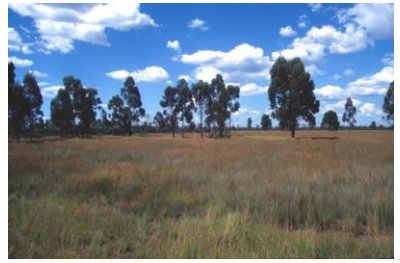
Chapter 1: Basic Economic Concepts

The Factors of Production

- **Economists classify resources into 4 categories:**
  - **Land**
    - Natural resources
    - The payment for land is **rent**



  - **Labor**
    - Human resources
    - The payment for labor is **wages**

The Factors of Production

- **Capital**
  - Tools, machines, & factories
  - The payment for capital is **interest**

- **Entrepreneurship**
  - Combines land, labor and capital in new ways in order to make profit
  - The payment for entrepreneurship is **profit**

Scarcity

- **Economics, simply put, is the study of scarcity**
  - **Scarcity exists because individuals want more than can be produced**

Marginal Cost and Marginal Benefit

- **Marginal cost:** the additional cost (above incurred costs)
  - This does not include **sunk costs**—costs that are incurred and cannot be recovered

- **Marginal benefit:** the additional benefit (above the current benefit)

Applying MC and MB

- **Making a good economic decision involves following this rule:**
  - If the **marginal benefit** of doing something exceeds the **marginal cost** DO IT
    - **MB > MC → Do it!**

MC and MB

- If the **marginal cost** of doing something exceeds the **marginal benefit** DON'T DO IT
  - **MC > MB → Don't do it!**

Opportunity Cost

- **Opportunity cost** is the benefit that you might have gained from choosing the next-best alternative
  - This is the market value of the next-best alternative
  - **Opportunity cost should always be less than the benefit of what you have chosen**
  - **Opportunity cost is the basis of cost/benefit economic reasoning**

Opportunity Cost Example

Robert has three hours to study for two final exams. The tables indicate the anticipated scores based on the time studied for each exam.

Study for Micro (In hours)	Final Exam Score (out of 100)
3	100
2	80
1	60
0	0

Study for Math (In hours)	Final Exam Score (out of 100)
0	0
1	50
2	65
3	80

Opportunity Cost Example

Study for Micro (In hours)	Final Exam Score (out of 100)
3	100
2	80
1	60
0	0

Study for Math (In hours)	Final Exam Score (out of 100)
0	0
1	50
2	65
3	80

a. Calculate the marginal benefit from studying a second hour of micro.

20 percent (difference between one hour and two hours)

Opportunity Cost Example

Study for Micro (In hours)	Final Exam Score (out of 100)
3	100
2	80
1	60
0	0

Study for Math (In hours)	Final Exam Score (out of 100)
0	0
1	50
2	65
3	80

b. Robert studies one hour of Micro and two hours of Math. Calculate his gain from studying a second hour of math.

15 percent (Difference between one and two hours of studying math)

Opportunity Cost Example

Study for Micro (In hours)	Final Exam Score (out of 100)
3	100
2	80
1	60
0	0

Study for Math (In hours)	Final Exam Score (out of 100)
0	0
1	50
2	65
3	80

c. Calculate Robert's opportunity cost of studying a second hour of math.

20 percent (can only study one hour for Micro; 80-60)

Opportunity Cost Example

Study for Micro (In hours)	Final Exam Score (out of 100)
3	100
2	80
1	60
0	0

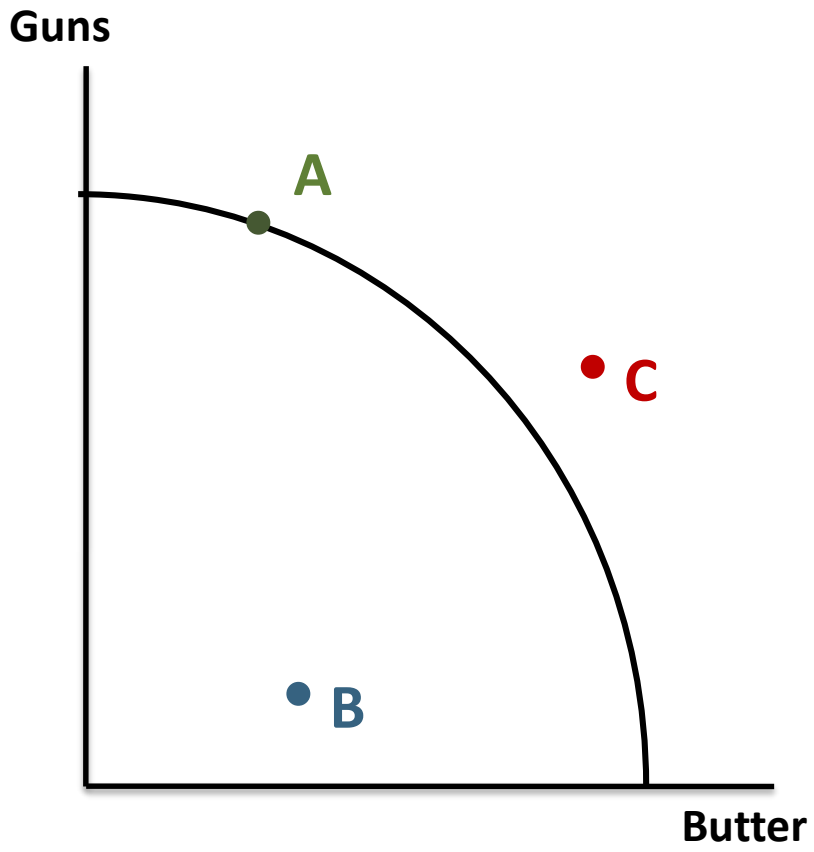
Study for Math (In hours)	Final Exam Score (out of 100)
0	0
1	50
2	65
3	80

d. Robert wants to maximize the sum of his final exam scores for Micro and math. How many hours should he study for each exam?

Two hours for Micro and one hour for math (sum of scores is 130; highest of all combinations)

Chapter 2: PPC and Trade

Draw the Graph: PPC Showing Efficient and Inefficient Points



- **A: Point of efficiency (anywhere on the curve)**
- **B: Point of inefficiency (underproducing or underutilization of resources**
- **C: Unattainable (beyond the curve)**

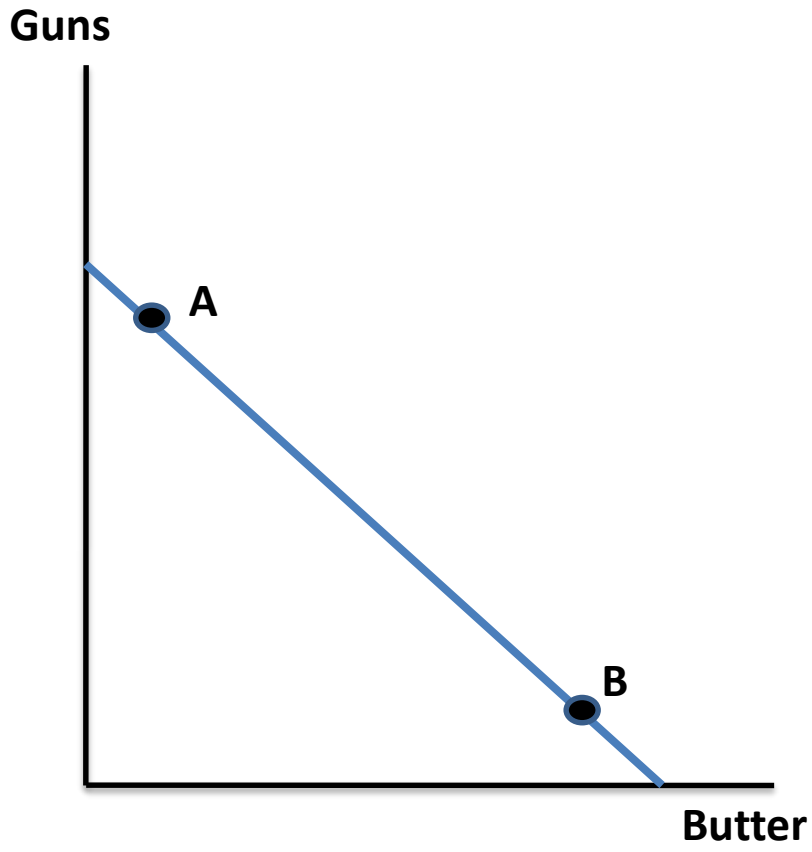
Why is the PPC a Curve?

- **Law of increasing opportunity costs**
  - As production switches from one product to another, more resources are needed to increase production of second product

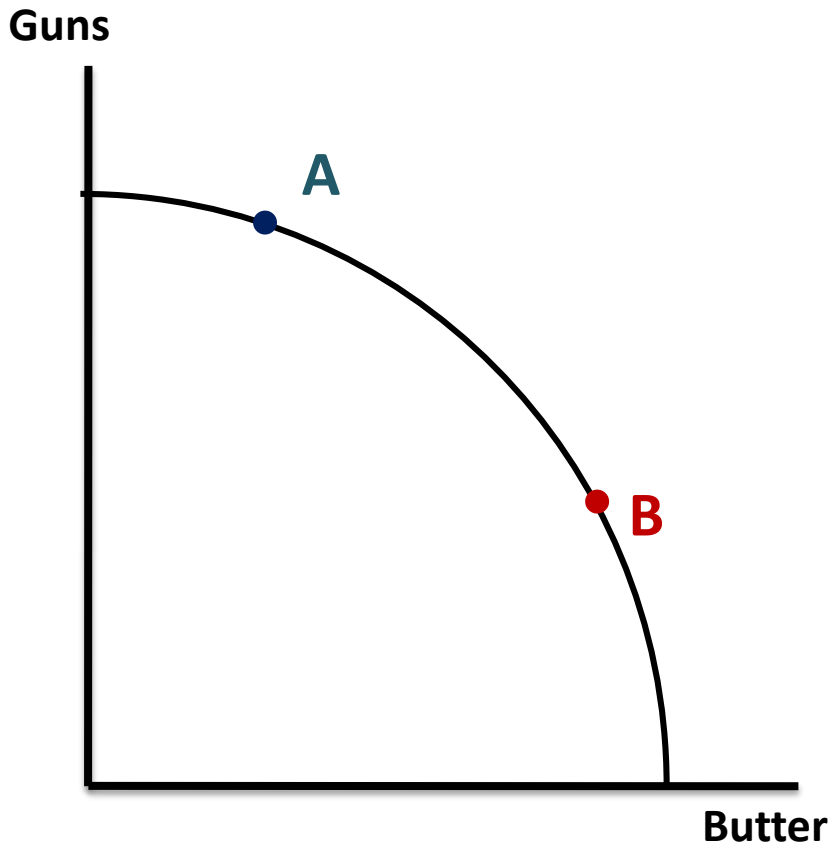
- **Reasons for increasing cost of making more of one product**
  - Need new resources, machines, or factories
  - Must retrain workers

Why can the PPC also be a straight line?

- The PPC can be a straight line to represent a **constant opportunity cost**



Opportunity Cost and Tradeoff



- **What is the difference between opportunity cost and tradeoff?**
- **Tradeoff:** to produce more guns, you have to produce less butter
- **Opportunity cost:** the specific number of butter you give up to produce more guns

Comparative Advantage

- **We cannot produce everything efficiently**
- A resource has **comparative advantage** if it has the ability to be better suited to the production of one good than another; it can be produced at the **lowest opportunity cost**

- **Countries should specialize in the good that is "cheaper" for them to produce (lower opportunity cost) and trade for goods that they have a higher opportunity cost to produce**

Absolute and Comparative Advantage

- **Absolute Advantage:** the producer that can produce the most output

- **Comparative Advantage:** the producer with the lowest opportunity cost

Determining Comparative Advantage: The Output Method

- **Output Questions:**
  - OOO=Output: Other goes Over

Determining Comparative Advantage
The Output Method

	Avocados	Soybeans
Mexico	60	15
U.S.	90	30

1. Which country has an absolute advantage in producing avocados? Explain.

- U.S.: it produces more avocados than Mexico (90 vs. 60)

Determining Comparative Advantage
The Output Method

	Avocados	Soybeans
Mexico	60	15
U.S.	90	30

2. Which country has an absolute advantage in producing soybeans? Explain.

- U.S.: it produces more soybeans than Mexico (30 vs. 15)

Determining Comparative Advantage
The Output Method

	Avocados	Soybeans
Mexico	60 1A=1/4S	15 1S=4A
U.S.	90 1A=1/3S	30 1S=3A

3. Which country has a comparative advantage in producing avocados? Explain.

- Mexico; it can produce them at a lower opportunity cost, 1/4 soybean for Mexico vs. 1/3 soybean for the U.S.

Determining Comparative Advantage
The Output Method

	Avocados	Soybeans
Mexico	60 1A=1/4S	15 1S=4A
U.S.	90 1A=1/3S	30 1S=3A

4. Which country has a comparative advantage in producing soybeans? Explain.

- The U.S.; it can produce them at a lower opportunity cost; 3 avocados for the U.S. vs. 4 for Mexico.

Terms of Trade

	Avocados	Soybeans
Mexico	60 1A=1/4S	15 1S=4A
U.S.	90 1A=1/3S	30 1S=3A

Terms of trade refers to trade that is mutually beneficially to both countries.

- **The U.S. has a comparative advantage in soybeans. It would specialize in soybeans if it could get more than 3 avocados through trade.**

- **Mexico has a comparative advantage in avocados. It would specialize in avocados if it could get one soybean for less than 4 avocados through trade.**

Terms of Trade

	Avocados	Soybeans
Mexico	60 1A=1/4S	15 1S=4A
U.S.	90 1A=1/3S	30 1S=3A

What would be an acceptable term of trade for soybeans?

- **Anywhere between 3 and 4 avocados**

- **1 soybean for 3.5 avocados: this would allow the U.S. to get 3.5 avocados from Mexico by sending 1 soybean to Mexico.**

- **This would allow Mexico to obtain 1 ton of soybeans for 3.5 avocados, a lower opportunity cost (on their own it they would have to give up 4 avocados to produce 1 soybean)**

Determining Comparative Advantage: The Input Method

Input Questions

- IOU= Input: Other goes Under
- Usually the amount of hours (or labor) to produce something

Determining Comparative Advantage: The Input Method

	Car (in hours)	Machines (in hours)
Mexico	4	2
U.S.	2	6

1. Which country has an absolute advantage in producing cars? Explain.

- **The U.S.: it can produce cars in 2 hours while Mexico can produce them in 4 hours**
- **★★Notice that when looking at hours, that the country with the absolute advantage is the one with the fewest hours**

Determining Comparative Advantage: The Input Method

	Car (in hours)	Machines (in hours)
Mexico	4	2
U.S.	2	6

2. Which country has an absolute advantage in producing machines?

- **Mexico: it can produce machines in 2 hours while the U.S. can produce machines in 6 hours**

Determining Comparative Advantage: The Input Method

	Car (in hours)	Machines (in hours)
Mexico	4 1C=2M	2 1M=1/2C
U.S.	2 1C=1/3M	6 1M=3C

3. Which country has a comparative advantage in producing cars? Explain.

- **The U.S. has a comparative advantage in cars because it can produce them with a lower opportunity cost (1/3 machine for the U.S. vs. 2 machines for Mexico).**

Determining Comparative Advantage: The Input Method

	Car (in hours)	Machines (in hours)
Mexico	4 1C=2M	2 1M=1/2C
U.S.	2 1C=1/3M	6 1M=3C

4. Which country has a comparative advantage in producing machines?

- **Mexico has a comparative advantage in machines because it can produce them with a lower opportunity cost (1/2 car for Mexico vs. 3 cars for the U.S.).**

Terms of Trade

	Car (in hours)	Machines (in hours)
Mexico	4 1C=2M	2 1M=1/2C
U.S.	2 1C=1/3M	6 1M=3C

5. What would be terms of trade for machines?

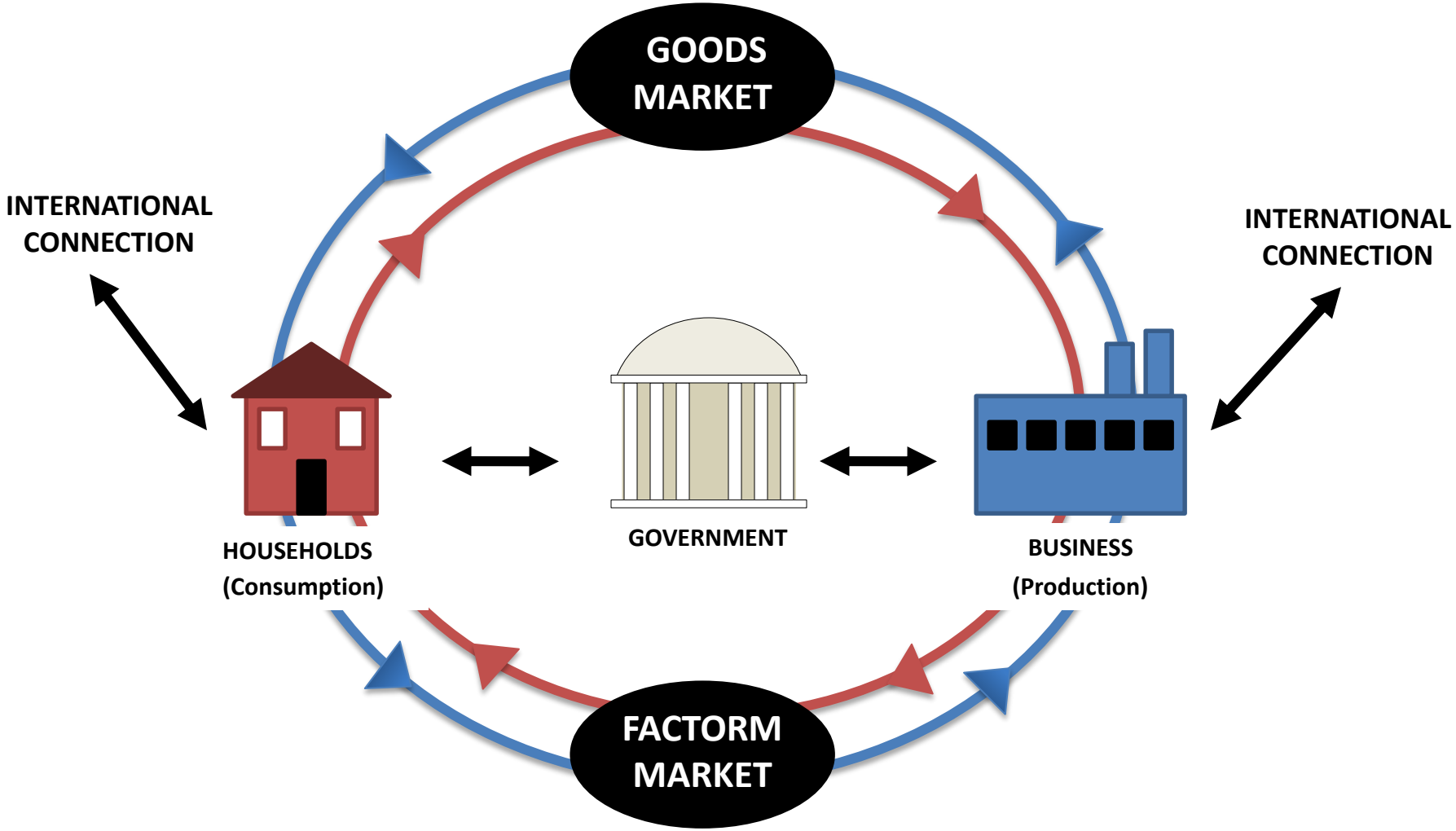
- **Anywhere between ½ car and 3 cars.**
- **Mexico has the comparative advantage in machines. It would specialize in machines if it could get more than ½ car through trade.**
- **The U.S. has the comparative advantage in cars. It would specialize in cars if it could get one machine for less than 3 cars through trade.**

Chapter 3: Economic Systems

What is an Economic System?

- **Economic system: how society uses resources to satisfy people's wants**
  - Seeks to answer the **three** economic questions:
    - **What to produce?**
    - **How to produce it?**
    - **For whom to produce?**
  - Remember, due to **scarcity** we cannot produce everything we want

The Circular Flow Model



Economic Systems

- **Market economy:** based on private property; individuals decide how, what, and for whom to produce

- **Socialism**: society decides what, how, and for whom to produce; government ownership of the means of production with economic activity governed by central planning

- **Command economy:** government controls the factors of production and determines who gets what and how much

Chapter 4: Supply and Demand

Demand

- **Law of demand:** inverse relationship between P and Q

- A change in price changes **quantity demanded**
  - This is a **movement along the demand curve**

- **A change in anything other than price is a shift in demand**

Demand Shift Factors

1. Consumer income

- Increases = buy more normal goods and less inferior goods

2. Market size/population: significant increase in population in the Southwest will **increase** demand for housing

- A decrease in population in a city would **decrease** demand for housing

Demand Shift Factors

3. Consumer tastes and preferences

- When a good/service is popular, consumers demand **more** of it at all prices
- When the product becomes **less** popular, consumers demand less of it

4. Consumer expectation of price

- If consumers expect prices to rise in the future, demand **increases** now
- If consumers expect prices to fall in the future, demand **decreases** now

Demand Shift Factors

5. Substitute goods: goods and services that can be used in place of each other

- If the price of a substitute good drops, people will buy that good and **not** the original item
- Example: The demand for ice tea **increases** when the price of its substitute, lemonade, **increases**

6. Complementary goods: goods/services used together

- Example: When the price of movie tickets **decreases**, the demand for theatre popcorn **increases**

Supply

- **Law of supply:** direct relationship between P and Q (suppliers want to supply more at a higher price than at a lower price)

- A change in price changes **quantity supplied**
  - This is a **movement along the supply curve**

- **A change in anything other than price is a shift in supply**

Supply Shift Factors

1. **Input costs**
   - Increase= decreases supply
   - Decrease=increases supply

2. **Labor productivity**: the amount of goods or services that a person can produce in a given time
   - More productive=increase in supply

Supply Shift Factors

3. Technology: advances always increase supply

4. Government action: Taxes and subsidies

- Taxes always **decrease** supply
- Subsidies always **increase** supply

Supply Shift Factors

5. Producer expectations of price

- Producers supply less now if they believe the price will be higher in the future (and vice versa)

6. Number of producers/suppliers:

- More producers=more supply (and vice versa)

Chapter 5: Double Shifts in S + D
Price Ceilings and Price Floors

Double Shifting Example #1

- **Scenario: Consumers prefer to buy fuel efficient cars while technology to make more fuel efficient cars improves. Graph the market for fuel efficient cars.**

- **What are the S+D shift factors?**
  - D=Consumer tastes and preferences
  - S=Technology

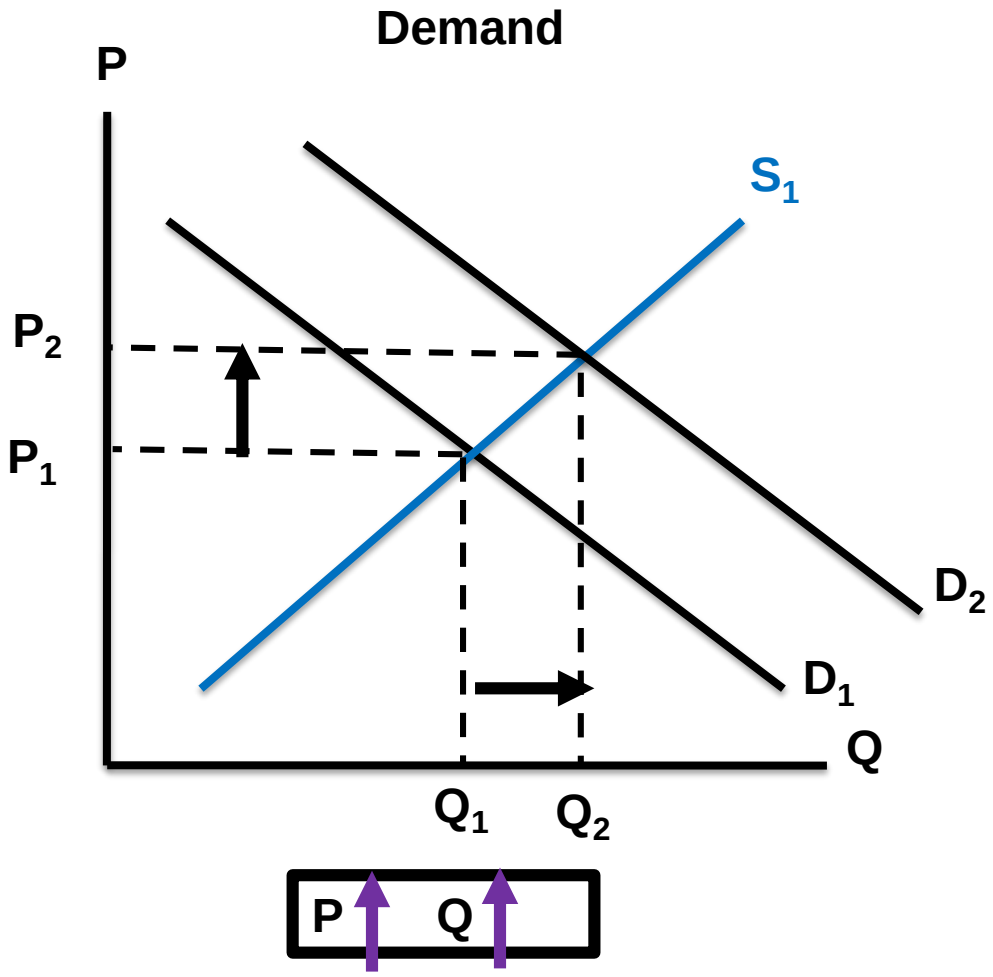
Double Shifting Example #1

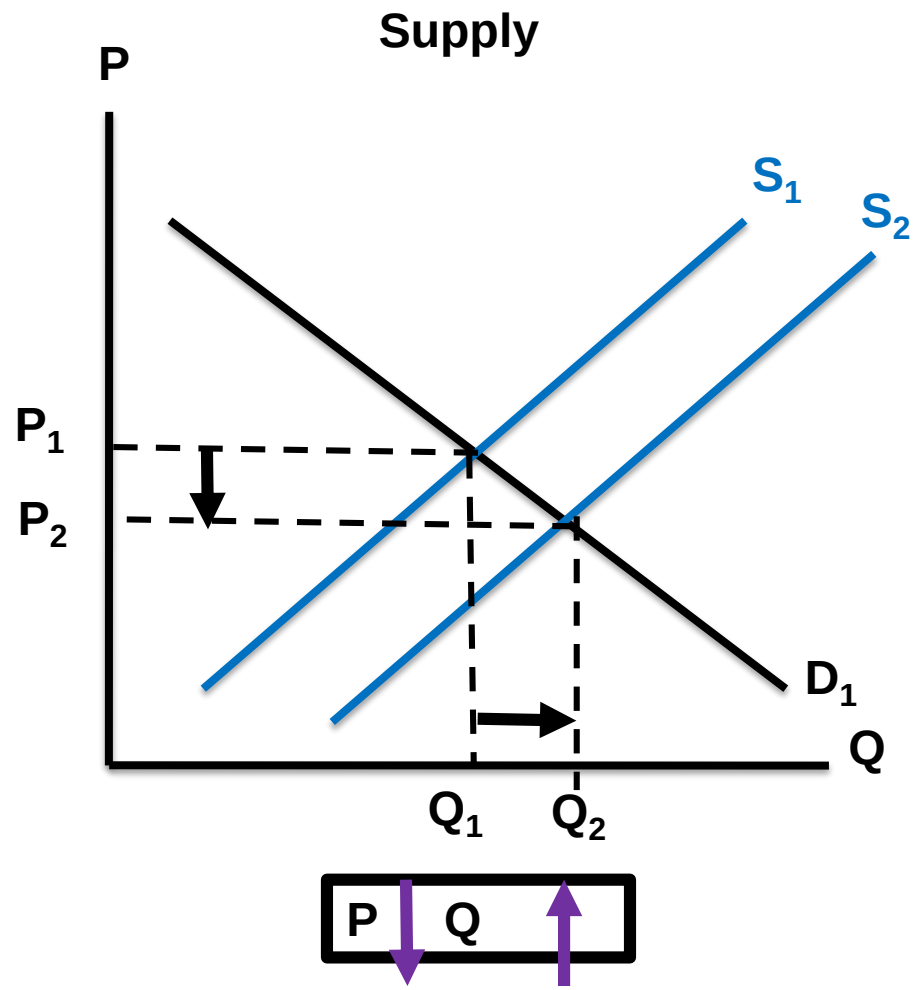
- **Which way is the demand curve shifting?**
  - Demand is increasing

- **Which way is the supply curve shifting?**
  - Supply is increasing

- **Graph each shift independently to determine how P and Q are impacted**

Double Shifting Example #1



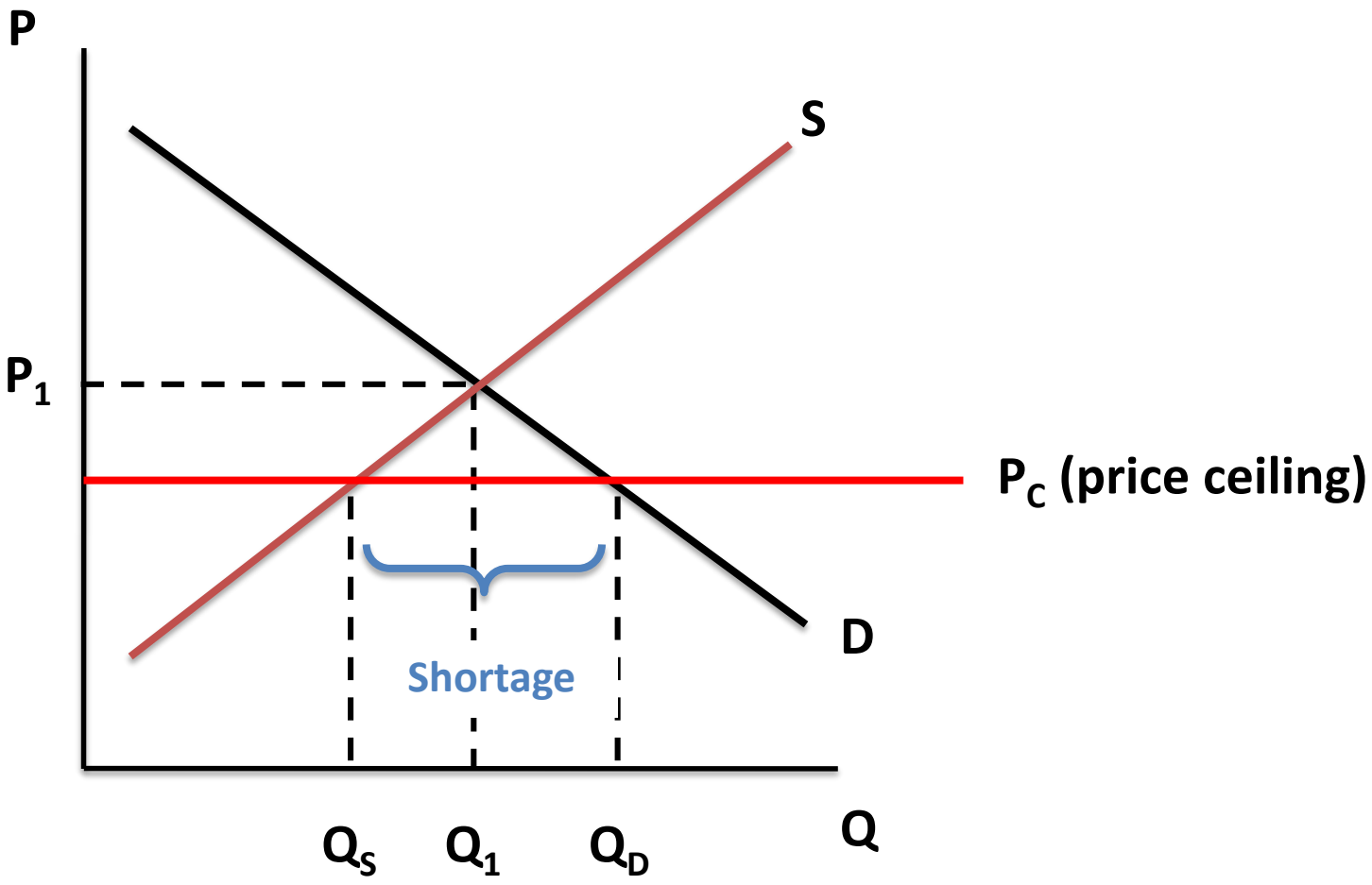


Price Ceiling

- **When a government wants to hold prices down to favor buyers, it imposes a price ceiling**

- A **price ceiling** is a government-imposed limit on **how high** a price can be charged
  - Creates a **shortage**
  - Generally affects the market when set **below** equilibrium price

Price Ceiling

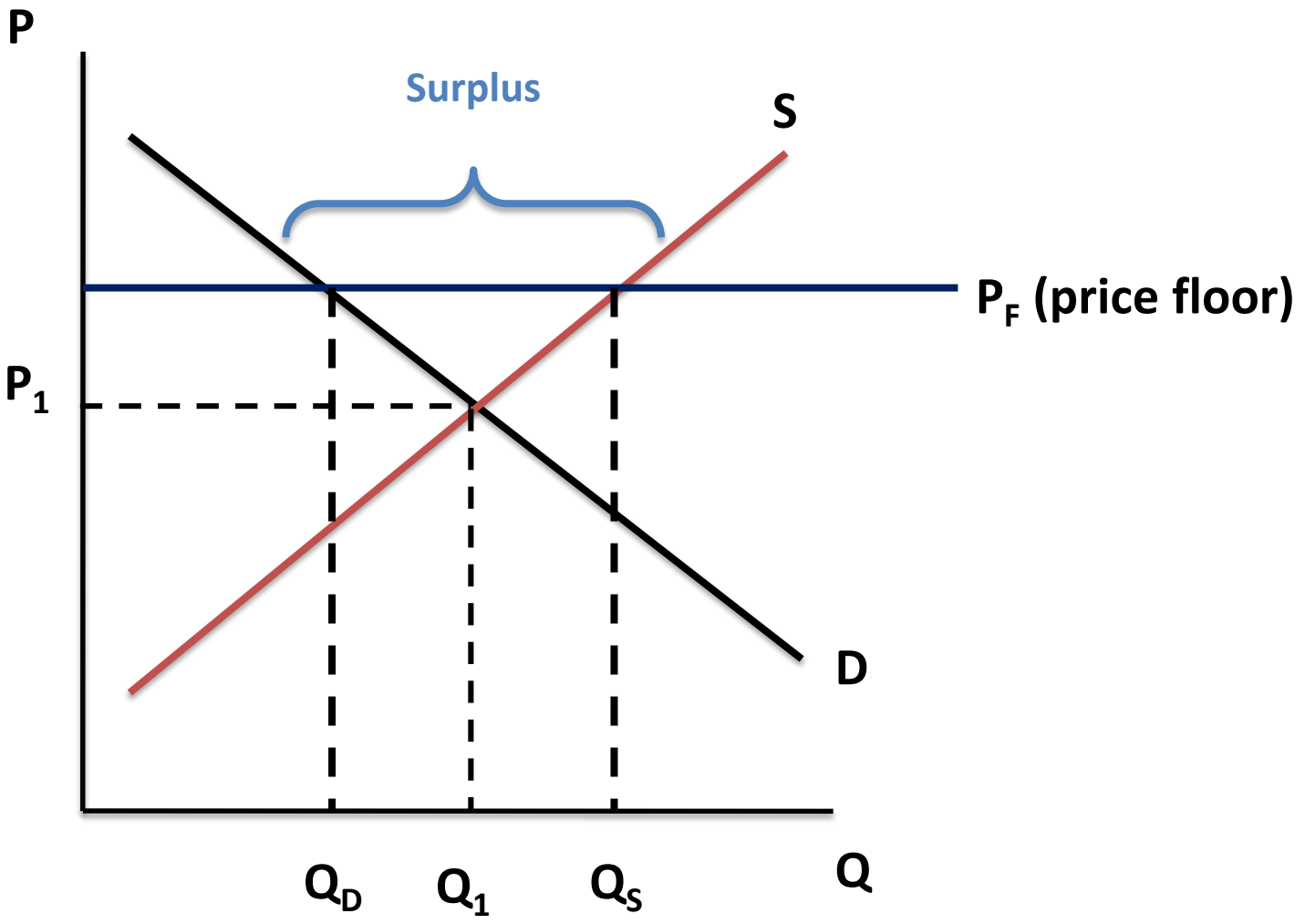


Price Floor

- **When a government wants to prevent a price from falling below a certain level to favor suppliers, it imposes a price floor**

