Chapter 10

Market Power: Monopoly and Monopsony

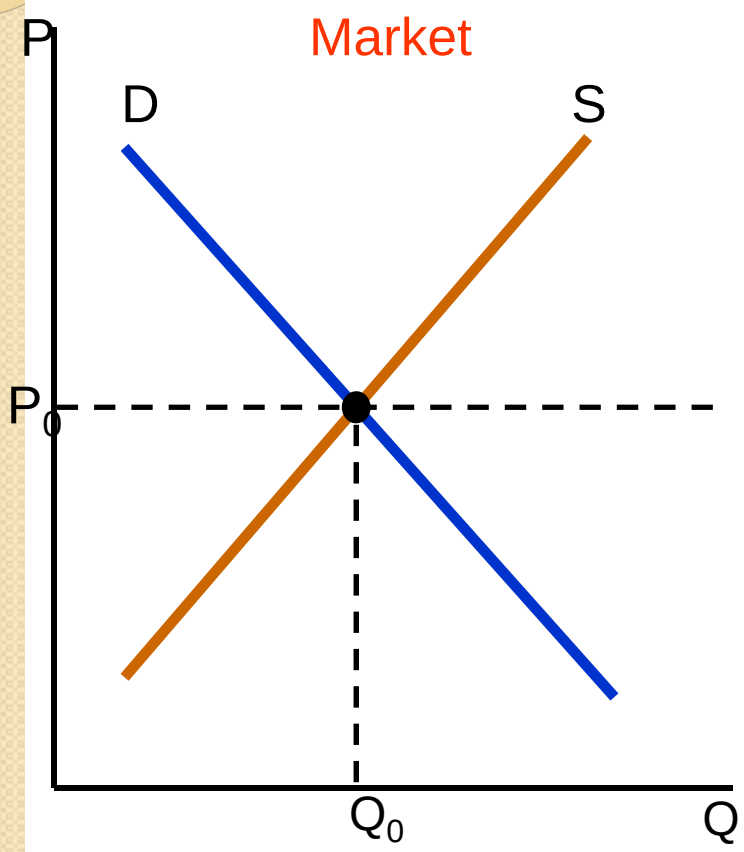
Topics to be Discussed

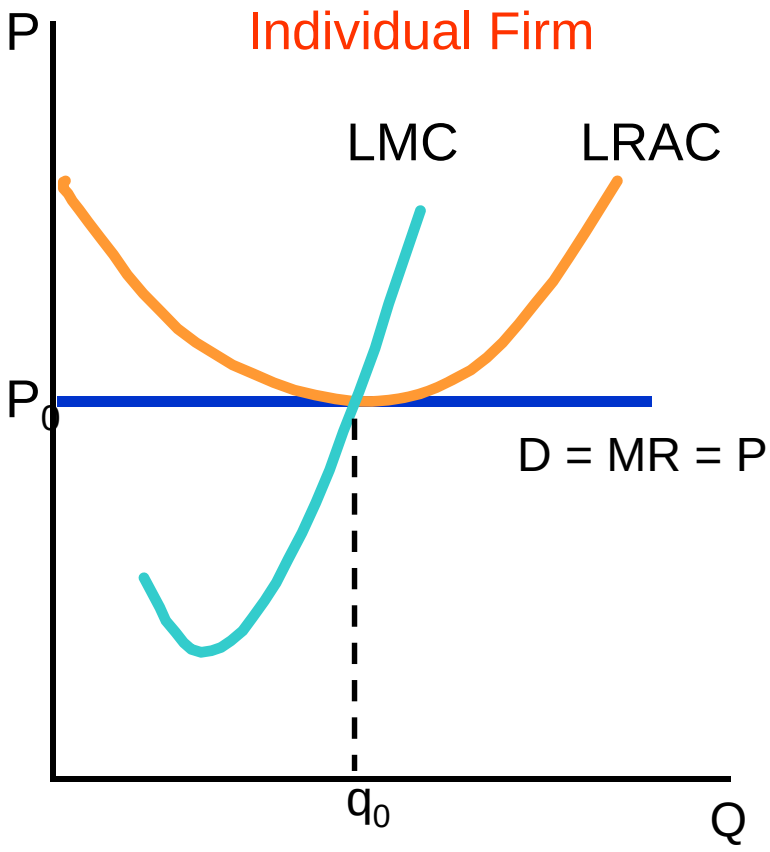
- Monopoly and Monopoly Power
- Sources of Monopoly Power
- The Social Costs of Monopoly Power
- Monopsony and Monopsony Power
- Limiting Market Power: The Antitrust Laws

Review of Perfect Competition

- P = MC = AC
- Normal profits or zero economic profits in the long run
- Large number of buyers and sellers
- Homogenous product
- Perfect information
- Firm is a price taker

Review of Perfect Competition





Monopoly

- Monopoly
  1. One seller - many buyers
  2. One product (no good substitutes)
  3. Barriers to entry
  4. Price Maker

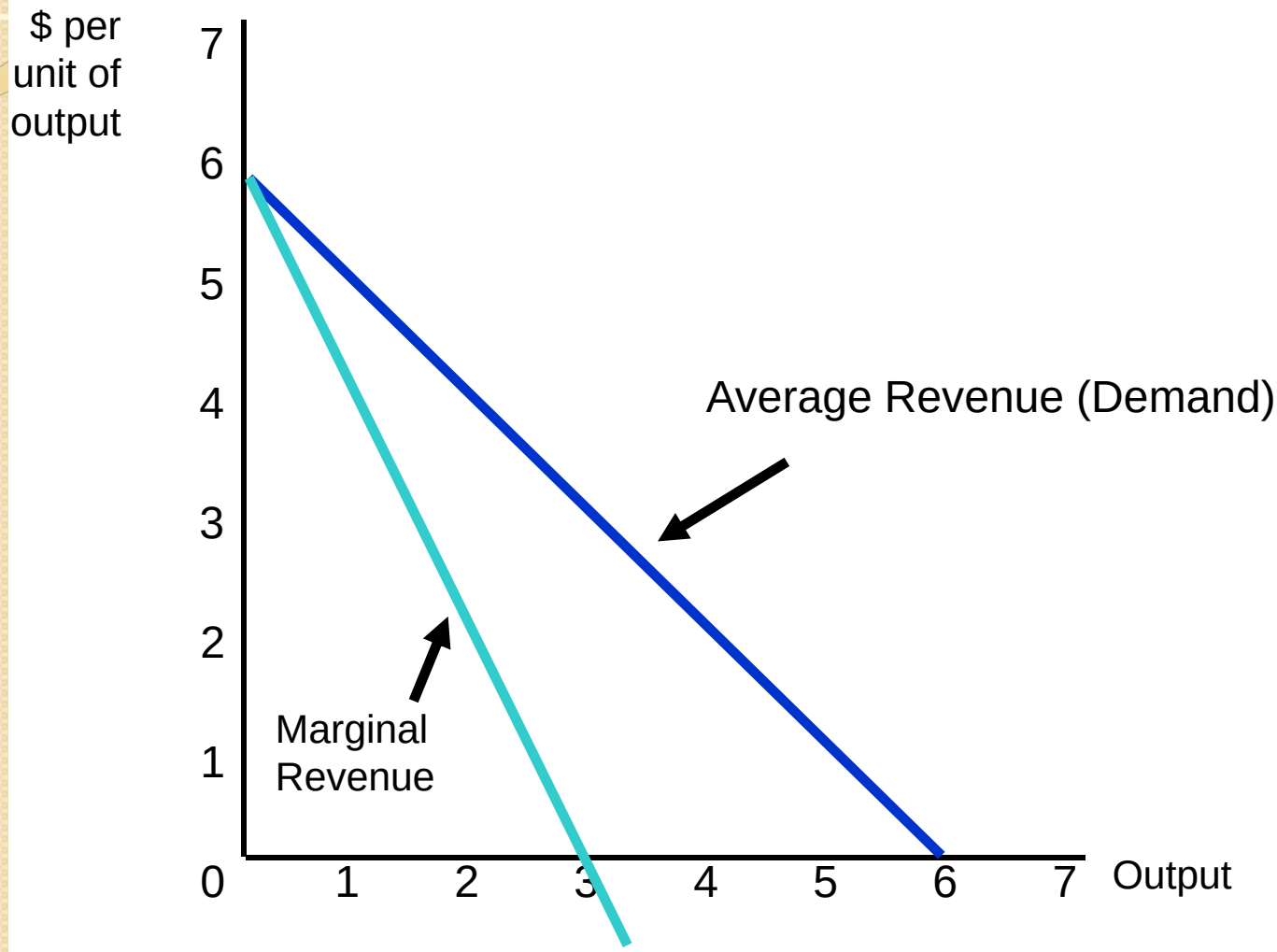
Monopoly

- The monopolist is the supply-side of the market and has complete control over the amount offered for sale
- Monopolist controls price but must consider consumer demand
- Profits will be maximized at the level of output where marginal revenue equals marginal cost

Average and Marginal Revenue

- The monopolist's **average revenue**, price received per unit sold, is the market demand curve
- Monopolist also needs to find **marginal revenue**, change in revenue resulting from a unit change in output
- MR is generally lower than AR. Why?

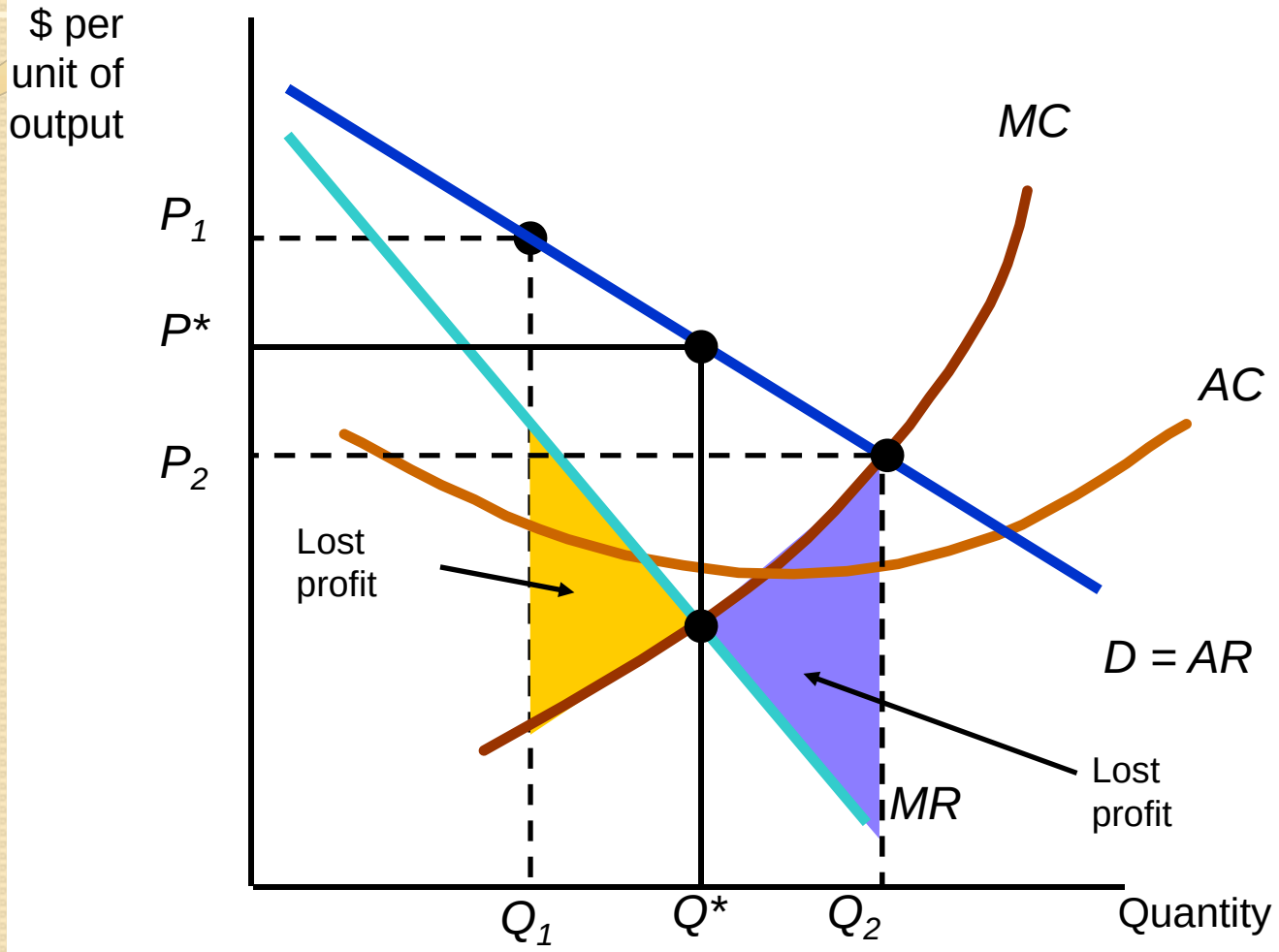
Average and Marginal Revenue



Monopoly

- Observations
  1. To increase sales the price must fall
  2. MR < P
  3. Compared to perfect competition
     - No change in price to change sales
     - MR = P

Monopolist's Output Decision



Monopoly: An Example

$$\textit{Cost} = C(Q) = 50 + Q^2$$

$$MC = \frac{\Delta C}{\Delta Q} = 2Q$$

$$\textit{Demand} : P(Q) = 40 - Q$$

$$R(Q) = P(Q)Q = 40Q - Q^2$$

$$MR = \frac{\Delta R}{\Delta Q} = 40 - 2Q$$

Monopoly: An Example

$$MC = MR$$

$$2Q = 40 - 2Q$$

$$4Q = 40$$

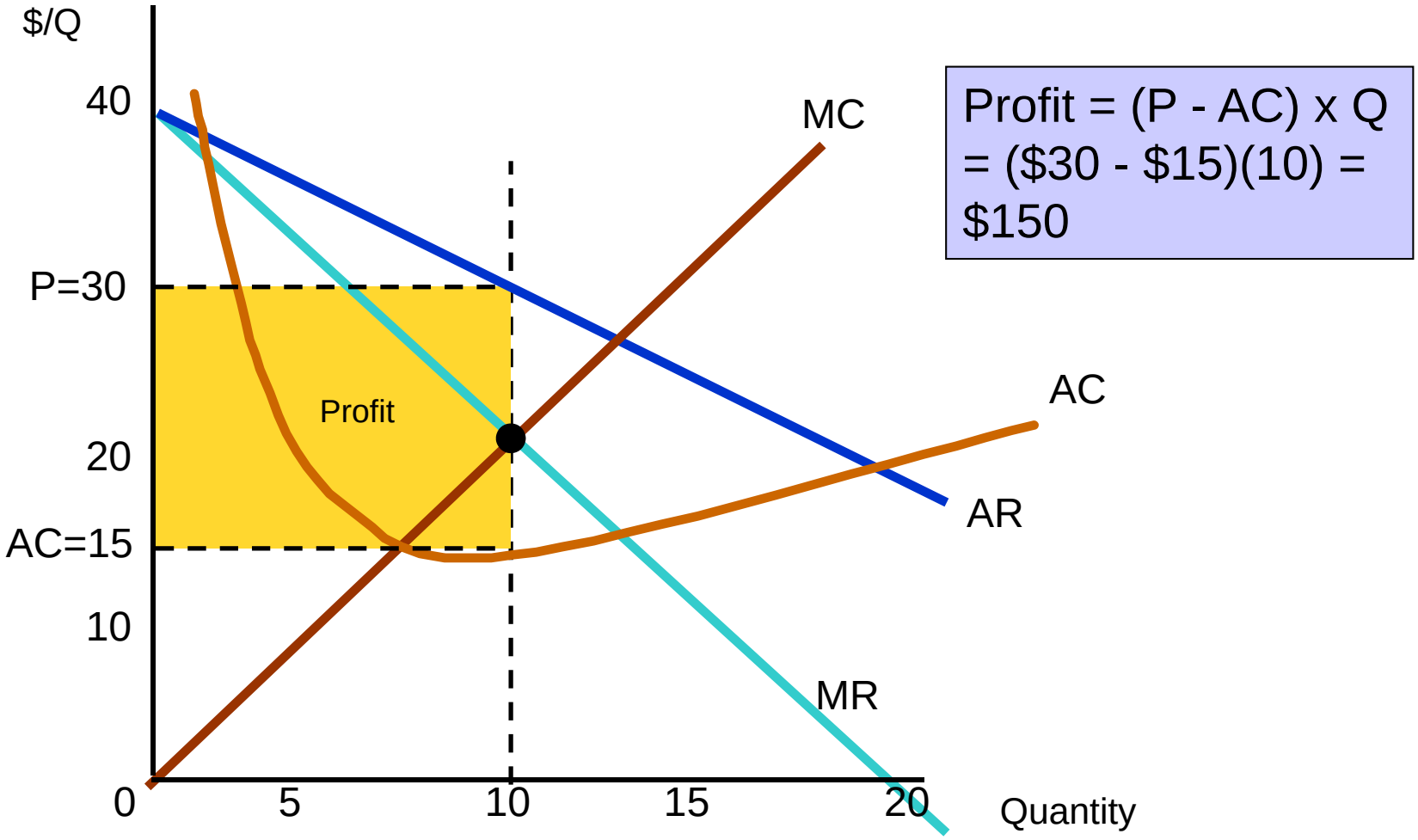
$$Q = 10$$

$$P(Q) = 40 - Q$$

$$P(Q) = 40 - 10$$

$$P(Q) = 30$$

Example of Profit Maximization



Profit = (P - AC) x Q
= ($30 - $15)(10) =
$150

Monopoly

- A Rule of Thumb for Pricing
  - We want to translate the condition that marginal revenue should equal marginal cost into a rule of thumb that can be more easily applied in practice
  - Looking at Marginal Revenue we can see that it has two components

