Unit 5: The Resource Market

**(aka: The Factor Market or Input Market)**

Resource Markets

Monopsony

Perfectly Competitive Labor Market

Characteristics:

- **Many small firms are hiring workers**
  - **No one 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**

2

Perfectly Competitive Labor Market and Firm
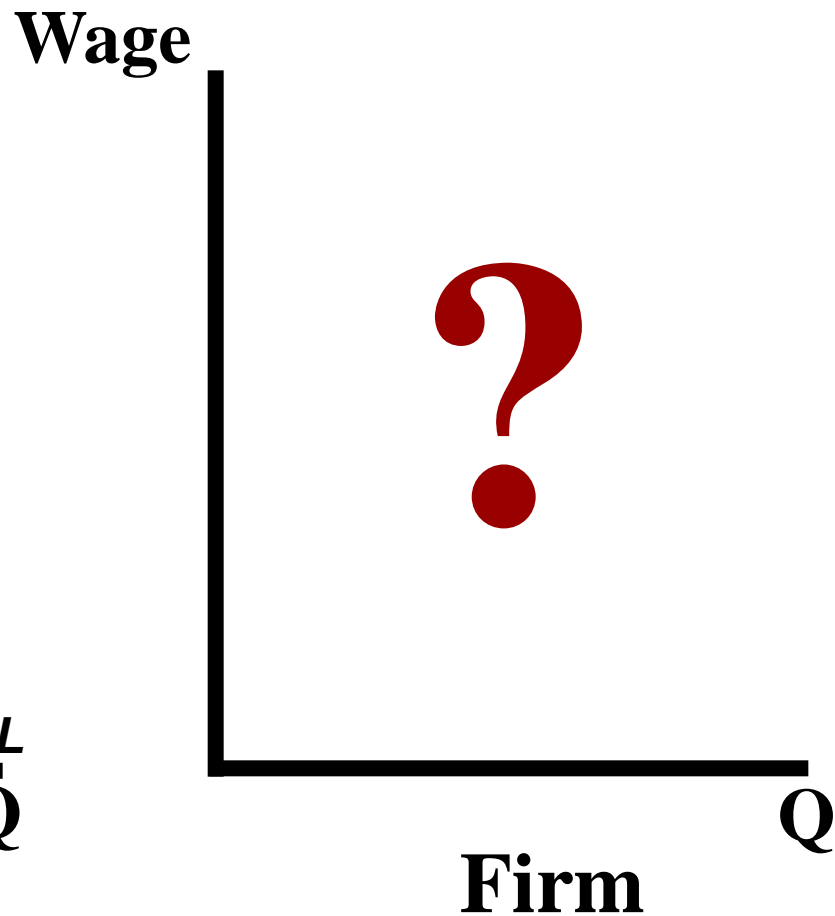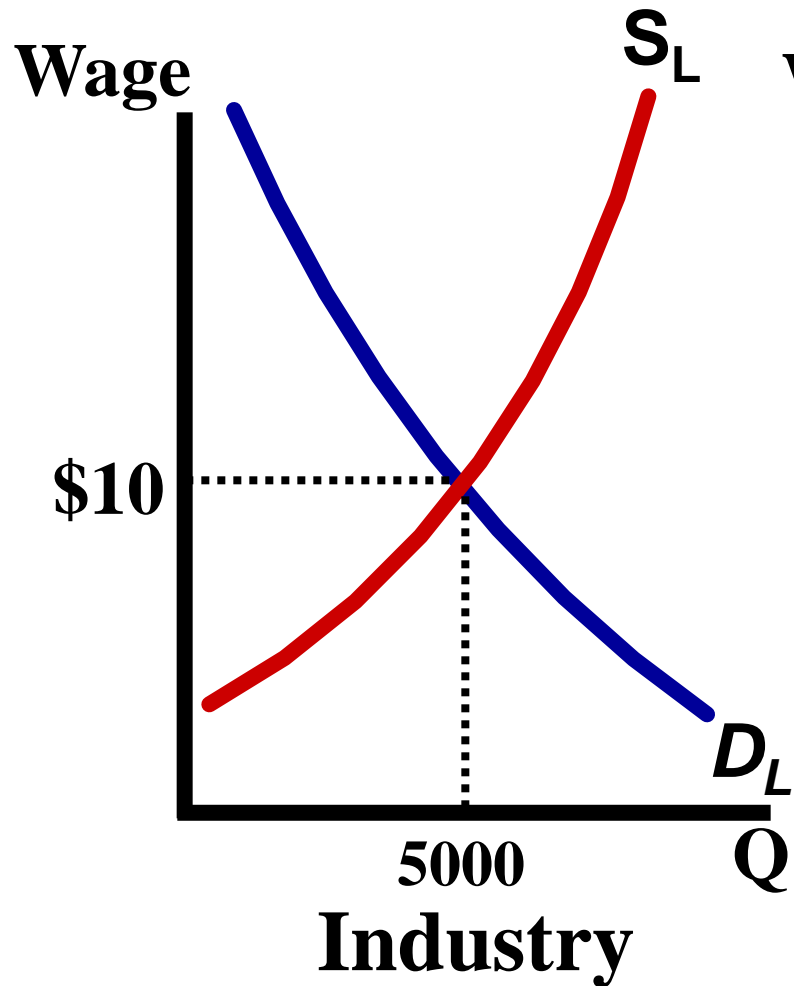
Resource Demand