- A **price floor** is a government-imposed limit on **how low** a price can be charged
  - Creates excess supply
  - Generally affects the market when set **above** equilibrium price

Price Floor



Chapter 6: Elasticity

Price Elasticity of Demand: Elastic Demand

- It is a measurement of consumers' responsiveness to a change in **price**

$$E_D = \frac{\%\text{ change in Quantity Demanded}}{\%\text{ change in Price}}$$

- Price elasticity of demand is always expressed as a **positive number (E>1)**

Price Elasticity of Demand: Inelastic Demand

- When demand is inelastic, quantity demanded is **insensitive** to a change in price—meaning there will be little change
  - If price increases, quantity demanded will fall a little
  - If price decreases, quantity demanded will increase a little

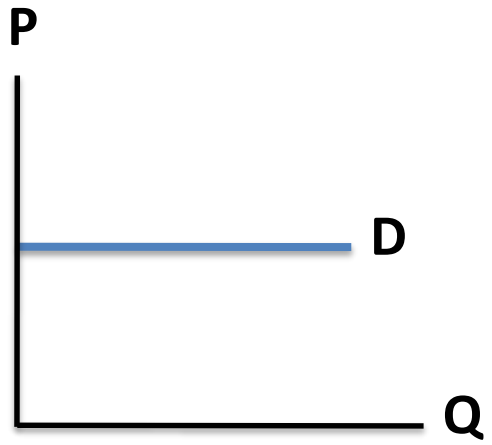
- Demand is inelastic if the percentage change in quantity is *less than* the percentage change in price
- **Inelastic demand=$E_D < 1$**

Characteristics of Elastic and Inelastic Goods

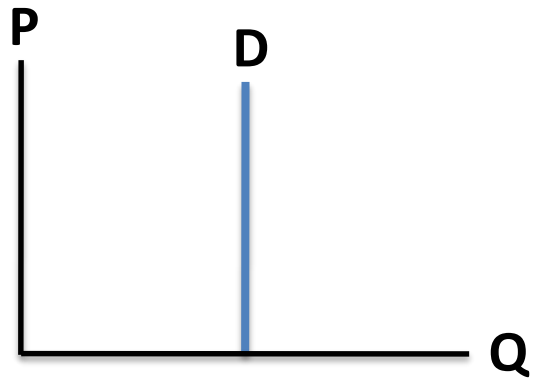
Elastic	Inelastic
• Many substitutes • Luxuries • Large portion of income • Plenty of time to decide • Elasticity coefficient greater than 1	• Few substitutes • Necessities • Small portion of income • Required now, rather than later • Elasticity coefficient less than 1

Perfectly Elastic and Perfectly Inelastic Demand

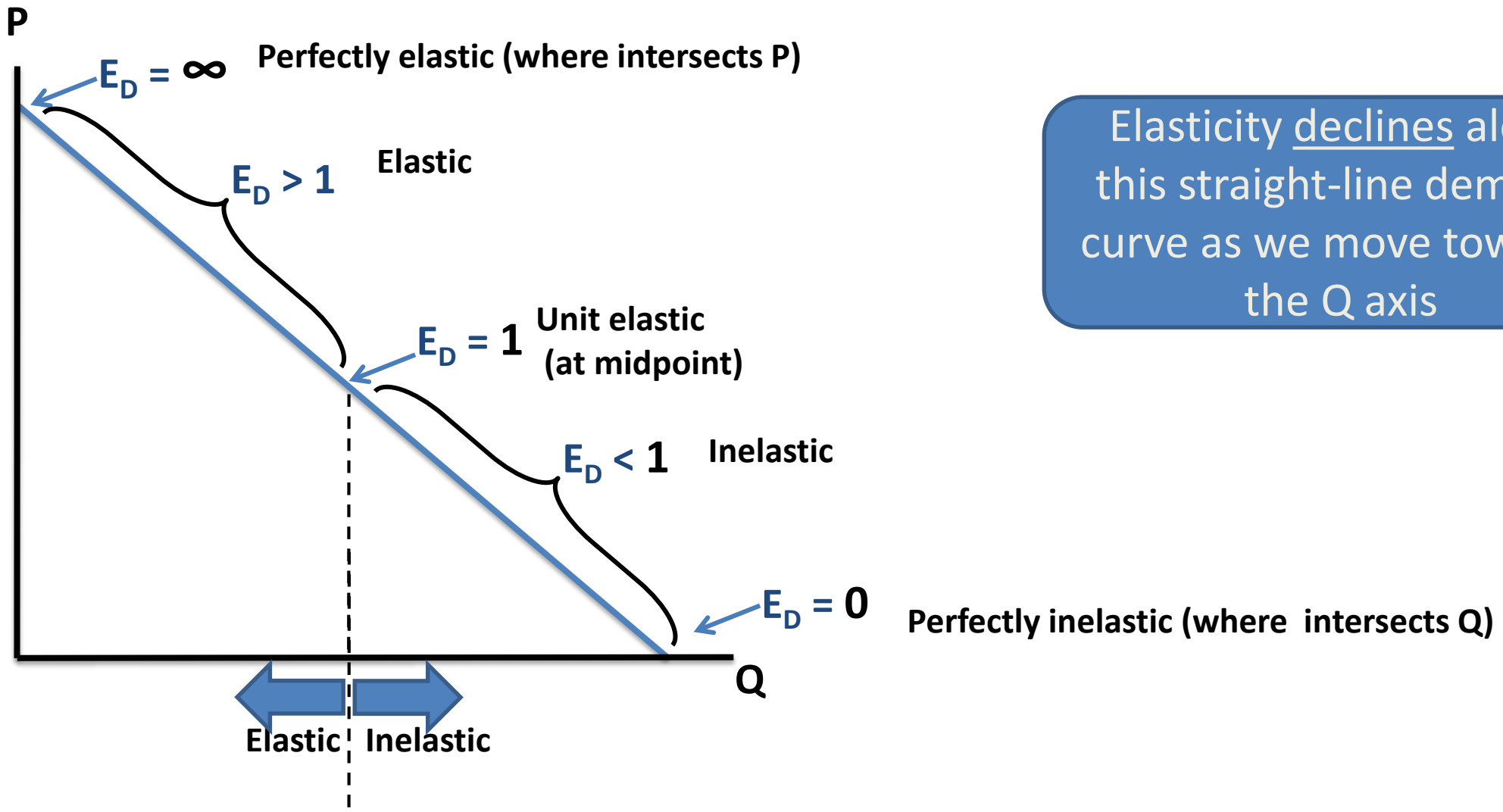
- This curve is perfectly elastic, meaning that Q responds enormously to changes in price, $E_D = \infty$



- This curve is perfectly inelastic, meaning that Q does not respond at all to changes in price, $E_D = 0$. Q is insensitive to changes in P.



Elasticity Along a Demand Curve



Elasticity declines along this straight-line demand curve as we move towards the Q axis

Calculating Elasticity: Using the Midpoint Formula

- **One way to calculate elasticity is to use the midpoint formula**

$$E_D = \frac{\%\Delta Q}{\%\Delta P} = \frac{\frac{Q_2 - Q_1}{\frac{1}{2}(Q_2 + Q_1)}}{\frac{P_2 - P_1}{\frac{1}{2}(P_2 + P_1)}}$$

- **When given price and quantity for two points on a line, we can use the above formula**

Calculating Elasticity: Using the % Δ Formula

- **Another way to calculate elasticity (when given two sets of points) is to use the percent change formula:**

$$\frac{\frac{Q_2 - Q_1}{Q_1}}{\frac{P_2 - P_1}{P_1}}$$

$$\frac{\text{(New) } Q_2 \text{ minus (old) } Q_1 \text{ divided by (old) } Q_1}{\text{(New) } P_2 \text{ minus (old) } P_1\text{, divided by (old) } P_2}$$

Total Revenue Test

- **Total Revenue = Price x Quantity (Can only use for demand, NOT supply)**
- **Elastic Demand:** If $E_D > 1$
  - Price increase causes TR to decrease
  - Price decrease causes TR to increase
- **Inelastic Demand: If $E_D < 1$**
  - Price increase causes TR to increase
  - Price decrease causes TR to decrease
- **Unit Elastic: If $E_D = 1$**
  - A change in price changes leaves TR unchanged

Income Elasticity of Demand

- **Income elasticity of demand** measures the responsiveness of demand to changes in income

$$E_{\textbf{Income}} = \frac{\%\text{ change in Demand}}{\%\text{ change in Income}}$$

Income Elasticity of Demand

- **Normal goods:** consumers buy more of these goods when income increases
  - **Normal goods:** $E_{income} > 0$
  - **Necessity**: $0 < E_{income} < 1$ (greater than 0 and less than 1)
  - **Luxury:** $E_{Income} > 1$

Income Elasticity of Demand

- **Inferior goods** consumers buy fewer of these goods when income increases

$$E_{\textbf{Income}} < 0 \text{ (negative number)}$$

Cross–Price Elasticity of Demand

- **Cross–price elasticity of demand** measures the responsiveness of demand to changes in prices of other goods

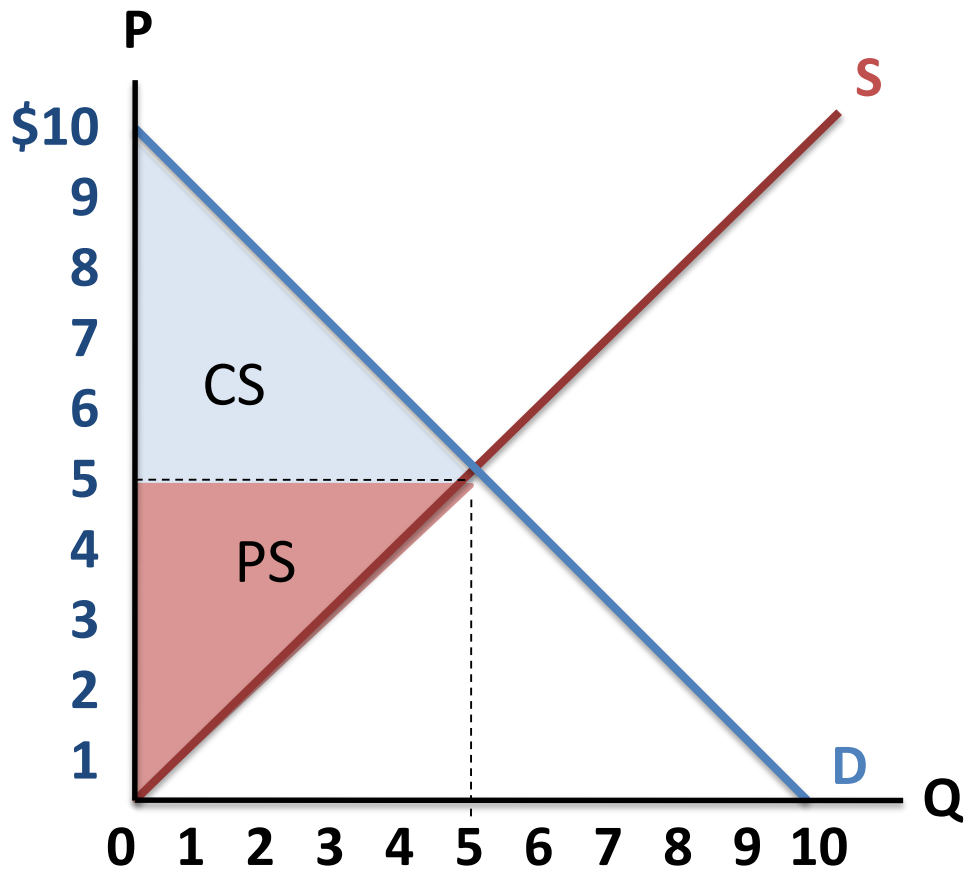
$$E_{\text{cross-price}} = \frac{\%\text{ change in Demand}}{\%\text{ change in P of related good}}$$

Cross–Price Elasticity of Demand

- **Cross-price elasticity tells us if goods are substitutes or complements**
  - Here, positive and negative matters
    - **Substitutes:** $E_{\text{cross-price}} > 0$ (positive number)
    - **Complements:** $E_{\text{cross-price}} < 0$ (negative number)

Chapter 7: CS + PS + Tax Burden

Producer and Consumer Surplus

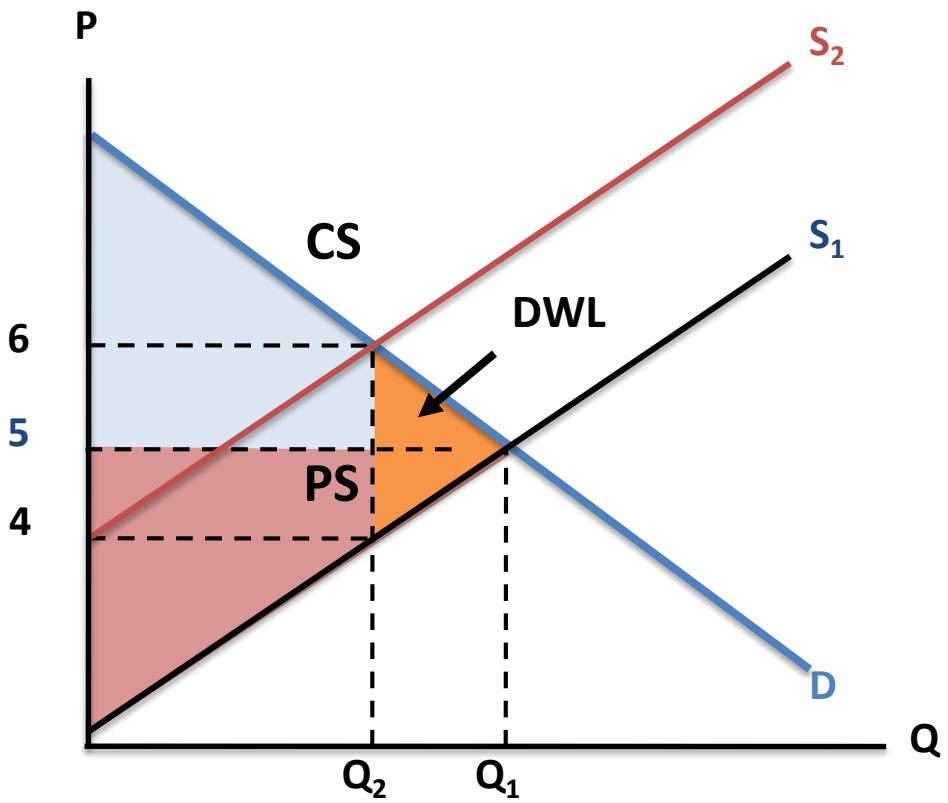


Consumer surplus = area of red triangle = ½(5)($5) = $12.50

Producer surplus = area of green triangle = ½(5)($5) = $12.50

The combination of producer and consumer surplus is maximized at market equilibrium

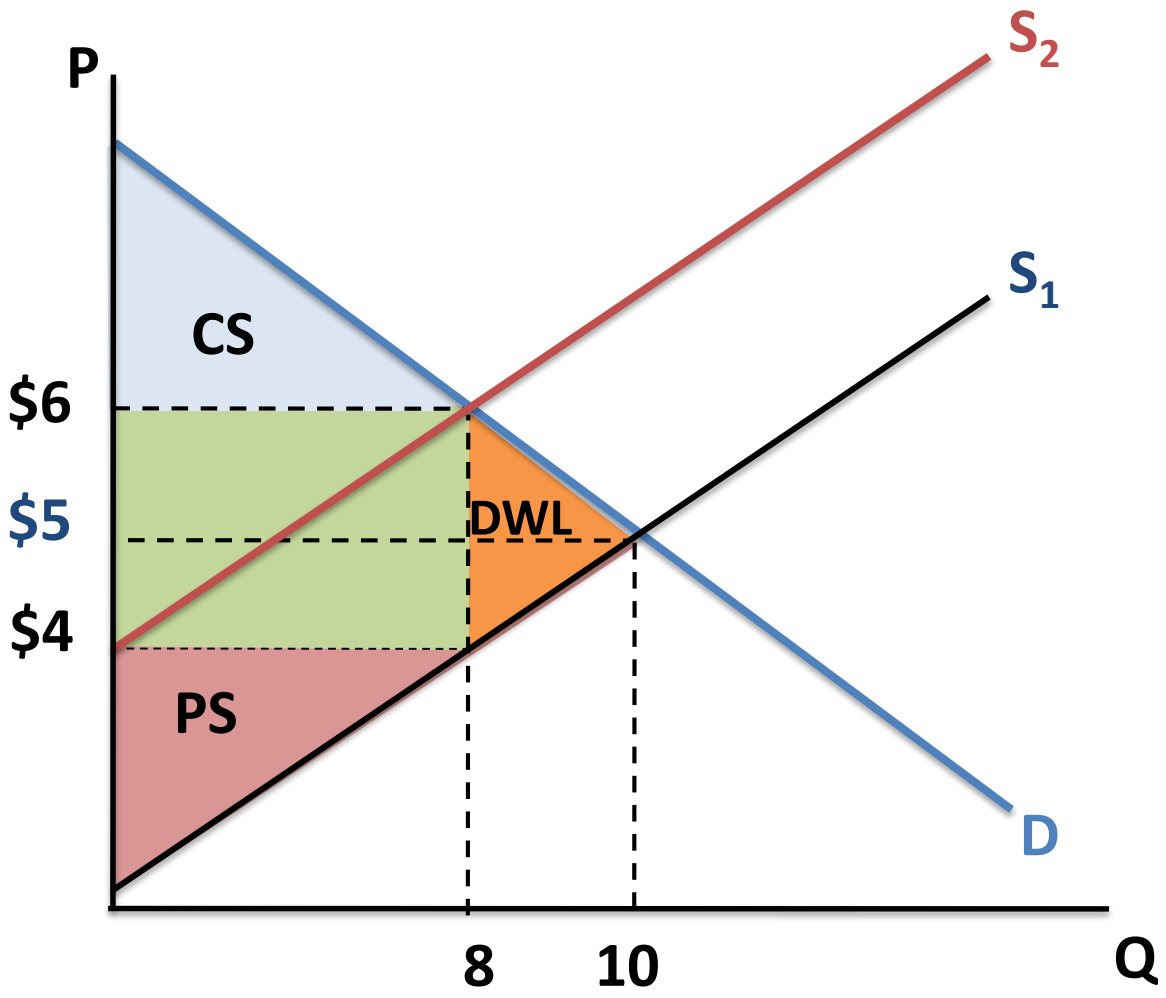
Draw the Graph: A $2 Tax



The amount of the tax is the distance between the supply curves

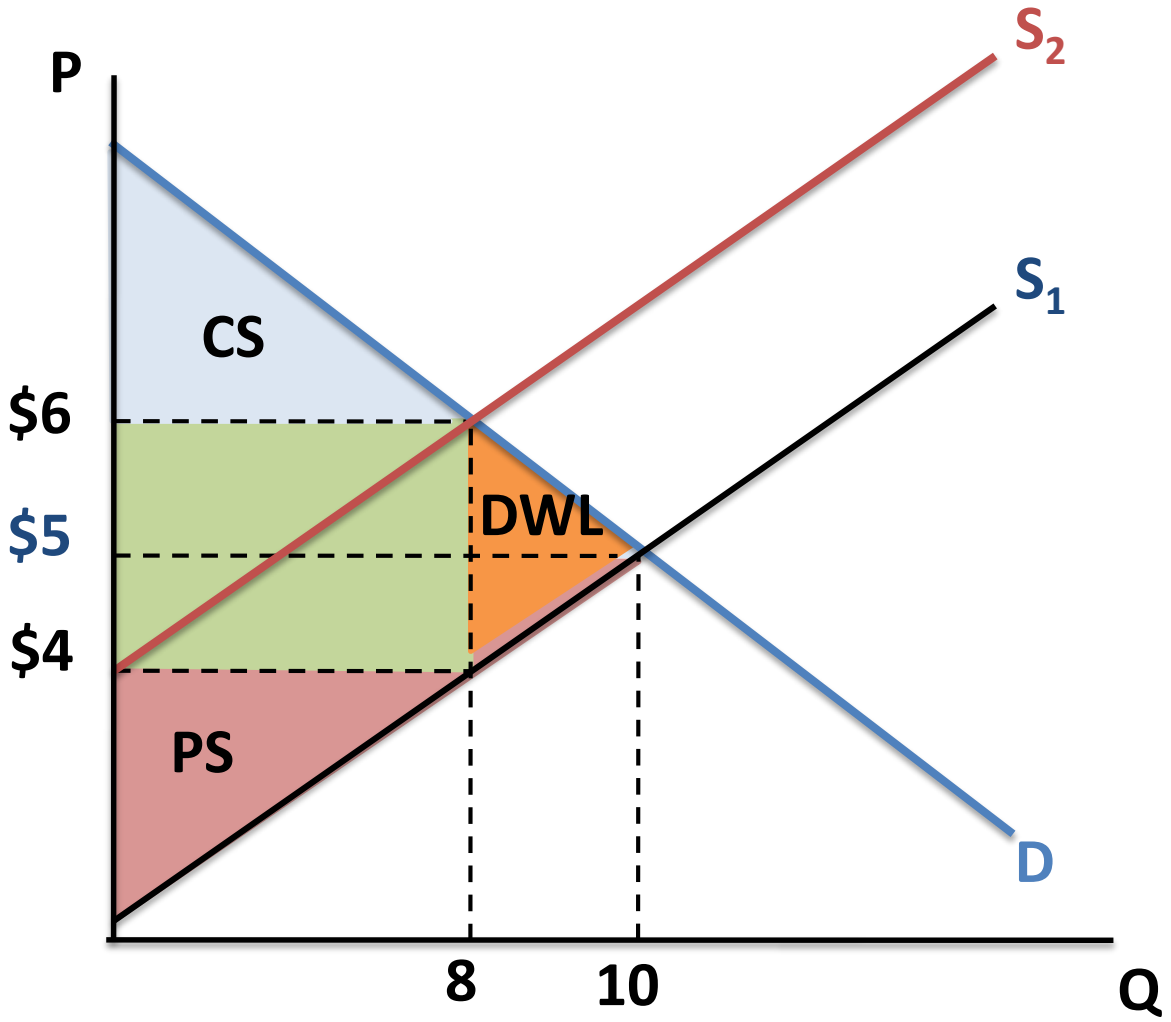
- The distance between the supply curves is $2.
- The new equilibrium price is $6.
- The orange triangle represents DWL as a result of the tax.
- Both CS and PS **decrease** as a result of the tax

Revenue Box



- The revenue box is created by the distance between the supply curves and by drawing a line from each point to the price axis
- This results in a smaller area of CS and PS
- Using the graph, what is the amount of tax revenue?
- The amount of tax revenue is $2(8) =$16

What price do buyers pay and sellers keep as a result of a $2 tax?



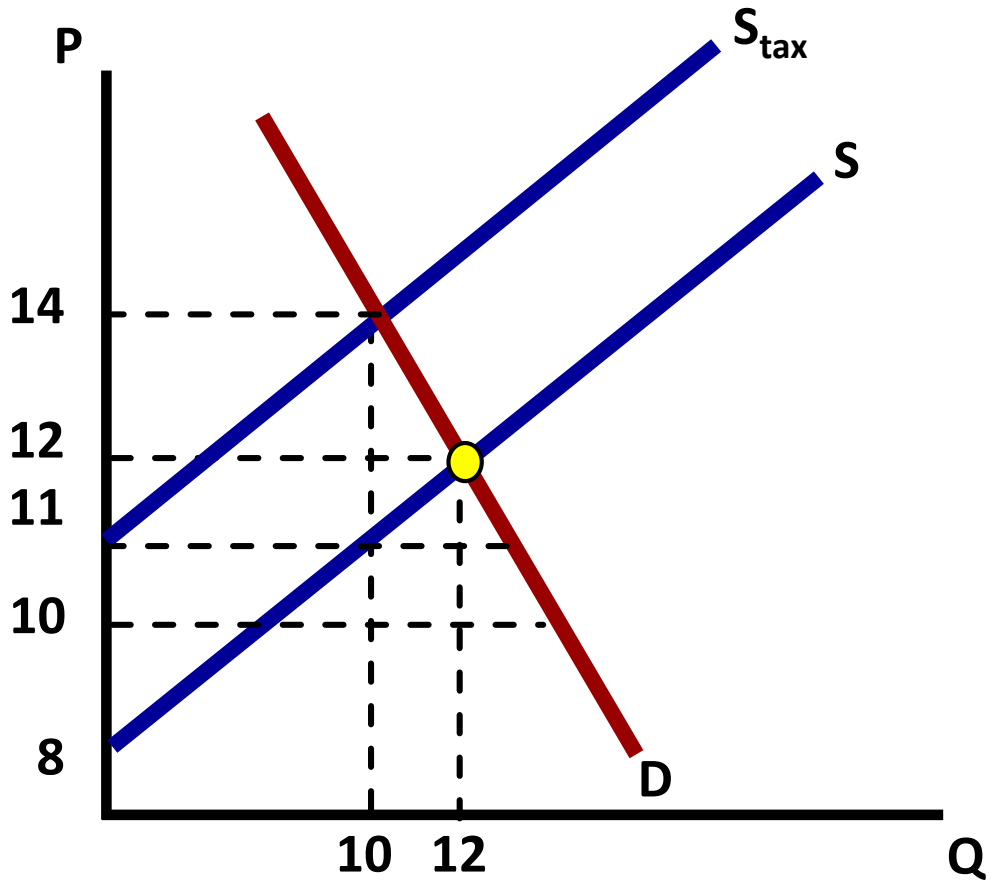
- What price do **buyers** pay?
- They pay **$6** (were paying $5 before the tax; an increase of $1)

- What is the price **sellers** keep?
- **$4** (the new price is $6 but they have to pay the $2 tax)

Who Bears the Burden of Taxation?

- The more ***inelastic*** one's relative demand and supply, the ***larger*** the tax burden one will bear
  - If **demand** is more **inelastic** than **supply**, **consumers** will **pay the higher share**
  - If **supply** is more **inelastic** than **demand**, **suppliers** will **pay the higher share**

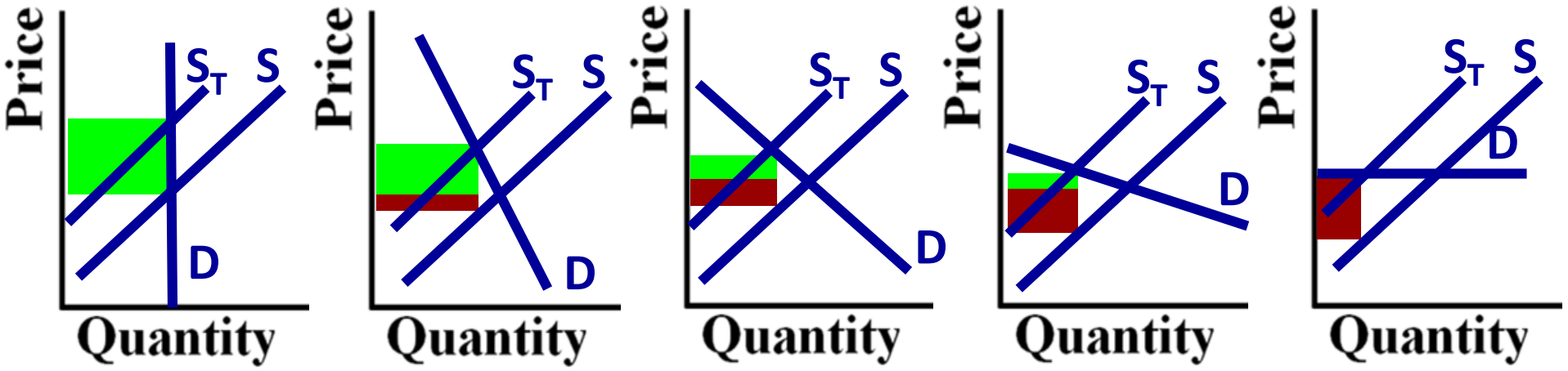
Who Bears the Burden of Taxation?



Calculate the following:

1. **Tax per unit**
   $3
2. **Total tax revenue**
   $3(10)=$30
3. **Amount of tax paid by consumers**
   $2(10)=$20
4. **Amount of tax paid by producers**
   $1(10)=$10
5. **Total expenditures**
   $14(10)=$140
6. **Total revenue for firms**
   $11(10)=$110
7. **Who bears the greater tax burden? Why?**
   Demanders; Demand is relatively inelastic compared to supply

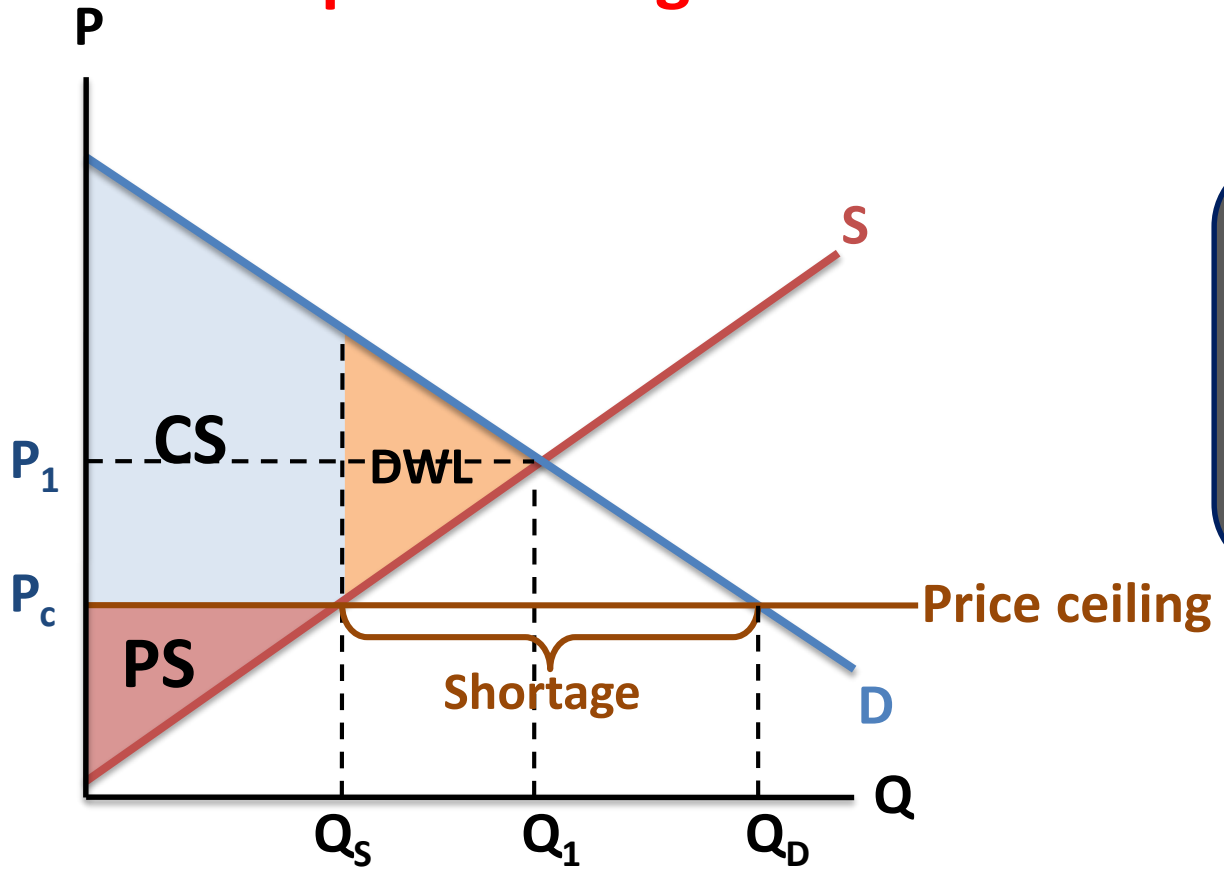
Summary: Who Bears the Burden of Taxation Based on Elasticity



Perfectly Inelastic	Relatively Inelastic	Unit Elastic	Relatively Elastic	Perfectly Elastic
Tax burden paid entirely by consumers	Tax burden mostly on consumers	Tax burden shared by consumers and producers	Tax burden mostly on producers	Tax burden paid entirely by producers

Government Intervention: Price Ceiling

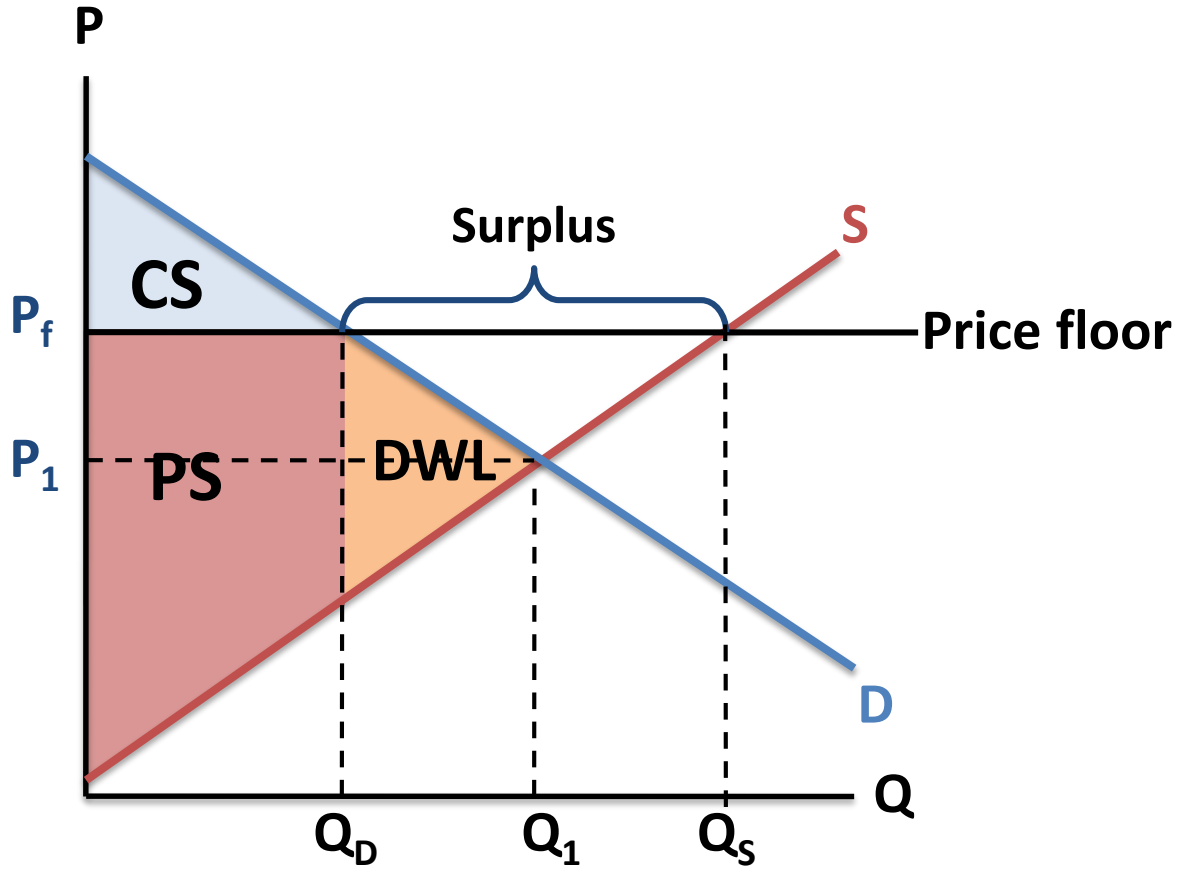
An effective price ceiling is set below market equilibrium price