A Rule of Thumb for Pricing

$$1.\ \boldsymbol{MR} = \frac{\Delta \boldsymbol{R}}{\Delta \boldsymbol{Q}} = \frac{\Delta(\boldsymbol{PQ})}{\Delta \boldsymbol{Q}}$$

- Producing one more unit brings in revenue (1)(P) = P
- With downward sloping demand, producing and selling one more unit results in small drop in price $\Delta P/\Delta Q$
  - Reduces revenue from all units sold, change in revenue: $Q(\Delta P/\Delta Q)$

A Rule of Thumb for Pricing

Thus

$$2.\ MR = P + Q\,\frac{\Delta P}{\Delta Q}$$

$$= P + P\left(\frac{Q}{P}\right)\left(\frac{\Delta P}{\Delta Q}\right)$$

$$3.\ E_d = \left(P \Big/ Q\right)\left(\Delta Q \Big/ \Delta P\right)$$

A Rule of Thumb for Pricing

4. $\left(Q/P\right)\left(\Delta P/\Delta Q\right) = \frac{1}{E_d}$

5. $MR = P + P\left(\frac{1}{E_d}\right)$

A Rule of Thumb for Pricing

π is maximized where MR $=$ MC

$$P + P\left[1/E_D\right] = MC$$

$$\frac{P - MC}{P} = -\frac{1}{E_D}$$

$$P = \frac{MC}{1 + \left(1/E_D\right)}$$

A Rule of Thumb for Pricing

- (P – MC)/P is the markup over MC as a percentage of price
- The markup should equal the inverse of the elasticity of demand
- Price is expressed directly as the markup over marginal cost

A Rule of Thumb for Pricing

$$9.\ P = \frac{MC}{1 + \left(1 / E_d \right)}$$

Assume

$$E_d = -4 \qquad MC = 9$$

$$P = \frac{9}{1 + \left(1 / -4 \right)} = \frac{9}{.75} = \$12$$

Monopoly

- Monopoly pricing compared to perfect competition pricing:
  - Monopoly
    - P > MC
    - Price is larger than MC by an amount that depends inversely on the elasticity of demand
  - Perfect Competition
    - P = MC
    - Demand is perfectly elastic, so P=MC

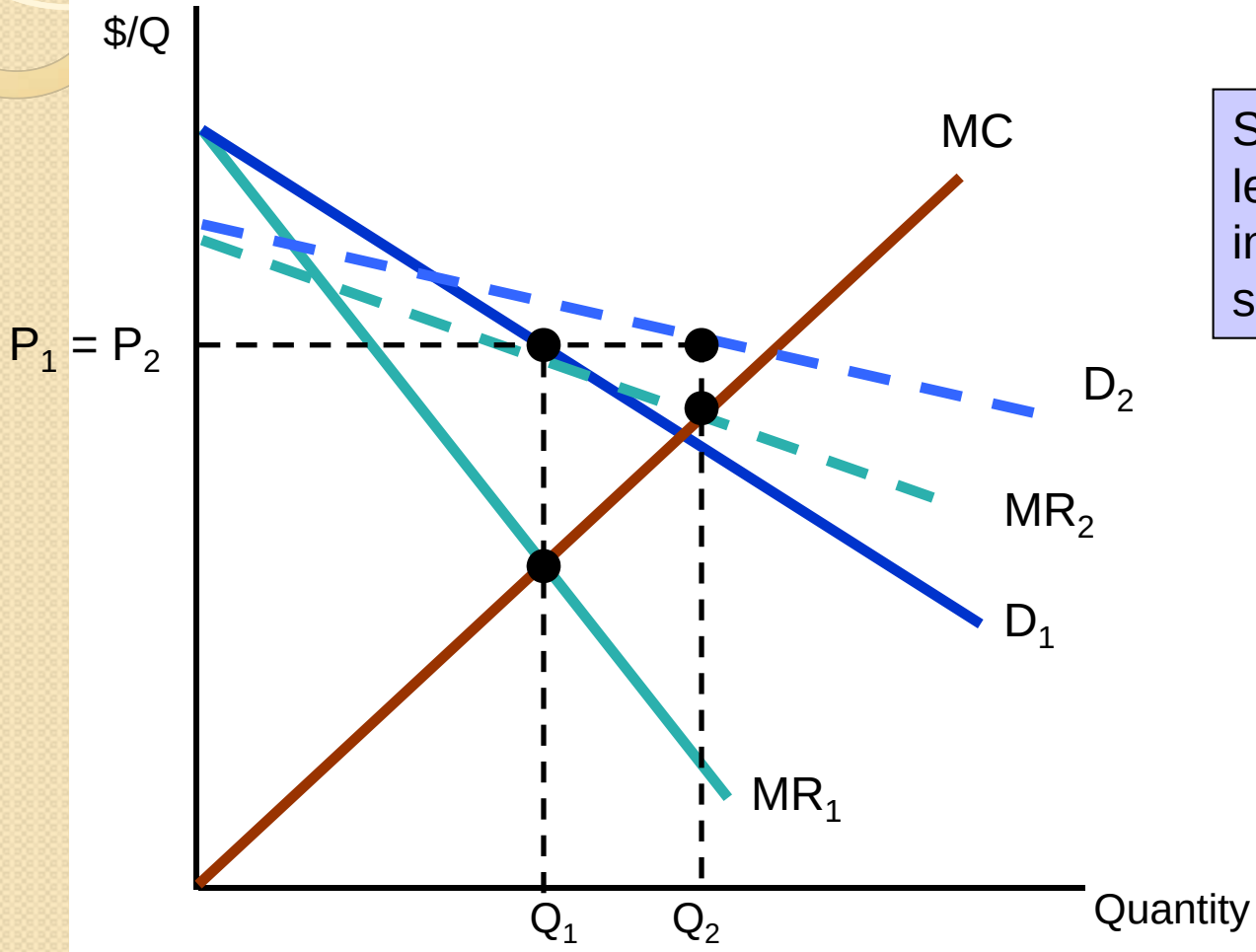
Monopoly

- If demand is very elastic, there is little benefit to being a monopolist
- The larger the elasticity, the closer to a perfectly competitive market
- Notice *a monopolist will never produce a quantity in the inelastic portion of demand curve*
  - In inelastic portion, can increase revenue by decreasing quantity and increasing price

Shifts in Demand

- In perfect competition, the market supply curve is determined by marginal cost
- For a monopoly, output is determined by marginal cost and the shape of the demand curve
  - *There is no supply curve for monopolistic market*

Shifts in Demand

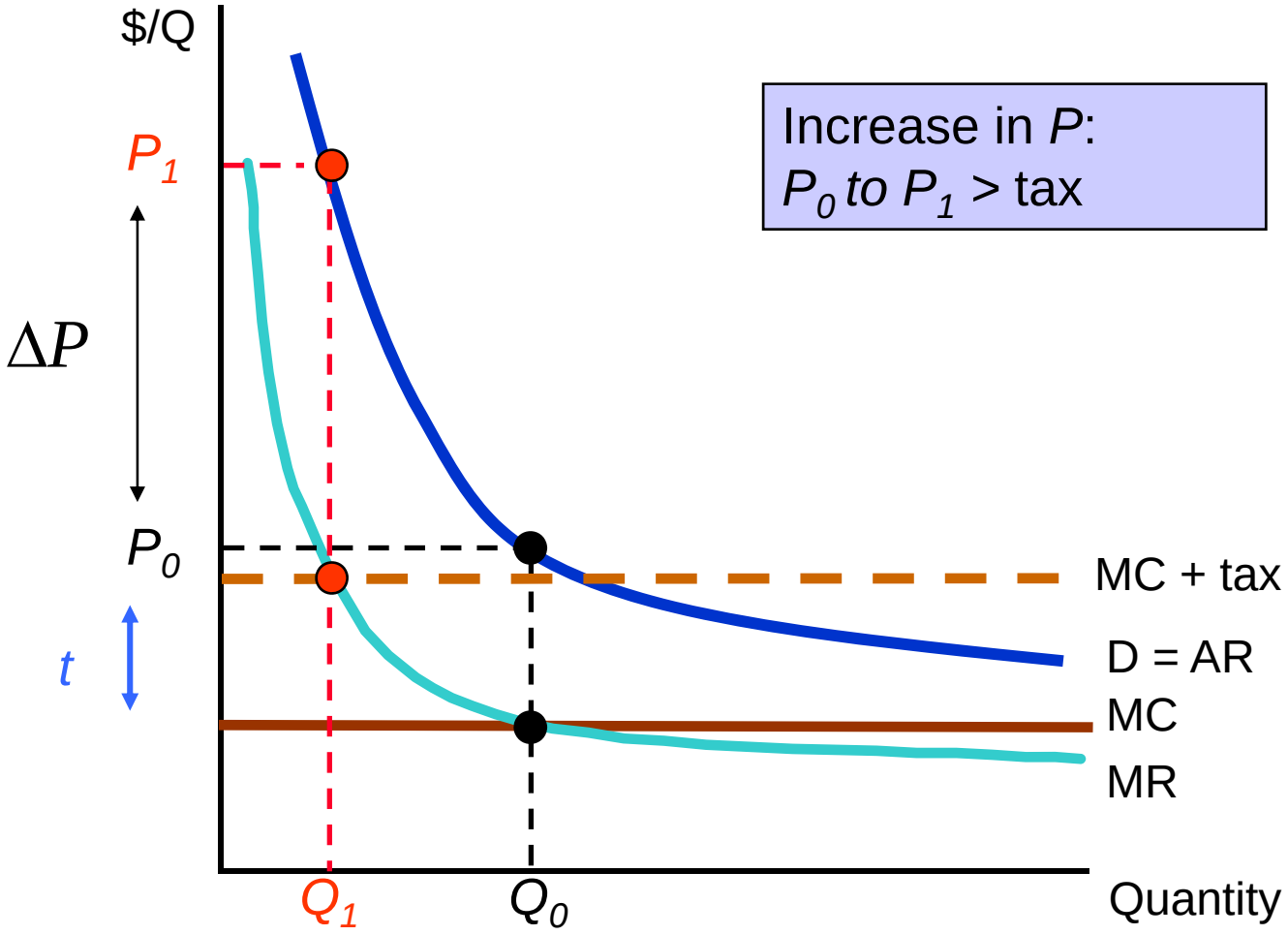


Shift in demand leads to change in quantity but same price

The Effect of a Tax

- In competitive market, a per-unit tax causes price to rise by less than tax: burden is shared by producers and consumers
- Under monopoly, price can sometimes rise by more than the amount of the tax
- To determine the impact of a tax:
  - t = specific tax
  - MC = MC + t

Effect of Excise Tax on Monopolist



Effect of Excise Tax on Monopolist

- The amount the price increases with implementation of a tax depends on elasticity of demand
- Price may or may not increase by more than the tax
- In a competitive market, the price cannot increase by more than tax
- Profits for monopolist will fall with a tax

The Multi-plant Firm

- For some firms, production takes place in more than one plant, each with different costs
- Firm must determine how to distribute production between both plants
  1. Production should be split so that the MC in the plants is the same
  2. Output is chosen where MR=MC. Profit is therefore maximized when MR=MC at each plant.

The Multi-plant Firm

- We can show this algebraically:
  - Q_1 and C_1 is output and cost of production for Plant 1
  - Q_2 and C_2 is output and cost of production for Plant 2
  - $Q_T = Q_1 + Q_2$ is total output
  - Profit is then:

$$\pi = PQ_T - C_1(Q_1) - C_2(Q_2)$$

The Multi-plant Firm

- Firm should increase output from each plant until the additional profit from last unit produced at Plant 1 equals 0

$$\frac{\Delta \pi}{\Delta Q_1} = \frac{\Delta (PQ_T)}{\Delta Q_1} - \frac{\Delta C_1}{\Delta Q_1} = 0$$

$$MR - MC_1 = 0$$

$$MR = MC_1$$

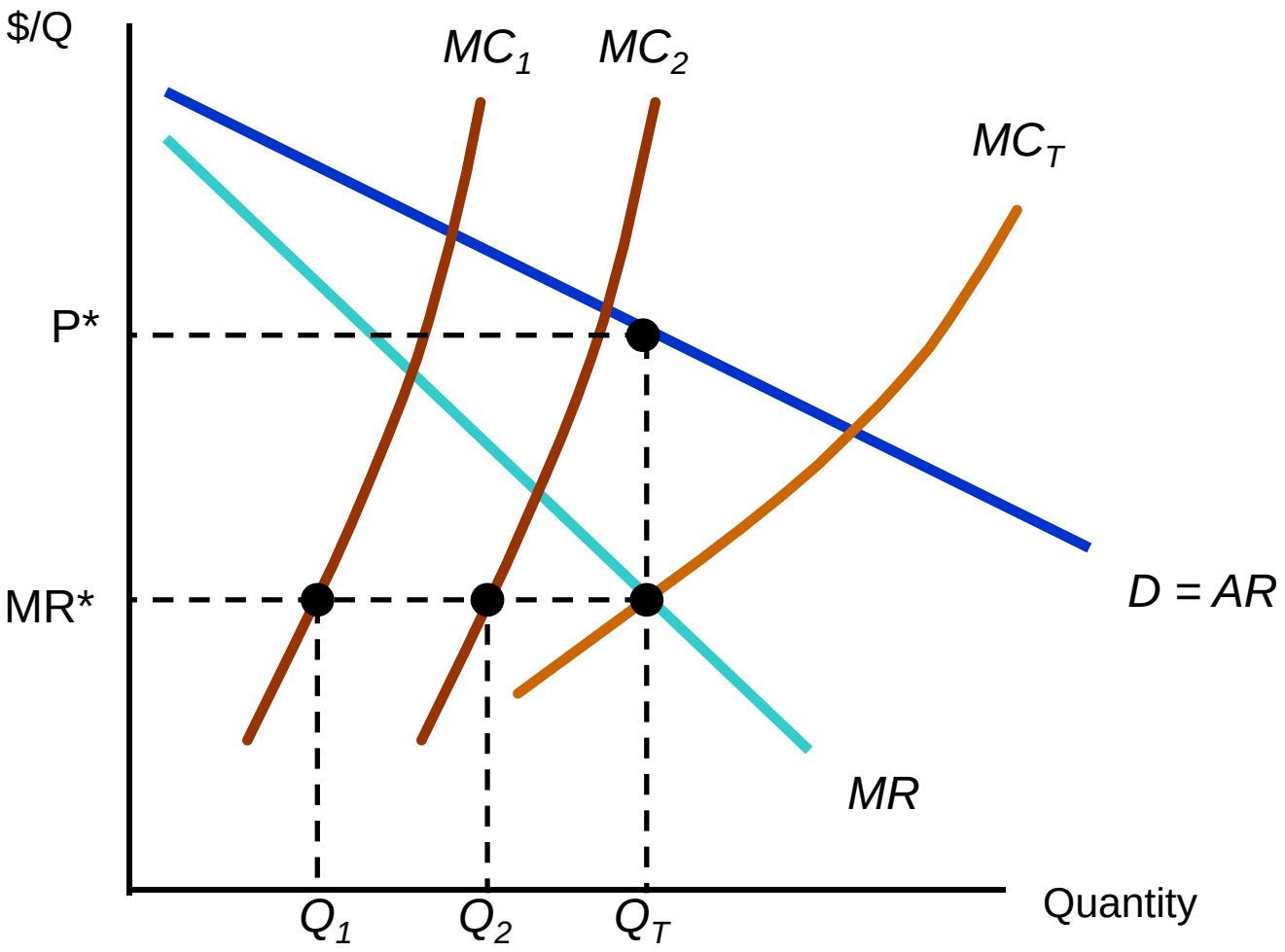
The Multi-plant Firm

- We can show the same for Plant 2
- Therefore, we can see that the firm should choose to produce where

$$MR = MC_1 = MC_2$$

- We can show this graphically
  - MR = MC_T gives total output
  - This point shows the MR for each firm
  - Where MR crosses MC_1 and MC_2 shows the output for each firm

Production with Two Plants



Measuring Monopoly Power

- Could measure monopoly power by the extent to which price is greater than MC for each firm
- Lerner's Index of Monopoly Power
  - $L = (P - MC)/P$
    - The larger the value of L (between 0 and 1) the greater the monopoly power
  - L is expressed in terms of E_d
    - $L = (P - MC)/P = -1/E_d$
    - E_d is elasticity of demand for a firm, not the market

Monopoly Power

- Monopoly power, however, does not guarantee profits
- Profit depends on average cost relative to price
- One firm may have more monopoly power but lower profits due to high average costs

