$4.18	$0.74
McDouble w/Cheese	$1.89	McDouble w/Cheese	$5.03	$3.68	$1.35
Big Mac	$2.45	Big Mac	$5.59	$4.28	$1.31
Quarter Pounder w/Cheese	$2.45	Quarter Pounder w/Cheese	$5.59	$4.38	$1.21
Crispy Chicken	$2.89	Crispy Chicken	$6.03	$4.68	$1.35
6-piece Chicken McNuggets	$1.99	6-piece Chicken McNuggets	$5.13	$4.28	$0.85
Large French Fries	$1.65				
Large Soda	$1.49				

Tying

- The practice of requiring a customer to purchase one good in order to purchase another
  - Xerox machines and the paper
  - IBM mainframe and computer cards
- Allows firm to meter demand and practice price discrimination more effectively

Tying

- Allows the seller to meter the customer and use a two-part tariff to discriminate against the heavy user
  - McDonald's
    - Allows them to protect their brand name
  - Microsoft
    - Uses to extend market power

Versioning

- Extreme example: damaged goods
  - Intel 486
    - 486SX - $333 in 1991
    - 486DX - $588 in 1991
    - IBM LaserPrinter E (5 pages per minute) LaserPrinter (10 pages per minute)

Durable-goods pricing

- Waiting for the price cut.
- Non-price discrimination seems to increase profits
- Possible solutions:
  - lowest price guarantee
  - leasing instead of selling

Advertising

- Firms with market power have to decide how much to advertise
- We can show how firms choose profit maximizing advertising
  - Decision depends on characteristics of demand for firm's product

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**

*11.6 ADVERTISING

Figure 11.20

Effects of Advertising

AR and MR are average and marginal revenue when the firm doesn't advertise, and AC and MC are average and marginal cost.

The firm produces Q_0 and receives a price P_0.

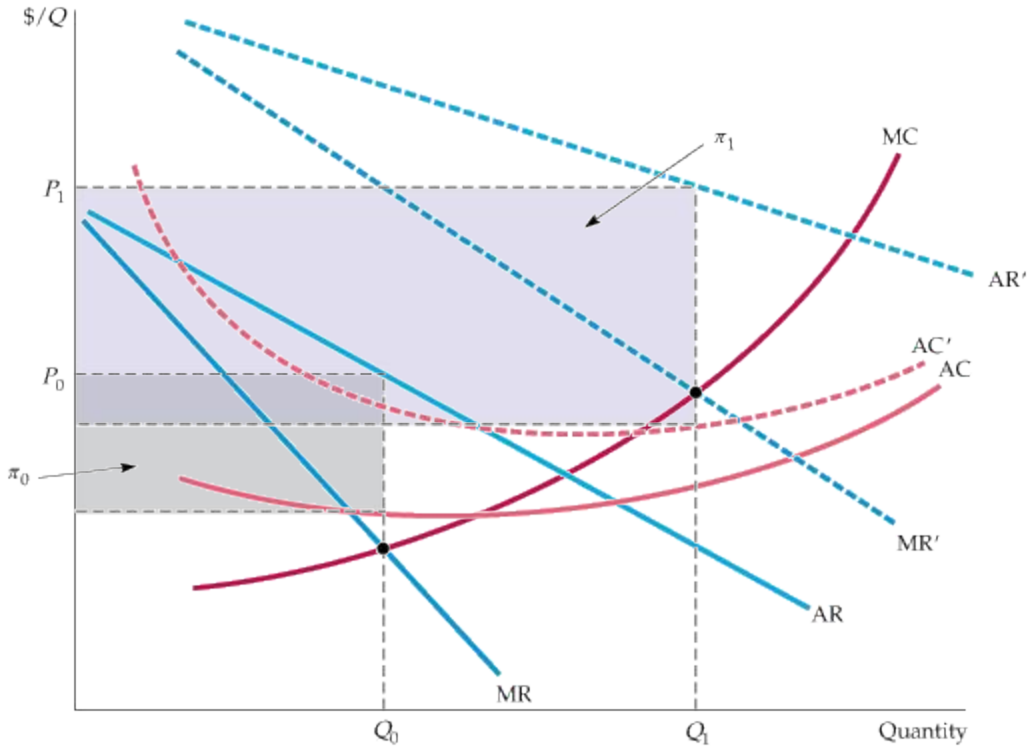
Its total profit π_0 is given by the gray-shaded rectangle.

If the firm advertises, its average and marginal revenue curves shift to the right.

Average cost rises (to AC′) but marginal cost remains the same.

The firm now produces Q_1 (where MR′ = MC), and receives a price P_1.

Its total profit, π_1, is now larger.



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

*11.6 ADVERTISING

The price *P* and advertising expenditure *A* to maximize profit, is given by:

$$\pi = PQ(P, A) - CQ - A$$

Advertising leads to increased output.

But increased output in turn means increased production costs, and this must be taken into account when comparing the costs and benefits of an extra dollar of advertising.

The firm should advertise up to the point that

$$\text{MR}_{\text{Ads}} = P\frac{\Delta Q}{\Delta A} = 1 + \text{MC}\frac{\Delta Q}{\Delta A} \qquad \textbf{(11.3)}$$

= *full* marginal cost of advertising

*11.6 ADVERTISING

A Rule of Thumb for Advertising

First, rewrite equation (11.3) as follows:

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

Now multiply both sides of this equation by A/PQ, the advertising-to-sales ratio.

- **advertising-to-sales ratio** Ratio of a firm's advertising expenditures to its sales.

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

- **advertising elasticity of demand** Percentage change in quantity demanded resulting from a 1-percent increase in advertising expenditures.

$$A/PQ=-(E_A/E_P) \qquad \textbf{(11.4)}$$

Advertising

- **A Rule of Thumb for Advertising**
  - **To maximize profit, the firm's advertising-to-sales ratio should be equal to minus the ratio of the advertising and price elasticities of demand**

Advertising

- An Example
  - R(Q) = $1 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)

Advertising

- **The firm in our example should increase advertising**
  - **A/PQ = -(2/-.4) = 5%**
  - **Increase budget to $50,000**

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