A price ceiling transfers surplus from producers to consumers, generates deadweight loss, and reduces equilibrium quantity

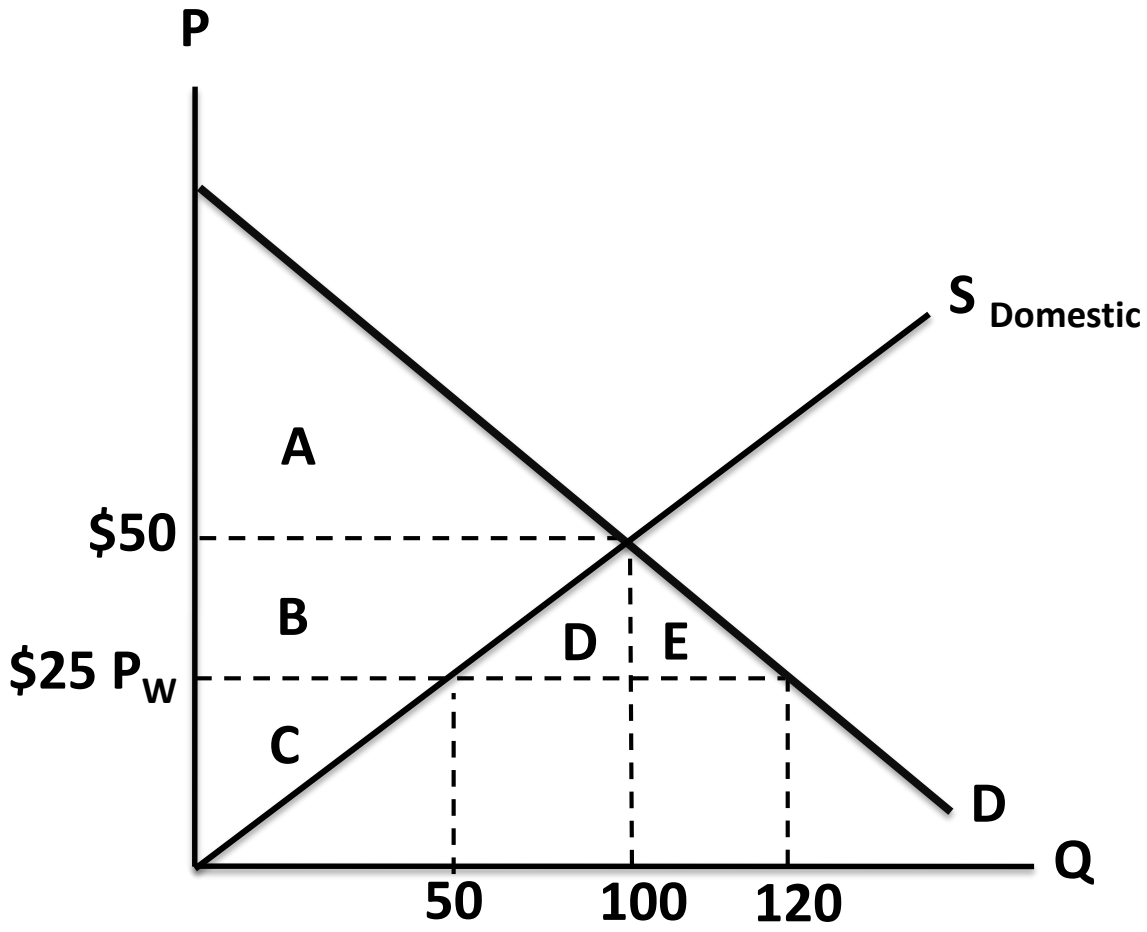
Government Intervention: Price Floor

An effective price floor is set above market equilibrium price



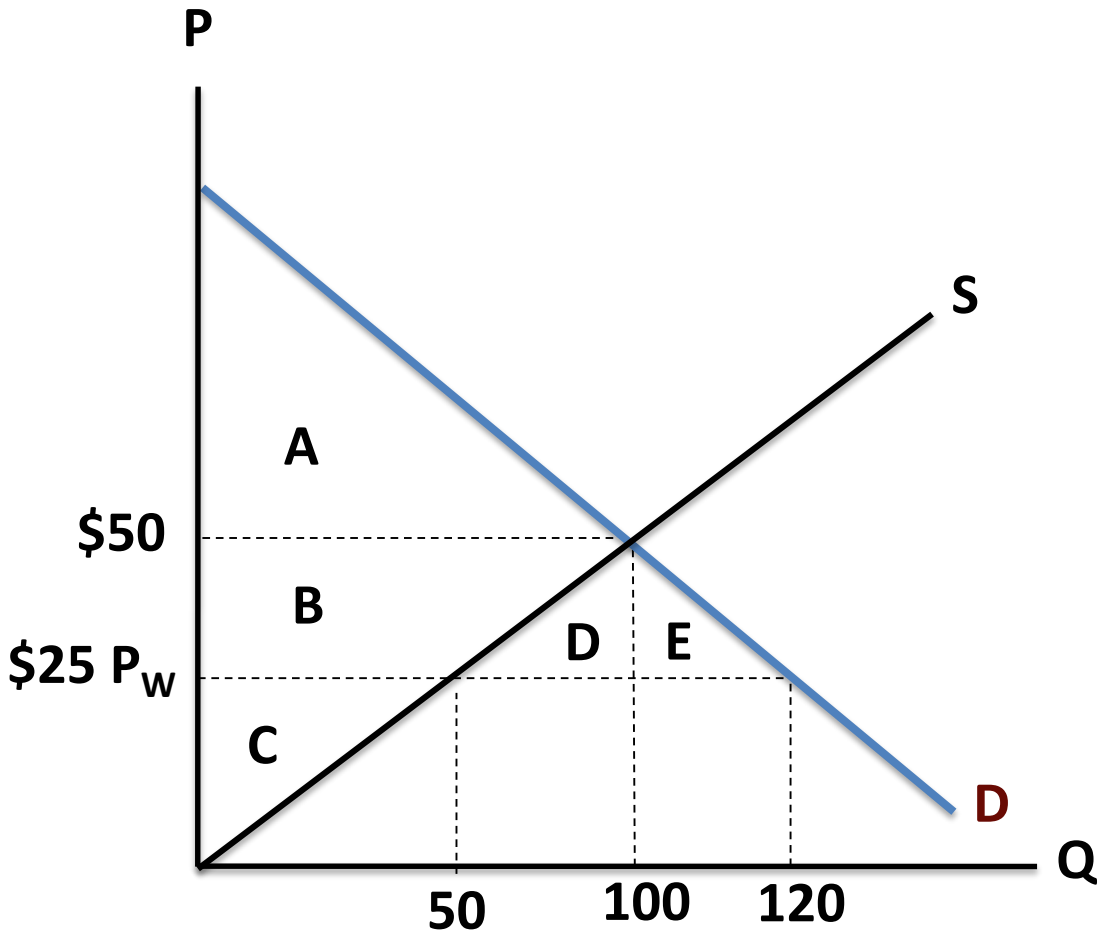
A price floor transfers surplus from consumers to producers, generates deadweight loss, and reduces equilibrium quantity

Tariffs, Quotas, and World Price



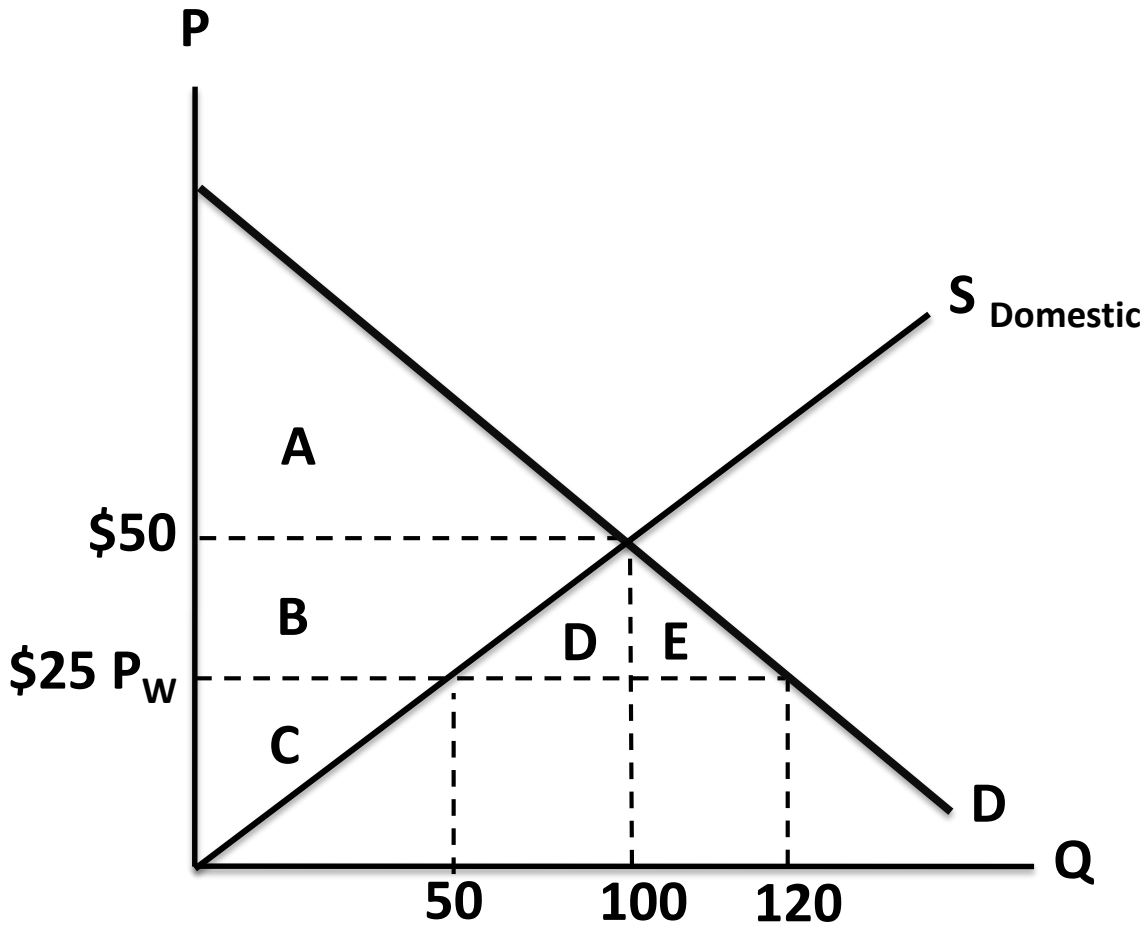
The market price is $50 but the world price with trade is $25. How does this affect CS and PS?

Tariffs, Quotas, and World Price



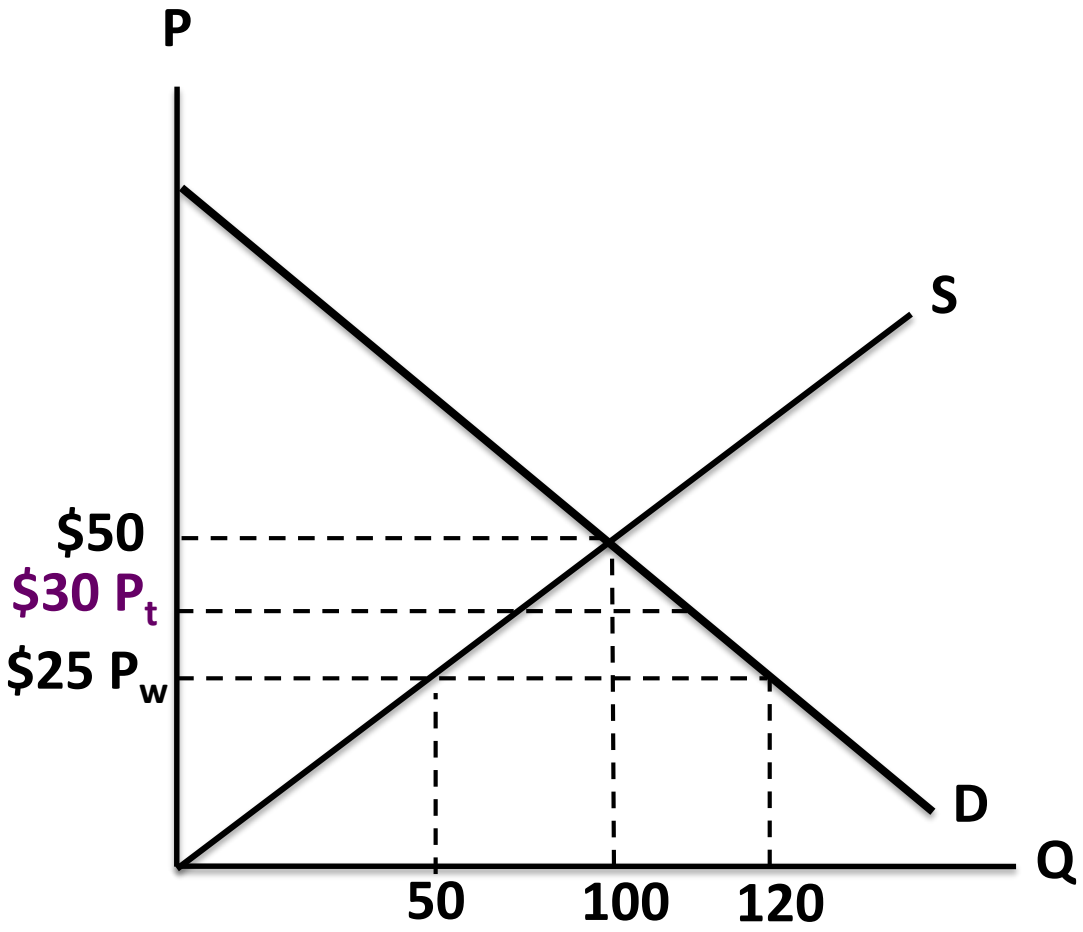
1. CS before trade
   A
2. PS before trade
   BC
3. CS after trade
   ABDE
4. PS after trade
   C
5. Net gain from trade
   DE (will import 70 units from another country)

Tariffs, Quotas, and World Price



1. CS before trade
   A
2. PS before trade
   BC
3. CS after trade
   ABDE
4. PS after trade
   C
5. Net gain from trade
   DE (will import 70 units from another country)

Tariffs, Quotas, and World Price



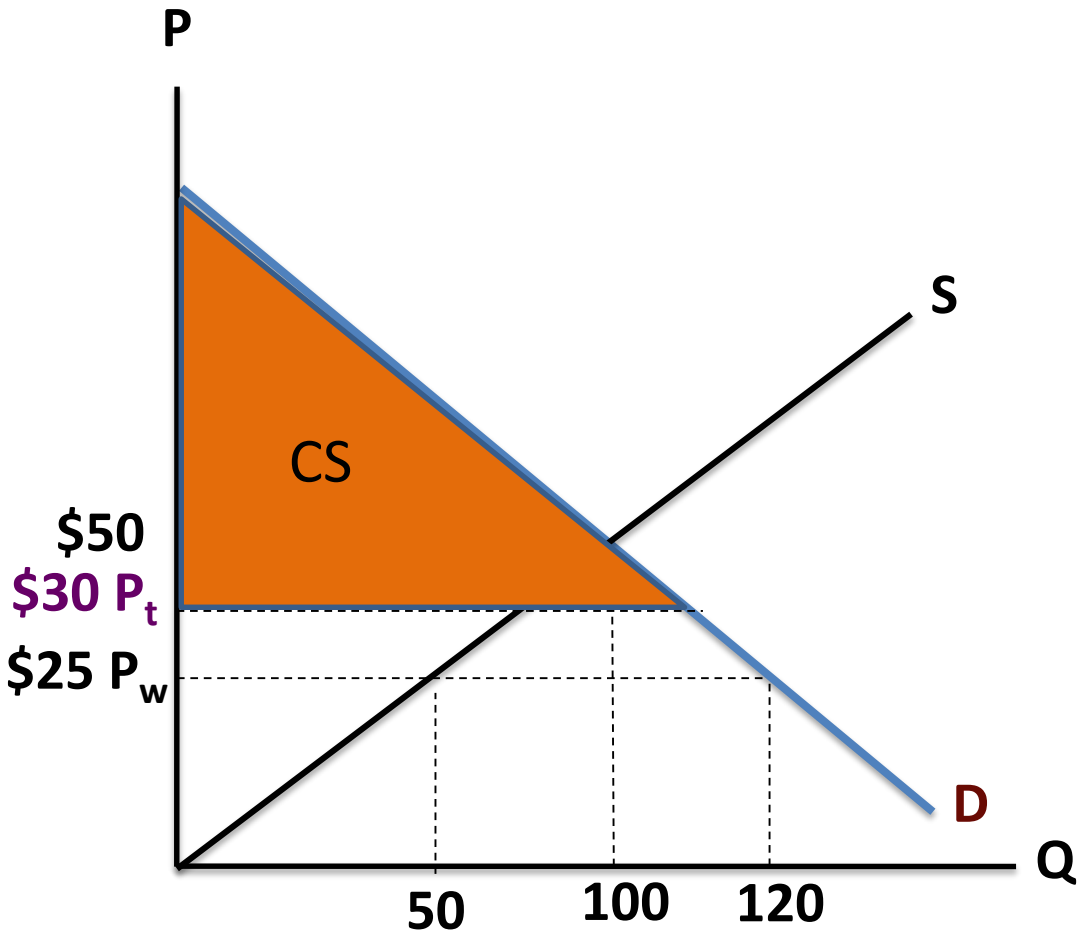
Now, the government places a $5 tariff on this good and the price becomes $30.

1. What happens to CS?

2. What happens to PS?

3. Where is the tariff revenue? (How would you calculate it?)

Tariffs, Quotas, and World Price

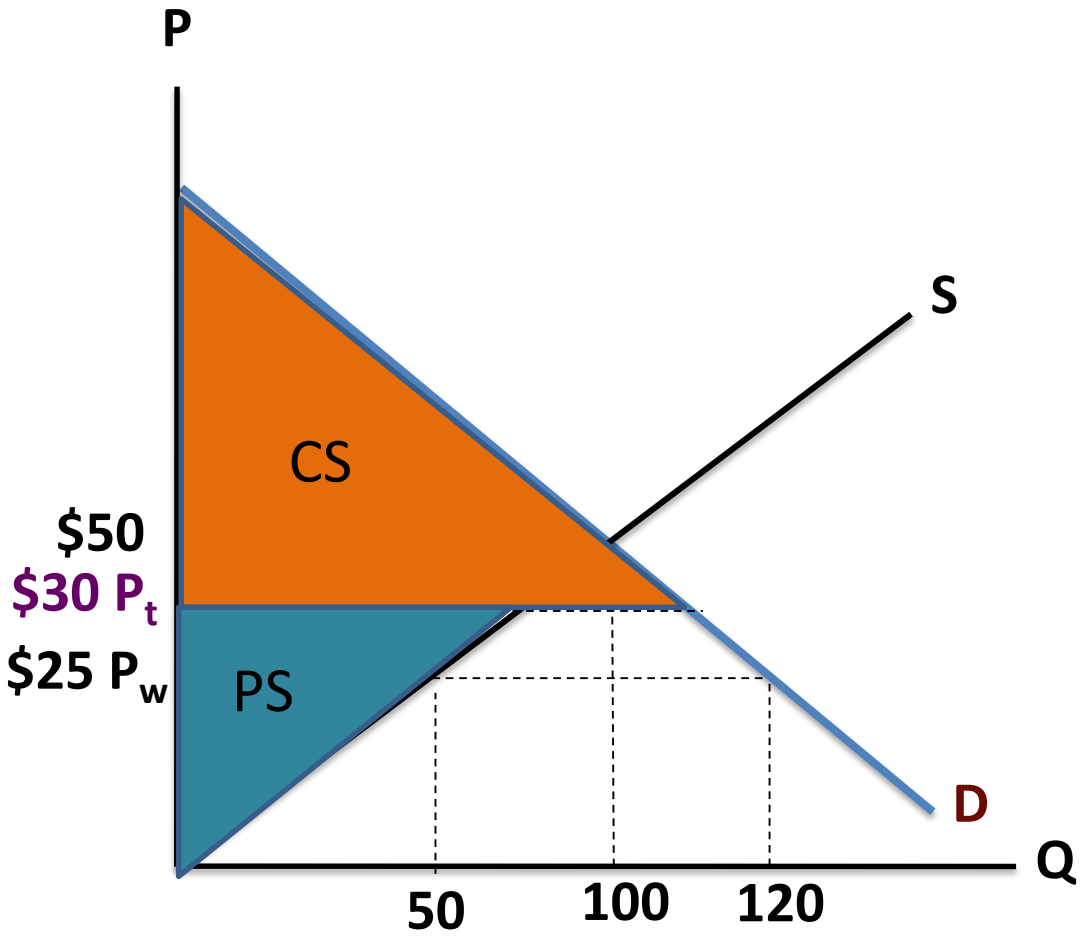


Now, the government places a $5 tariff on this good.
Now the price becomes $30.

1. What happens to CS?

   Decreases

Tariffs, Quotas, and World Price



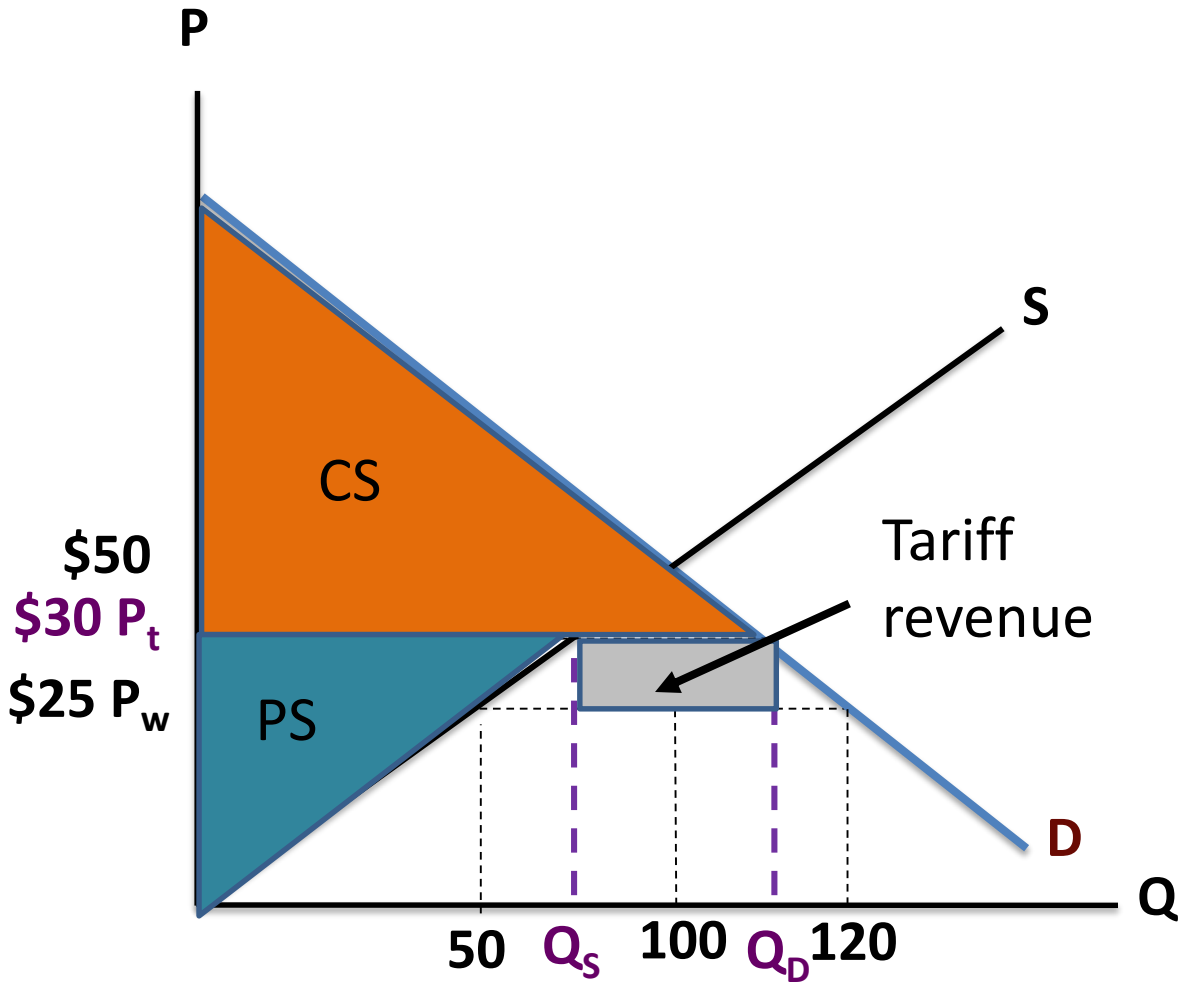
Now, the government places a $5 tariff on this good.

Now the price becomes $30.

2. What happens to PS?

Increases

Tariffs, Quotas, and World Price

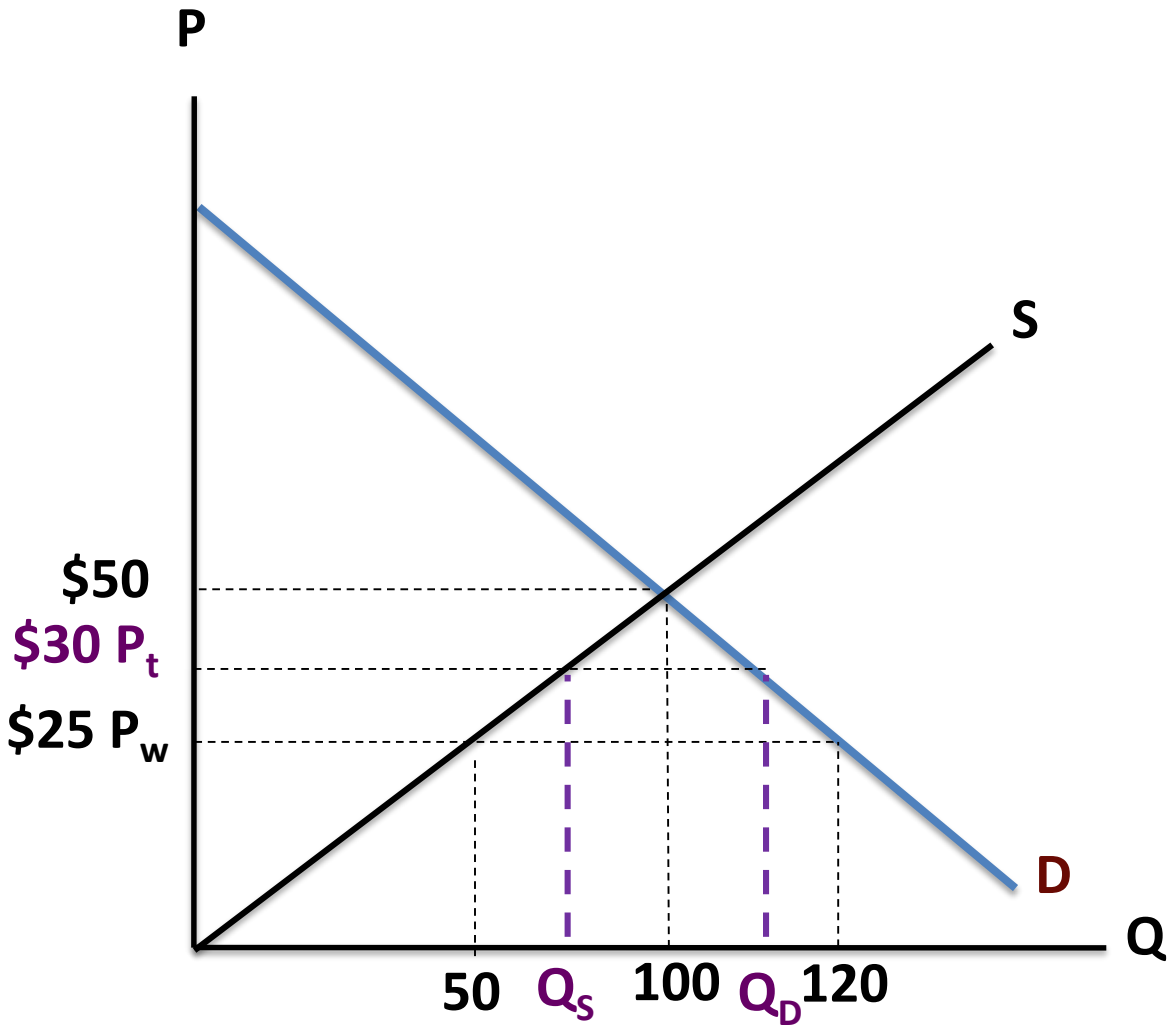


Now, the government places a $5 tariff on this good and the price becomes $30.

3. Where is the tariff revenue? (How would you calculate it?)

Located in grey box; $5 (amount of tariff) times the difference between Q_S and Q_D

Tariffs, Quotas, and World Price



What if there was a quota?

If we were at the world price of $25 we would be importing 70 units. The government imposes a quota because that quantity is too high. We would import the difference between Q_S and Q_D. (There would be no tariff revenue)

****Quotas are beyond the scope of what will be tested on the AP exam****

Tariffs, Quotas, and World Price: Summary

- With international trade total surplus gets **bigger** (CS and PS both increased)
  - Consumers benefit from a lower world price
  - Domestic producers do **not** benefit

Chapter 19: Consumer Choice Theory—Utility

Utility

- **Utility** = satisfaction
- **Total utility** = total satisfaction one gets from consuming a product
- **Marginal utility** = the satisfaction you get from consuming one additional unit
- **Diminishing marginal utility** = point at which the marginal utility received from each additional unit of a good **decreases** with each additional unit consumed

Utility

- As additional units are consumed, marginal utility decreases, but total utility continues to increase
- When **total utility** is at a **maximum**, marginal utility is **zero**
- Beyond this point, total utility decreases and marginal utility is **negative**

Maximizing Utility and Equilibrium

- **Utility maximizing rule states that when the ratios of the marginal utility to price of the two goods are <u>equal</u>, you are <u>maximizing utility</u>**

  - If $\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}$, you are maximizing utility

MU=marginal utility and P=price

****Use this formula to show your work if asked****

Application: Utility and Consumer Surplus

Tacos cost $2 and pizza costs $1.
What is the consumer surplus if Mary consumes 3 tacos?

Quantity of Tacos	Total Benefit of Tacos	Quantity of Pizzas	Total Benefit of Pizza
0	$0	0	$0
1	$6	1	$6
2	$10	2	$10
3	$12	3	$12

The total benefit of 3 tacos is $12. 3 tacos will cost Mary $6.
CS= $12-$6= $6

Utility and Optimal Combination

Tacos cost $2 and pizza costs $1.
What is Mary's optimal combination if she has $7 to spend?

Quantity of Tacos	Total Benefit of Tacos	MB Tacos	MU/P Tacos	Quantity of Pizzas	Total Benefit of Pizza	MB Pizza	MU/P Pizza
0	$0	0	0	0	$0	0	0
1	$6	6	3	1	$6	6	6
2	$10	4	2	2	$10	4	4
3	$12	2	1	3	$12	2	2

- **First we need to calculate MB (MU) and MU/P.**
- Find where the MU/P for tacos is equal to that for pizza.
- Her optimal quantity would be 2 tacos and 3 pizzas.

Utility and Optimal Combination

Tacos cost $2 and pizza now costs $2.
What is Mary's optimal combination if she now has $8 to spend?

Quantity of Tacos	Total Benefit of Tacos	MB Tacos	MU/P Tacos	Quantity of Pizzas	Total Benefit of Pizza	MB Pizza	MU/P Pizza
0	$0	0	0	0	$0	0	0
1	$6	6	3	1	$6	6	3
2	$10	4	2	2	$10	4	2
3	$12	2	1	3	$12	2	1

- Although Mary had an extra dollar to spend, her optimal quantity would be 2 tacos and 2 pizzas.

Chapter 11+12: Production and Costs

Explicit Costs versus Implicit Costs

- **Explicit cost:** money paid out (rent, wages, etc.)