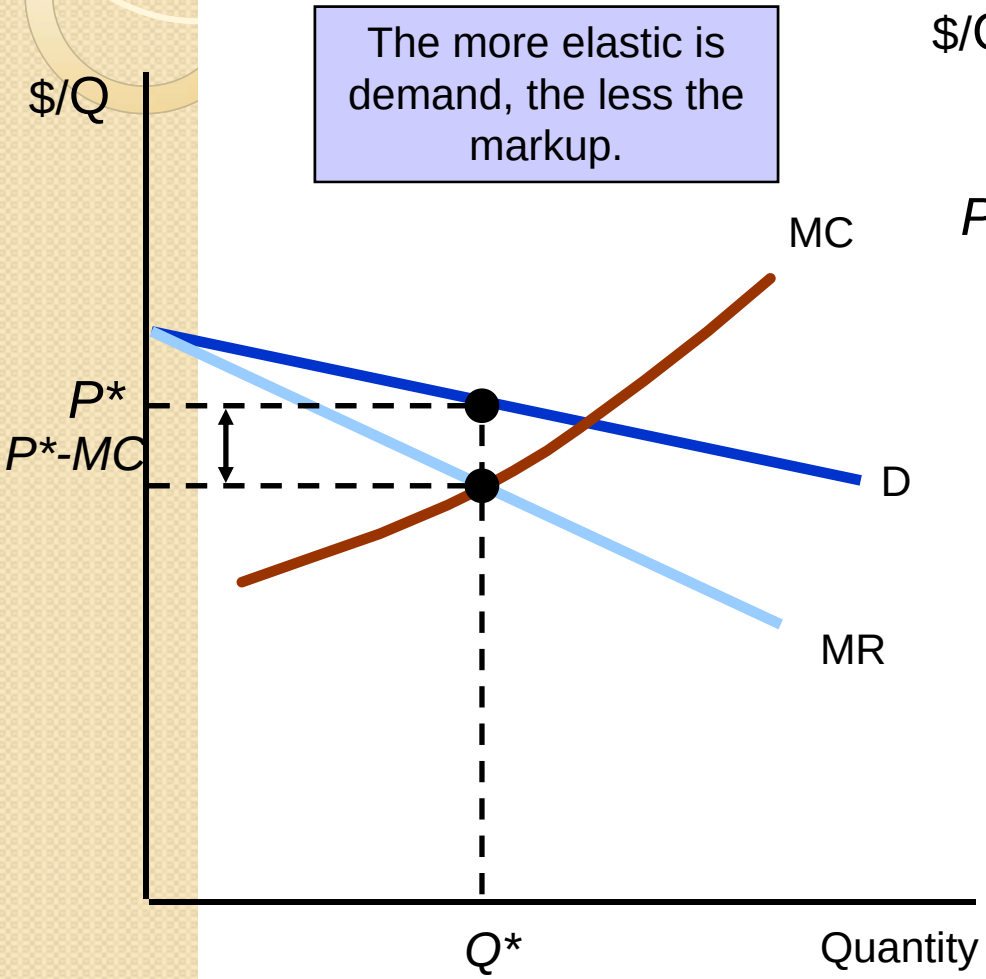
Rule of Thumb for Pricing

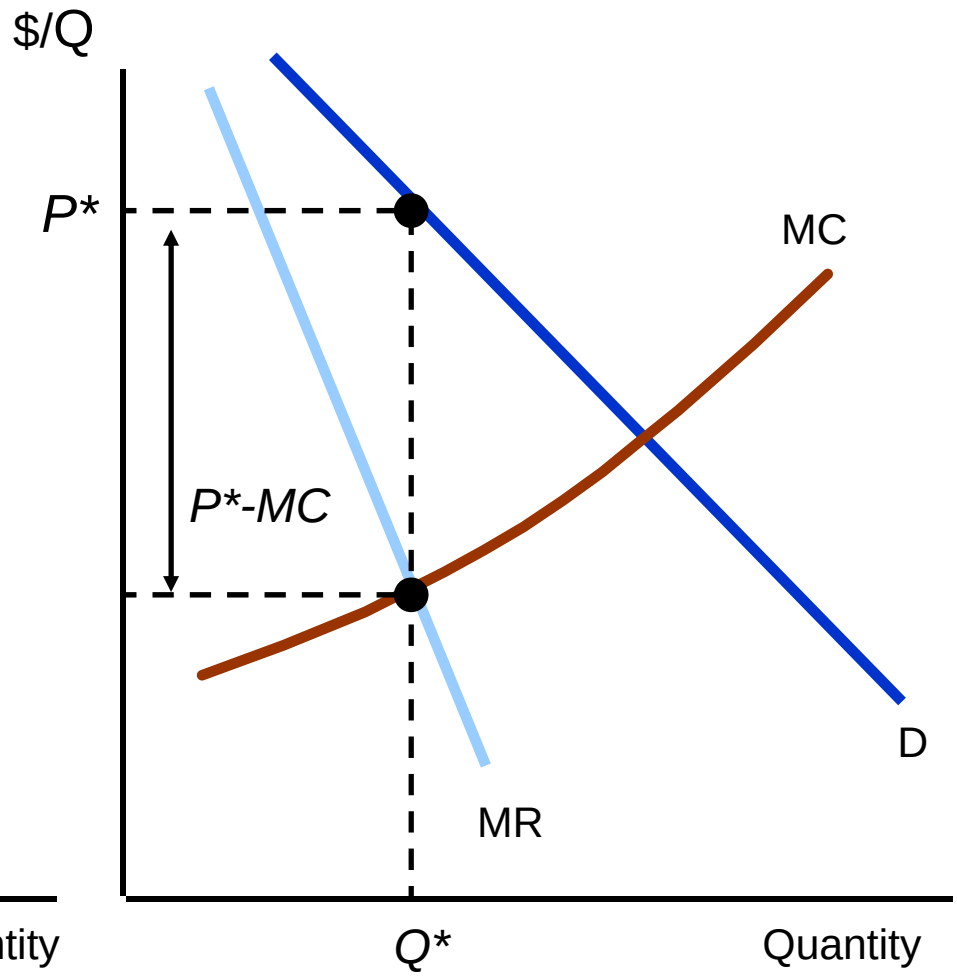
- Pricing for any firm with monopoly power:
  - If E_d is large, markup is small
  - If E_d is small, markup is large

$$P = \frac{MC}{1 + (1/E_d)}$$

Elasticity of Demand and Price Markup

The more elastic is demand, the less the markup.





Markup Pricing: Supermarkets & Convenience Stores

- Supermarkets

1. Several firms
2. Similar product
3. $E_d = -10$ for individual stores
4. $P = \frac{MC}{1+(1/-.1)} = \frac{MC}{0.9} = 1.11(MC)$
5. Prices set about 10 - 11% above MC.

Markup Pricing: Supermarkets & Convenience Stores

- Convenience Stores

1. Higher prices than supermarkets
2. Convenience differentiates them
3. $E_d = -5$
4. $P = \frac{MC}{1 + (1/-5)} = \frac{MC}{0.8} = 1.25(MC)$
5. Prices set about 25% above MC.

Homework Assignment

- Problem Set 3 has been distributed
- Due day: **November 28**
- Lecture notes for Chapter 9-10

Sources of Monopoly Power

- Why do some firms have considerable monopoly power, and others have little or none?
- Monopoly power is determined by ability to set price higher than marginal cost
- A firm's monopoly power, therefore, is determined by the firm's elasticity of demand

Sources of Monopoly Power

- The less elastic the demand curve, the more monopoly power a firm has
- The firm's elasticity of demand is determined by:

  1) Elasticity of market demand

  2) Number of firms in market

  3) The interaction among firms

Elasticity of Market Demand

- With one firm, their demand curve is market demand curve
  - Degree of monopoly power is determined completely by elasticity of market demand
- With more firms, individual demand may differ from market demand
  - Demand for a firm's product is more elastic than the market elasticity

Number of Firms

- The monopoly power of a firm falls as the number of firms increases; all else equal
  - More important are the number of firms with significant market share
  - Market is **highly concentrated** if only a few firms account for most of the sales
- Firms would like to create **barriers to entry** to keep new firms out of market
  - Patent, copyrights, licenses, economies of scale

Interaction Among Firms

- If firms are aggressive in gaining market share by, for example, undercutting the other firms, prices may reach close to competitive levels
- If firms collude (violation of antitrust rules), could generate substantial monopoly power
- Markets are dynamic and therefore, so is the concept of monopoly power

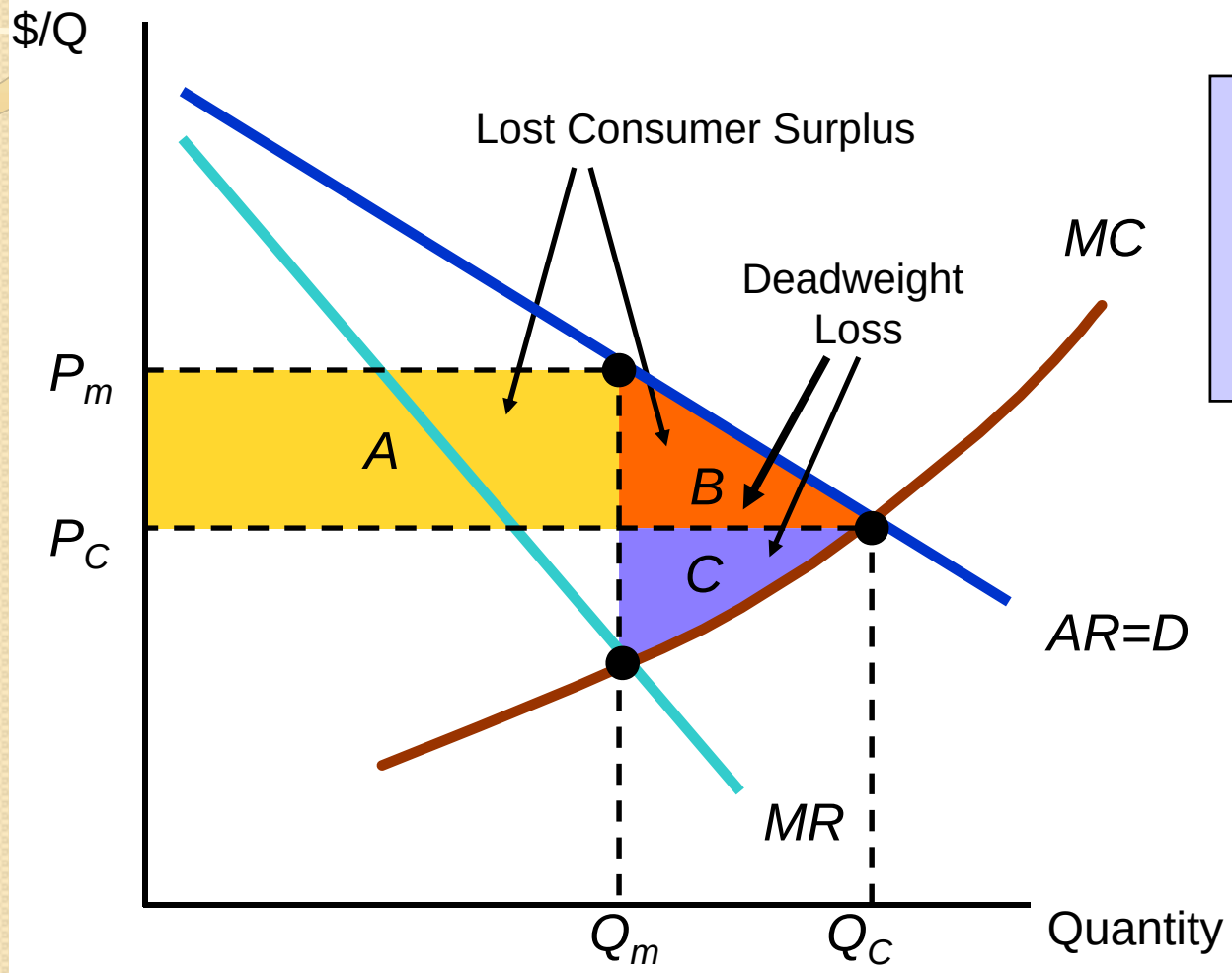
The Social Costs of Monopoly Power

- Monopoly power results in higher prices and lower quantities
- However, does monopoly power make consumers and producers in the aggregate better or worse off?
- We can compare producer and consumer surplus when in a competitive market and in a monopolistic market

The Social Costs of Monopoly

- Perfectly competitive firm will produce where MC = D → P_C and Q_C
- Monopoly produces where MR = MC, getting their price from the demand curve → P_M and Q_M
- There is a loss in consumer surplus when going from perfect competition to monopoly
- A deadweight loss is also created with monopoly

Deadweight Loss from Monopoly Power



Because of the higher price, consumers lose *A+B* and producer gains *A-C.*

The Social Costs of Monopoly

- Social cost of monopoly is likely to exceed the deadweight loss
- Rent Seeking
  - Firms may spend to gain monopoly power
    - Lobbying
    - Advertising
    - Building excess capacity

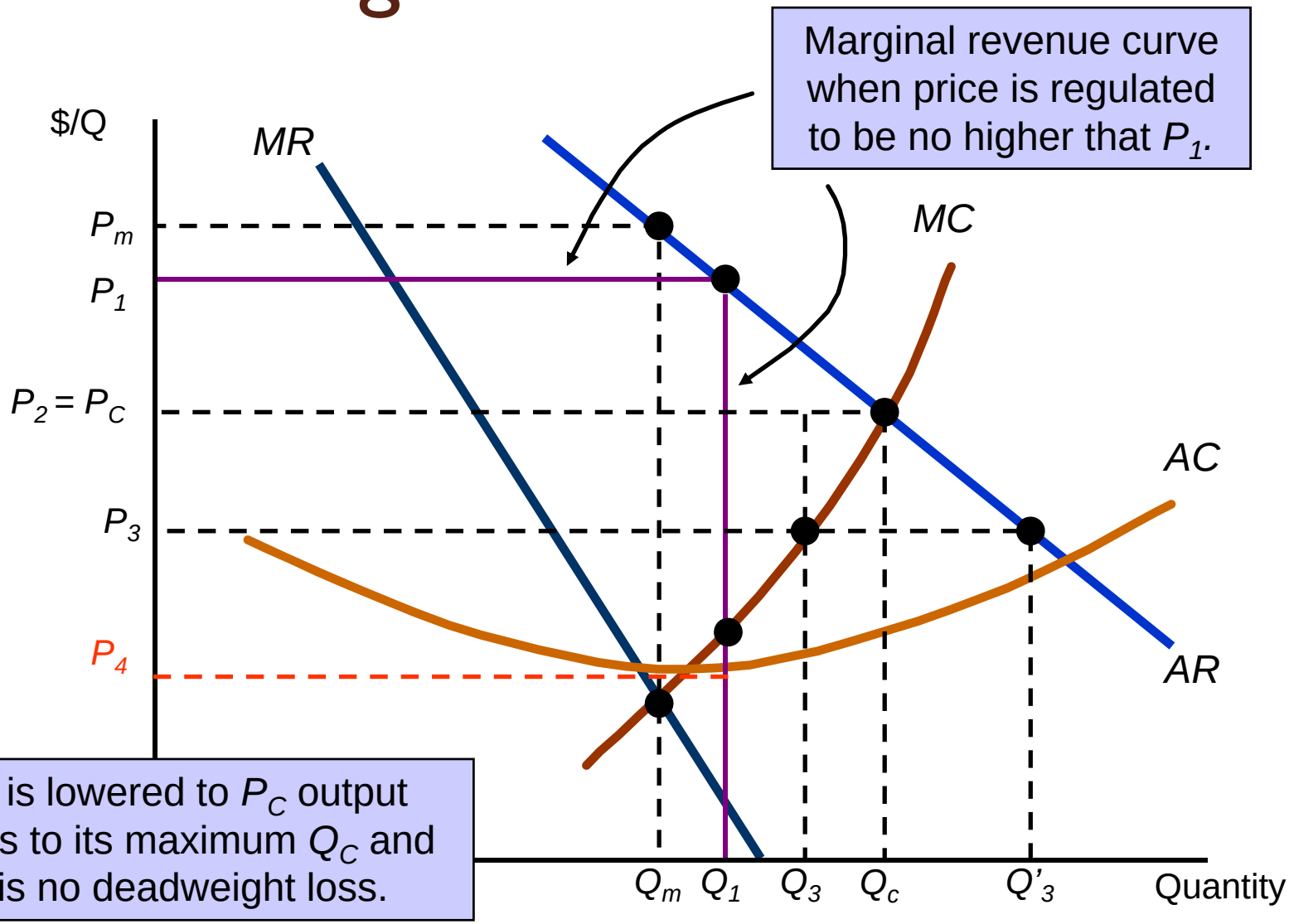
The Social Costs of Monopoly

- The incentive to engage in monopoly practices is determined by the profit to be gained
- The larger the transfer from consumers to the firm, the larger the social cost of monopoly

Government Regulation

- Government can regulate monopoly power through **price regulation**
  - Recall that in competitive markets, price regulation creates a deadweight loss
  - Price regulation can eliminate deadweight loss with a monopoly
  - The effect of the regulation can be shown graphically

Price Regulation

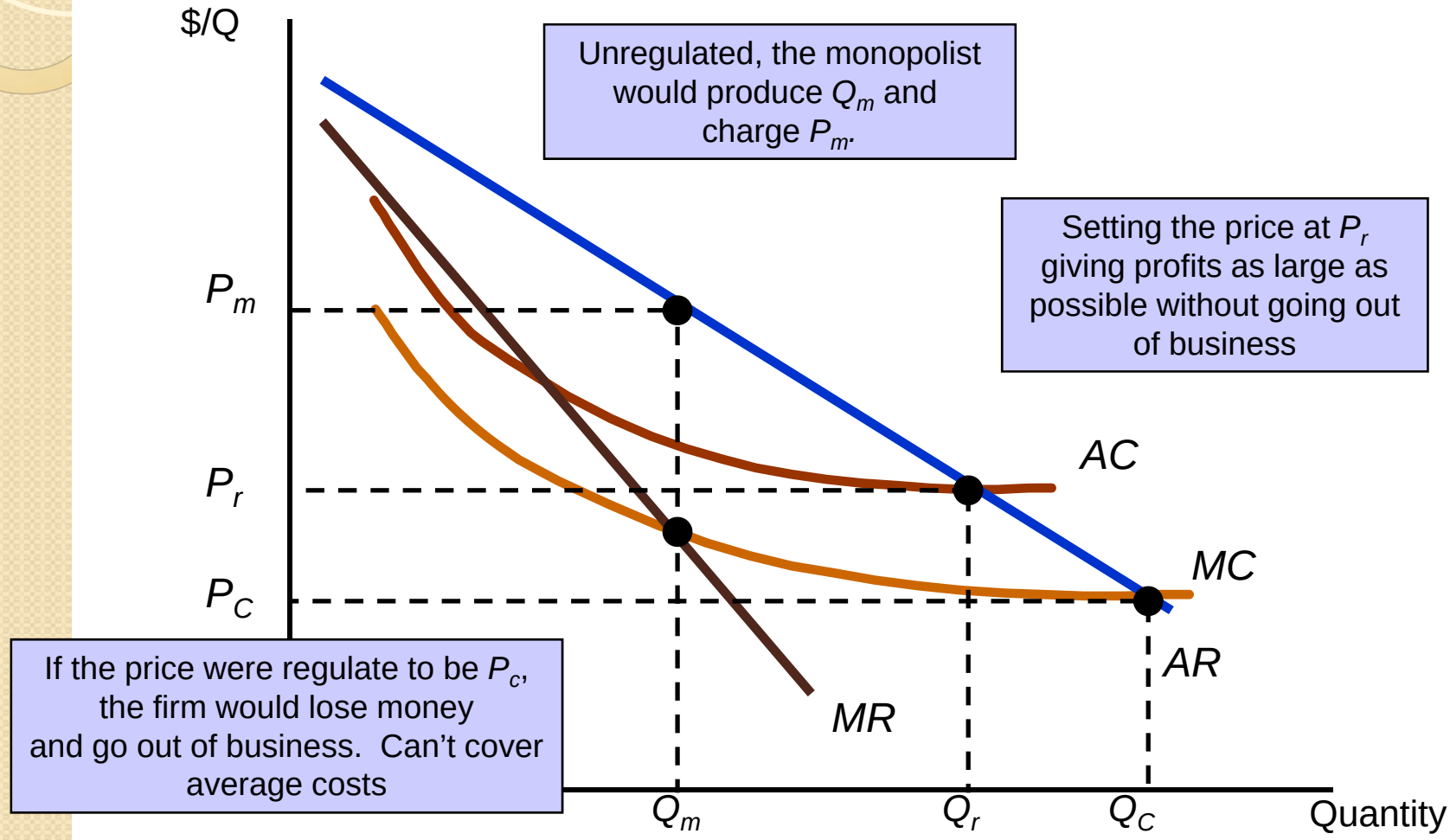


If price is lowered to P_C output increases to its maximum Q_C and there is no deadweight loss.