Example 1:

If there was a significant increase in the demand for pizza, how would this affect the demand for cheese?

Cows? Milking Machines? Veterinarians? Vet Schools? Etc.

Example 2:

An increase in the demand for cars increases the demand for…

Derived Demand-
The demand for resources is determined (derived) by the products they help produce.

Marginal Resource Cost (MRC)

The additional cost of an additional resource (worker).

In perfectly competitive labor markets the MRC equals the wage set by the market and is constant.

Ex: The MRC of an unskilled worker is $8.75.

Another way to calculate MRC is:

$$\text{Marginal Resource Cost} = \frac{\text{Change in Total Cost}}{\text{Change in Inputs}}$$

Marginal Revenue Product

The additional revenue generated by an additional worker (resource).

In perfectly competitive product markets the MRP equals the marginal product of the resource times the price of the product.

Ex: If the Marginal Product of the 3rd worker is 5 and the price of the good is constant at $20 the MRP is…….
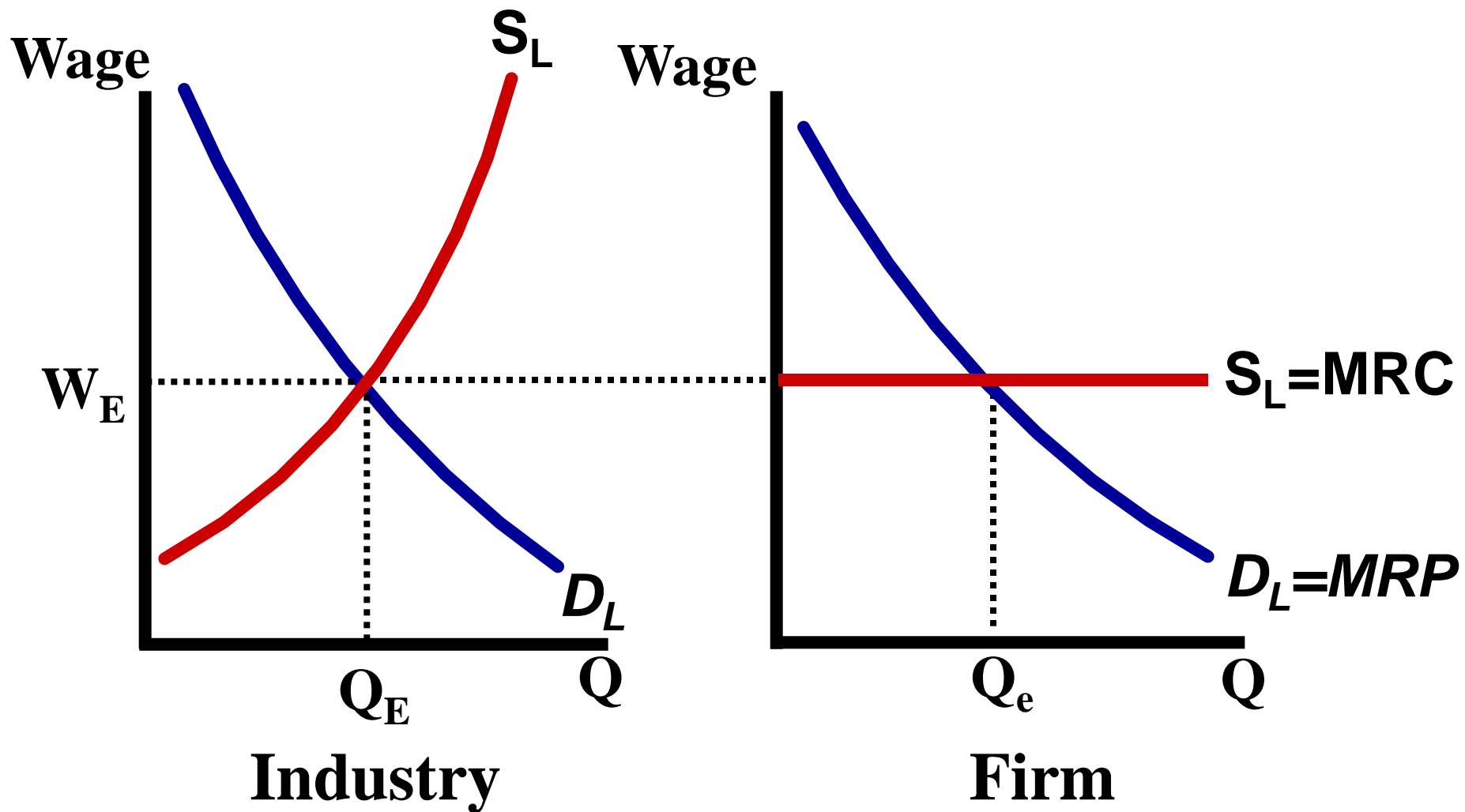
$100

Another way to calculate MRP is:

$$\text{Marginal Revenue Product} = \frac{\text{Change in Total Revenue}}{\text{Change in Inputs}}$$