- **Implicit cost:** opportunity cost of the factors of production used by the firm
  - Things such as the cost of financial capital, compensation for risk, or an entrepreneur's time

Economic Profit versus Accounting Profit

- **Economic profit =** (explicit and implicit revenue) – (explicit and implicit cost)
  - [Remember, they problem likely will not give you implicit revenue so don't worry about it; Also, you may need to calculate explicit revenue which is P x Q]
  - Takes opportunity cost into consideration

- **Accounting profit:** = explicit revenue – explicit cost

- ****When asked: even when a firm is making zero economic profit they are making a positive accounting profit**

Short run versus Long Run

- The **short run** is the period in which at least one input (resource) is fixed
  - Plant/factory size **cannot** be changed

- In the **long run** all firms can adjust their **inputs** (resources), so costs become **variable**
  - There are **no** fixed resources
  - Plant/factory size **can** be changed

Costs of Production

- **Fixed costs (FC)** are those that **cannot** be changed in the period of time under consideration
  - **In the short run, a number of inputs and their costs will be fixed**
  - **In the long run, there are NO fixed costs since all inputs are variable**

  - **Examples**: Rent, insurance, salaries of managers

Costs of Production

- **Variable costs (VC):** costs for variable resources that change as output changes
  - **Examples:** Raw materials, labor, utilities

- **Total cost (TC)** is the sum of the variable and fixed costs
  - **TC = FC + VC**

The Costs of Production

- **Average fixed costs (AFC)** equals fixed cost divided by quantity produced
  - **AFC = FC/Q**

- **Average variable costs (AVC)** equals variable cost divided by quantity produced
  - **AVC = VC/Q**

The Costs of Production

- **Average total cost (ATC)** equals total cost divided by quantity produced
  - **ATC = TC/Q or ATC = AFC + AVC**

- **Marginal cost (MC)** is the additional cost when output increases by one unit
  - **MC = ΔTC/ΔQ**

Example: Calculating Costs

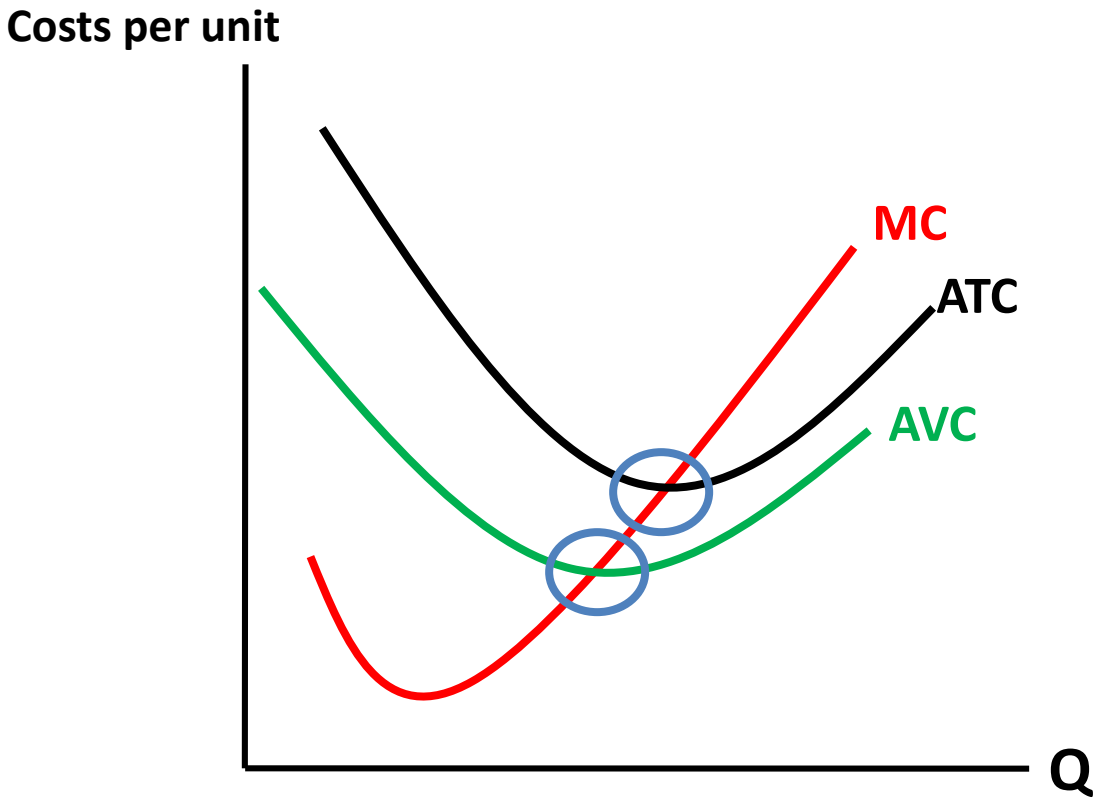
Fill in the chart below

Output	VC	FC	TC	MC	AVC	AFC	ATC
0	$0	$10	$10	--	--	--	--
1	$10	$10	$20	$10	$10	$10	$20
2	$17	$10	$27	$7	$8.50	$5	$13.50
3	$25	$10	$35	$8	$8.33	$3.33	$11.66
4	$40	$10	$50	$15	$10	$2.50	$12.50
5	$60	$10	$70	$20	$12	$2.00	$14

The Shapes of Cost Curves

- The **marginal cost** curve goes through the **minimum points** of the ATC and AVC curves (*remember this*)
  - When the marginal cost is **below** the average, it pulls the average down
  - When the marginal cost is **above** the average, it pulls the average up

Draw the Graph: Marginal Cost, AVC, and ATC



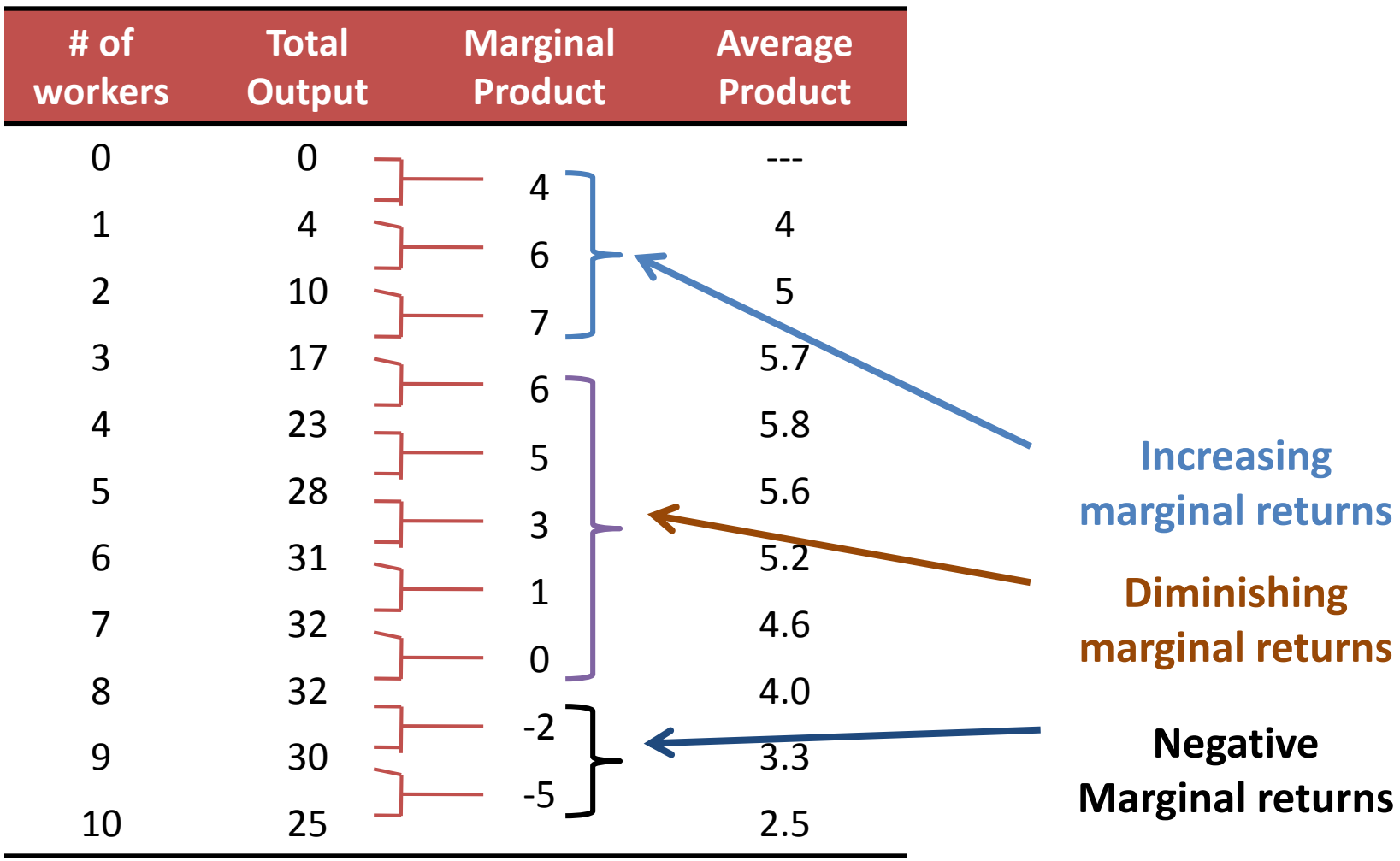
The marginal cost curve goes through the minimum point of both the ATC and AVC curves

Law of Diminishing Marginal Returns

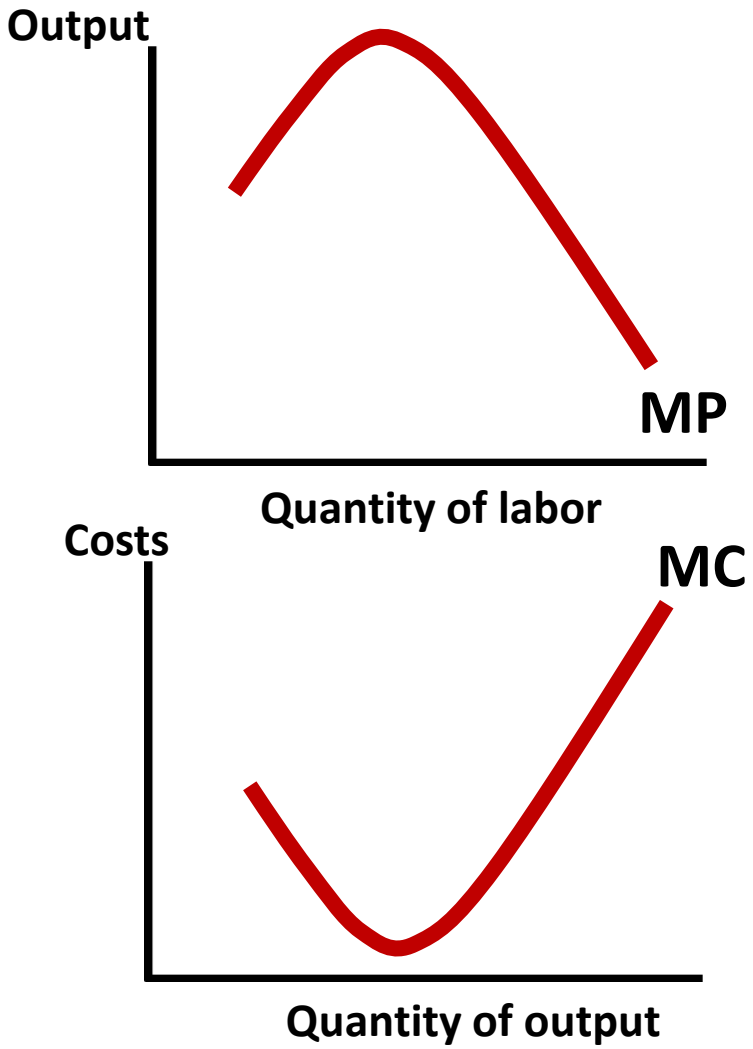
- **Law of diminishing marginal returns (productivity):** as more of a **variable input** is added to an existing **fixed input**, the additional output produced from each additional worker will eventually **fall**

Law of Diminishing Marginal Returns

# of workers	Total Output	Marginal Product	Average Product
0	0		---
		4	
1	4		4
		6	
2	10		5
		7	
3	17		5.7
		6	
4	23		5.8
		5	
5	28		5.6
		3	
6	31		5.2
		1	
7	32		4.6
		0	
8	32		4.0
		-2	
9	30		3.3
		-5	
10	25		2.5



Relationship between Production and Cost



As more workers are hired, their marginal product increases and then eventually decreases because of the law of diminishing marginal returns

The additional costs (MC) of the units they produce falls when MP goes up, but eventually increases as additional workers produce less and less output

MP and MC are mirror images of each other

Returns to Scale

- **Returns to scale indicates what happens to production in the long run**
  - **If output more than doubles, increasing returns to scale occurs**
  - **If output doubles, constant returns to scale occurs**
  - **If output less than doubles, decreasing returns to scale occurs**

  - **Note: Returns to scale is only looking at production, not costs**

Long run ATC (LRATC)

- **The long-run cost curve (LRATC) is characterized by economies of scale, constant returns to scale, and diseconomies of scale**
    - **We are looking only at costs of production**

Economies of Scale

- **Economies of scale** exist when long-run average total costs **decrease** as output **increases**
  - These are shown by the **downward sloping portion of the long-run ATC**

- **Why does economies of scale occur?**
  - Firms are able to use mass production techniques and specialization to produce more
  - Think of the car industry

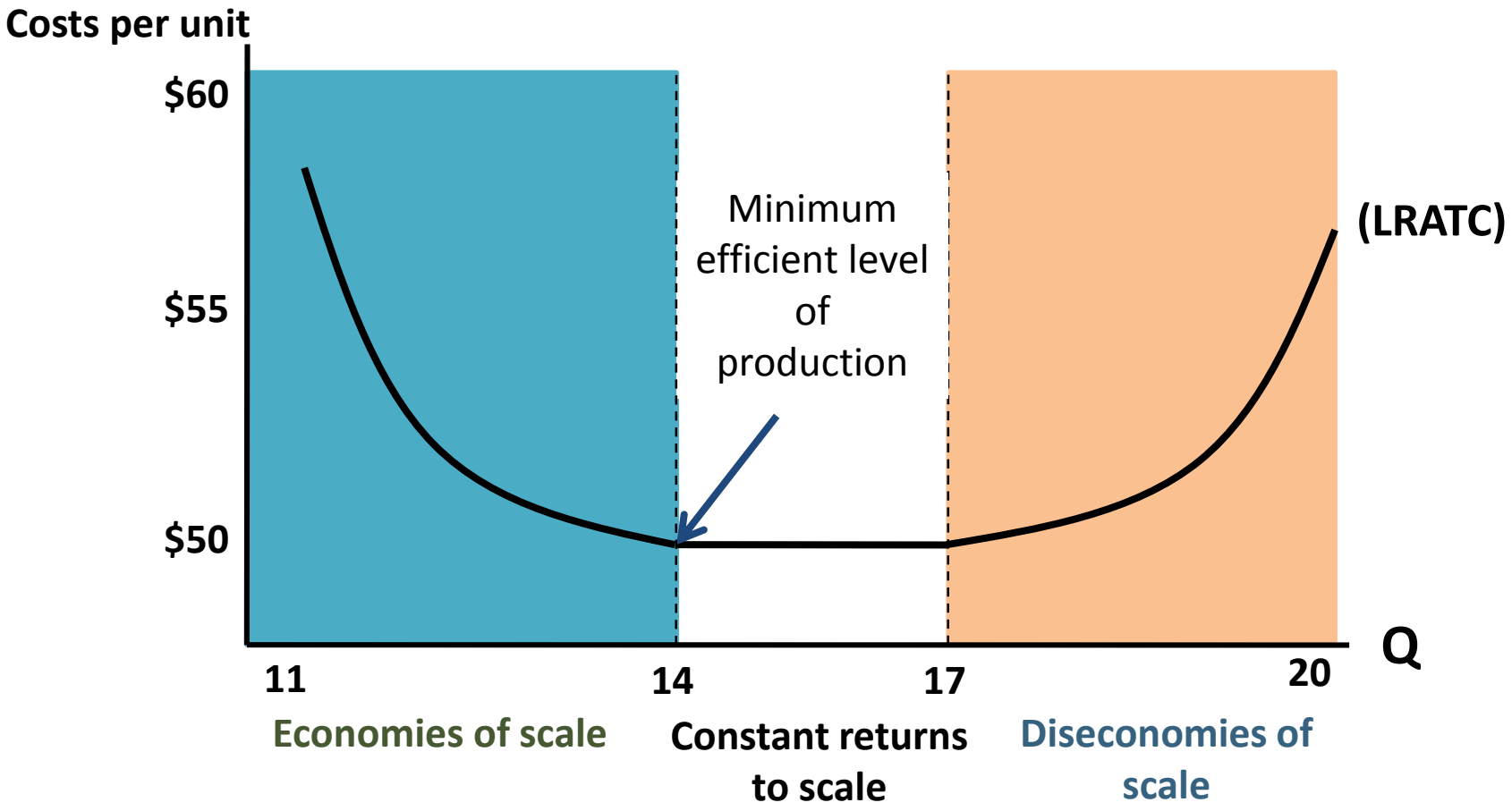
Constant Returns to Scale

- **Constant returns to scale** exist when average total costs **do not change** as output increases
  - **This is shown by the flat portion of the long-run average total cost curve**
- **Constant returns to scale occur when production techniques can be replicated again and again to increase output**

Diseconomies of Scale

- **Diseconomies of scale** exist when long-run average total costs **increase** as output increases
- **These are shown by the upward sloping portion of the long-run average total cost curve**

LRATC


Costs per unit
$60
$55
$50
Minimum efficient level of production
(LRATC)
Q
11
14
17
20
Economies of scale
Constant returns to scale
Diseconomies of scale

Chapter 13: Perfect Competition

Characteristics of Perfect Competition

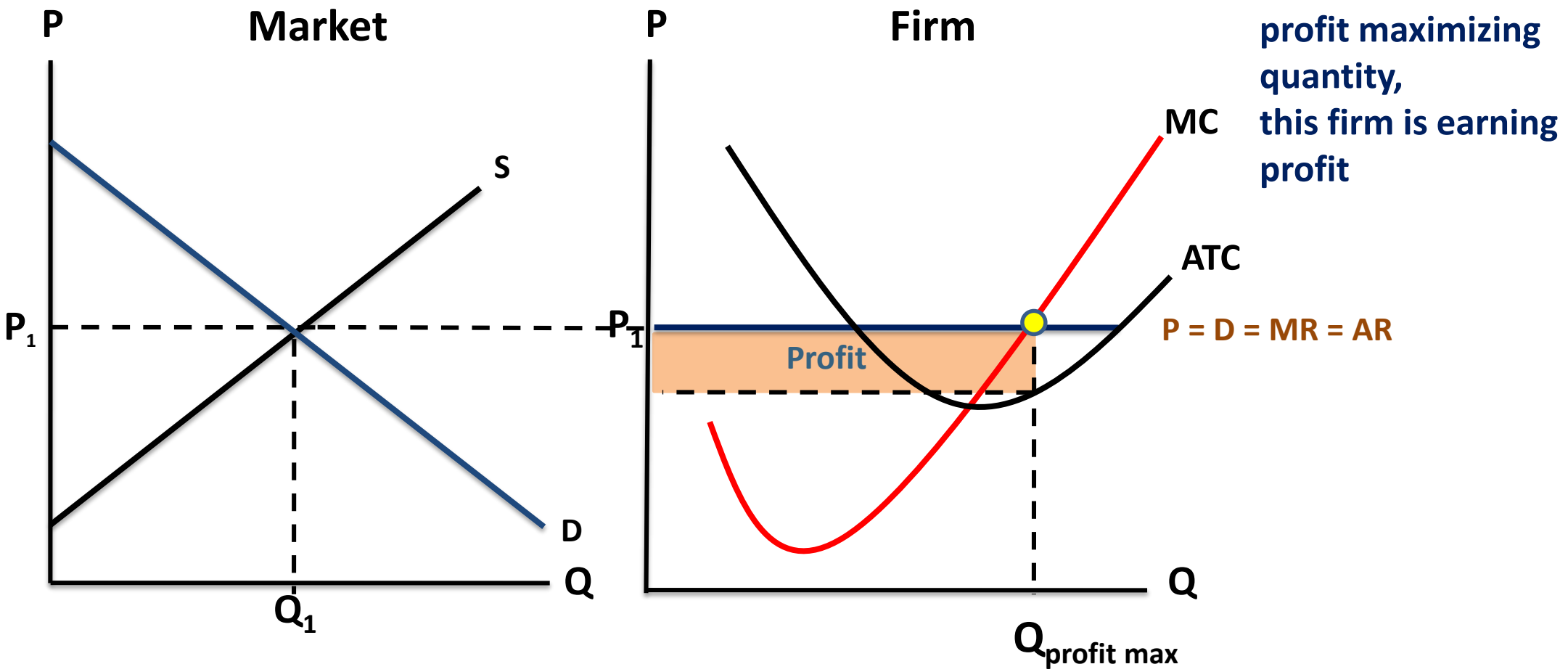
- Both buyers and sellers are price takers
  - Price is derived from market S + D graph
  - The firm's demand curve is **perfectly elastic** (since the firm is a price taker)
- Many firms
- No barriers to entry
- Firm's products are identical
- Complete information for buyers and sellers
- Firms are profit-maximizing
  - P=D=MR=AR (MR. DARP)
  - MR is the same as price; AR is the same as MR

Supply curve is its short-run marginal cost curve **above average variable cost

Profit Maximizing Level of Output

- The **profit-maximizing condition** of a perfectly competitive firm is: **MC = MR**
  - **Marginal cost (MC) is the change in total cost associated with a change in quantity**
  - **Marginal revenue (MR) is the change in total revenue associated with a change in quantity**
    - **Every time a perfectly competitive firm sells a unit, they earn marginal revenue**
    - **Since they are a price taker, P=MR (which also equals AR)**

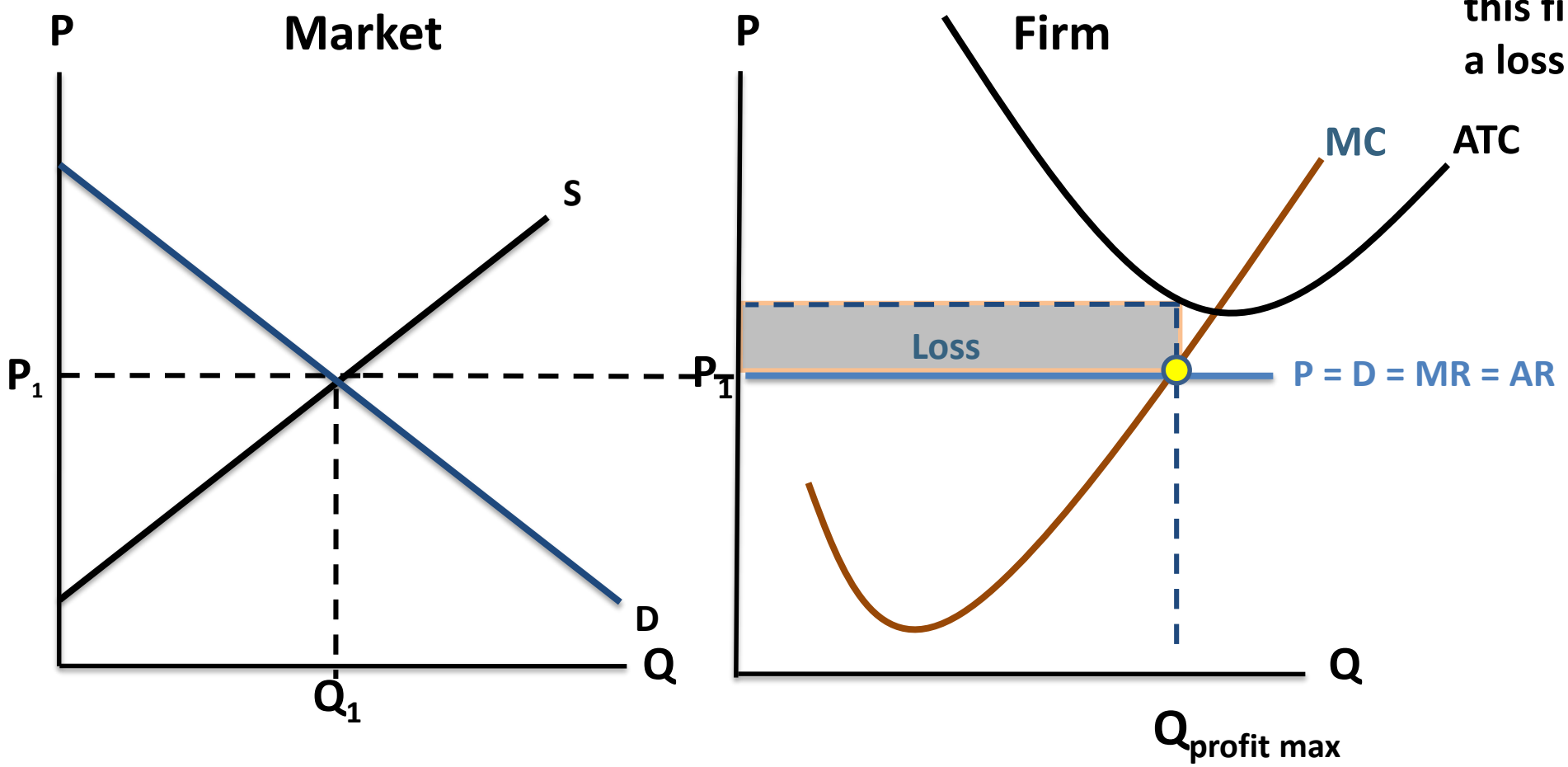
Perfect Competition Profit in the Short Run



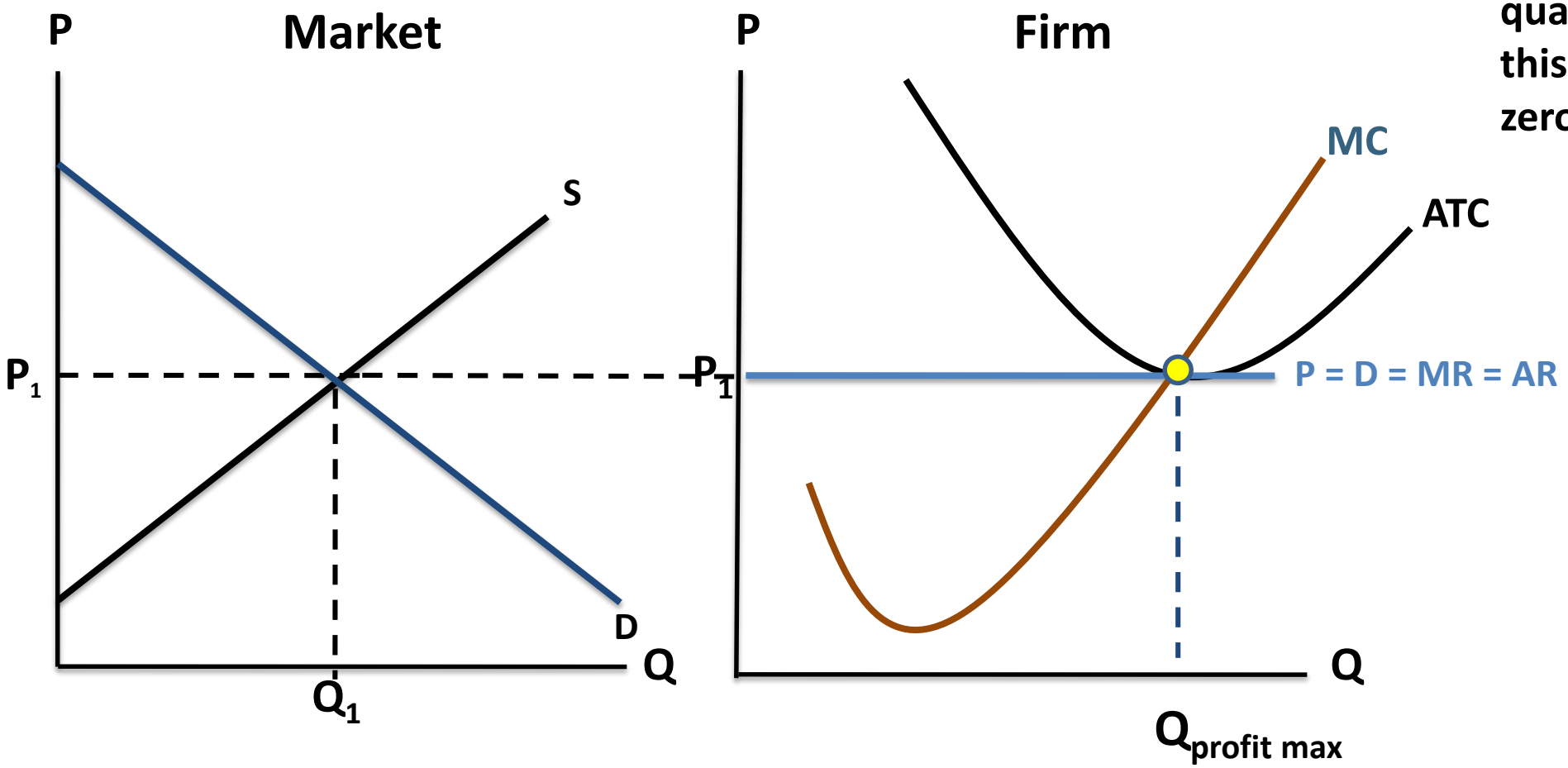
Since P>ATC at the profit maximizing quantity, this firm is earning profit

Perfect Competition Loss in the Short Run

Since P<ATC at the profit maximizing quantity, this firm is earning a loss



Perfect Competition Zero Economic Profit (Normal Profit) in the Long Run



Since P=ATC at the profit maximizing quantity,
this firm is earning zero economic profit

Perfect Competition in the Long-Run

- **In the long run perfect competitors make zero economic profit (normal profit)**
  - **WHY?: Due to the entry and exit of firms**
    - If a firm is making a profit other firms will **enter the market**, **shifting the market supply curve to the right** (and in effect will compete away the profit)

- **Normal profit** is the amount the owners would have received in their next best alternative (breakeven point; where TR=TC)
- **Economic profits** are profits above normal profits (where TR exceeds TC)

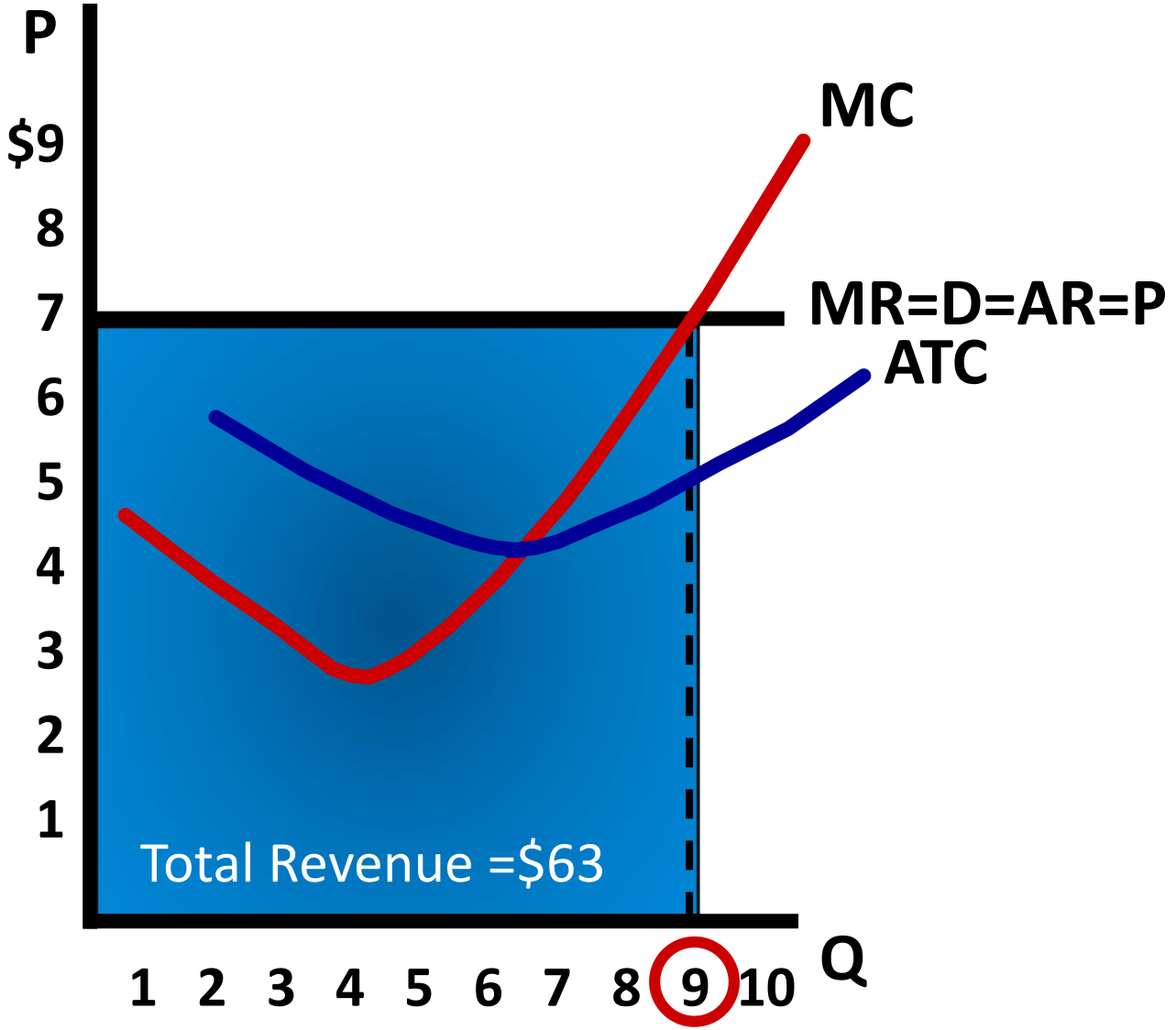
Perfect Competition in the Long-Run

- In the long run, perfectly competitive markets are **productively efficient** (producing at its minimum ATC) as well as **allocatively efficient**
  - **At competitive market equilibrium perfect competitors are allocatively efficient (or socially optimal), the price of a product equals both the private marginal benefit received by the last unit consumed and the private marginal cost incurred to produce the last unit**

Perfect Competition in the Long-Run

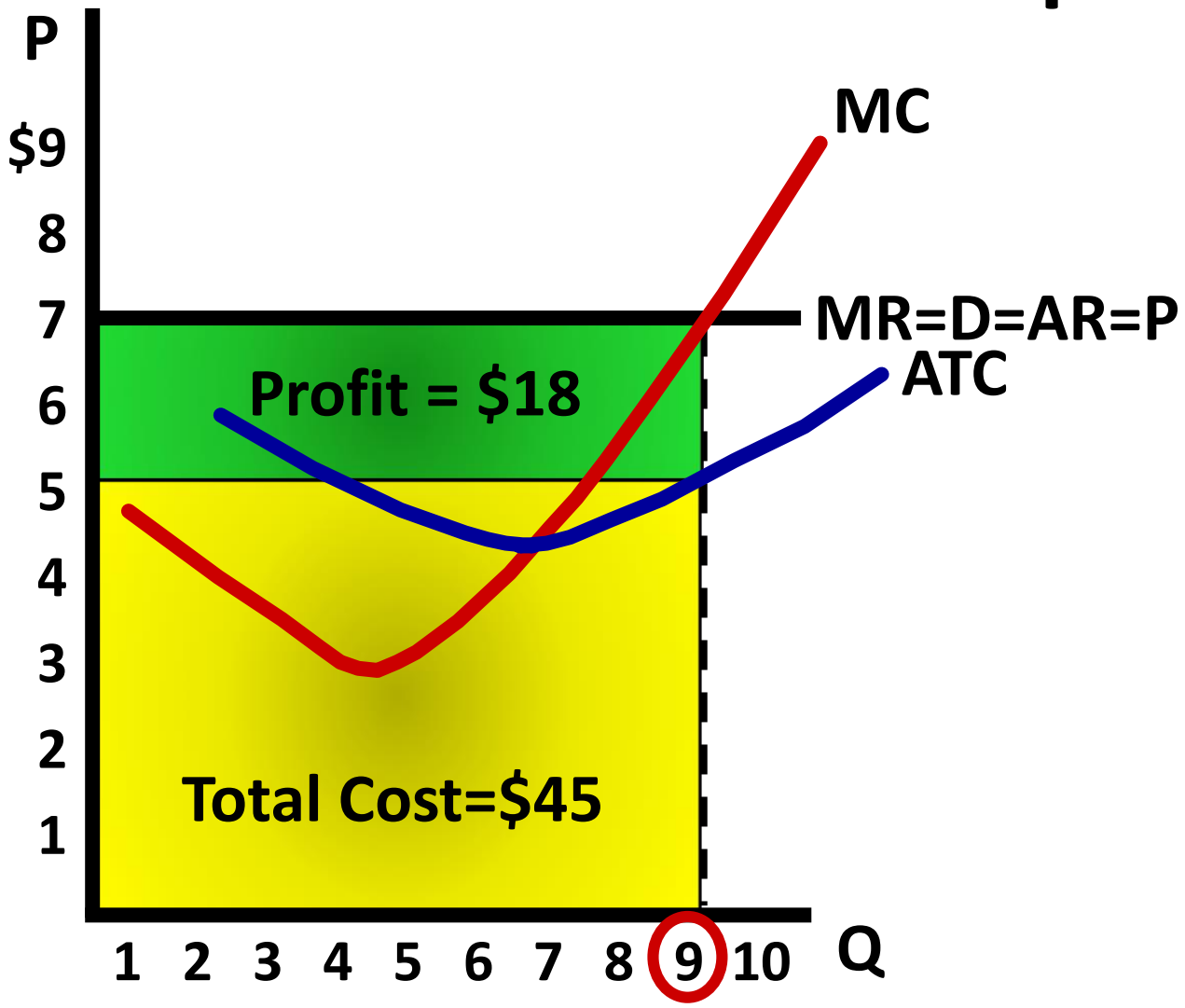
- The **long run market supply curve** for a perfectly competitive firm is **perfectly elastic**
  - This occurs when firms are no longer entering or exiting the market

Perfect Competition: Practice



- How much is total revenue?
- $63 (9 x 7)

Perfect Competition: Practice



- How much is total cost?
- $45 (9 x 5)

- Is there profit or loss? What is the profit/loss:
- Profit $18 (TR-TC; $63-$45=$18)