Government Regulation

- Natural Monopoly
  - A firm's AC is decreasing when increasing output such that this firm can produce the entire output of an industry at a cost lower than what it would be if there were several firms
  - Usually arises when there are large economies of scale
  - We can show that splitting the market into two firms results in higher AC for each firm than when only one firm was producing

Regulating the Price of a Natural Monopoly



Government Regulation

- Regulation in Practice
  - It is very difficult to estimate the firm's cost and demand functions because they change with evolving market conditions
  - An alternative pricing technique – ***rate-of-return regulation*** allows the firms to set a maximum price based on the expected rate or return that the firm will earn

Regulation in Practice

- There are problems, however, with rate of return regulation
  1. Firm's capital stock is difficult to value
  2. "Fair" rate of return is based on actual cost of capital, that cost is based on regulatory behavior (and investor's perception of allowed rates in the future)

Regulation in Practice

- Rate of return regulation leads to lags in regulatory response to changes in cost and other market conditions
- Leads to long and expensive regulatory hearings
- The hearing process creates a *regulatory lag* that may benefit producers or consumers

Regulation in Practice

- Government may also set price caps based on firm's variable costs, past prices, and possibly inflation and productivity growth
- A firm is typically allowed to raise its price each year without approval from regulatory agency by amount equal to inflation minus expected productivity growth

Factor Markets with Monopoly

- We have examined factor demand when a firm faces a competitive output market and a competitive factor demand
- Now we consider factor demands when markets are facing one-sided monopoly
- Two cases to be discussed: 1) Monopoly in the output market but competition in the factor market; 2) Competition in the output market but monopoly in the factor market

A General Rule for Factor Demand

- When a firm determines a profit-maximizing demand for a factor, it will always want to choose a quantity such that the MR from hiring one more unit of that factor just equals the MC of doing so

- The above decision rule takes various forms depending on our assumptions about the environment in which the firm operates

Monopoly in the Output Market

- Suppose that a firm has a monopoly for its output and it has a production function $y = f(x)$
- $R(y) = p(y)y$ or $R(x) = R(y(x))$
- $dR/dx = [dR/dy]\,[dy/dx] = MR*MPx$
- dR/dx represents the effect on revenue due to the marginal increase in the input, which is called ***marginal revenue product (MRP)***

Marginal Revenue Product

- If a firm is facing a competitive market for the output, MRPx = P*MPx
- But if it is facing a monopolistic market, then
-

$$MRP_x = p(y)\left[1 - \frac{1}{|E_d|}\right]MP_x$$

$$MRP_x = p(y)\left[1 - \frac{1}{|E_d|}\right]MP_x \leq pMP_x$$

Monopoly in the Output Market

- Suppose that the factor market is competitive
- If the firm is a competitive in the output market, then $P \bullet MP(x_c^*) = w$
- If the firm is a monopolistic in the output market, then $MRP(x_m^*) = w$
- The factor demand by a monopolist must be less than the factor demand by the same firm if it behaves competitively

Monopsony

- A **monopsony** is a market in which there is a single buyer
- **Monopsony power** is the ability of the buyer to affect the price of the good and pay less than the price that would exist in a competitive market
- We suppose that the firm is a monopsony in the labor market but a price taker in the output market

Monopsonist Buyer

- Buyer will buy until value from last unit equals expenditure on that unit
- The market supply curve is not the marginal expenditure curve
  - Market supply shows how much the firm must pay per unit as a function of total units purchased
  - Supply curve is ***average*** expenditure curve
  - Upward sloping supply implies the marginal expenditure curve must lie above it
  - Decision to buy extra unit raises price paid for *all* units

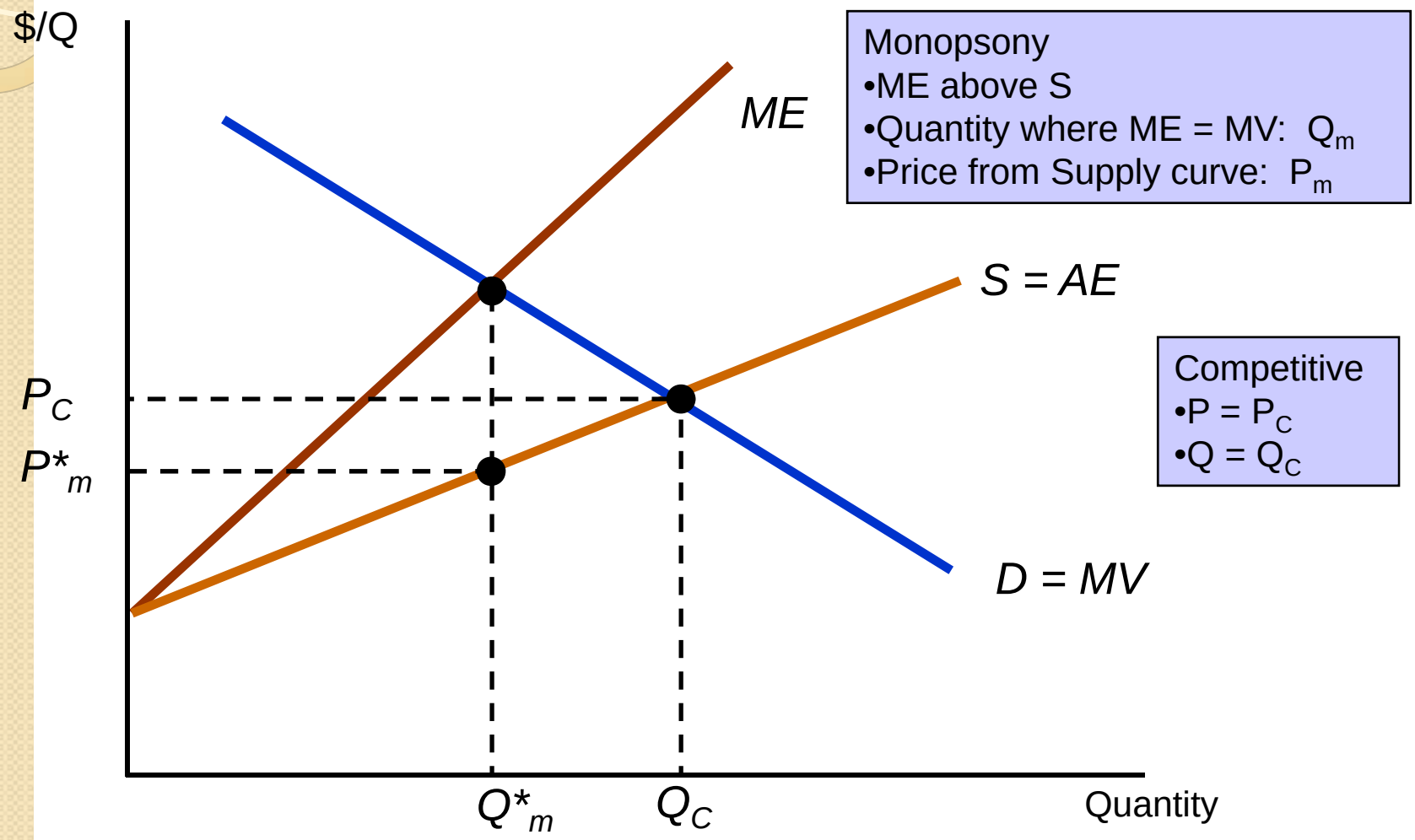
Marginal vs. Average Expenditure

- We assume that the supply curve w(x) is upward sloping, i.e., w'(x) > 0

$$Max\ pf(x) - w(x)x$$

$$\underbrace{pf'(x)}_{\substack{marginal \\ revenue}} = w + w'(x)x = \underbrace{w\left[1 + \frac{1}{E_s}\right]}_{marginal\ expenditure(cost)}$$

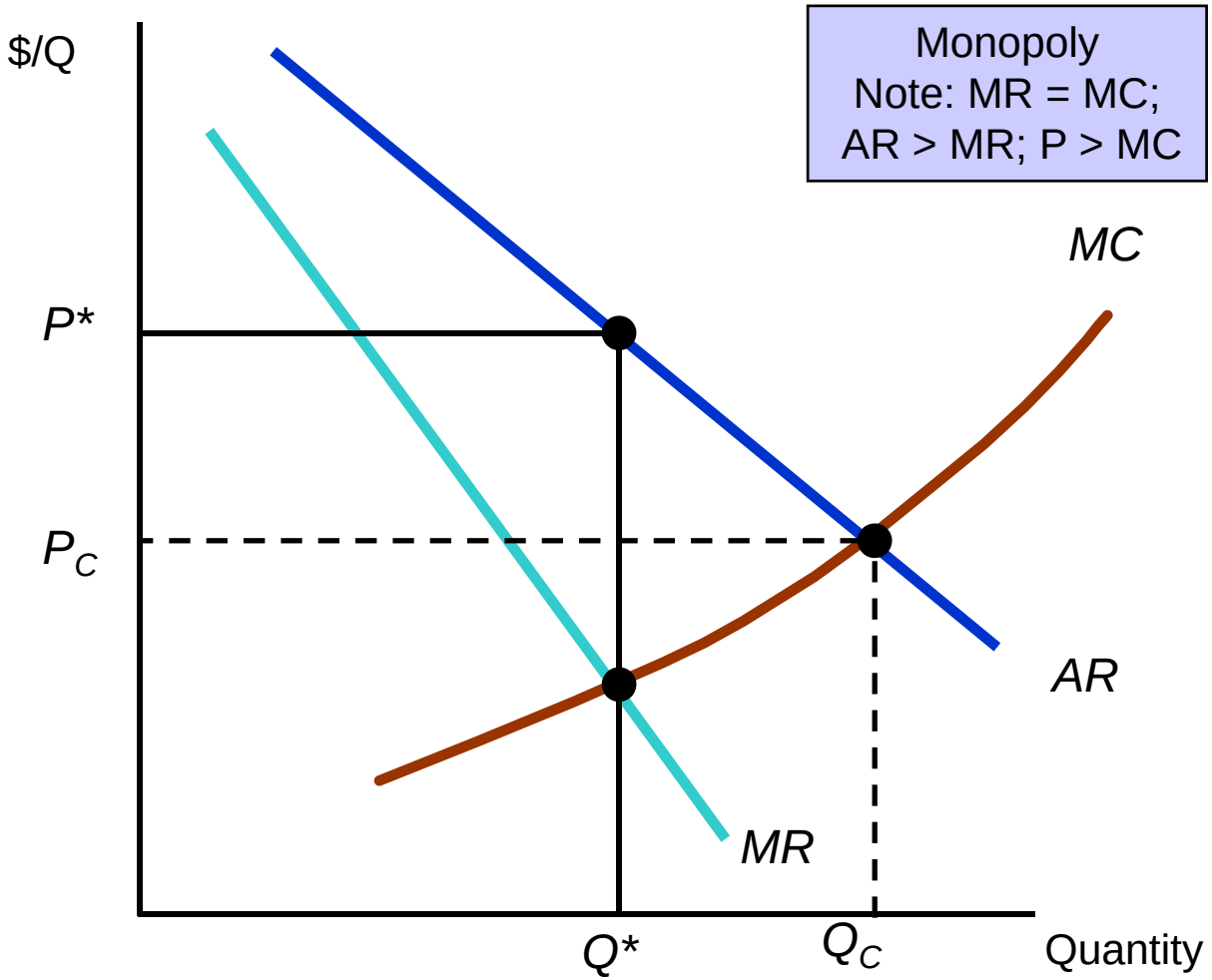
Monopsonist Buyer



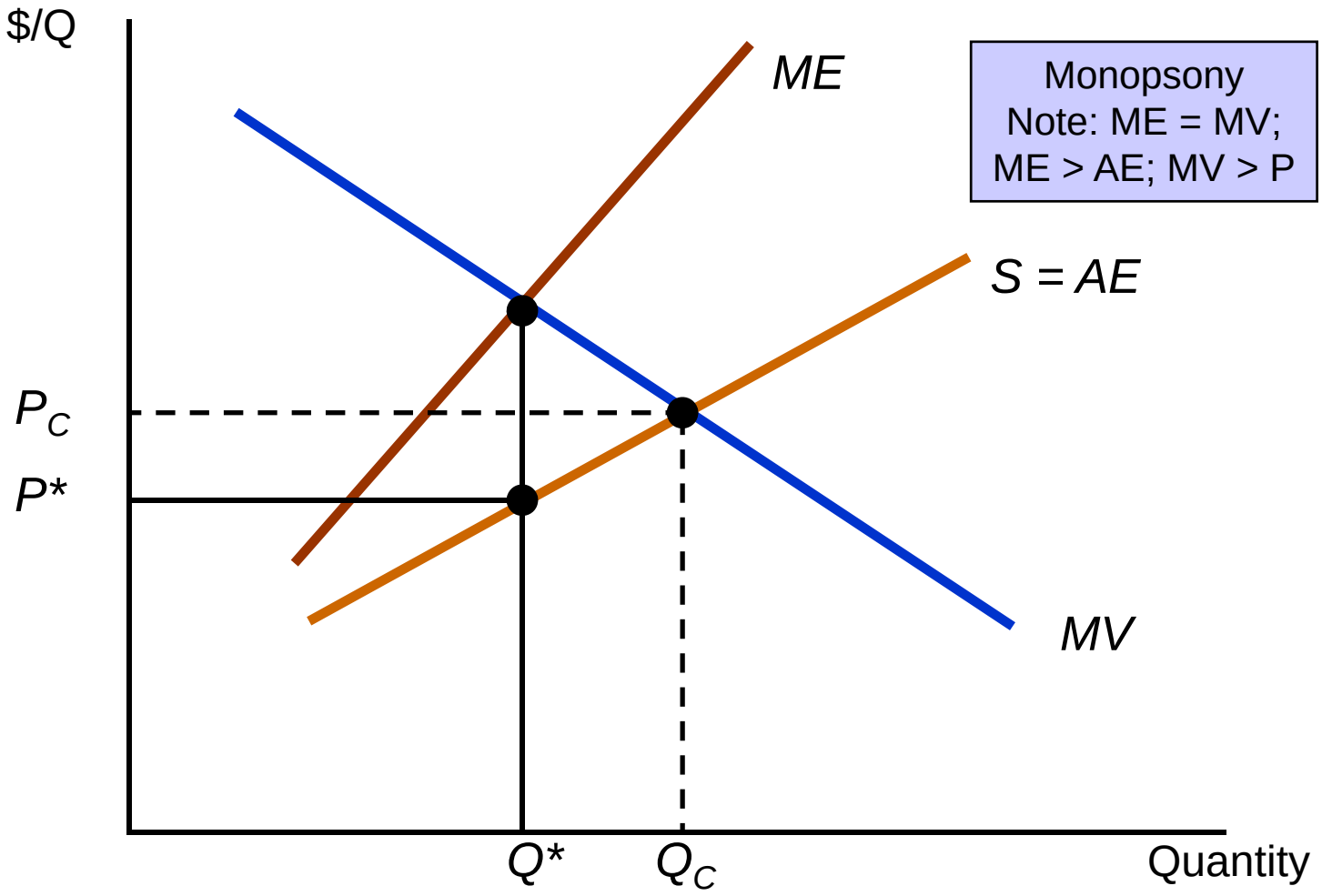
Monopoly and Monopsony

- Monopsony is easier to understand if we compare to monopoly
- We can see this graphically
- Monopolist
  - Can charge price above MC because faces downward sloping demand (average revenue)
  - MR < AR
  - MR = MC gives quantity less than competitive market and price that is higher