The Shutdown Point for Perfectly Competitive Firms

- A firm pays attention to its variable costs when deciding to shutdown
  - As long as a firm is covering its variable costs it should continue producing
  - When price falls below AVC is when the firm should shutdown

Perfect Competition: Constant-cost Industry

- **In a constant-cost industry, we assume that the entry and exit of firms has no impact on the cost curves of the firms in the market**
  - MC and ATC will **not** change

Perfect Competition: Increasing Cost Industry

- In an **increasing cost industry** we assume that the entrance of new firms increases the demand for the factors of production
  - This might increase the cost of employing those resources
  - When this happens, the **cost curves shift upward**

Perfect Competition: Increasing Cost Industry

- **Graphically, what would happen in an increasing cost industry?**
  - The entrance of new firms would drive down the price of output and increase the cost curves—profit would be eliminated more quickly here than in a constant-cost industry
  - The new long run price would be higher than in a constant-cost industry

Perfect Competition: Decreasing Cost Industry

- The other option is a **decreasing cost industry** (yet to see this in the FRQs)
  - This is when the entry of new firms **decreases** the price of key inputs and causes the **cost curves to shift downward**
  - Could be due to economies of scale and lower per unit-costs

Perfect Competition: Decreasing Cost Industry

- The entrance of new firms lowers the price of the output and decrease the cost curves
- Takes longer for profit to be eliminated than in the constant-cost industry
- More firms can enter this market and the new long run price would be **lower** than in a constant cost industry

Chapter 14: Monopolies

Characteristics of a Monopoly

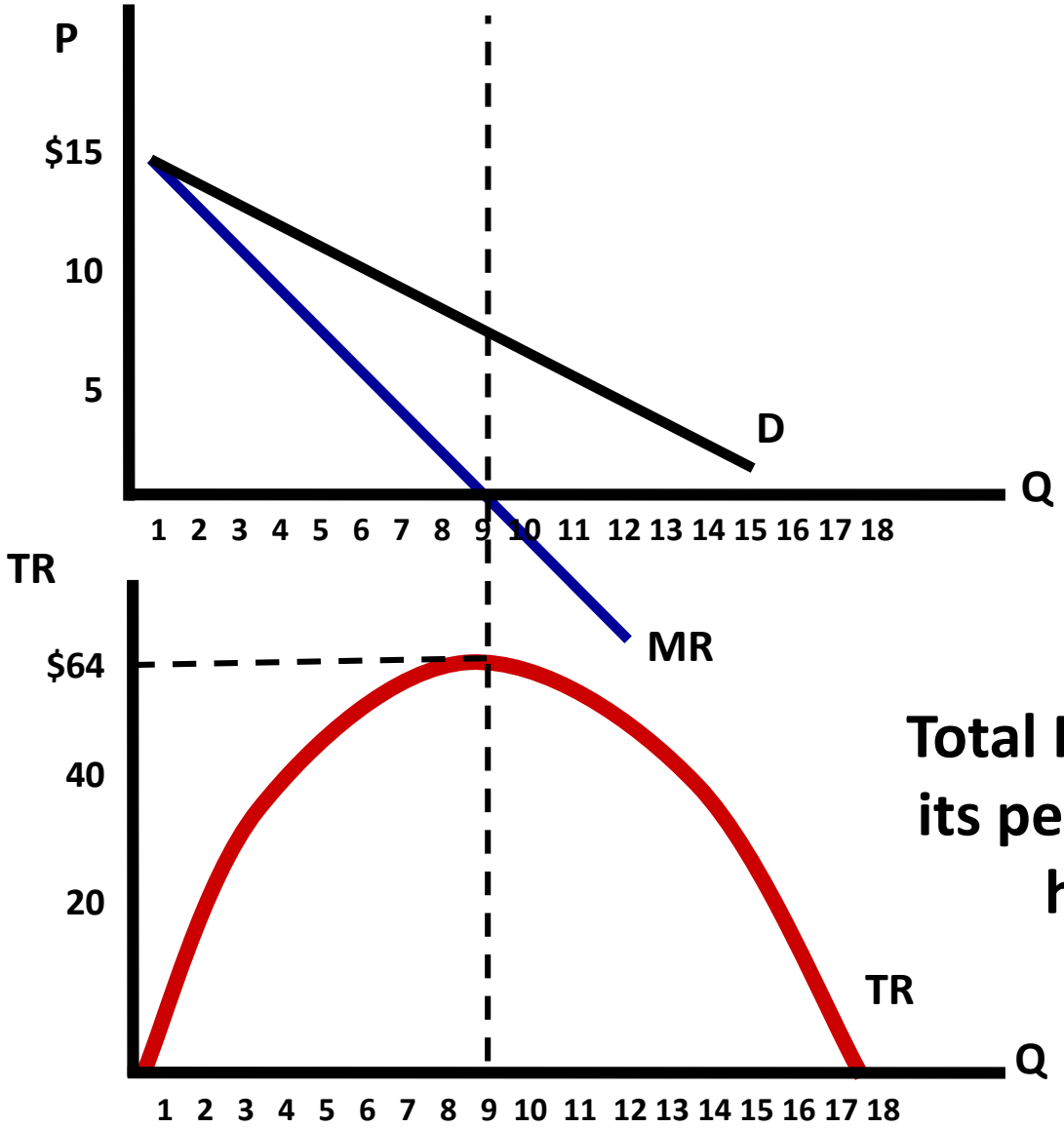
- Firm=Industry
- No close substitutes for the monopolist's product
- Price maker
- P is always greater than MC
- Barriers to entry prevent competition
- Profit-maximizing condition of a monopolistic firm is: MC = MR
- **Assume the monopoly is unregulated unless the question states otherwise**

Profit Maximizing Level of Output

- For a monopolistic firm, MR < P (ALWAYS)
  - This is because to sell more units a monopolist has to lower its price
- A monopoly maximizes **total** profit, ***not*** profit per unit
- A monopoly does not produce at socially optimal
- When **marginal revenue** is **zero**, a monopolist has **maximized total revenue**

Demand and Marginal Revenue Curves

What happens to TR when MR hits zero?



Total Revenue is at its peak when MR hits zero

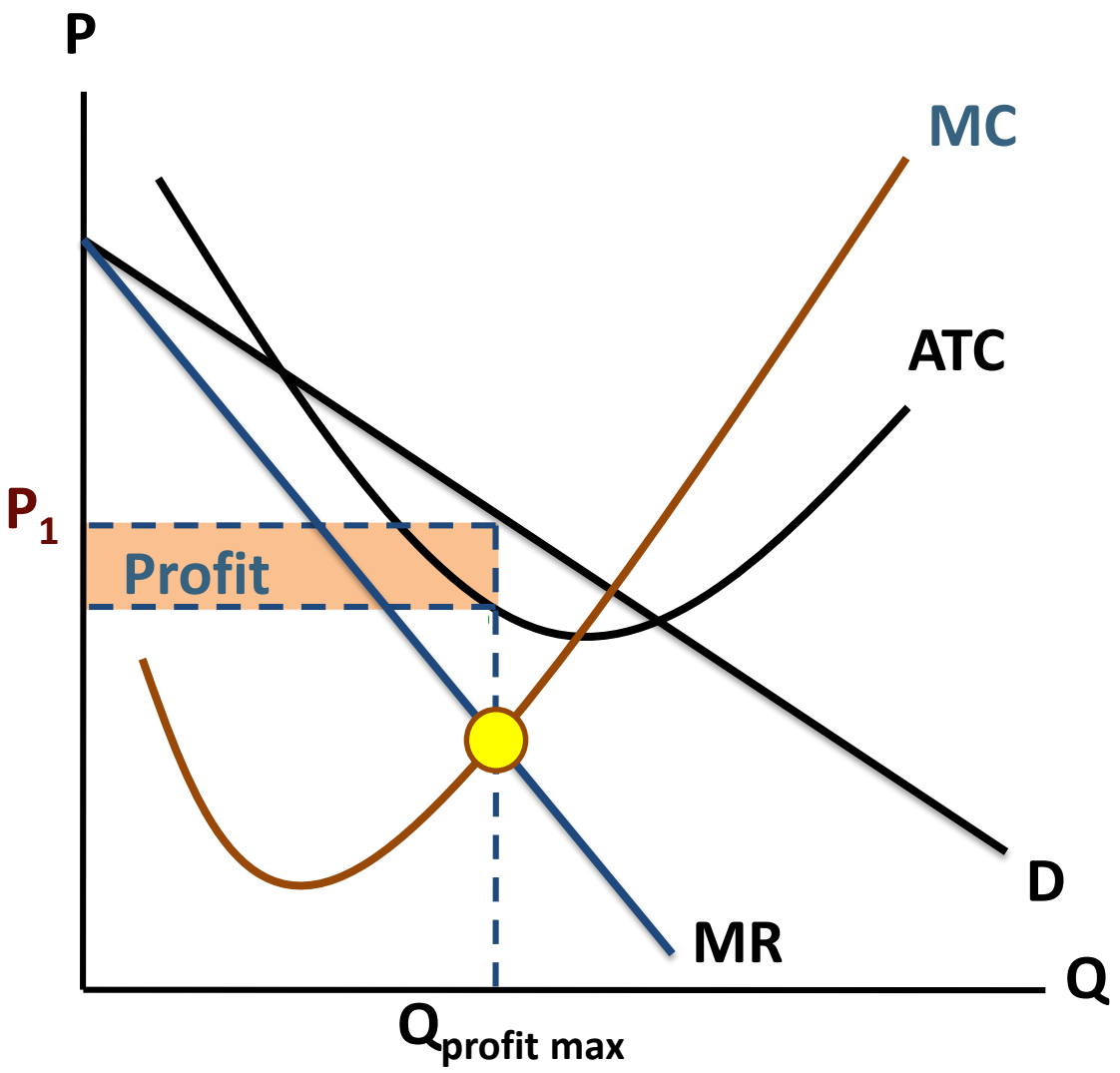
A Monopoly Earning a Profit

Find output where MC = MR, this is the profit maximizing Q

Find how much consumers will pay where the profit max Q intersects demand, this is the monopolist price

Find profit per unit where the profit max Q intersects ATC

Since P>ATC at the profit maximizing quantity, this firm is earning profits



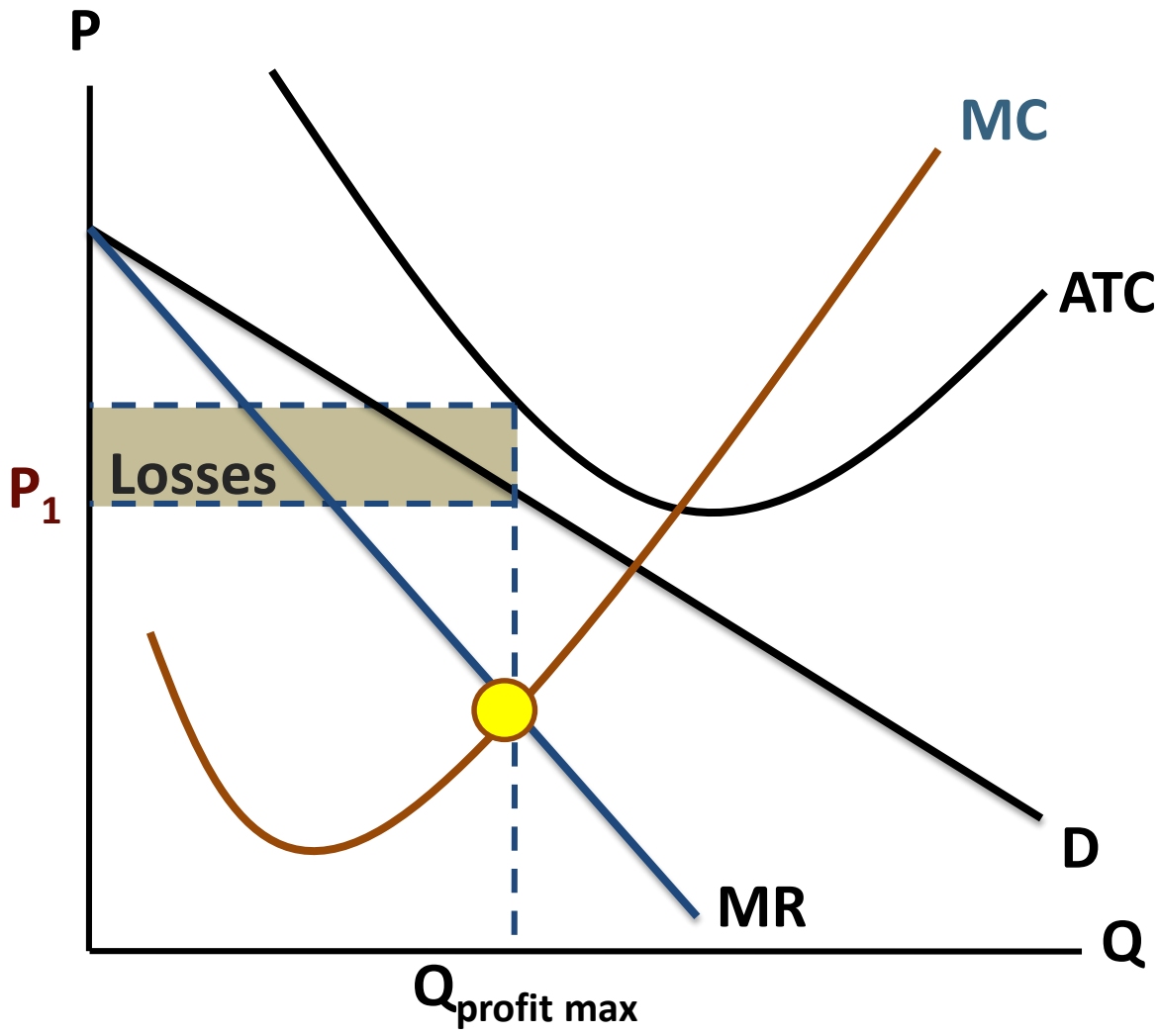
A Monopoly with a Loss

Find output where MC = MR, this is the profit maximizing Q

Find how much consumers will pay where the profit max Q intersects demand, this is the monopolist price

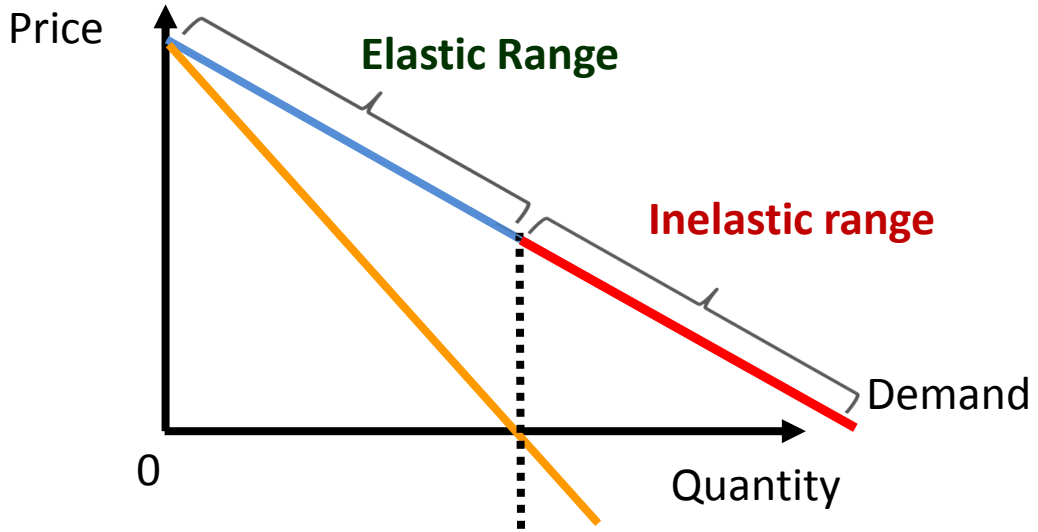
Find profit per unit where the profit max Q intersects ATC

Since P<ATC at the profit maximizing quantity, this firm is earning a loss



Monopoly: Elastic and Inelastic Range

A monopoly will only produce in the <u>elastic</u> range

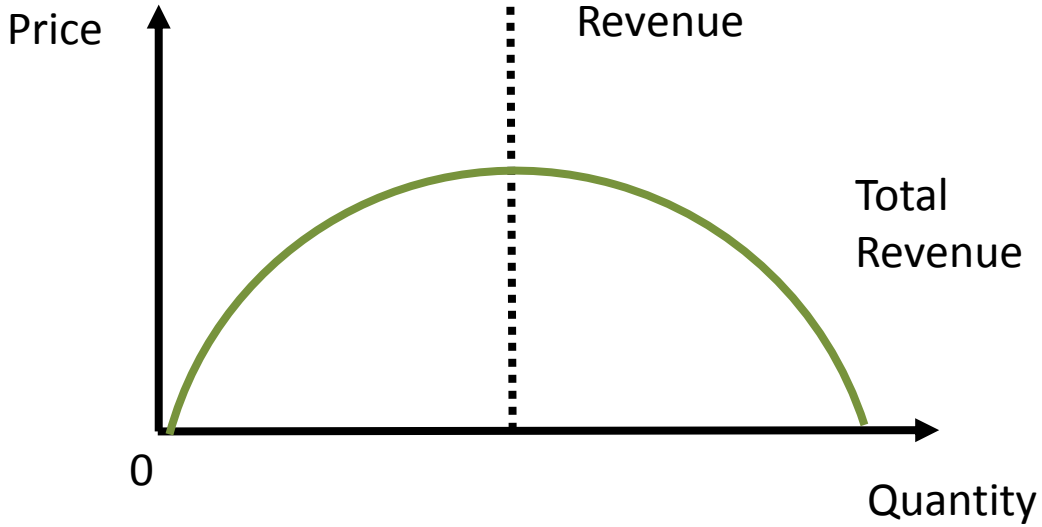


★So, when MR is zero, demand is unit elastic★

Total Revenue Test

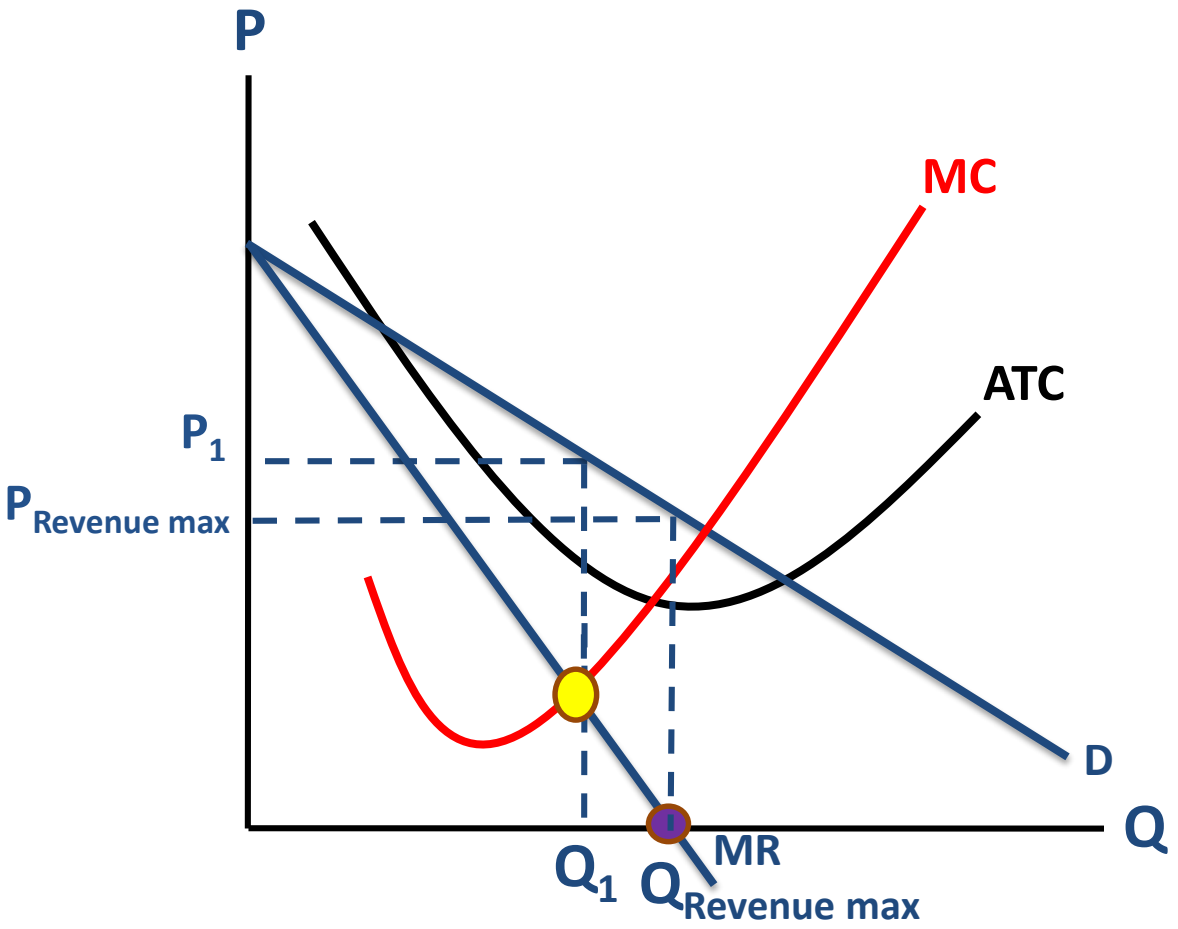
If price falls and TR increases, then demand is elastic.

If price falls and TR falls, then demand is inelastic.



Note that in the inelastic range of the demand curve, MR is **<u>negative</u>** and TR falls as Q increases.

Revenue Maximizing Point for a Monopoly

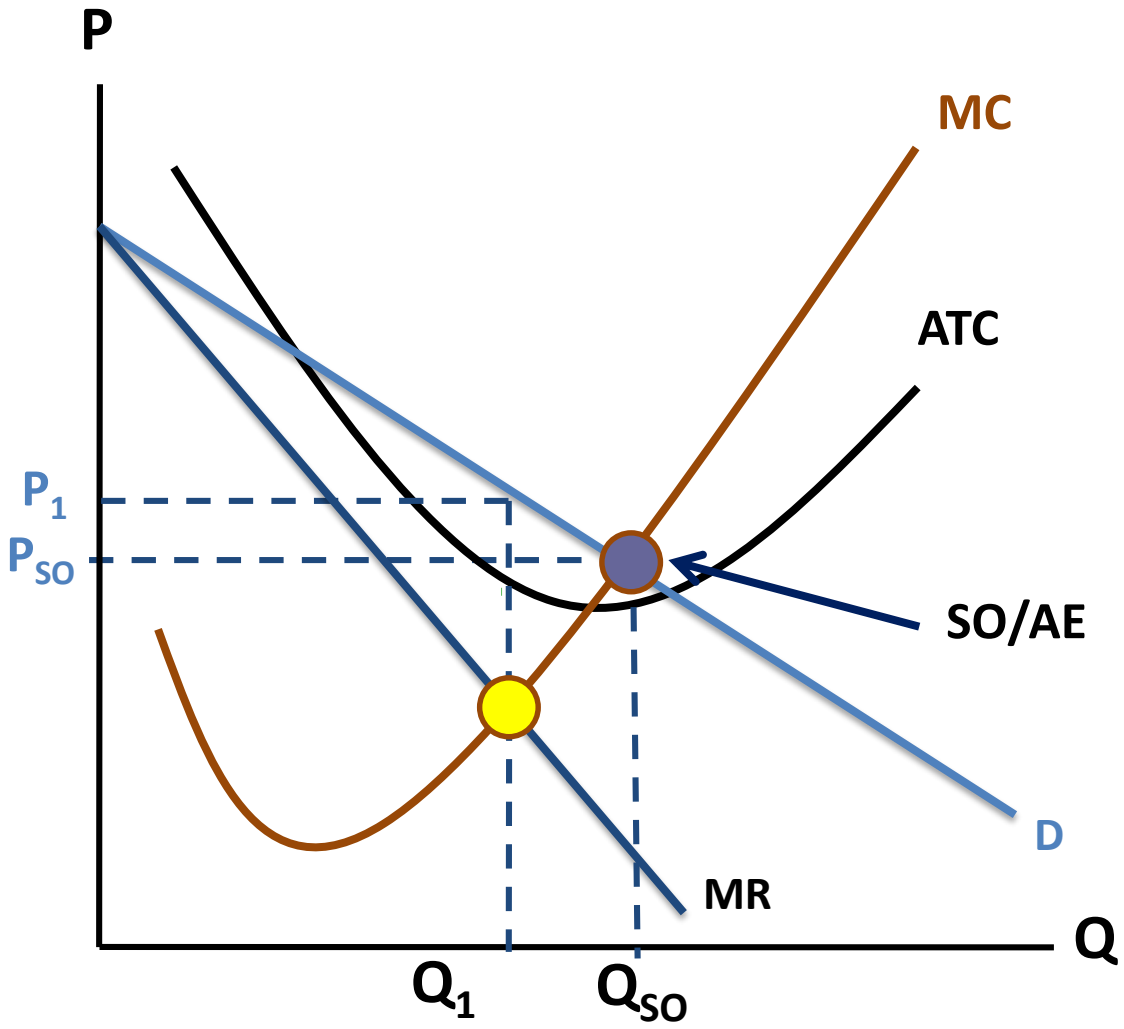


- Revenue maximizing point, where MR crosses quantity axis, splits the demand curve into elastic and inelastic regions
- To the left of this point MR is positive and D is relatively elastic; to the right of this point MR is negative and D is relatively inelastic; at this point D is unit elastic)

Are Monopolies Efficient?

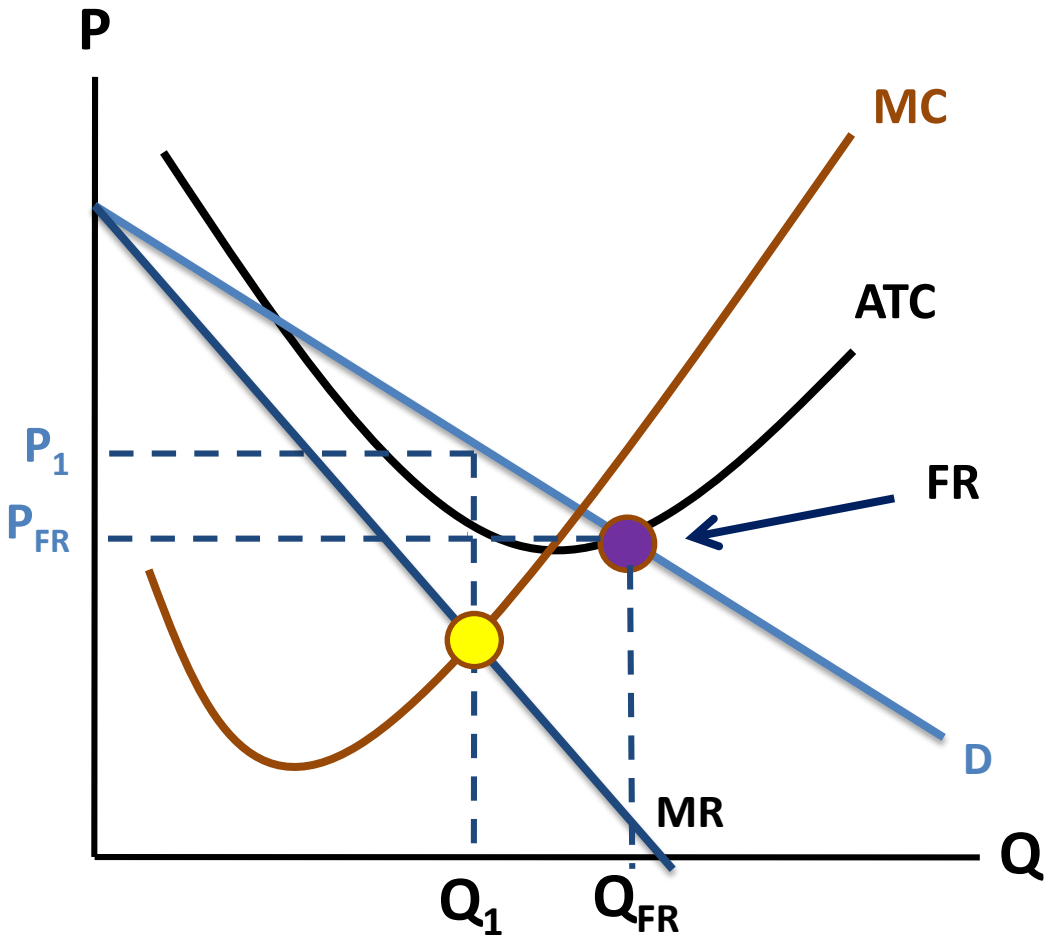
- NO
- They charge a higher price
- They **under produce** and are **not allocatively efficient**
- They are **not productively efficiency** because they are not producing at the lowest cost (at the minimum of their ATC)

Socially Optimal Level (Allocatively Efficient) for a Monopoly



- Socially optimal (allocatively efficient) is where MC=D
- This is where CS and PS is maximized

Fair Return Level for a Monopoly



- Fair return is when the government regulates price with a price ceiling

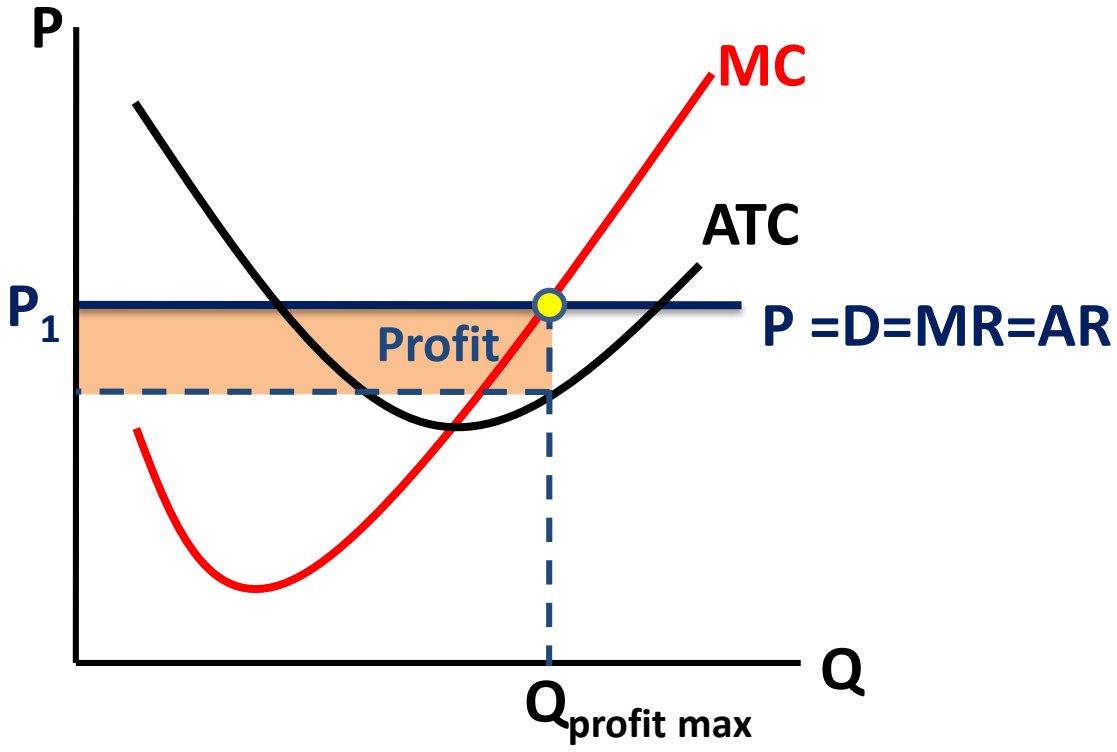
- This is where D=ATC and where TR=TC (**no economic profit**)

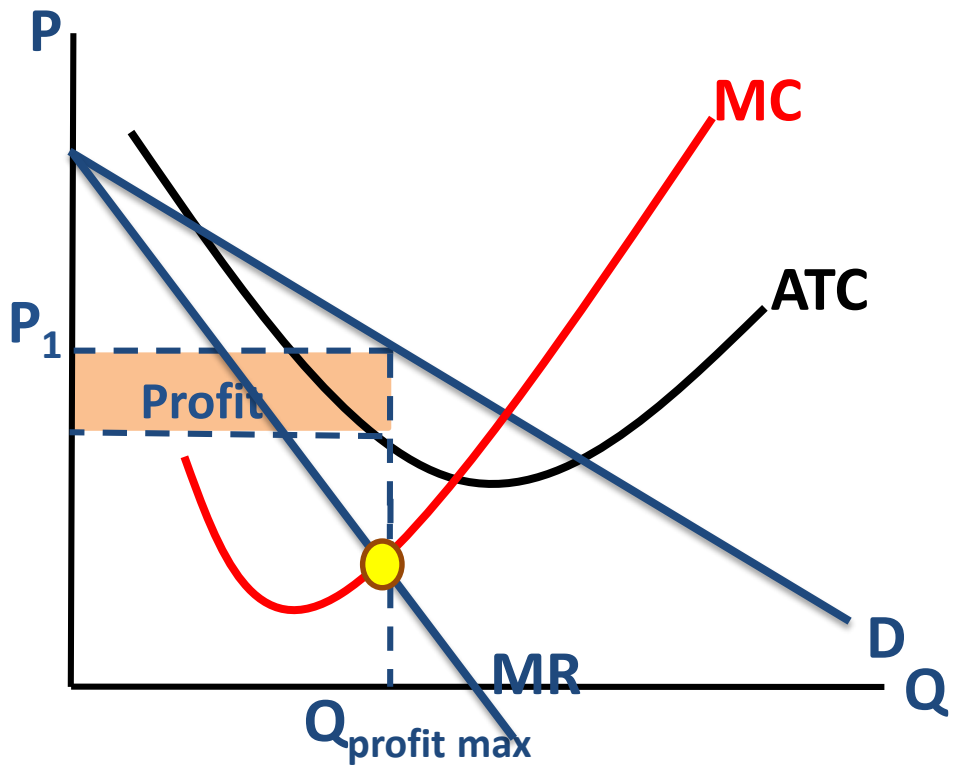
Monopoly Compared to Perfect Competition

- A monopolistic firm's marginal revenue is ***not*** its price
  - MR is always **below** its price
  - To sell more units a monopolist has to **decrease** its price—this makes the MR curve less than demand
  - Monopolies create **DWL**

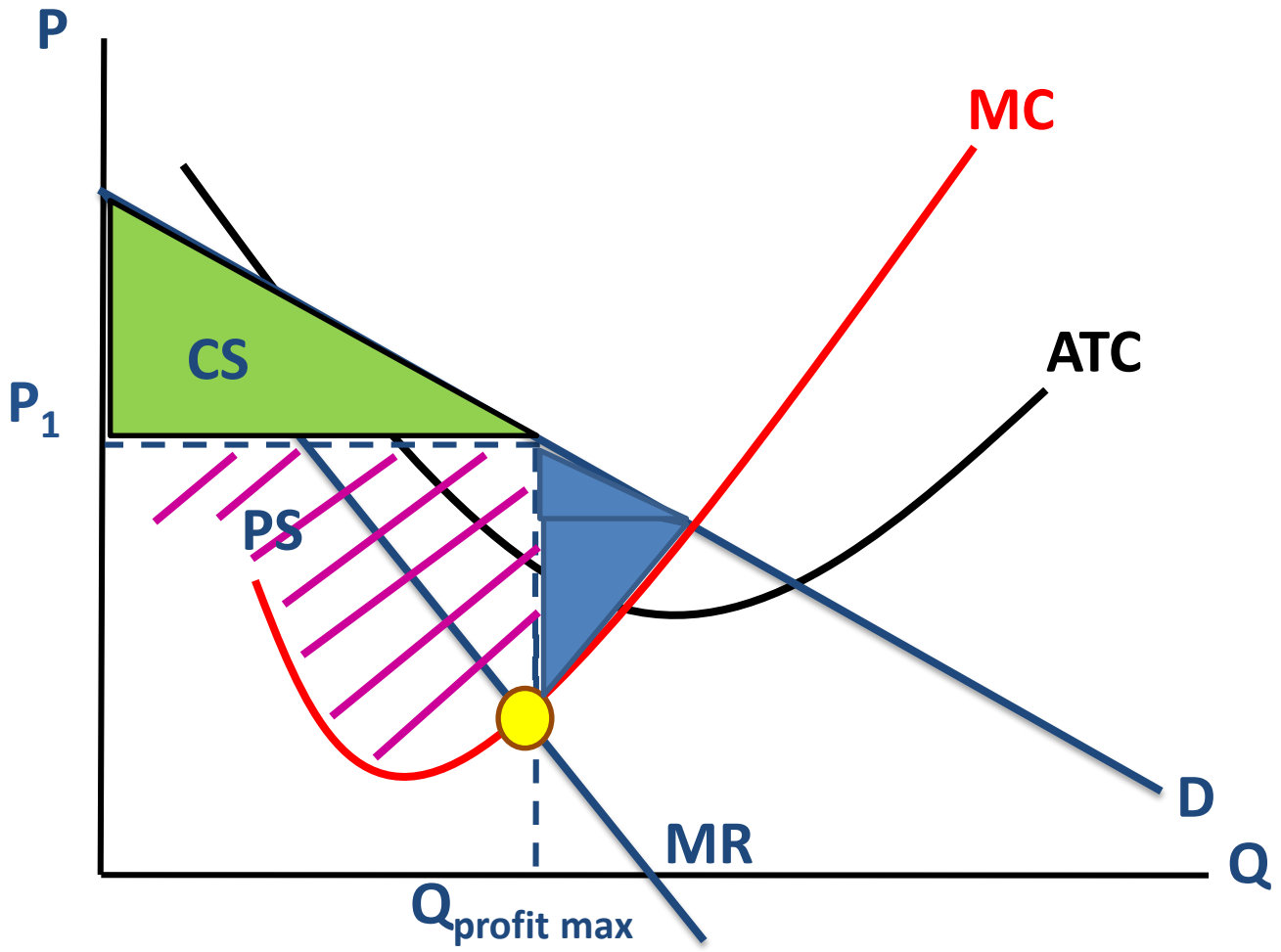
Monopoly and Perfect Competition

Let's compare where perfect competitors produce and where monopolists produce





CS, PS, and DWL for a Monopoly



Lump-sum tax vs. Per-unit Subsidies and Taxes

- **Lump-sum tax (or subsidy) is a one-time tax**
  - It affects **fixed costs**: AFC and ATC

- A **per-unit tax (or subsidy) is added to every unit produced**
  - It affects **variable costs**: AVC, ATC, and MC

Lump-sum vs. Per-unit Tax

- **If a monopoly is earning a profit, the government could institute a lump-sum or per-unit tax**

- **A lump-sum tax would affect fixed costs (AFC and ATC) and not MC, so it would not alter the profit maximizing P and Q**
  - It would decrease profit

Lump-sum vs. Per-unit Tax

- A per-unit tax would affect variable costs (AVC, ATC, and MC), so it would alter the profit maximizing P and Q
  - It would shift MC up (to the left)
  - Q would decrease and P would increase
  - It would decrease profit

Lump-sum vs. Per-unit Subsidy

- If a monopoly is earning a loss, the government could institute a lump-sum or per-unit subsidy

- A lump-sum subsidy would affect fixed costs (AFC and ATC) and not MC, so it would not alter the profit maximizing P and Q
  - It would not impact DWL

Lump-sum vs. Per-unit Subsidy

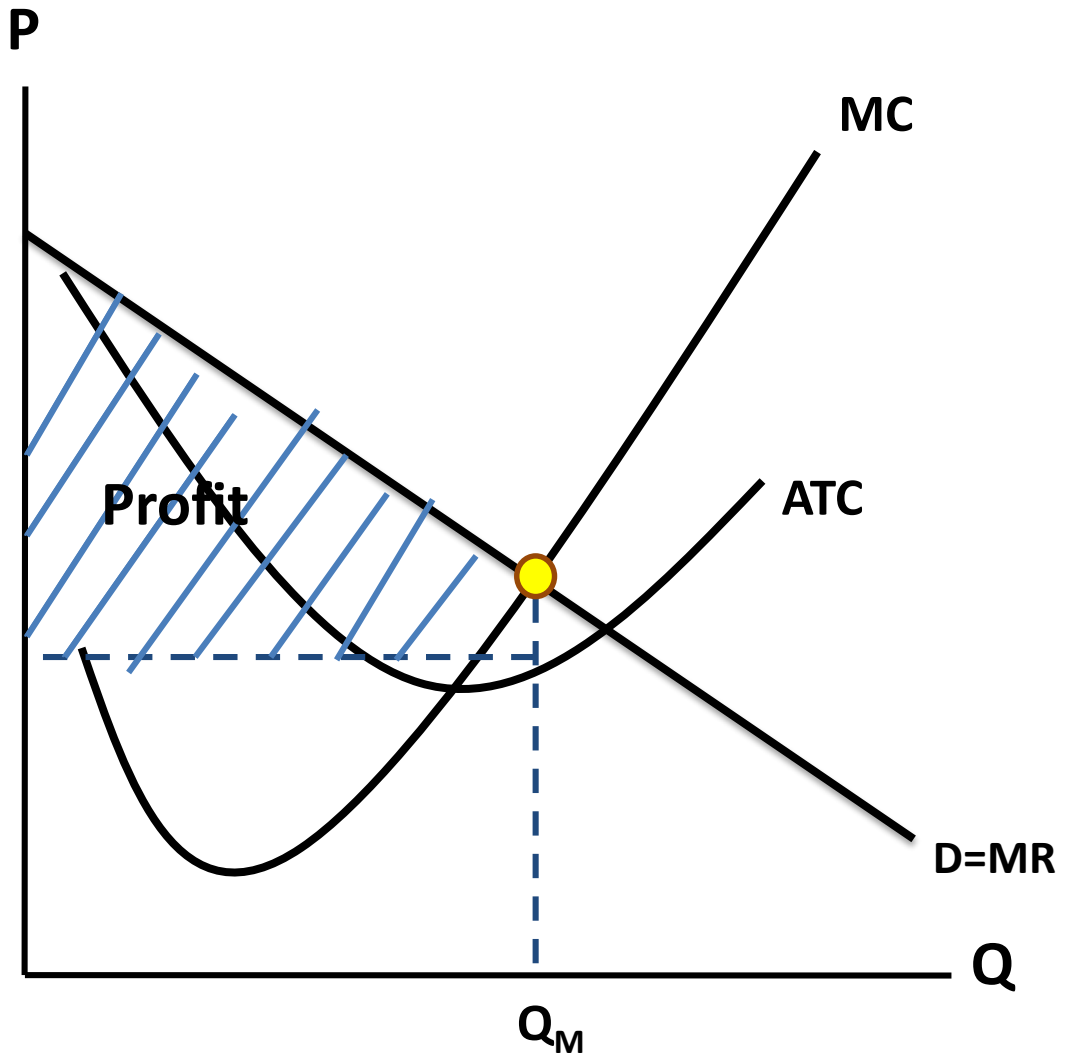
- A per-unit subsidy would affect variable costs (AVC, ATC, and MC), so it would alter the profit maximizing P and Q
  - Q would increase and P would decrease
  - MC would shift down (to the right) and would allow the firm to produce where MC=D (where a perfect competitor would produce)

The Price-Discriminating Monopolist

- When a monopolist price discriminates, it charges different prices to different individuals (or groups of individuals) in an effort to increase profits

- Consumers with less elastic demands are charged higher prices
- Consumers with more elastic demands are charged lower prices
- Price discrimination increases output and profits

The Price-Discriminating Monopolist



- D and MR are the same
- Q is where it would be for a perfect competitor, where MC=MR
- P, is anywhere on the demand curve because those willing to pay a higher price will
- There is no CS

Natural Monopoly

- **Natural monopoly** is when a **one firm** can produce at a lower cost due to **economies of scale** **(more than one firm would prevent the monopolist from taking advantage of economies of scale)**
  - There is **no** DWL

Natural Monopoly

- **If demand intersects ATC while demand is downward sloping, we can conclude the industry is a natural monopoly**

- **If a firm charges at its profit maximizing point, where MC=MR, it is charging much higher than the socially optimal price (where MC=D)**
  - **It also restricts its output (or under produces)**

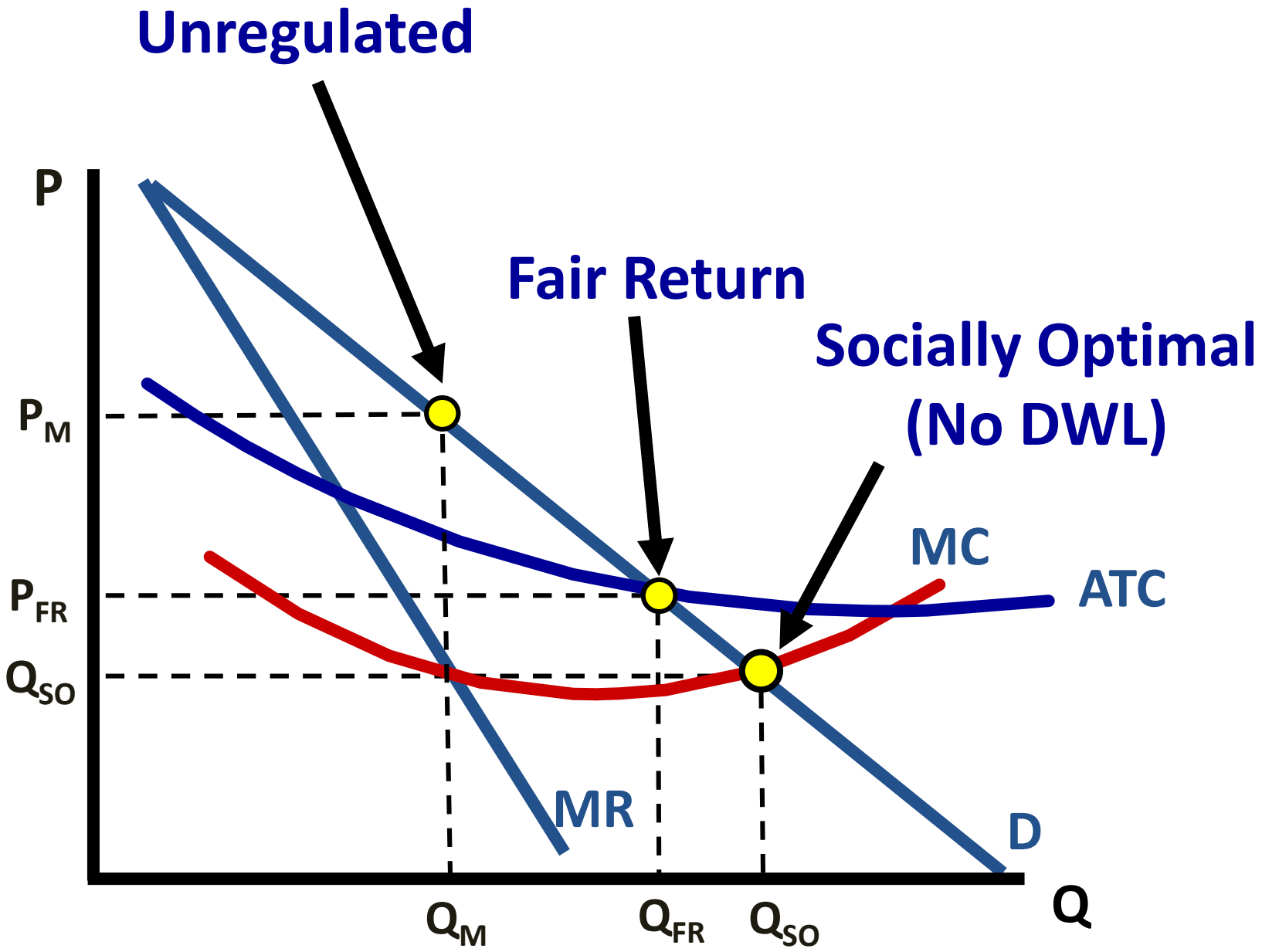
Natural Monopoly

- **How can society achieve a socially optimal level with a natural monopoly?**
  - **The government can intervene with price controls and subsidies**

Natural Monopoly

- A price control instituted at the socially optimal price would cause the firm to earn economic losses and shutdown
  - The natural monopoly is then referred to as a regulated monopoly

Natural Monopoly

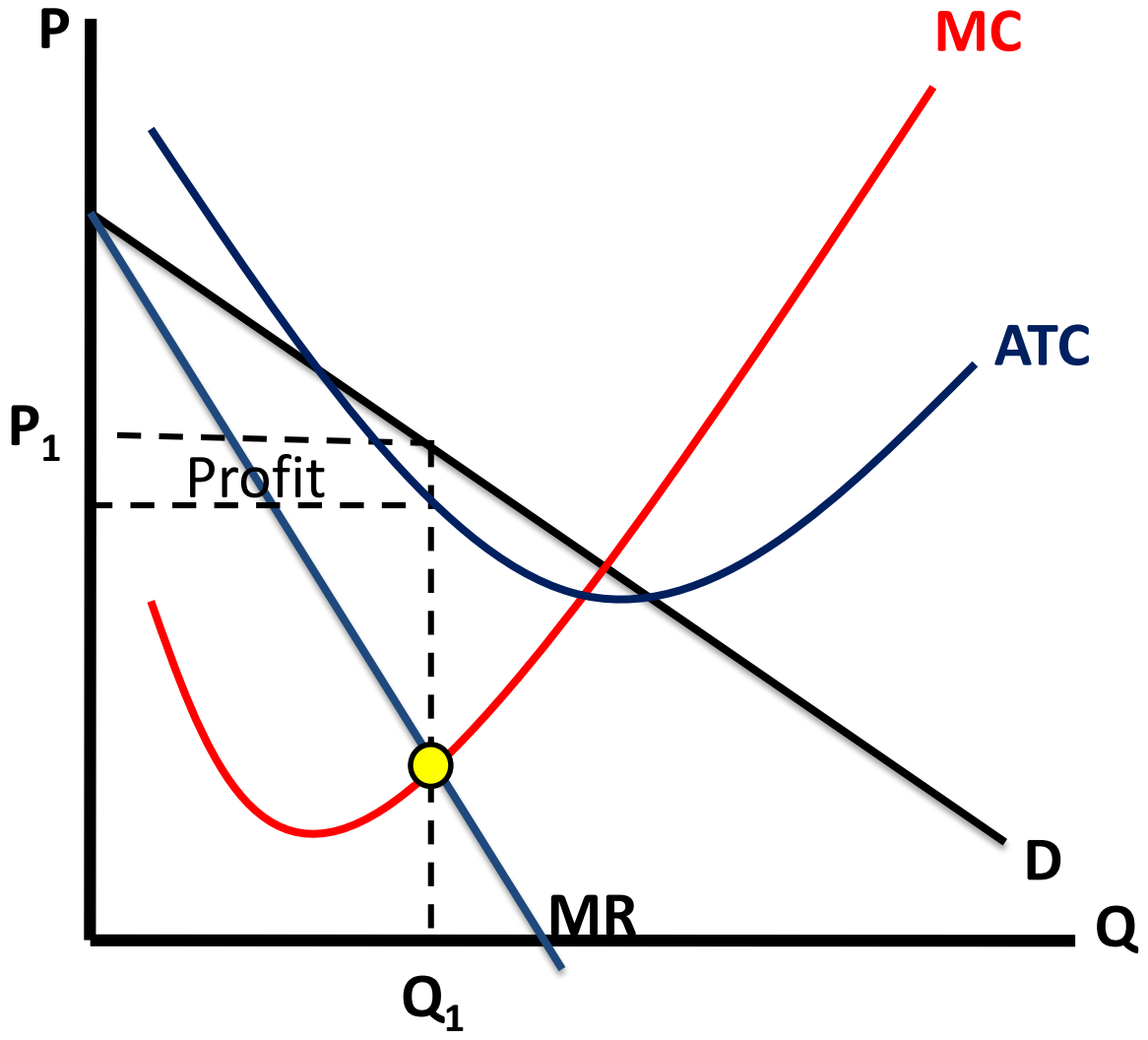


Chapter 14: Monopolistic Competition

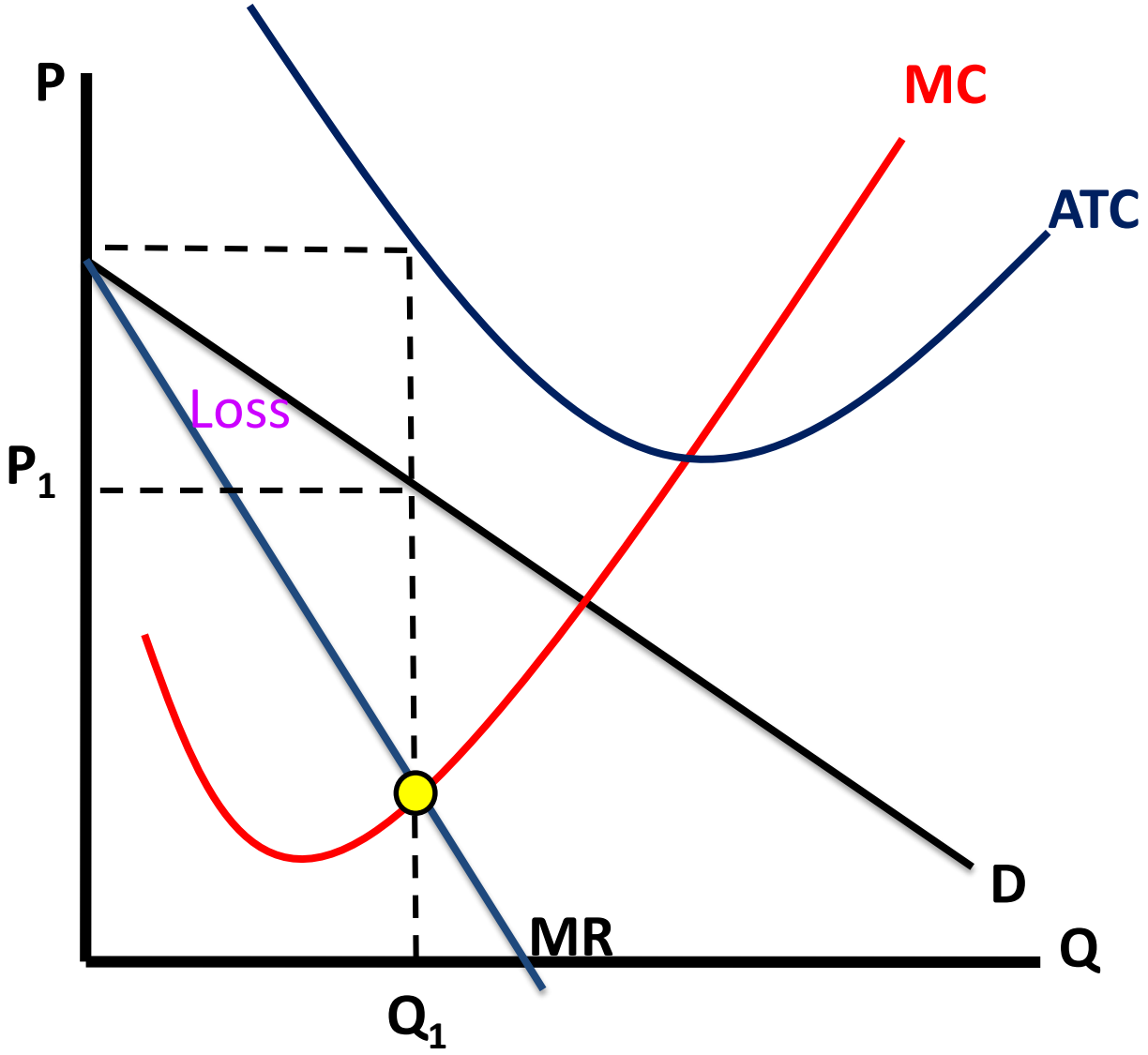
Characteristics of Monopolistic Competition

- Many sellers
- Firms are price makers so MR is less than demand
- Product differentiation (many substitutes available); emphasizes non-price competition through advertising
- Easy entry and exit of firms in the long run
- Zero economic profit in the long run
- Not allocatively efficient because P ≠ MC
- Not productively efficient because **not** producing at minimum ATC
- Firms have **excess capacity**; could be producing at the lowest cost but is producing less quantity

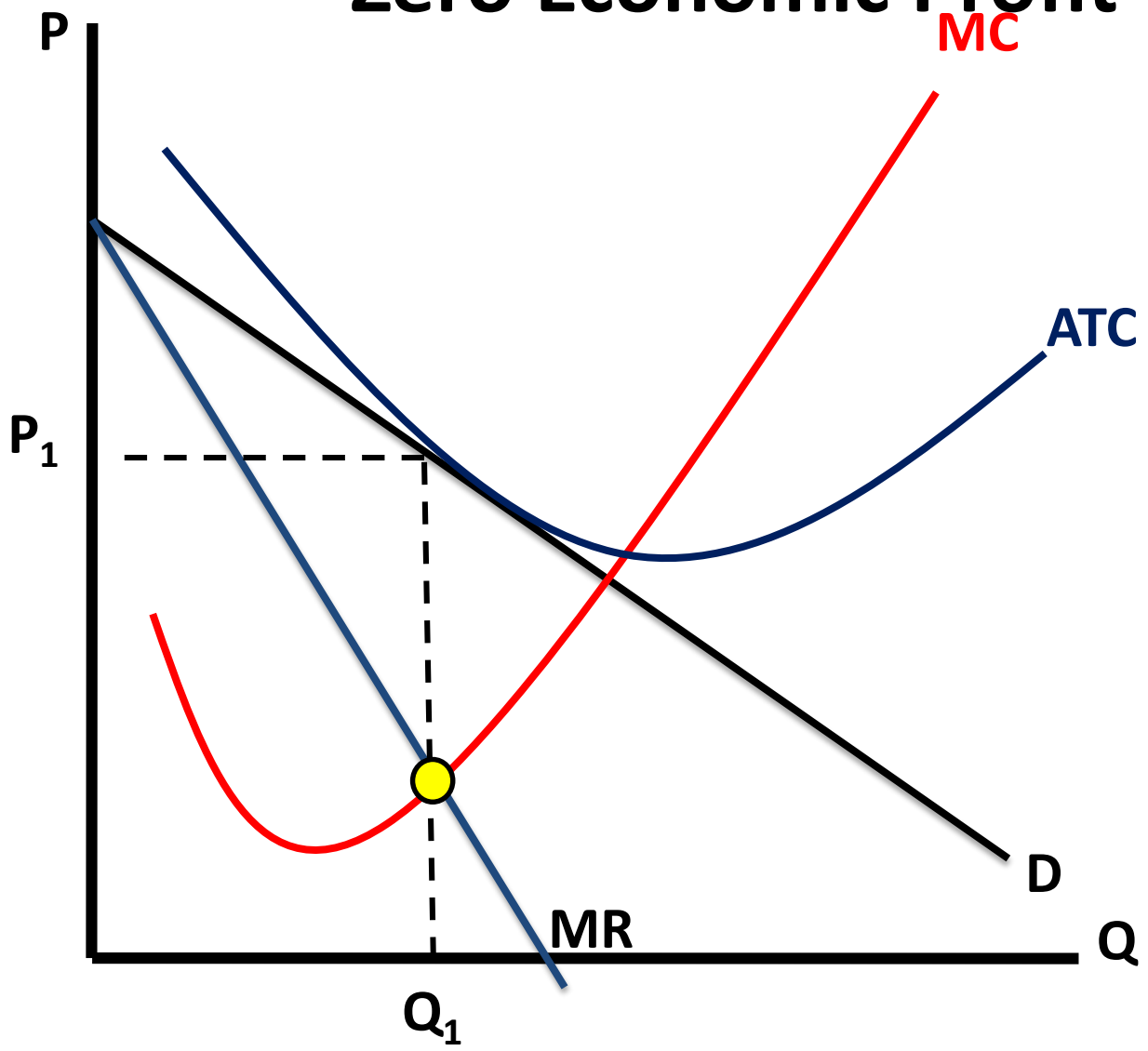
Monopolistic Competition Earning a Profit in the Short run



Monopolistic Competition Earning a Loss



Monopolistic Competition in the Long Run: Zero Economic Profit

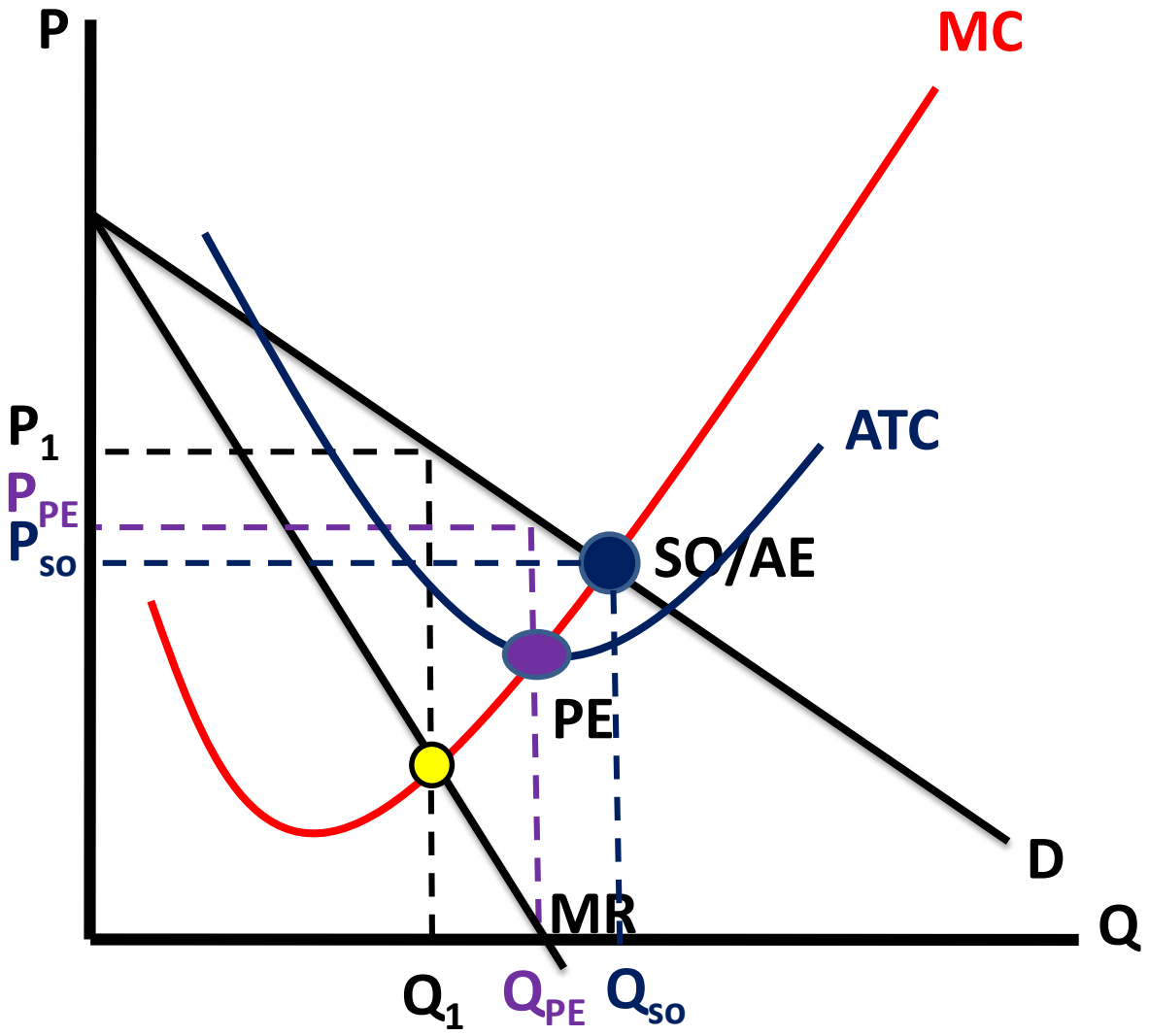


ATC is tangent at P_1; min ATC still goes through MC but **not** through SO (where MC=D)

Are Monopolistically Competitive Firms Efficient?

- Not allocatively efficient (or socially optimal) because P ≠ MC
- Not productively efficient because **not** producing at **minimum ATC**
- Firms have **excess capacity**: firm could be producing at the lowest cost but is producing less quantity (not allocatively efficient)

Monopolistic Competition Earning a Profit in the Short run with SO and PE



- Socially optimal/allocatively efficient level: where D=MC

- Productively efficient level: minimum ATC

Chapter 15: Oligopoly and Anti Trust Policy

Characteristics of Oligopoly

- Few firms in an industry have large market share
- Can produce standard or differentiated products
- High barriers to entry
- Firms are mutually interdependent
- Can be collusive or noncollusive

Anti-Trust Policy

- Used to regulate firms engaging in monopoly-like behavior or that are restraining trade

Chapter 20: Game Theory

Game Theory and Oligopolies

- Their pricing and output decisions must be strategic to avoid economic losses—their decisions are **mutually interdependent**

- **Game theory helps us analyze their strategies**

Payoff Matrix

This is a payoff matrix for Firms A and B and their profits. The first entry in each cell column represents Firm A's profits and the second entry in each cell represents Firm B's profits.

		Firm B: Raise Price	Firm B: Lower Price
Firm A	Raise Price	$100, $80	$80, $90
	Lower Price	$90, $75	$70, $80

Payoff Matrix

The easiest way to analyze which strategy is best is to start with one player at a time. We will “box” Firm A’s strategies and analyze them first.

Firm A		Firm B: Raise Price	Firm B: Lower Price
	Raise Price	$100, $80	$80, $90
	Lower Price	$90, $75	$70, $80

Payoff Matrix

Step 1: We will use an **X** to identify which strategy is best for **Firm A.**

- If Firm B raises its price, Firm A can raise its price for $100 in profit, or lower its price for $90 in profit.
- If Firm B lowers its price, Firm A can raise its price for $80 in profit, or lower its price for $70 in profit.

Firm A	Firm B: Raise Price	Firm B: Lower Price
Raise Price	X $100, $80	X $80, $90
Lower Price	$90, $75	$70, $80

Payoff Matrix

Step 2: We will use a ✓ to identify which strategy is best for **Firm B.**

- If Firm A raises its price, Firm B can raise its price for $80 in profit, or lower its price for $90 in profit.
- If Firm A lowers its price, Firm B can raise its price for $75 in profit, or lower its price for $80 in profit.

Firm A	Firm B: Raise Price	Firm B: Lower Price
Raise Price	X **$100, $80**	X **$80, $90** ✓
Lower Price	**$90, $75**	**$70, $80** ✓

Payoff Matrix

What is the best strategy for each Firm given the other player's choice?

- Firm A's best strategy is to **raise price.**
- Firm B's best strategy is to **lower price.**

Firm A		Firm B: Raise Price	Firm B: Lower Price
Raise Price		X $100, $80	X ✓ $80, $90
Lower Price		$90, $75	✓ $70, $80

Dominant Strategy

- In the previous example, both Firm A and B have a **dominant strategy:** the decision (strategy) you will make regardless of what your opponent does
- When looking at two firms, they **may or may not** have a dominant strategy
- If there is **not** a dominant strategy, the firm is **dependent** on what the **other firm does**

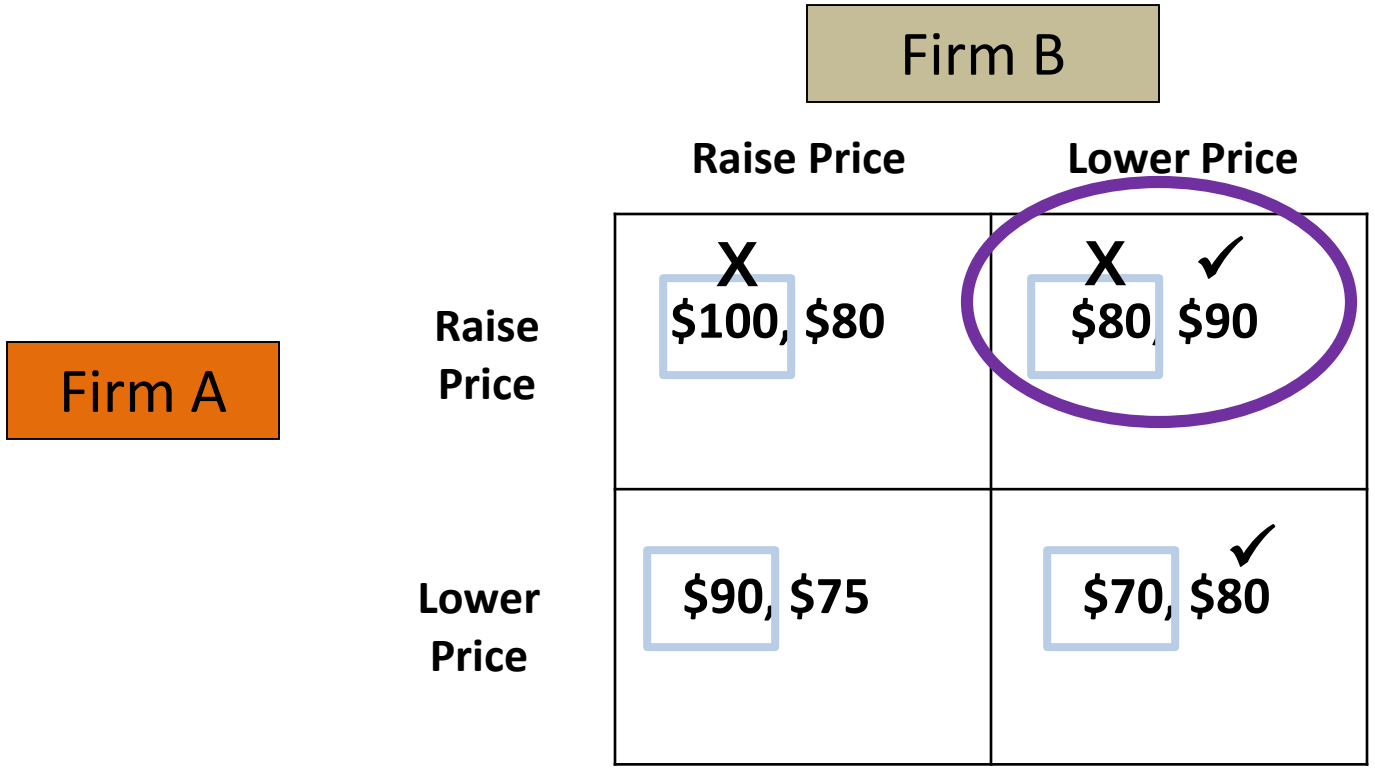
Nash Equilibrium

- A **Nash equilibrium** means no player can improve his or her payoff by changing his/her strategy

- A Nash equilibrium **doesn't** have to be the solution that is jointly best for all players
  - This appears when there is an "x" and a "✓" in one of the boxes of the **matrix—this would be the decision each player/firm makes (where each player's option is optimal given what the other player will do)**

Nash Equilibrium

- Below, there is a Nash equilibrium:



Chapter 17: The Labor Market

Demand and Labor

- **What is demand for labor?**
  - **Demand is the different quantities of workers that businesses are willing and able to hire at different wages**
  - There is an **inverse (negative)** relationship between wage and quantity of labor demanded

Demand and Labor

- **Who demands labor?**
  - Firms demand labor
  - Demand for labor shows the quantities of workers that firms will hire at different wage rates
    - As wage **falls**, quantity demanded (for labor) **increases**
    - As wage **increases**, quantity demanded (for labor) **falls**

Derived Demand for Labor

- **The demand for labor follows the basic law of demand:** the higher the wage, the lower the quantity of labor demanded

- **The demand for labor by firms is a derived demand:** it comes from consumers' demand for a particular good

What shifts the demand for labor?