Monopoly and Monopsony



Monopoly and Monopsony



Monopoly and Monopsony

- Monopoly
  - $MR < P$
  - $P > MC$
  - $Q_m < Q_C$
  - $P_m > P_C$
- Monopsony
  - $ME > P$
  - $P < MV$
  - $Q_m < Q_C$
  - $P_m < P_C$

Monopsony Power

- More common than pure monopsony are a few firms competing among themselves as buyers so that each firm has some monopsony power
  - Automobile industry
- Monopsony power gives them the ability to ***pay a price that is less than marginal value***

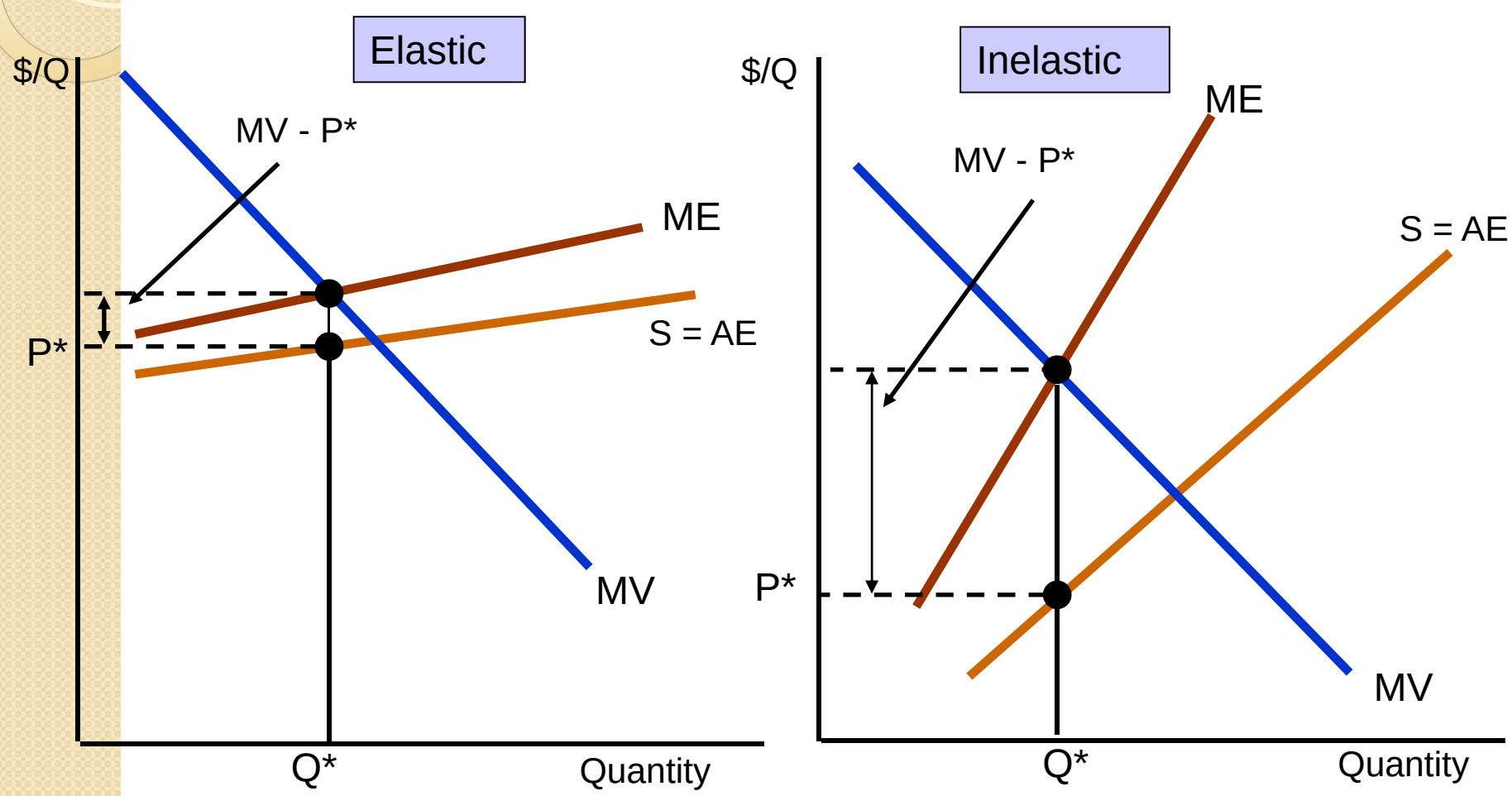
Monopsony Power

- The degree of monopsony power depends on three factors:
  1. Number of buyers
     - The fewer the number of buyers, the less elastic the supply and the greater the monopsony power
  2. Interaction Among Buyers
     - The less the buyers compete, the greater the monopsony power

Monopsony Power

- The degree of monopsony power depends on three factors (cont'd):
  3. Elasticity of market supply
     - Extent to which price is marked down below MV depends on elasticity of supply facing buyer
     - If supply is very elastic, markdown will be small
     - The more inelastic the supply, the more monopsony power

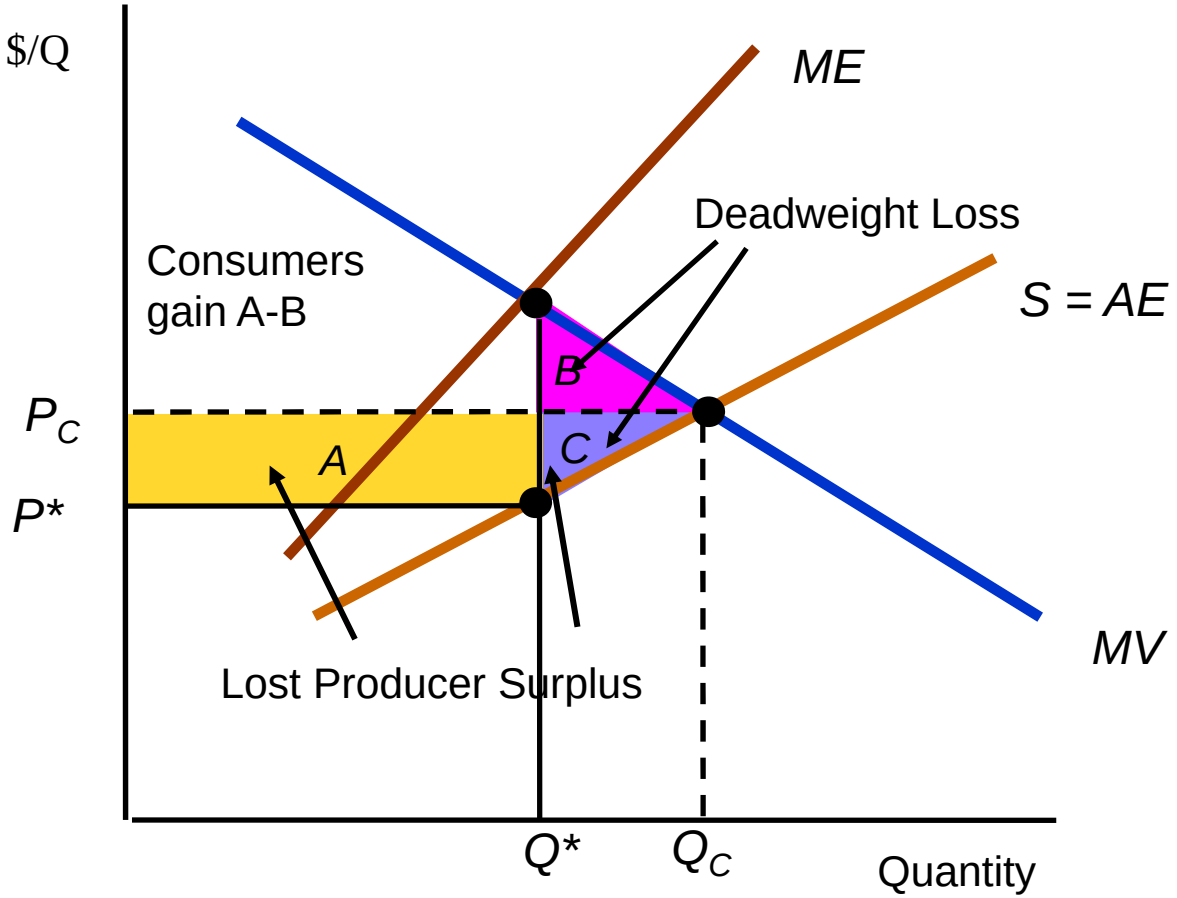
Monopsony Power: Elastic Versus Inelastic Supply



Social Costs of Monopsony Power

- Since monopsony power gives lower prices and lower quantities purchased, we would expect sellers to be worse off and buyers better off
- We can show the effects of monopsony power using producer and consumer surplus compared to competitive market
  - For sole monopsonist, quantity is where ME = MV and price is from demand
  - For competitive market, quantity and price where S = D

Deadweight Loss from Monopsony Power



Limiting Market Power: The Antitrust Laws

- Market power harms some players in the market – buyer or seller
- Market power reduces output, leading to deadweight loss
- Excessive market power could raise problems of equity and fairness

Limiting Market Power: The Antitrust Laws

- What can we do to limit market power and keep it from being used anti-competitively?
  - Tax away monopoly profits and redistribute to consumers
    - Difficult to measure and find all those who lost
  - Direct price regulation of natural monopolies
  - Keep firms from acquiring excessive market power
    - Antitrust laws

The Antitrust Laws

- Rules and regulations designed to promote a competitive economy by:
  - Prohibiting actions that restrain or are likely to restrain competition
- Monopoly power arises in a number of ways, each of which is covered by the antitrust laws

Limiting Market Power: The Antitrust Laws

- Sherman Act (1890) – Section 1
  - Prohibits contracts, combinations, or conspiracies in restraint of trade
    - Explicit agreement to restrict output or fix prices
    - Implicit collusion through **parallel conduct**
      - Form of implicit collusion in which one firm consistently follows actions of another
  - Example
    - In 1999, four of the world's largest drug and chemical companies were found guilty of fixing prices of vitamins sold in US
    - In 2009, Panasonic and LG were found guilty of fixing prices in Japan

Limiting Market Power: The Antitrust Laws

- Sherman Act (1890) – Section 2
  - Makes it illegal to monopolize or attempt to monopolize a market and prohibits conspiracies that result in monopolization
- Clayton Act (1914)
  1. Makes it unlawful to require a buyer or lessor not to buy from a competitor

Limiting Market Power: The Antitrust Laws

- Clayton Act (1914)
  2. Prohibits **predatory pricing**
     - The practice of pricing to drive current competitors out of business and to discourage new entrants in a market so that a firm can enjoy higher future profits
  3. Prohibits mergers and acquisitions if they "substantially lessen competition" or "tend to create a monopoly"

Limiting Market Power: The Antitrust Laws

- Robinson-Patman Act (1936)
  - Amendment to the Clayton Act
  - Prohibits price discrimination if it causes buyers to suffer economic damages and competition is reduced

Limiting Market Power: The Antitrust Laws

- Federal Trade Commission Act (1914, amended 1938, 1973, 1975)
  1. Created the Federal Trade Commission (FTC)
  2. Supplements the Sherman and Clayton Acts by fostering competition through a set of prohibitions against unfair and anticompetitive practices
     - Prohibitions against deceptive advertising, labeling, agreements with retailer to exclude competing brands

Enforcement of Antitrust Laws

Antitrust laws are enforced three ways:

1. Antitrust Division of the Department of Justice
   - A part of the executive branch – the administration can influence enforcement
   - Fines levied on businesses; fines and imprisonment levied on individuals

Enforcement of Antitrust Laws

2. Federal Trade Commission
   - Enforces through voluntary understanding or formal commission order
3. Private Proceedings
   - Can sue for *treble* damages (threefold damages)
   - Individuals or companies can also ask for injunctions to force wrongdoers to cease anticompetitive actions

Enforcement of Antitrust Laws

- US antitrust laws are stricter and more far reaching than the rest of the world
  - Some have claimed this has hindered US competing in international markets
- With growth of European Union, methods of antitrust enforcement have evolved
  - Similar to US laws with some procedural and substantive differences
  - Europe only imposes civil penalties

Chapter 10 (continued)

Pricing with Market Power
Monopolistic Competition

Topics to be Discussed

- Capturing Consumer Surplus
- Price Discrimination
- Intertemporal Price Discrimination and Peak-Load Pricing
- The Two-Part Tariff
- Bundling
- Monopolistic Competition

Introduction

- Pricing without market power (perfect competition) is determined by market supply and demand
- The individual producer must be able to forecast the market and then concentrate on managing production (cost) to maximize profits

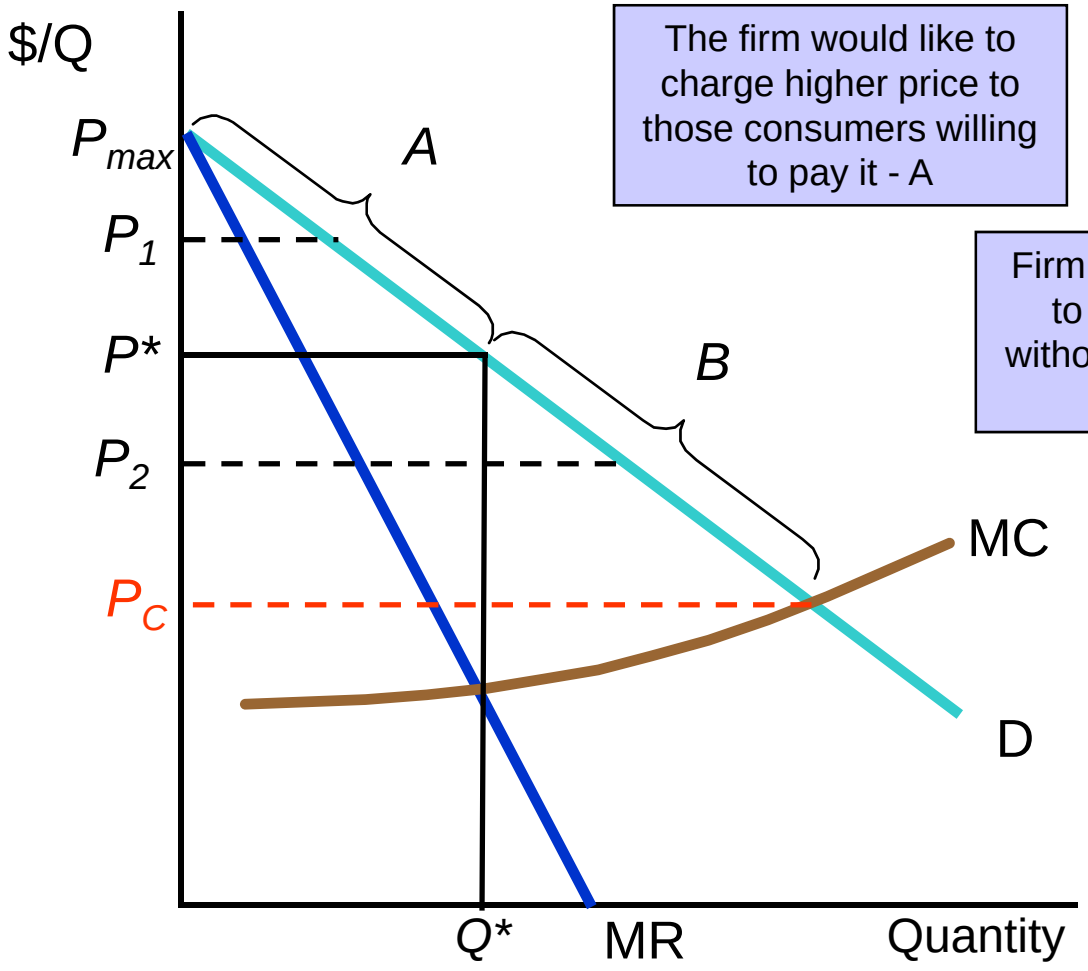
Introduction

- Pricing with market power (imperfect competition) requires the individual producer to know much more about the characteristics of demand as well as manage production
- It also requires the discriminating producer to segment the markets successfully such that no arbitrage across markets occurs

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
  - Two-Part Tariffs and bundling