- **Changes in the Price of the Product**
  - An increase in **price** of the product increases MRP and **demand** for labor (remember the demand for resources is a derived demand)

- **Changes in Worker Productivity**
  - Technological advances increase marginal product and therefore MRP (demand)

What shifts the demand for labor?

- **Changes in the Price of Other Resources**
  - **Substitute Resources**
    - **Example: What happens to the demand for assembly line workers if the price of robots falls?**
    - This would decrease the demand for assembly line workers

What shifts the demand for labor?

- **Complementary Resources**
  - **Example: What happens to the demand for nails if the price of lumber increases significantly?**
    - The demand for nails decreases

Supply and Labor

- **What is supply for labor?**
  - **Supply is the different quantities of individuals that are willing and able to sell their labor at different wages**
  - There is a **direct (positive)** relationship between wage and quantity of labor supplied
    - Workers have trade-off between work and leisure

Supply and Labor

- **Who supplies labor?**
  - Individuals supply labor
  - **Supply of labor is the number of workers that are willing to work at different wage rates**
  - Higher wages give workers incentives to leave other industries or give up leisure activities
    - As wage **increases**, quantity supplied (of labor) **increases**
    - As wage **decreases** quantity supplied (of labor) **decreases**

What shifts the supply of labor?

- Number of qualified workers
  - Education, training, and abilities required
  - This would increase or decrease the supply of workers depending on the scenario
- Immigration, working conditions, availability of alternative options, preferences for leisure, and cultural expectations all cause the labor supply curve to shift

Characteristics of Perfectly Competitive Labor Markets

- Many small firms are hiring workers
- **No single firm is large enough to manipulate the market**
- Many workers with **identical skills**
- Wage is **constant**
- Workers are **wage takers**
- **Firms can hire as many workers as they want at a wage set by the industry**

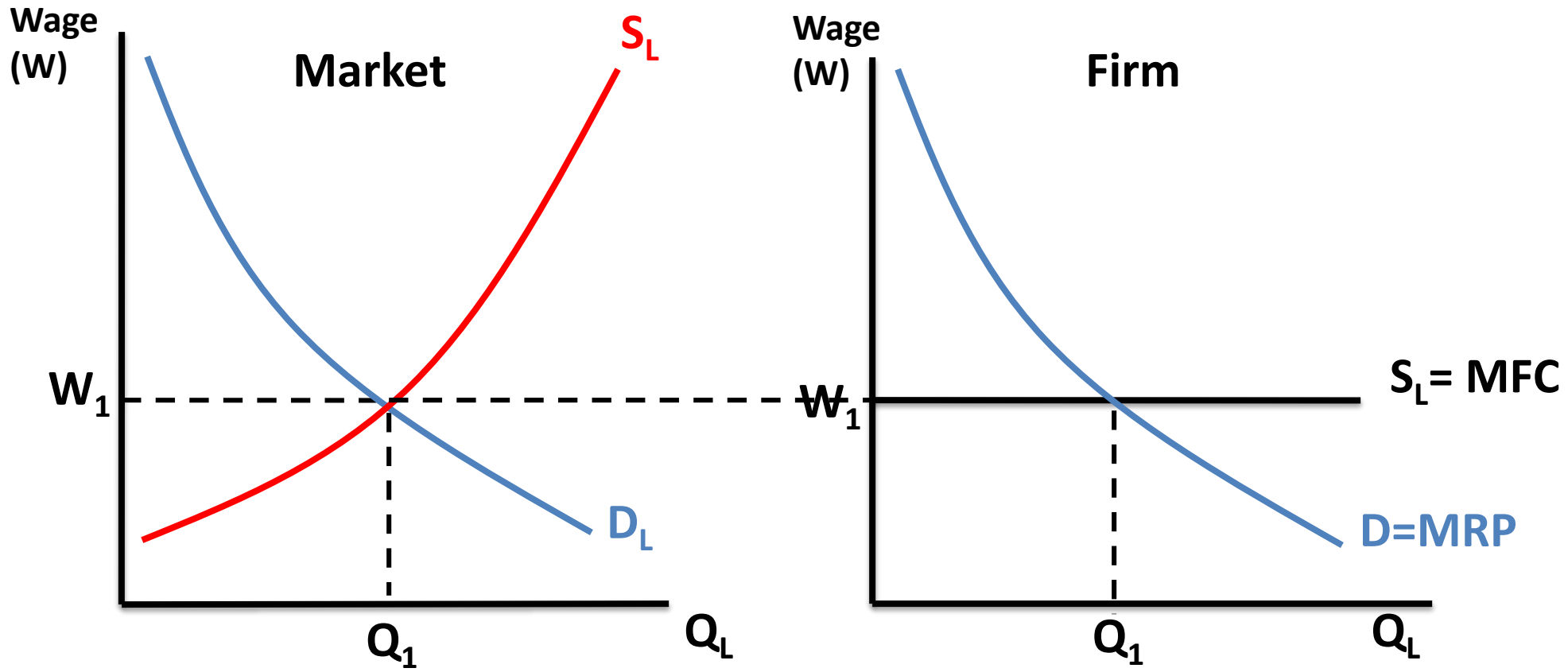
Perfectly Competitive Labor Market

- **Marginal factor cost (MFC, or marginal resource cost, MRC)=** the additional cost for each additional input (hiring one more worker)
  - It is the firm's **supply curve** and is **perfectly elastic** (they are a **wage taker**)
    - If workers are paid $100 per day, this is the MFC
  - **MFC also equals change in total cost divided by change in inputs**

Perfectly Competitive Labor Market

- **Marginal revenue product (MRP)=** the additional revenue generated by the additional input (by one more worker)
  - **It is the firm's demand curve for labor (and is downward sloping)**
  - **MRP also equals change in total revenue divided by change in inputs**

Perfectly Competitive Labor Market
Side-by-side Graphs



Hiring Labor for a Perfectly Competitive Firm

- **For a perfectly competitive firm:**
  - **MRP=MPP x P**
  - **MPP is marginal physical product:** the additional units of output that hiring an additional worker will add
  - **P** represents the price of the good being sold

Hiring Labor for a Perfectly Competitive Firm

Calculate MPP

Number of Workers	Output	MPP
0	0	0
1	10	10
2	25	15
3	50	25
4	65	15
5	70	5
6	72	2

Where does diminishing marginal returns set in?
With the addition of the 4^{th} worker

Hiring Labor for a Perfectly Competitive Firm

- **The MRP determines the demand for labor**
  - The firm is willing and able to pay each worker up to the amount they generate in revenue
  - **If the worker generates $100 in MRP, they will hire and pay them up to that amount**
- **How do you know how many workers to employ?**
  - Continue to hire until **MRP = MFC (or MRC)**

Hiring Labor for a Perfectly Competitive Firm

The price of the good being sold is $10. Calculate MRP.

Number of Workers	Output	MPP	MRP
0	0	0	
1	10	10	
2	25	15	
3	50	25	
4	65	15	
5	70	5	
6	72	2	

Hiring Labor for a Perfectly Competitive Firm

The price of the good being sold is $10. Calculate MRP.

Number of Workers	Output	MPP	MRP
0	0	0	$0
1	10	10	$100
2	25	15	$150
3	50	25	$250
4	65	15	$150
5	70	5	$50
6	72	2	$20

If the market wage is $250 per day, how many workers will this firm hire?

3 workers

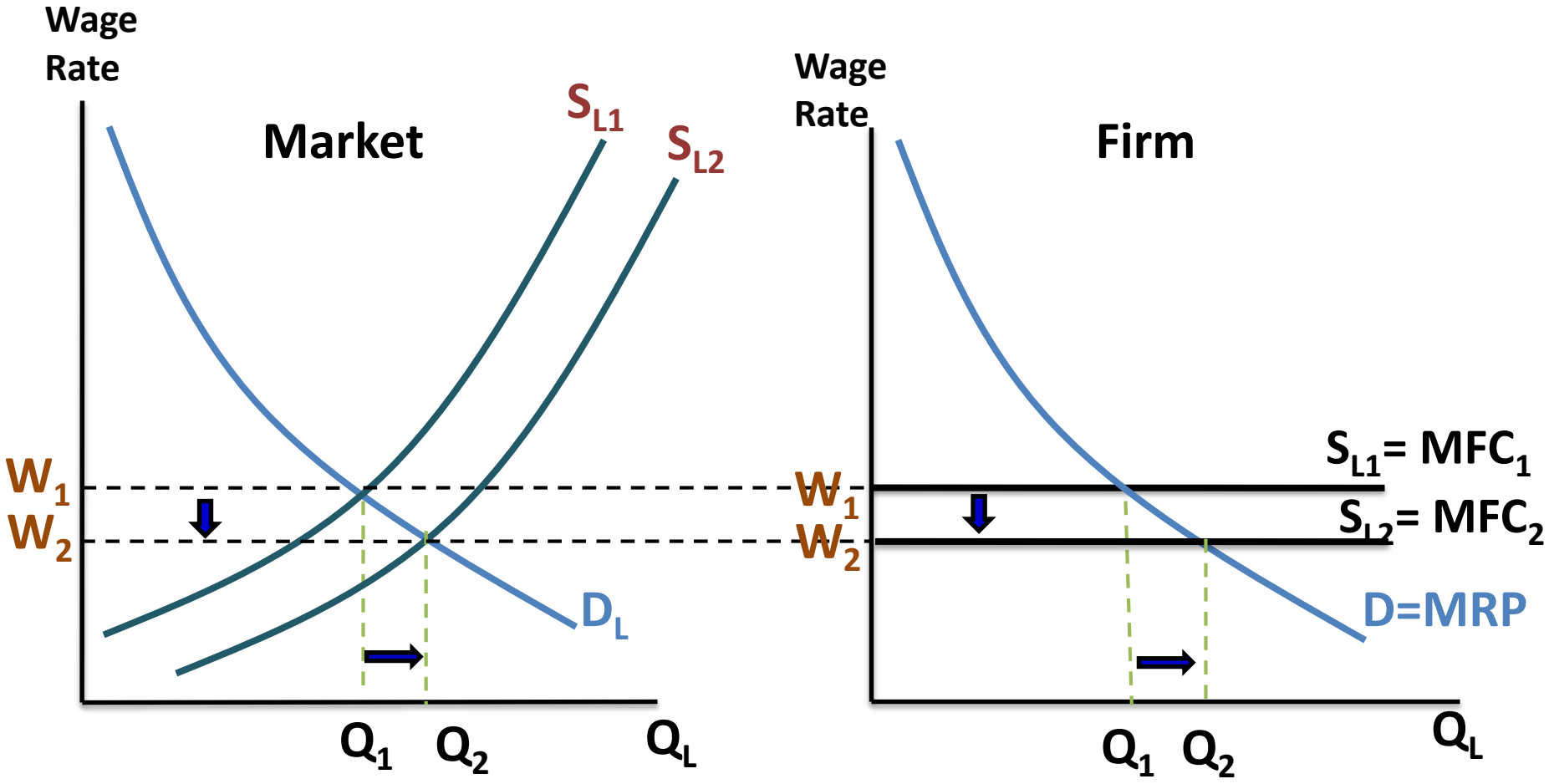
Hiring Labor for a Perfectly Competitive Firm

- **Why does the MRP eventually fall?**
  - **Diminishing marginal returns** (demand curve is downward sloping)
  - Fixed resources means each worker will eventually add **less** than the previous worker

Perfectly Competitive Labor Market

What would happen if the supply of labor increased?

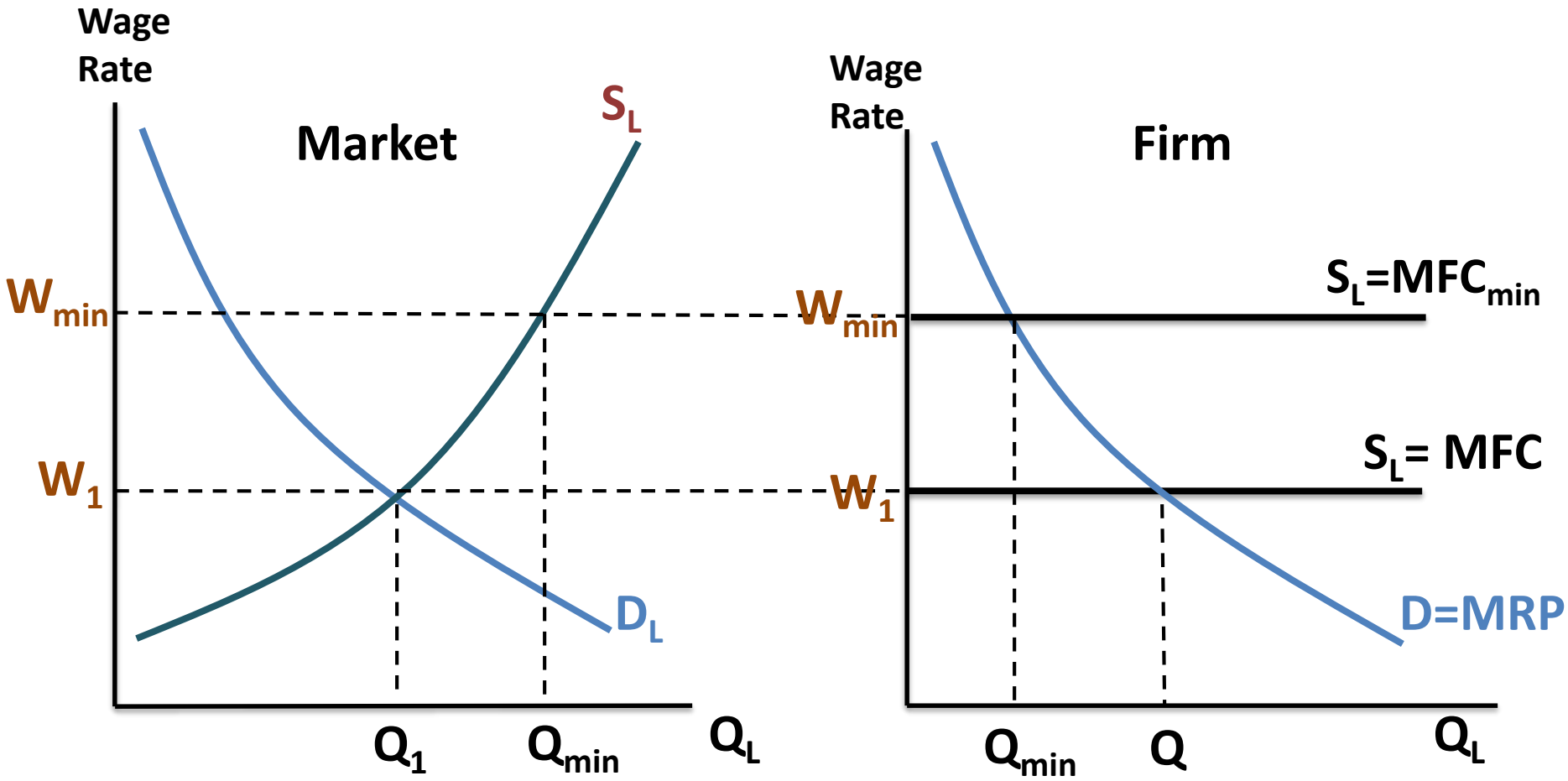
Equilibrium wage would decrease and equilibrium quantity would increase



Perfectly Competitive Labor Market

What would happen if a minimum wage was imposed?

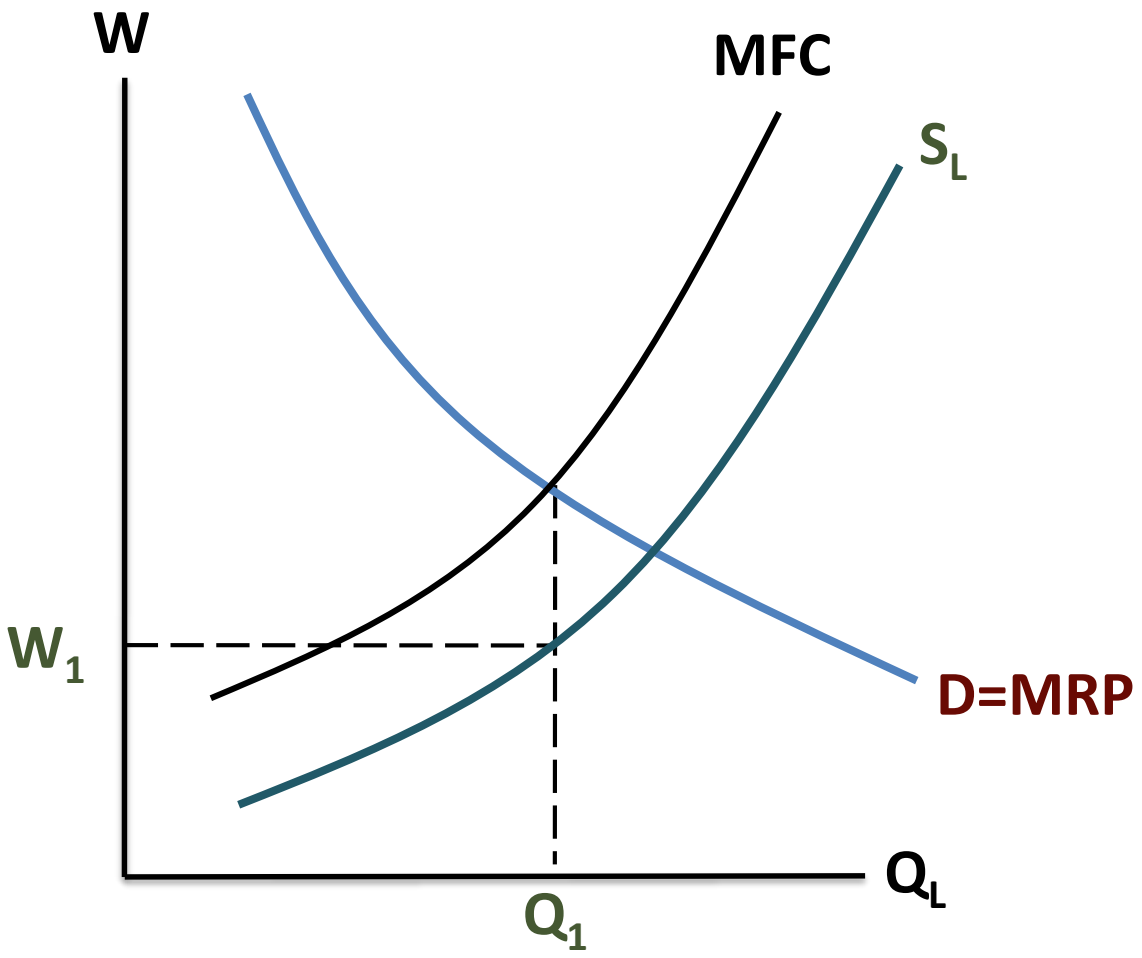
There would be an excess supply of labor and more unemployment



Imperfect Competition and the Labor Market

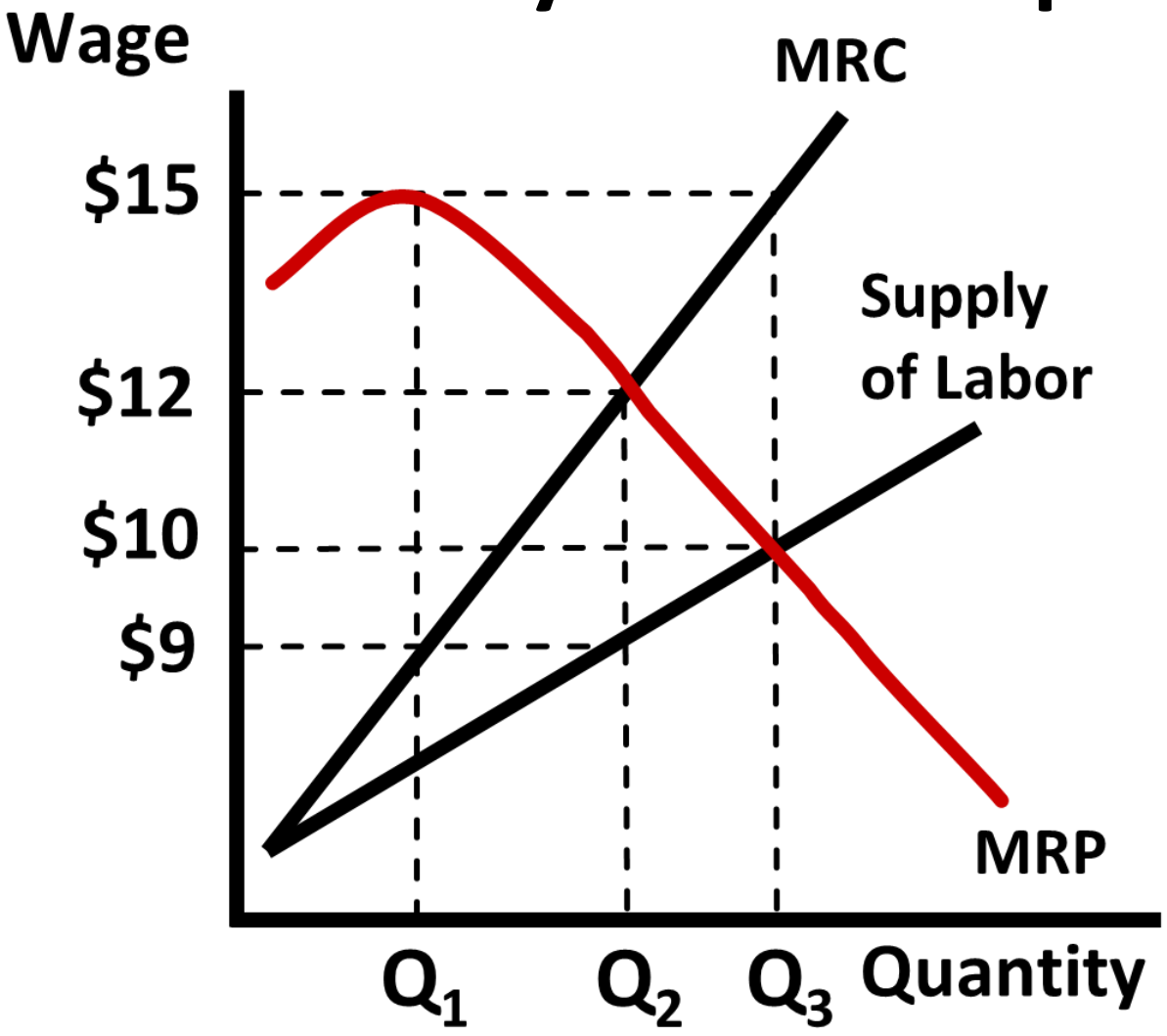
- **Monopsony** is a market in which a single firm is the only one hiring labor
  - The firm is large enough to manipulate the market—the firm is a **wage maker**
  - If a monopsonist hires another worker, the **equilibrium wage will rise the MFC is greater than the supply price of labor)**
  - The marginal factor cost (MFC) is **above** the supply curve
  - MFC **does not** equal wage

Monopsony Graph



- Use MRP=MRC to find the quantity of labor the firm will hire
- Then find where that quantity intersects the labor supply curve to find the wage

Identify the wage and quantity of labor that would be hired by this monopsony



Wage= $9

Quantity= Q_2

Imperfect Competition and the Labor Market

- **Monopolist**: price of a monopolist's product **decreases** as units are sold since the monopolist faces a **downward** sloping demand curve
- MRP of a worker= MPP x MR (marginal revenue)
- Since a monopolist's marginal revenue is always **less** than price it will **always** hire **fewer workers** than a competitive industry

Cost Minimization (or Least Cost) Rule

- **Cost minimization rule**: where the ratio of marginal product to the price of an input is equal for all inputs

$$\frac{MRPx}{MRCx} = \frac{MRPy}{MRCy} = 1$$

- **This means that the firm is hiring where MRP = MRC for each resource x and y**

Least Cost Rule

- Production at least cost requires the ratio of labor's marginal product to its price equals the ratio of capital's marginal product to its price
- The price of workers is $10 and the price of machines is $20. Complete the chart below.

Quantity of Workers	Total # of Boxes Packed (Workers)	Marginal Product (Workers)	MP/Dollar (Workers)	Total # of Boxes Packed (Machines)	Marginal Product (Machines)	MP/Dollar (Machines)
1	40			100		
2	70			180		
3	90			240		
4	100			280		

Least Cost Rule

- The price of workers is $10 and the price of machines is $20.
- The firm has $110 to spend on workers and machines.
- How many workers and machines should the firm employ?

Quantity of Workers	Total # of Boxes Packed (Workers)	Marginal Product (Workers)	MP/Dollar (Workers)	Total # of Boxes Packed (Machines)	Marginal Product (Machines)	MP/Dollar (Machines)
1	40	40	4	100	100	5
2	70	30	3	180	80	4
3	90	20	2	240	60	3
4	100	10	1	280	40	2

Least Cost Rule

- The price of workers is $10 and the price of machines is $20.
- The firm has $110 to spend on workers and machines.
- **How many workers and machines should the firm employ?**

Quantity of Workers	Total # of Boxes Packed (Workers)	Marginal Product (Workers)	MP/Dollar (Workers)	Total # of Boxes Packed (Machines)	Marginal Product (Machines)	MP/Dollar (Machines)
1	40	40	4	100	100	5
2	70	30	3	180	80	4
3	90	20	2	240	60	3
4	100	10	1	280	40	2

The firm should hire 3 workers and use 4 machines

Chapter 8: Externalities & Market Failure

Marginal Benefit (MB) and Marginal Cost (MC)

- The optimal quantity of a good occurs when the marginal benefit of consuming the last unit **equals** the marginal cost of producing that last unit
  - **This maximizes total economic surplus**

- **The market equilibrium quality is equal to the socially optimal quantity only when all social benefits and costs are internalized by individuals in the market**

Externalities

- **Externalities** are an example of market failure
  - They exist when the **external benefits** or **external costs** are on someone other than the original decision maker (a third party)
  - The market fails to include external **costs** or external **benefits**
  - **With no government involvement there would be <u>too much</u> of some goods and <u>too little</u> of others**

Externalities

- **In terms of supply and demand:**
  - The **demand** is the **marginal social benefit (MSB)** of the good and its usefulness to society
  - The **supply** is the **marginal social cost (MSC)** of providing each additional quantity
  - The **socially optimal quantity** is where **MSB=MSC** (OR MB=MC)

Positive Externalities

- **Positive externalities** (or spillover benefits) result in a benefit for someone other than the original decision maker
- **Marginal private benefit (MPB):** those purchasing the good in the market
- **Marginal social benefit (MSB):** when third parties are better off when someone else consumes a good this increases benefit to society
  - Because of this benefit, society is willing and able to pay a **higher price** at every given quantity

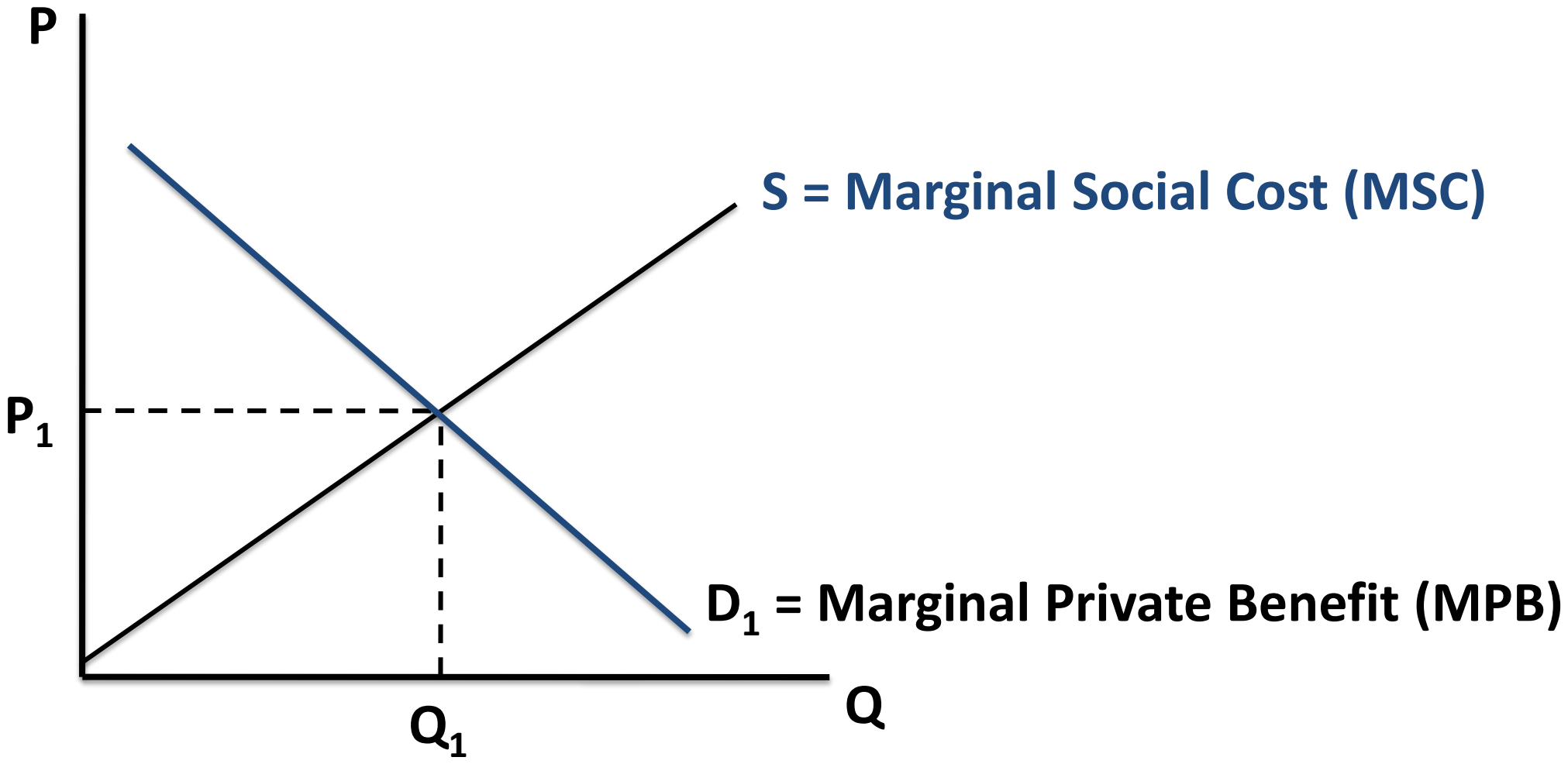
Positive Externalities

- If a third party benefits from the production or consumption of a good, even without directly buying it, the market always **under produces** a good with a **positive externality**

- Due to this, **DWL** occurs when total surplus (CS+PS) is not maximized

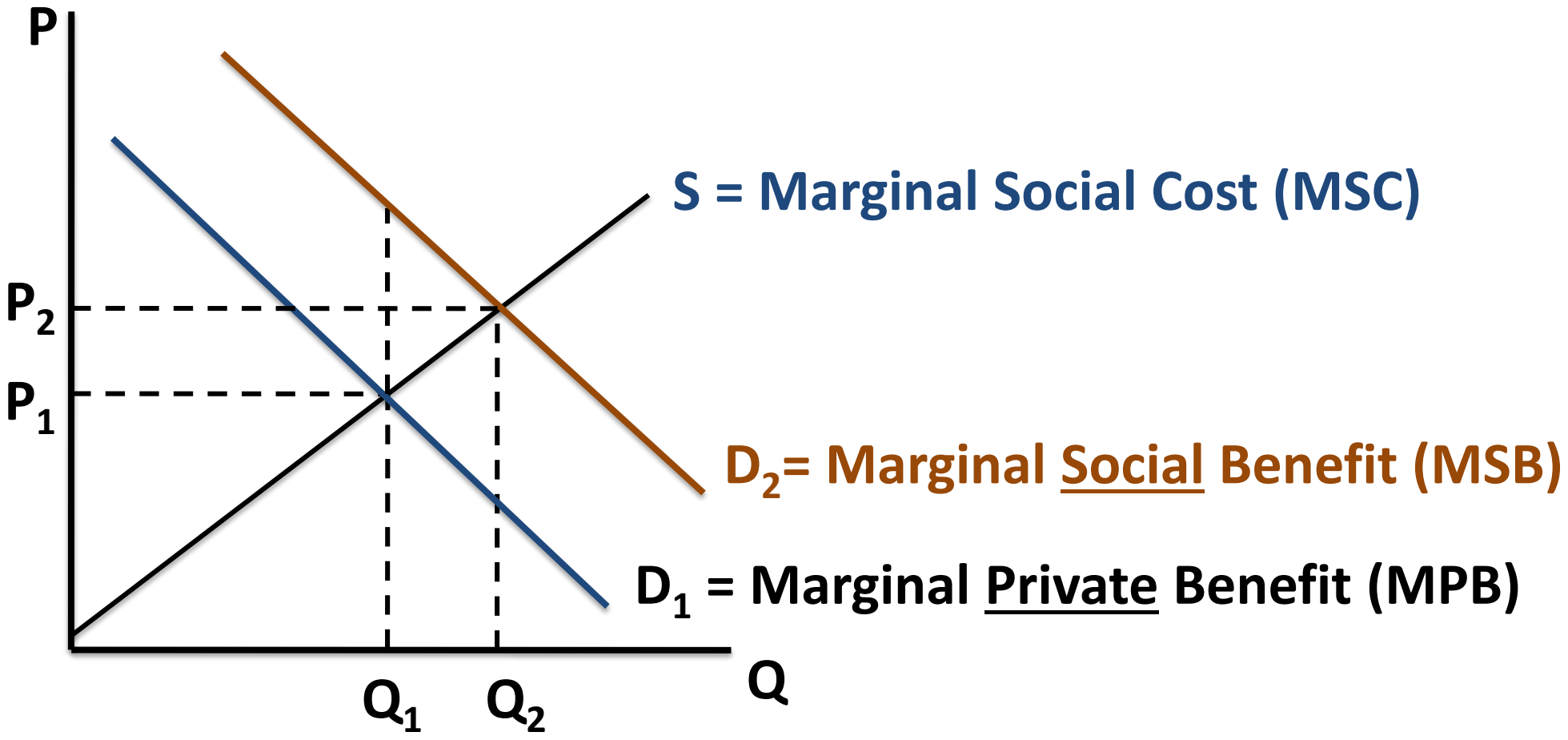
Positive Externalities

The marginal private benefit does **not** include the additional benefits to society



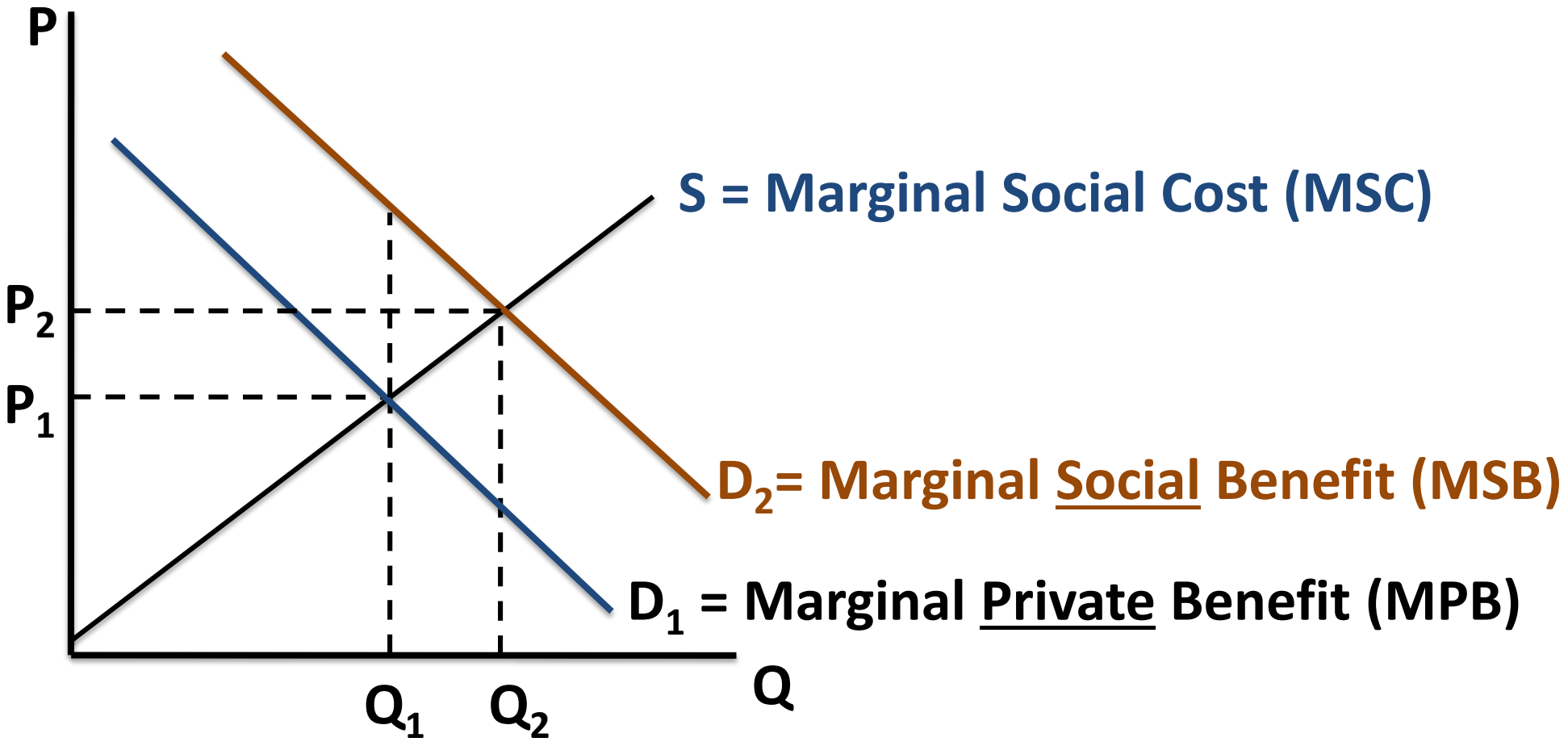
Positive Externalities

What will the demand look like when external benefits are factored in?



Positive Externalities

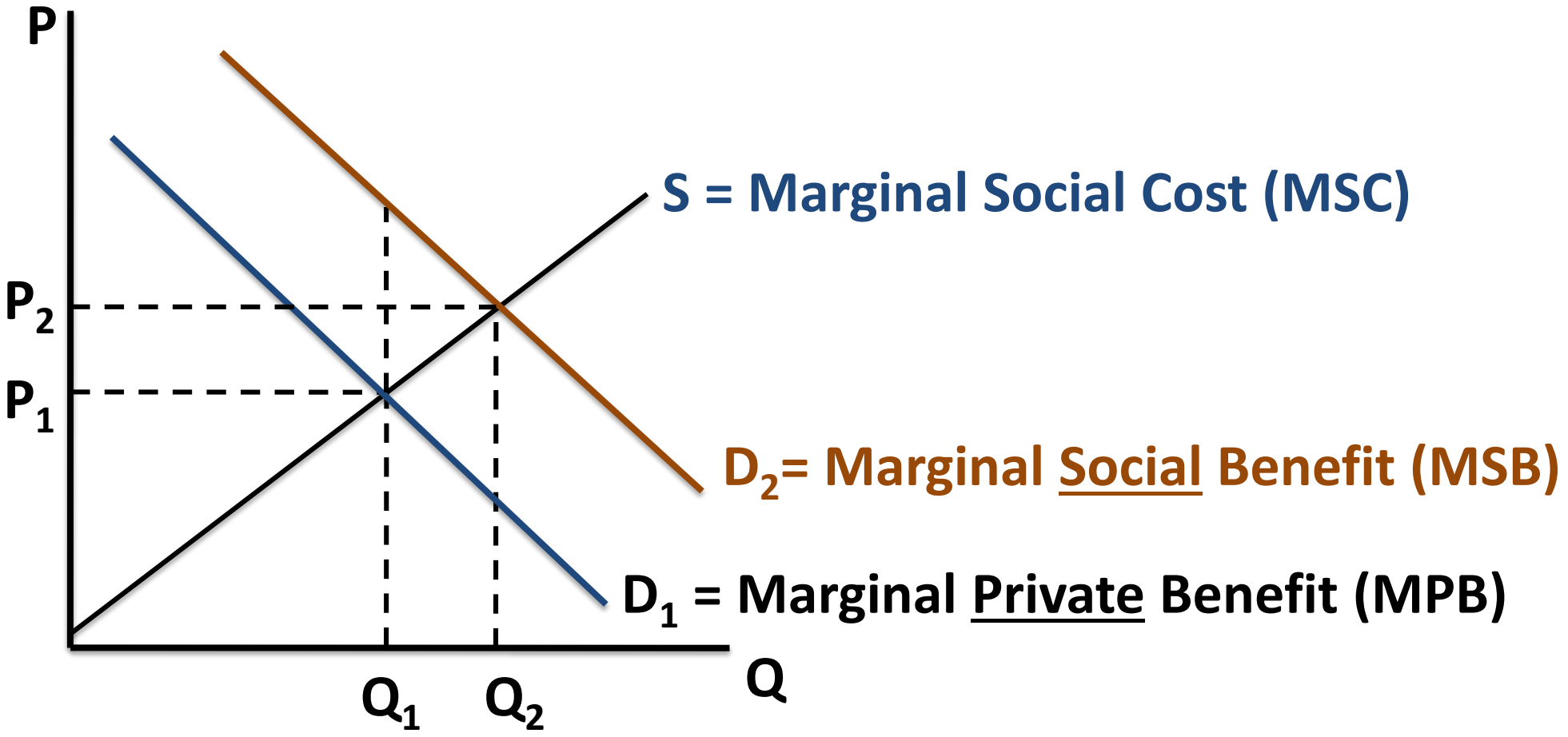
If the market produces Q_1, why is it an example of market failure?



Positive Externalities

If the market produces Q_1, why is it an example of market failure?

At Q_1, the MSC is <u>less than</u> the MSB (too little is being produced)

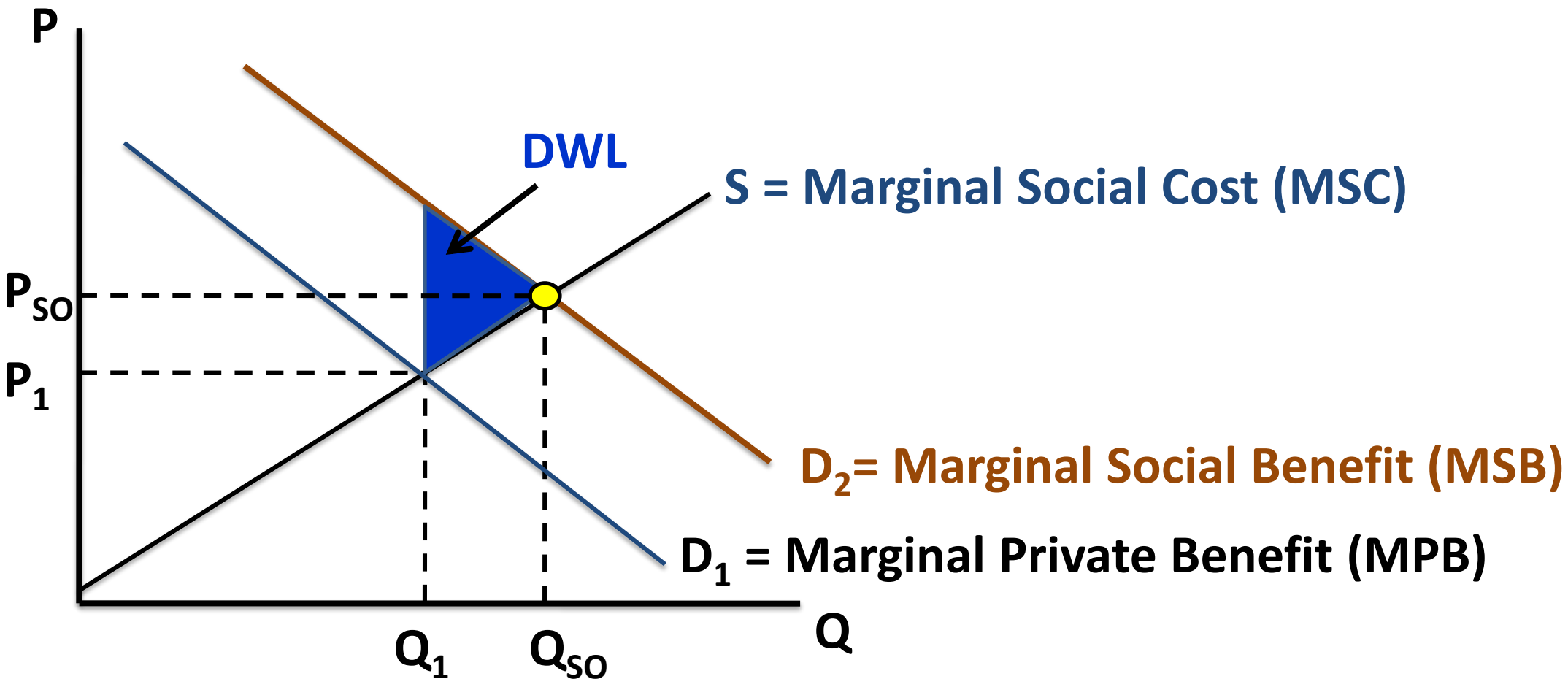


Correcting the Positive Externality

- **What should the government do to fix a positive externality?**
  - **Subsidize the amount of the externality (per-unit subsidy)**

- This **per-unit subsidy** shifts demand to the **right** (by the amount of the subsidy) and represents the marginal social benefit (the new curve is where MSB=MPB; in essence D_1, or MPB, "goes away" because we are now producing at the socially optimal P and Q)

Positive Externality Graph with DWL



Negative Externalities

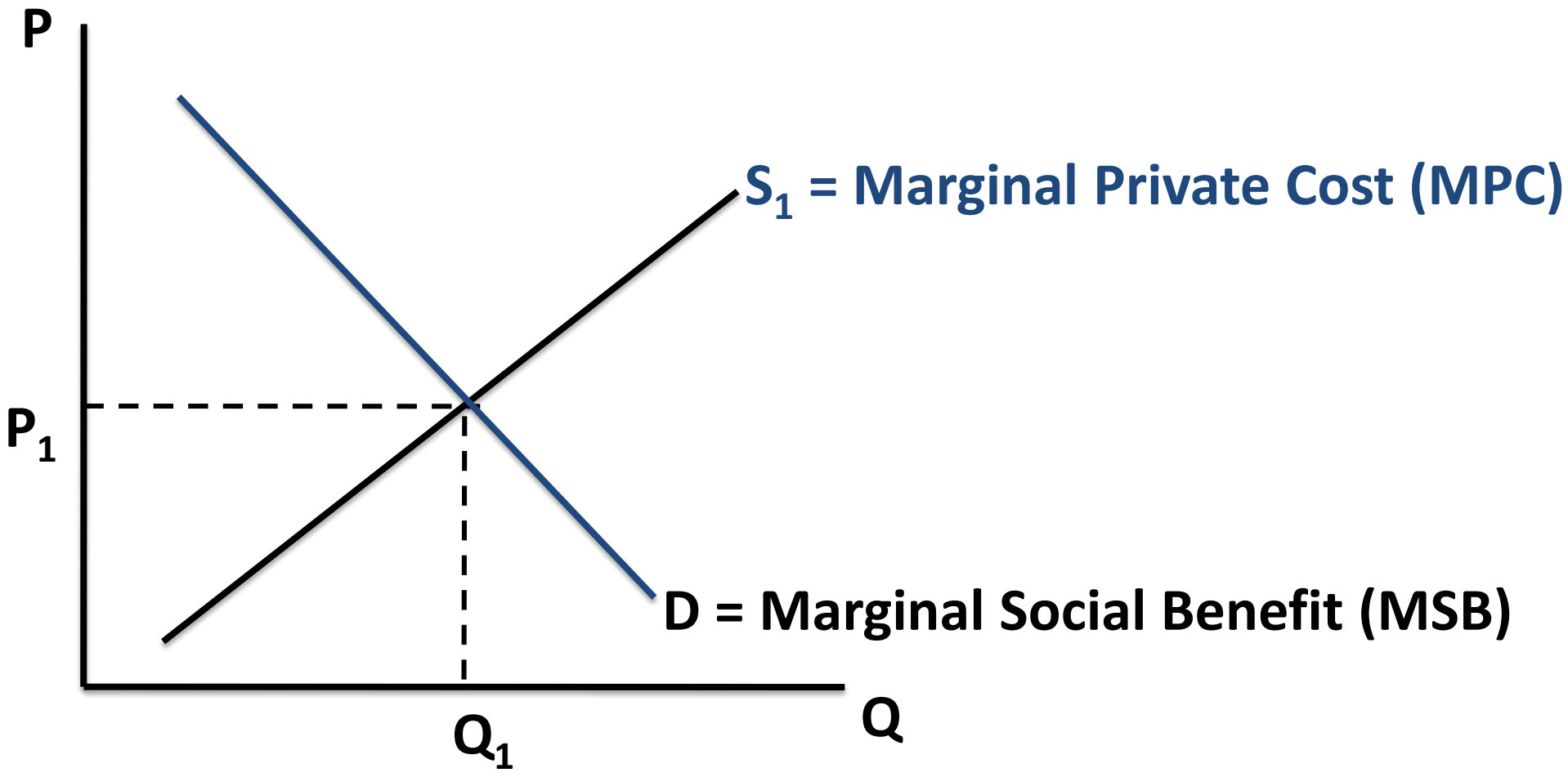
- **Negative externalities (or spillover effects)** occur when the effects are detrimental to others
  - Results in a **cost** for someone other than the original decision maker
    - **Example:** Second-hand smoke and carbon monoxide emissions
  - For a **negative externality**, the good is **overproduced** which leads to **DWL**

Negative Externalities

- **Marginal social cost (MSC):** represents the cost to the firm and to the third parties
- Since someone else consumes the good, the cost to society increases
- Society incurs a higher cost at every given quantity so **MEC** (marginal external cost) is added to MPC to get MSC

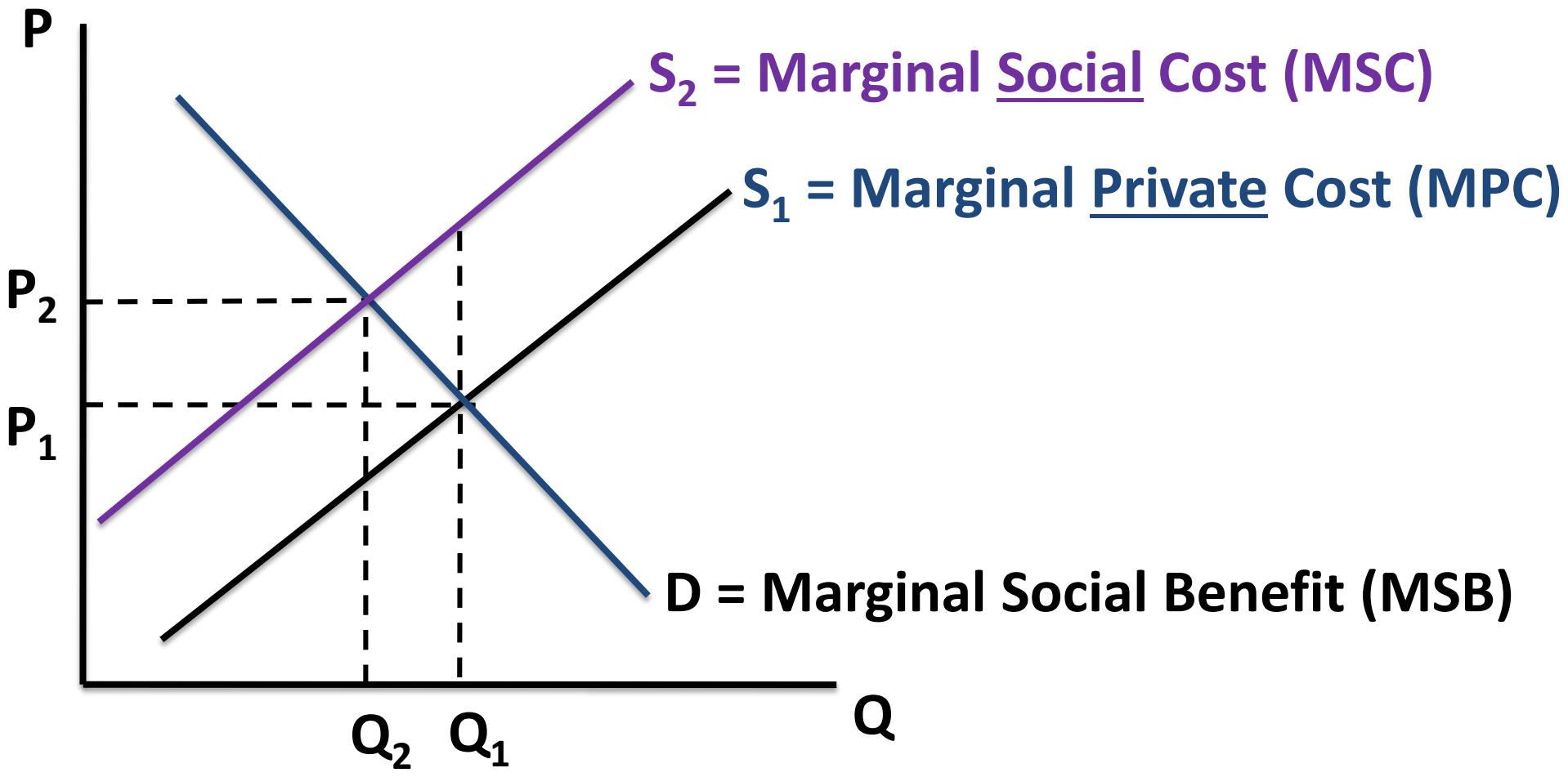
Negative Externality

The marginal private cost doesn't include the costs to society.



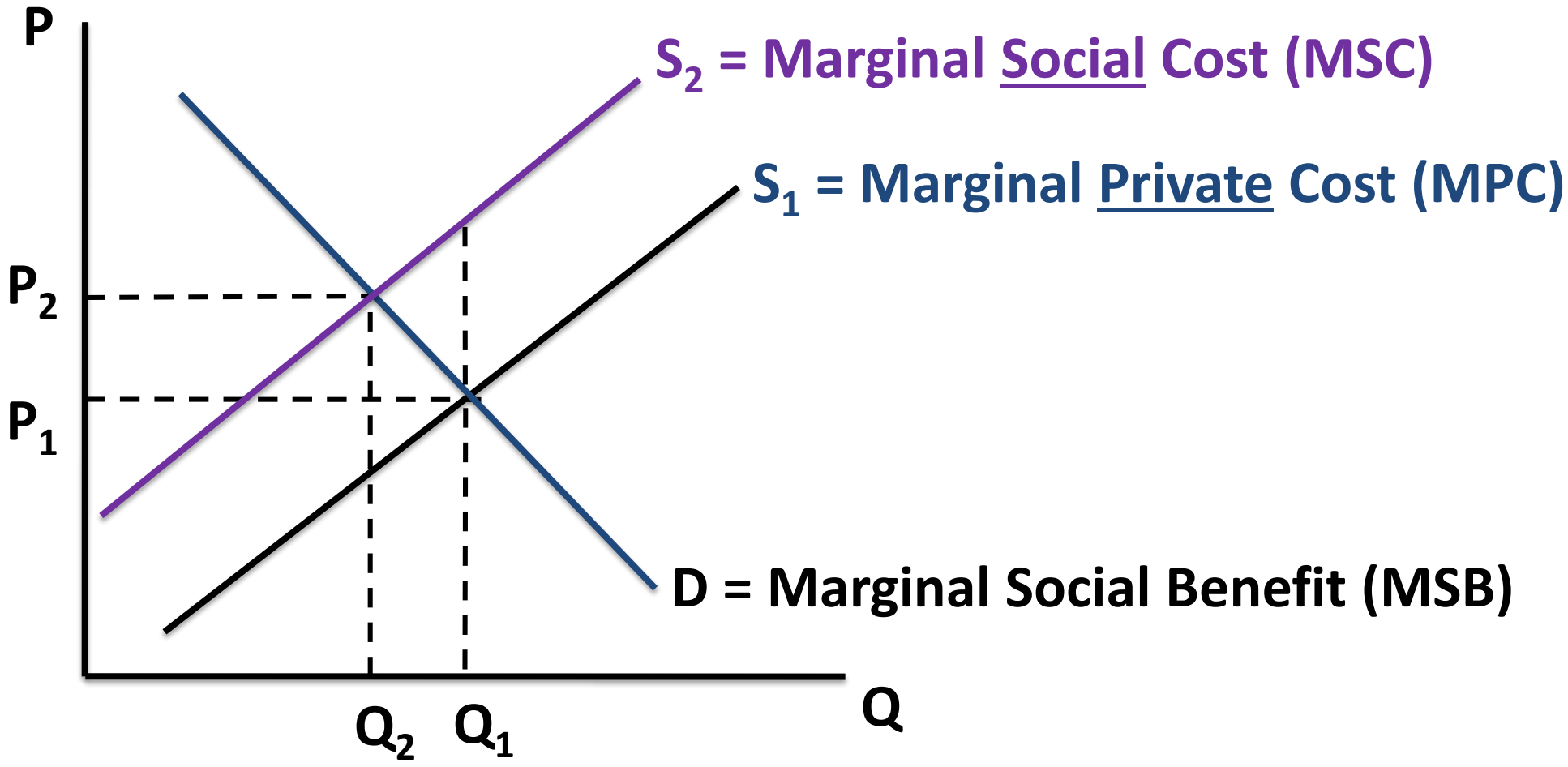
Negative Externality

What will the supply look like when external costs are factored in?



Negative Externality

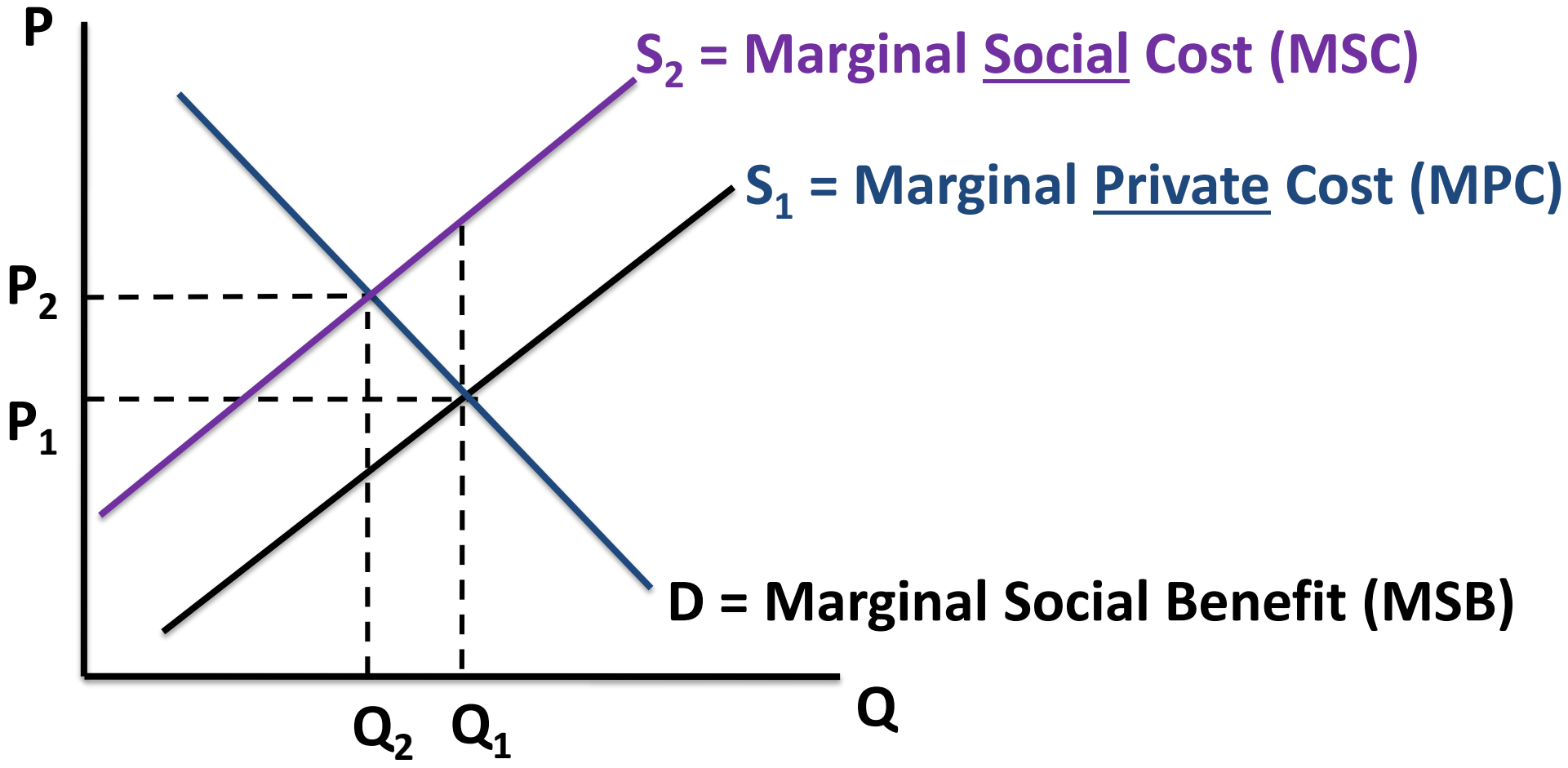
If the market produces Q_1, why is this an example of market failure?



Negative Externality

If the market produces Q_1, why this an example of market failure?

- **At Q_1 the MSC is greater than the MSB (too much is being produced so there is deadweight loss)**

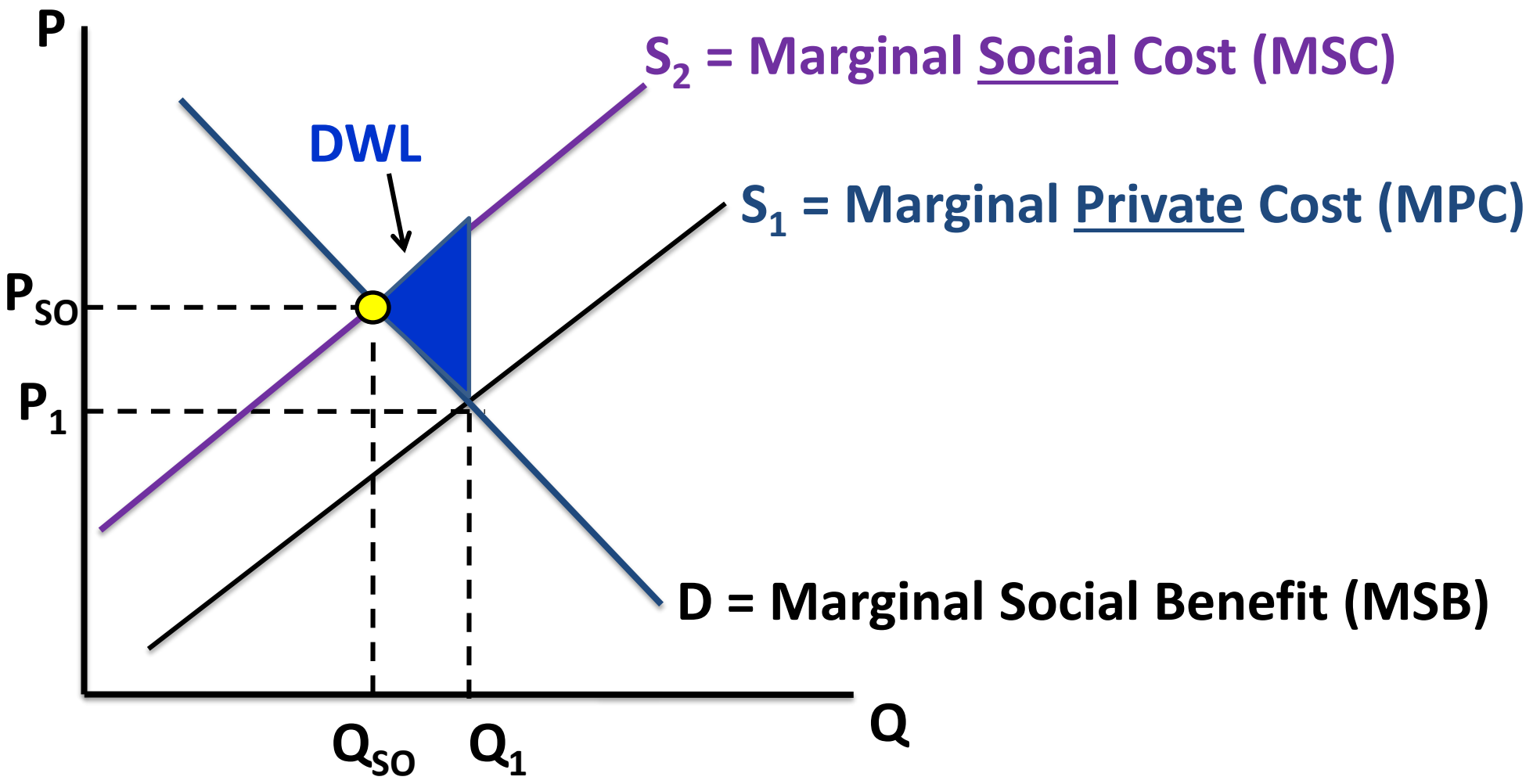


Correcting the Negative Externality

- **What should the government do to fix a negative externality?**
  - **Tax the amount of the externality (per-unit tax)**

- This tax shifts S to the **left** and represents the MSC (the new curve is where MSC=MPC; in essence, S_1, or MPC, "goes away" because we are now producing at the socially optimal P and Q)

Negative Externality Graph with DWL



Public Goods

- A **public good** is an example of market failure
  - **These goods have to meet two pieces of criteria:**
    - **Nonexclusive:** everyone can use the good no one can be excluded from its benefits (even if they don't pay)
    - **Nonrival (shared consumption):** consumption by one does not reduce the usefulness to others
    - **Examples:** national defense and public parks

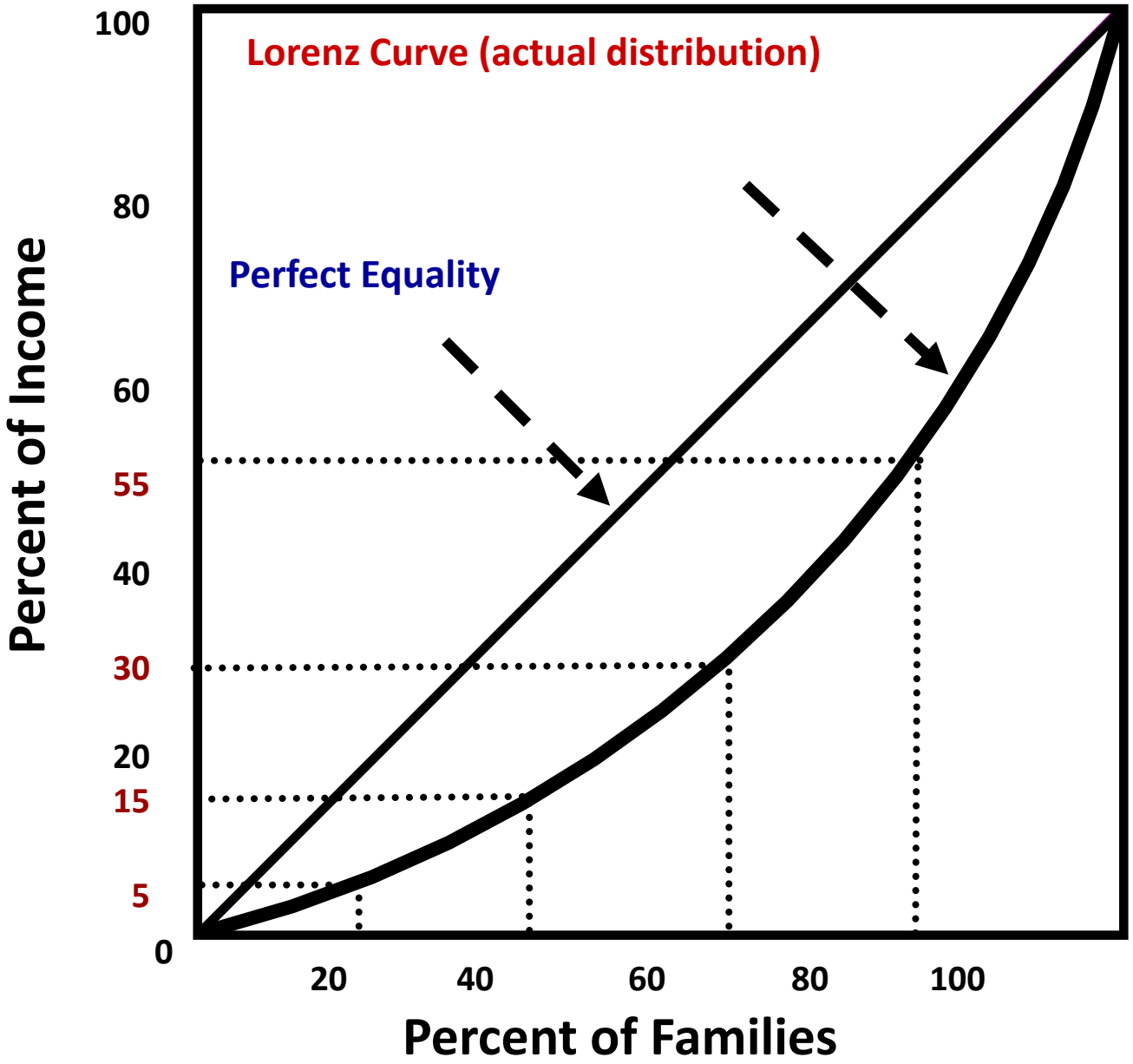
Chapter 18: Distribution of Income and Taxation

The Lorenz Curve

- The solid line represents perfect equality

- The curved line represents the actual distribution of income, which is unequal

The Lorenz Curve



The Gini Coefficient

- **The Gini coefficient measures the degree of income inequality in a nation**
  - Measures the gap between the perfect line of equality and the Lorenz curve
  - The closer the Gini coefficient is to **zero**, the more **equal** the distribution of income
  - The closer the Gini coefficient is to **1**, the more **unequal** the distribution of income

Types of Taxes

- **Progressive tax:** average tax rate increases with income
    - It takes more income from the rich than the poor
    - Our current system of taxation
- **Proportional tax (flat rate):** taxes each income group at the same rate
    - Does **not** redistribute income
- **Regressive tax:** the average tax rate decreases as income increases
    - It takes more from the poor than the rich
    - Example: sales tax

Tax Rates

- **Marginal tax rate:** the rate paid on the last dollar earned
  - Marginal tax rate= △taxes due/△taxable income

- **Average tax rate:** the proportion of total income paid to taxed
  - Average tax rate=total taxes due/total taxable income