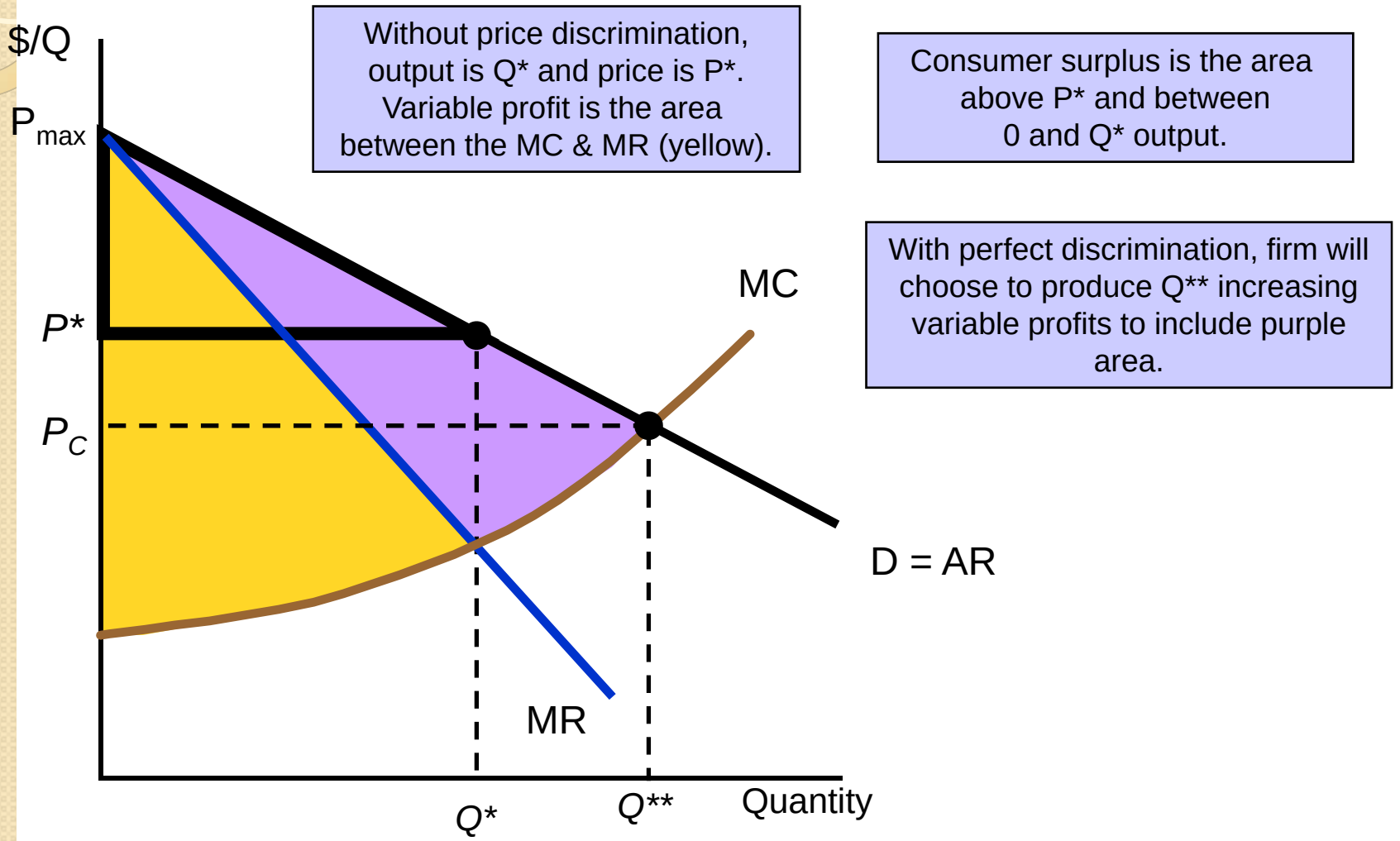
Price Discrimination

- First Degree Price Discrimination
  - Charge a separate price to each customer: the maximum or reservation price they are willing to pay
- How can a firm profit?
  - The firm produces Q* → MR = MC
  - We can see the firm's variable profit – the firm's profit ignoring fixed costs
    - Area between MR and MC
  - Consumer surplus area between demand and price

Price Discrimination

- If the firm can price discriminate perfectly, each consumer is charged exactly what they are willing to pay
  - MR curve is no longer part of output decision
  - Incremental revenue 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*

Perfect First-Degree Price Discrimination



Without price discrimination, output is Q* and price is P*. Variable profit is the area between the MC & MR (yellow).

Consumer surplus is the area above P* and between 0 and Q* output.

With perfect discrimination, firm will choose to produce Q** increasing variable profits to include purple area.

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
  - 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

- "*What the company is trying to do is prevent the passengers who can pay the second-class fare from travelling third class; it hit the poor not because it wants to hurt them, but to frighten the rich…; Having refused the poor what is necessary, they give the rich what is superfluous*" Emile Dupuit

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

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

Third-Degree Price Discrimination

- Practice of dividing consumers into two or more groups with separate demand curves and charging different prices to each group
  1. Divides the market into two groups
  2. Each group has its own demand function

Price Discrimination

- Third Degree Price Discrimination
- Most common type of price discrimination
  - Examples: airlines, premium vs. non-premium liquor, discounts to students and senior citizens, frozen vs. canned vegetables

Third-Degree Price Discrimination

- Same 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

Creating Consumer Groups

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

Third-Degree Price Discrimination

- Algebraically
  - P_1: price first group
  - P_2: price second group
  - $C(Q_T)$ = total cost of producing output
    $Q_T = Q_1 + Q_2$
  - Profit: $\pi = P_1Q_1 + P_2Q_2 - C(Q_T)$

Third-Degree Price Discrimination

- Firm should increase sales to each group until incremental profit from last unit sold is zero

$$\frac{d\pi}{dQ_1} = \frac{d(P_1(Q_1)Q_1)}{dQ_1} - \frac{dC}{dQ_1} = MR_1 - MC = 0$$

$$\frac{d\pi}{dQ_2} = \frac{d(P_2(Q_2)Q_2)}{dQ_2} - \frac{dC}{dQ_2} = MR_2 - MC = 0$$

$$MR_1 = MR_2 = MC$$

Third-Degree Price Discrimination

- Determining relative prices
  - Thinking of relative prices that should be charged to each group of consumers and relating them to price elasticities of demand may be easier

Recall: $MR = P\left(1+1/E_d\right)$

Then: $MR_1 = P_1(1+1/E_1) = MR_2 = P_2(1+1/E_2)$

E_1 *and* E_2 *elasticities of demand for each group*

Third-Degree Price Discrimination

- Determining relative prices
  - Equating MR_1 and MR_2 gives the following relationship that must hold for prices
  - The higher price will be charged to consumer with the lower demand elasticity

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

$$P_1 > P_2 \Leftrightarrow |E_2| > |E_1|$$

Third-Degree Price Discrimination

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

$$\frac{\boldsymbol{P}_1}{\boldsymbol{P}_2} = \frac{(1-1/4)}{(1-1/2)} = \frac{3/4}{1/2} = 1.5$$

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

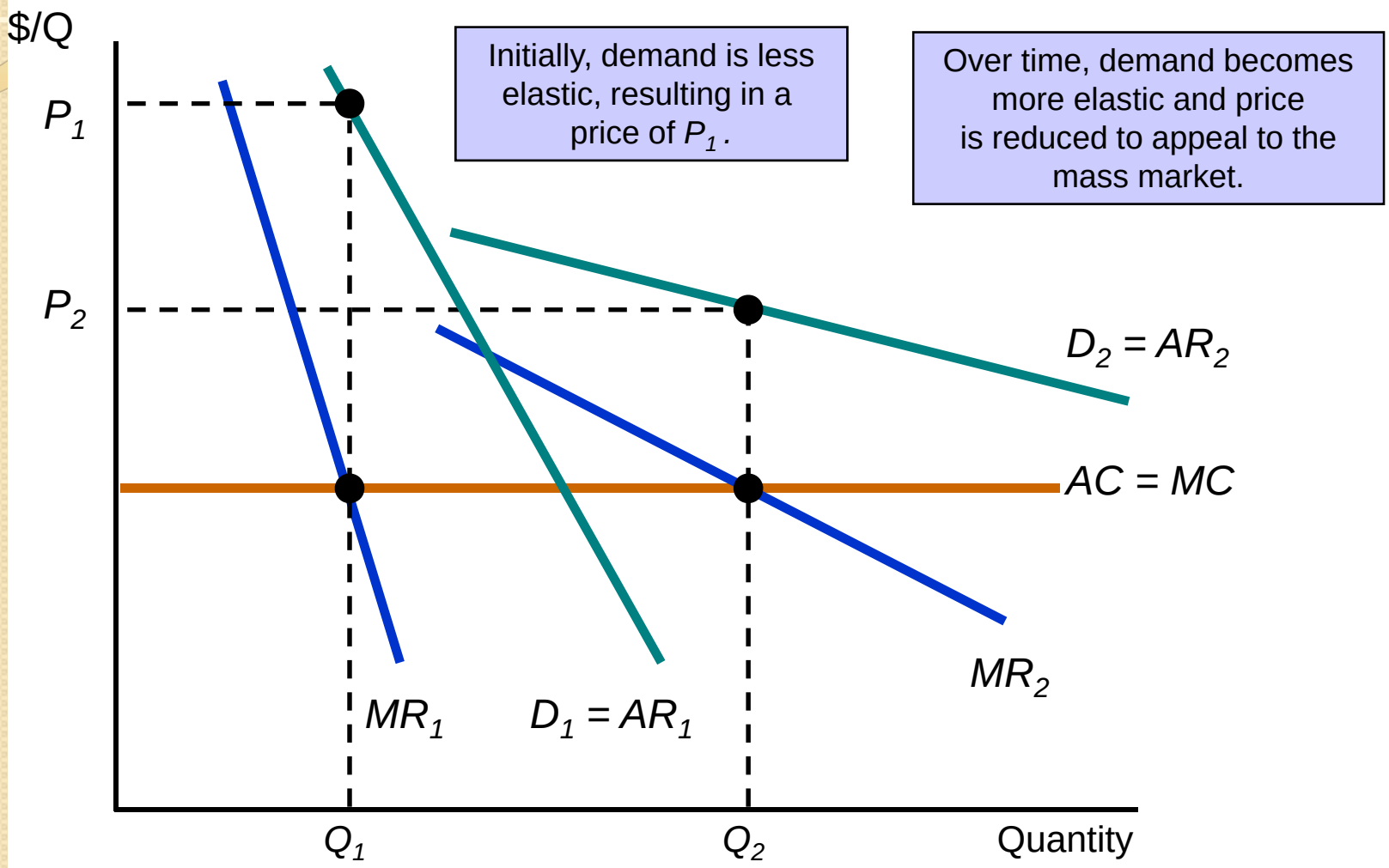
Other Types of Price Discrimination

- 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
    - Electronic products
    - Selling apartments in the reverse order of quality

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
  - Ski resorts on weekends

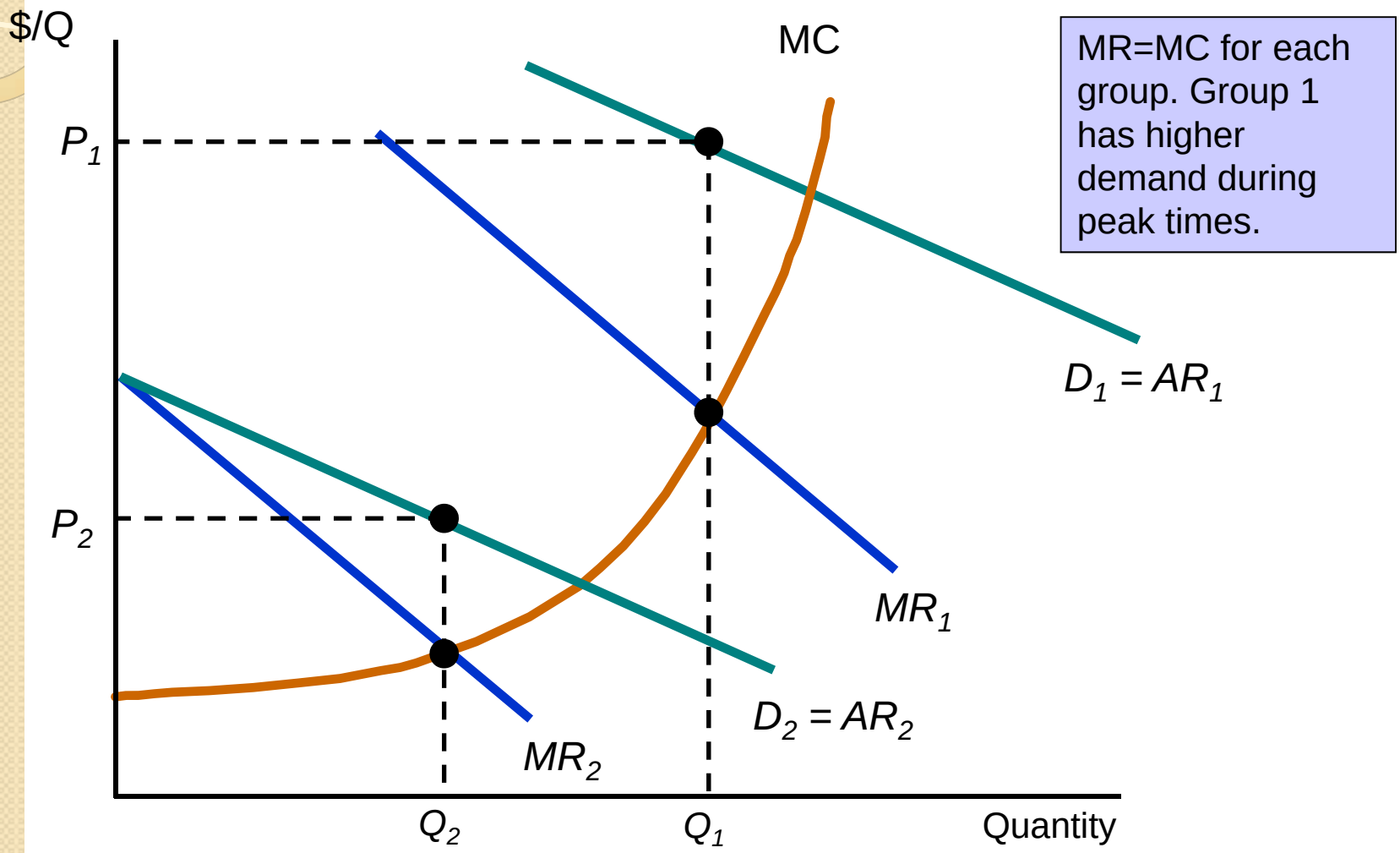
Peak-Load Pricing

- 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.

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

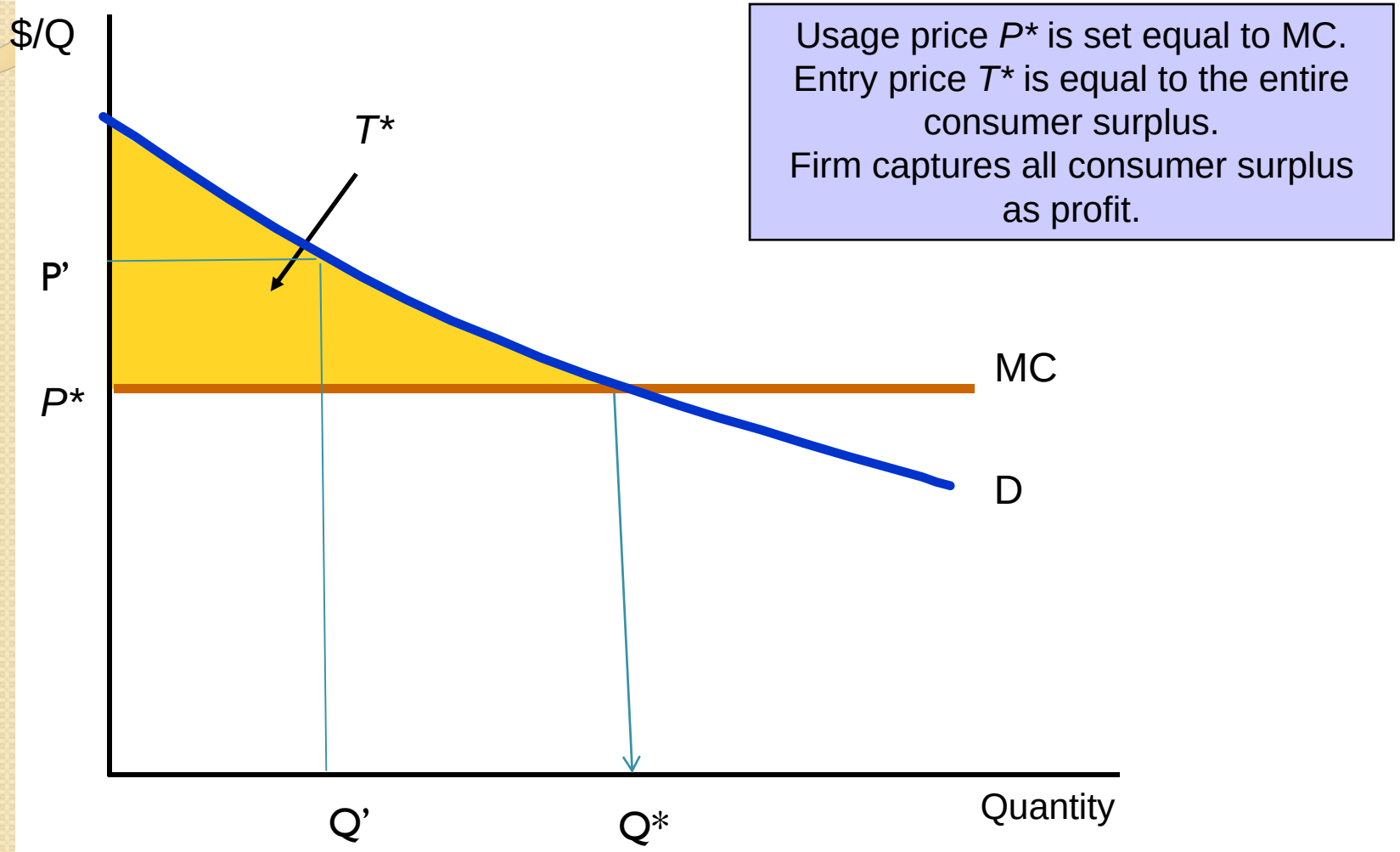
The Two-Part Tariff

- 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

Disneyland Dilemma

- How set entrance fee and marginal price? For an amusement park like Disneyland?
- Assumptions:
  - There is only one kind of ride in Disneyland
  - People only desire to go to Disneyland for the rides
  - Everyone has the same taste for the rides or there is only one single consumer

Two-Part Tariff with a Single Consumer

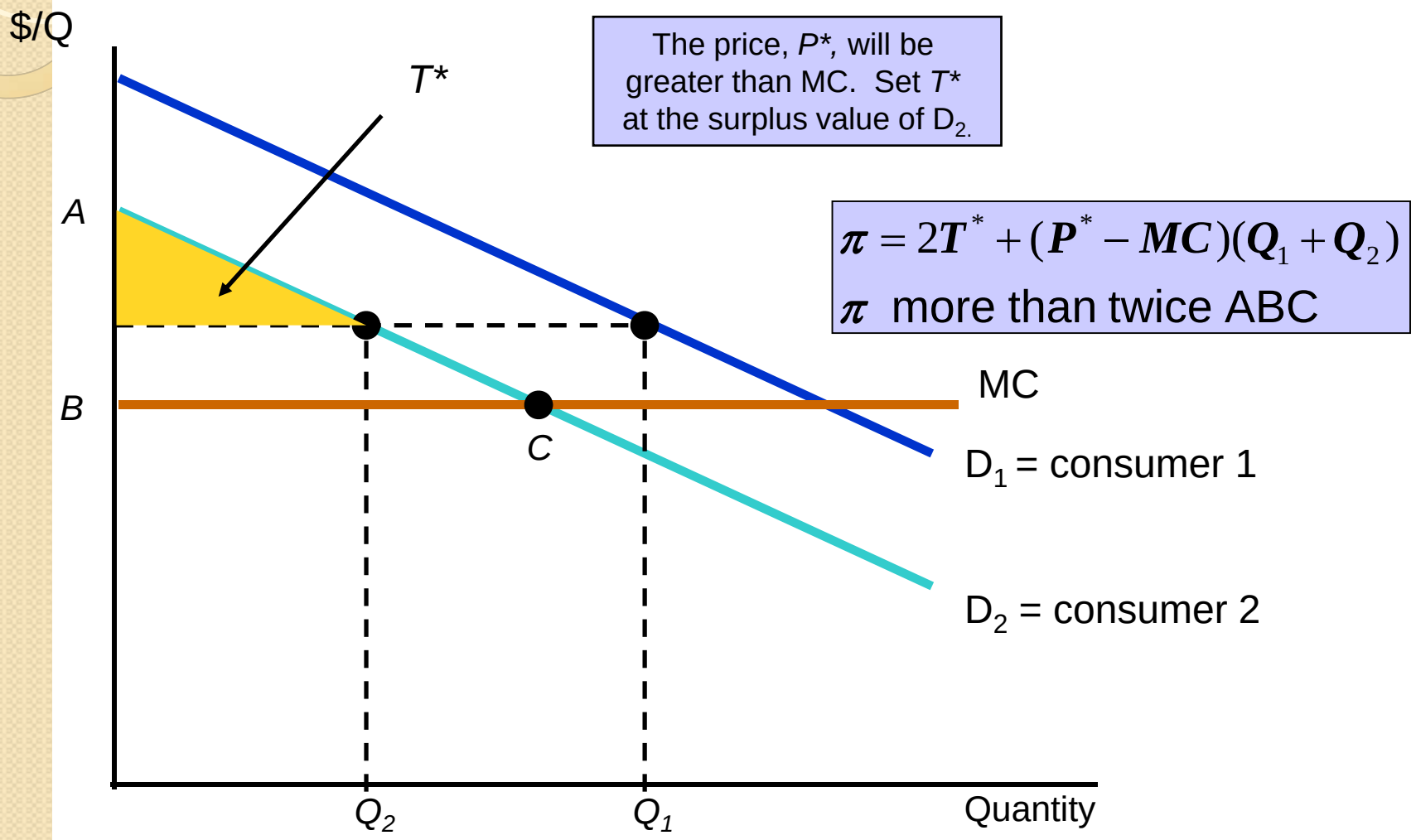


Usage price *P** is set equal to MC.
Entry price *T** is equal to the entire consumer surplus.
Firm captures all consumer surplus as profit.

Two-Part Tariff with Two Consumers

- Two kinds of 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

Two-Part Tariff with Two Consumers



The price, *P**, will be greater than MC. Set *T** at the surplus value of D_2.

$$\pi = 2T^* + (P^* - MC)(Q_1 + Q_2)$$

π more than twice ABC

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

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

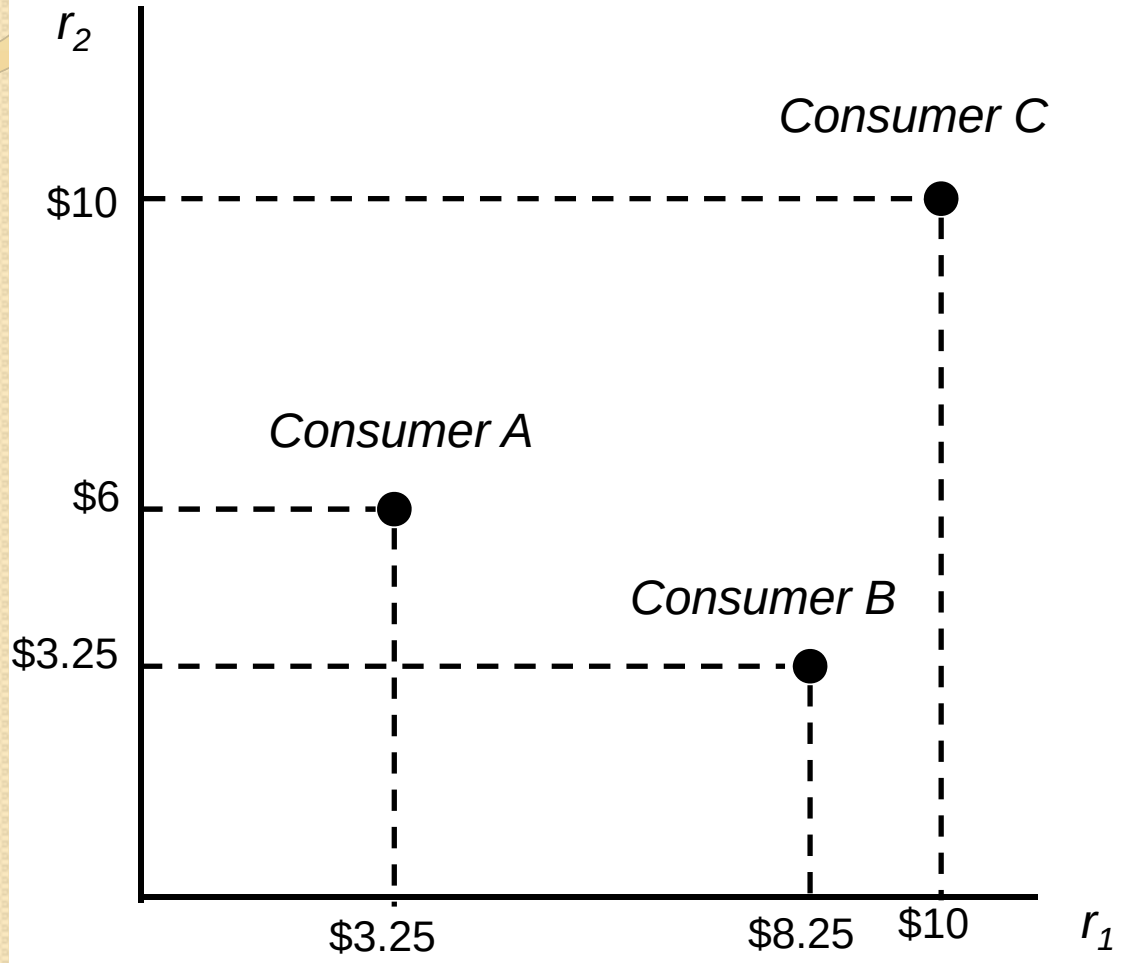
Bundling

- 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

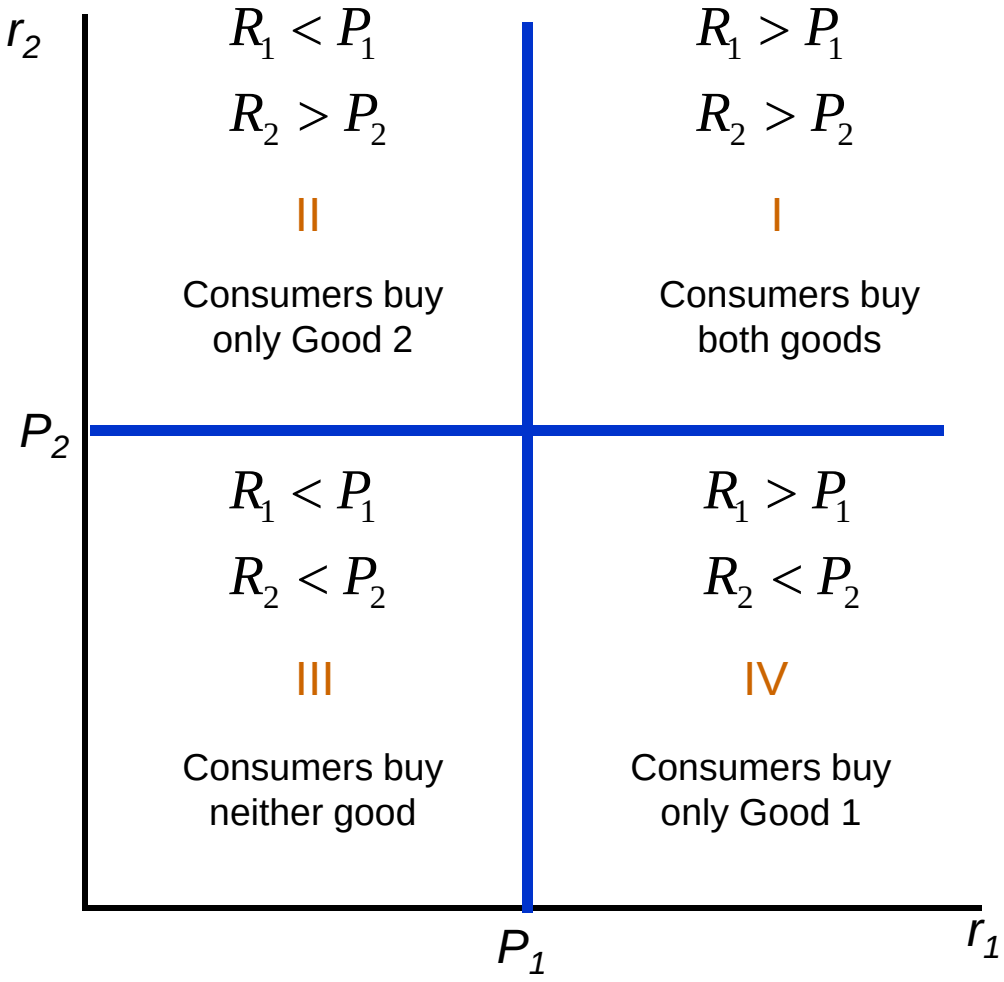
- Bundling Scenario: Two different goods and many consumers
  - Many consumers with different reservation price combinations for two goods
  - Can show graphically the preferences of consumers in terms of reservation prices and consumption decisions given prices charged
  - r_1 is reservation price of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

Reservation Prices



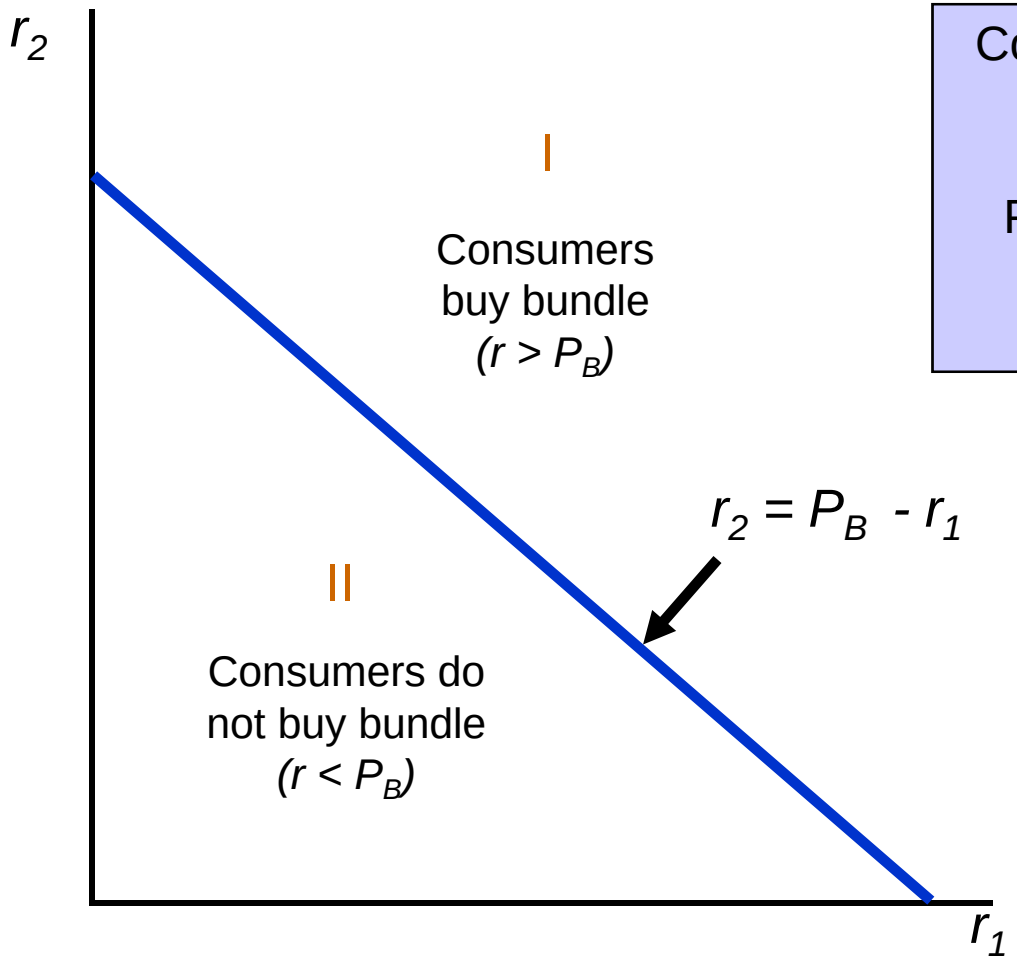
For example, Consumer *A* is willing to pay up to $3.25 for good 1 and up to $6 for good 2.

Consumption Decisions When Products are Sold Separately



Consumers fall into four categories based on their reservation price.

Consumption Decisions When Products are Bundled

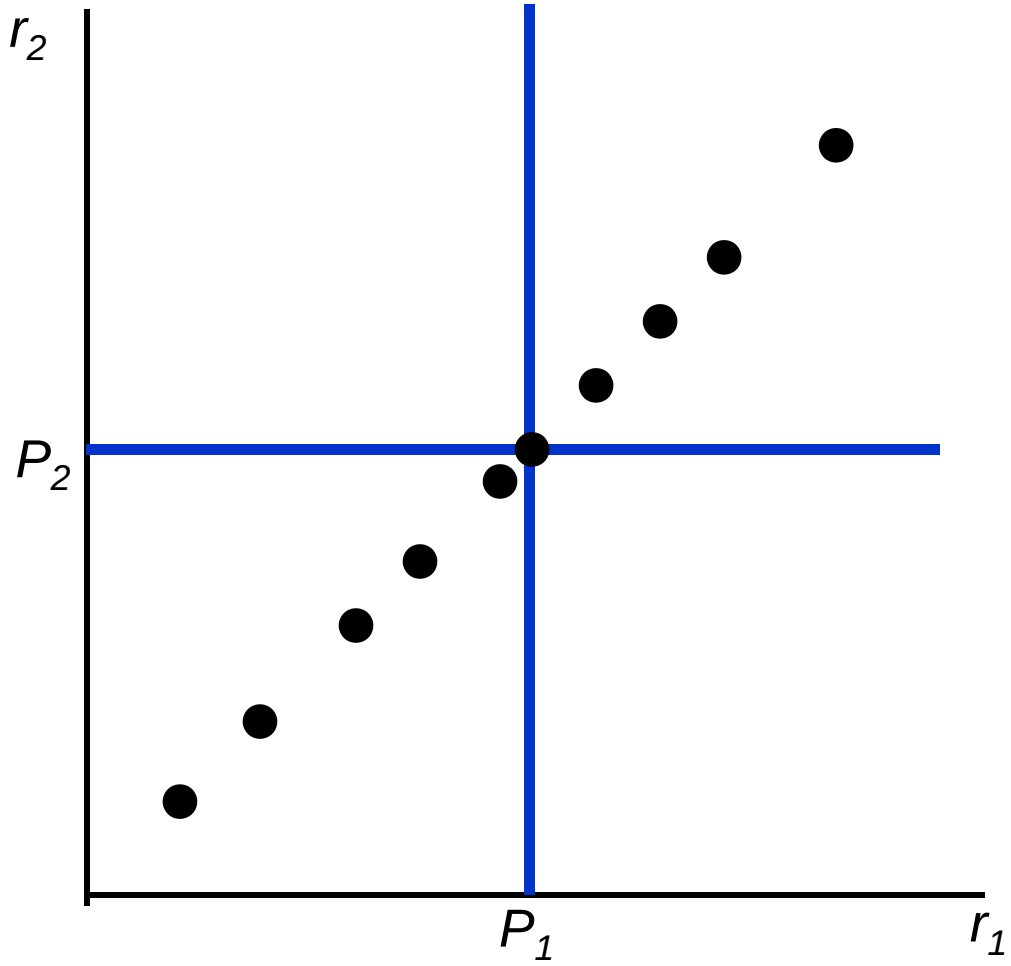


Consumers buy the bundle when $r_1 + r_2 \geq P_B$ (P_B = bundle price).
$P_B = r_1 + r_2$ or $r_2 = P_B - r_1$
Region 1: $r > P_B$
Region 2: $r < P_B$

Consumption Decisions When Products are Bundled

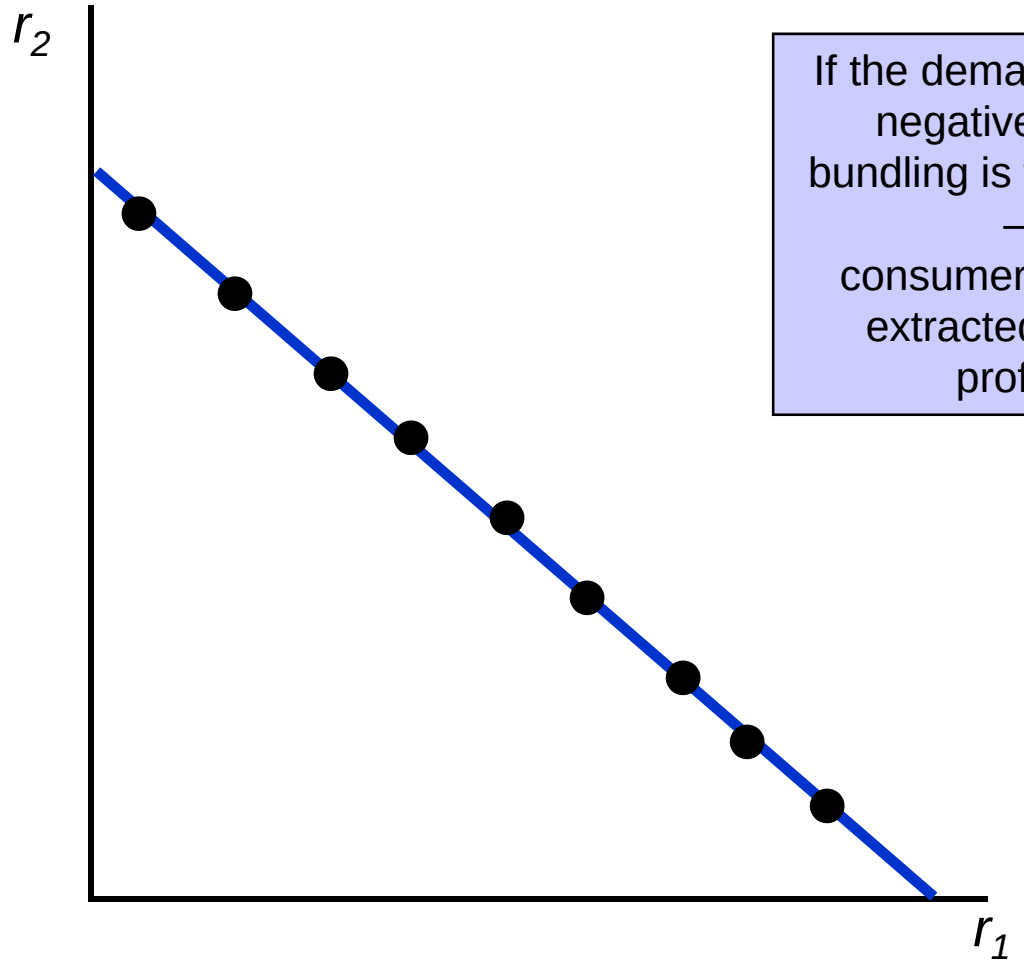
- The effectiveness of bundling depends upon the degree of negative correlation between the two demands
  - Best when consumers who have high reservation price for Good 1 have a low reservation price for Good 2 and vice versa
  - Can see graphically looking at positively and negatively correlated prices

Reservation Prices



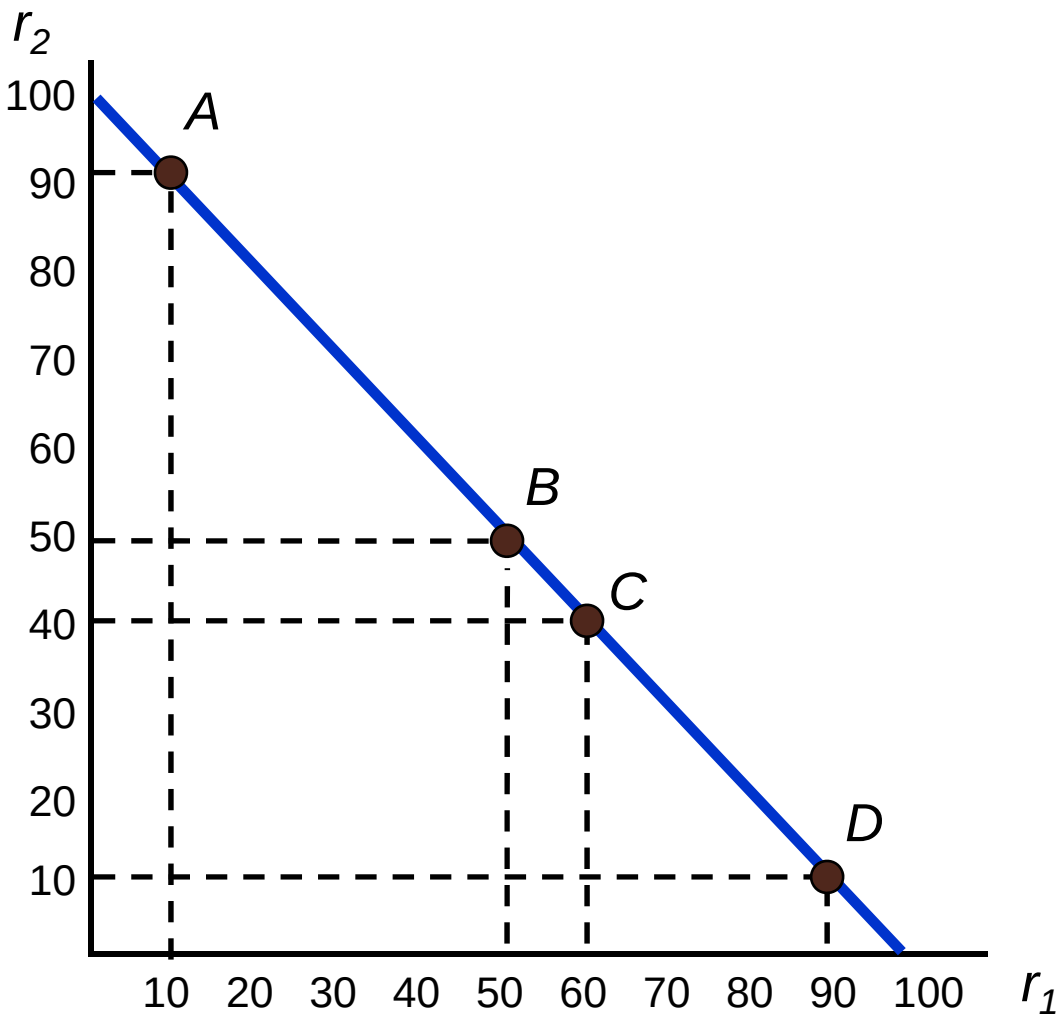
If the demands are perfectly positively correlated, the firm will not gain by bundling. It would earn the same profit by selling the goods separately.

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.

Bundling


r_2
100
90
80
70
60
50
40
30
20
10
A
B
C
D
10 20 30 40 50 60 70 80 90 100
r_1

Monopolistic Competition

- Characteristics
  1. Many firms
  2. Free entry and exit
  3. Differentiated product

Monopolistic Competition

- The amount of monopoly power depends on the degree of differentiation
- Examples of this very common market structure include:
  - Toothpaste
  - Soap
  - Cold remedies

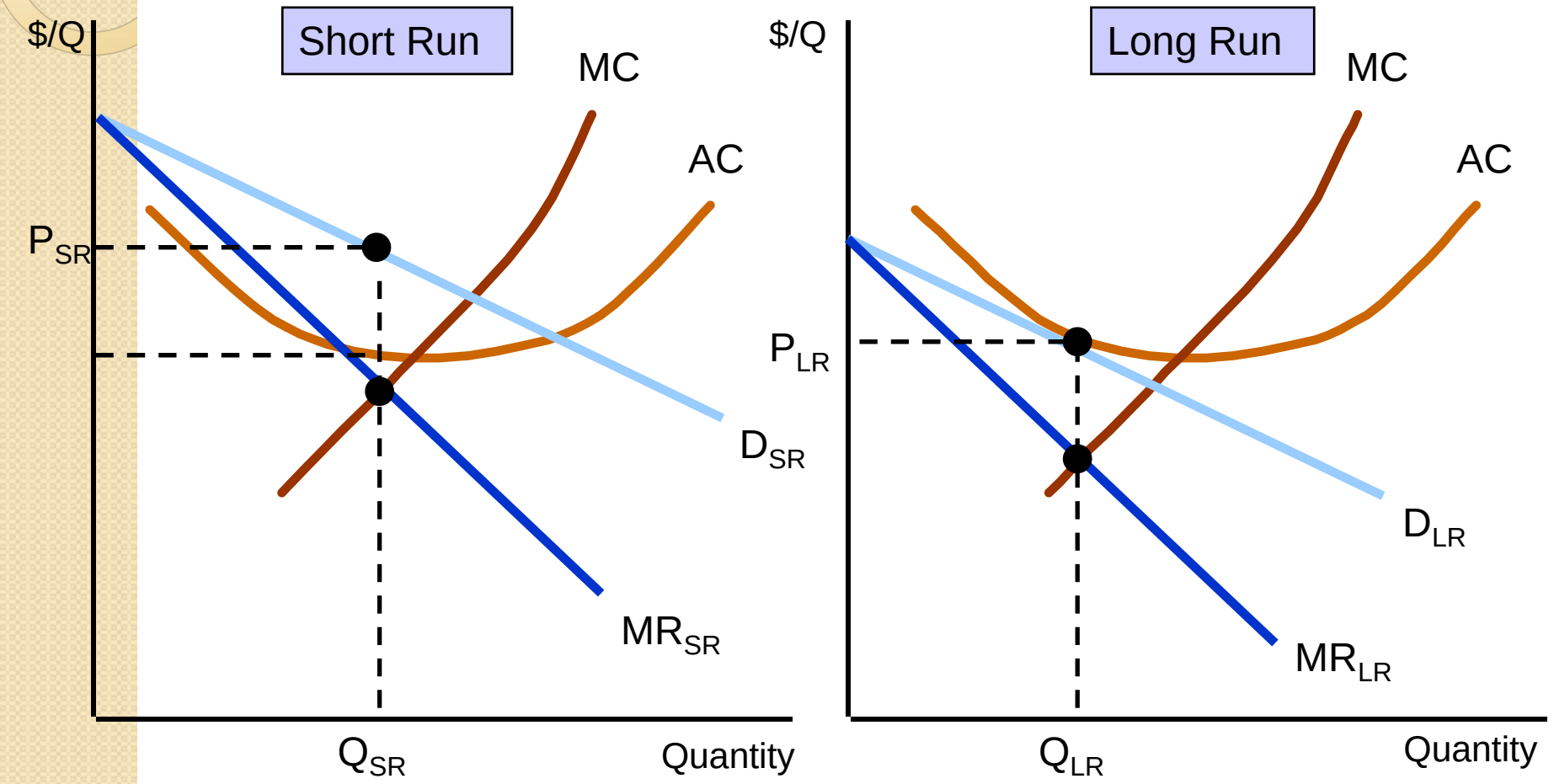
Monopolistic Competition

- Toothpaste
  - Crest and monopoly power
    - Procter & Gamble is the sole producer of Crest
    - Consumers can have a preference for Crest – taste, reputation, decay-preventing efficacy
    - The greater the preference (differentiation) the higher the price

Monopolistic Competition

- Two important characteristics
  - Differentiated but highly substitutable products
  - Free entry and exit

A Monopolistically Competitive Firm in the Short and Long Run



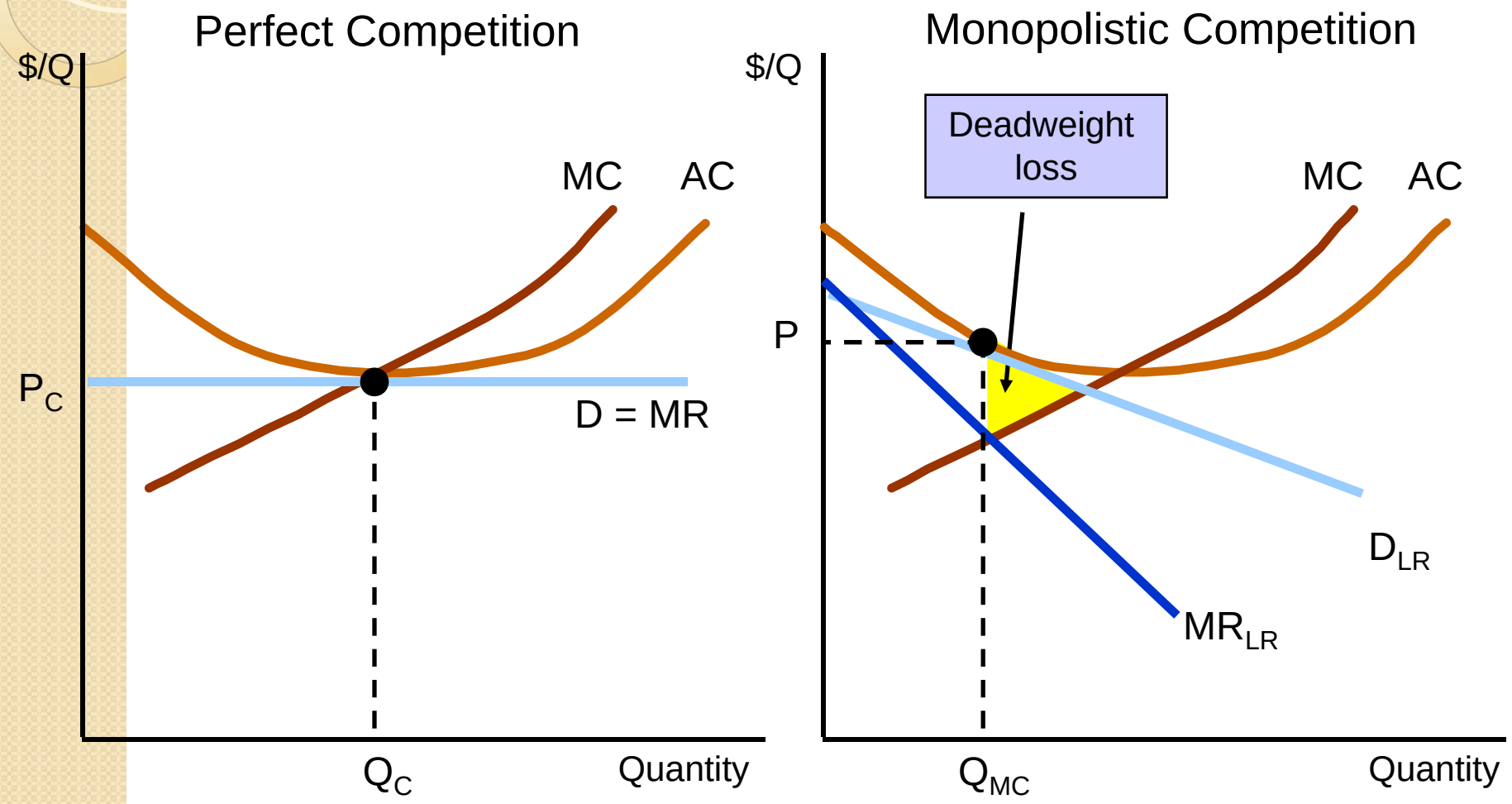
A Monopolistically Competitive Firm in the Short and Long Run

- Short run
  - Downward sloping demand – differentiated product
  - Demand is relatively elastic – good substitutes
  - MR < P
  - Profits are maximized when MR = MC
  - This firm is making economic profits

A Monopolistically Competitive Firm in the Short and Long Run

- Long run
  - Profits will attract new firms to the industry (no barriers to entry)
  - The old firm's demand will decrease to DLR
  - Firm's output and price will fall
  - Industry output will rise
  - No economic profit (P = AC)
  - P > MC → some monopoly power

Monopolistically and Perfectly Competitive Equilibrium (LR)



Monopolistic Competition and Economic Efficiency

- The monopoly power yields a higher price than perfect competition. If price was lowered to the point where MC = D, consumer surplus would increase by the yellow triangle – deadweight loss.
- With no economic profits in the long run, the firm is still not producing at minimum AC and excess capacity exists.

Monopolistic Competition and Economic Efficiency

- Firm faces downward sloping demand so zero profit point is to the left of minimum average cost
- Excess capacity is inefficient because average cost would be lower with fewer firms
  - Inefficiencies would make consumers worse off

Monopolistic Competition

- If inefficiency is bad for consumers, should monopolistic competition be regulated?
  - Market power is relatively small. Usually there are enough firms to compete with enough substitutability between firms – deadweight loss small.
  - Inefficiency is balanced by benefit of increased product diversity – may easily outweigh deadweight loss.