How do you know how many resources (workers) to employ?

Continue to hire until…

MRP = MRC

Side-by-side graph showing Market and Firm

Wage

S_L

Wage

W_E

S_L=MRC

D_L

D_L=MRP

Q_E Q

Q_e Q

Industry

Firm

Industry Graph

DEMAND RE-DEFINED

What is Demand for Labor?

Demand is the different quantities of workers that businesses are willing and able to hire at different wages.

What is the Law of Demand for Labor?

There is an INVERSE relationship between wage and quantity of labor demanded.

What is Supply for Labor?

Supply is the different quantities of individuals that are willing and able to sell their labor at different wages.

What is the Law of Supply for Labor?

There is a DIRECT (or positive) relationship between wage and quantity of labor supplied.

Workers have trade-off between work and leisure

Where do you get the Market Demand?

McDonalds

Wage	Q$_L$ Dem
$12	1
$10	2
$8	3
$6	5
$4	7

Burger King

Wage	Q$_L$ Dem
$12	0
$10	1
$8	2
$6	3
$4	5

Other Firms

Wage	Q$_L$ Dem
$12	9
$10	17
$8	25
$6	42
$4	68

Market

Wage	Q$_L$ Dem
$12	10
$10	20
$8	30
$6	50
$4	80

+ + =

P — $8 — 3 — Q — D

+

P — $8 — 2 — Q — D

+

P — $8 — 25 — Q — D

=

P — $8 — 30 — Q — D
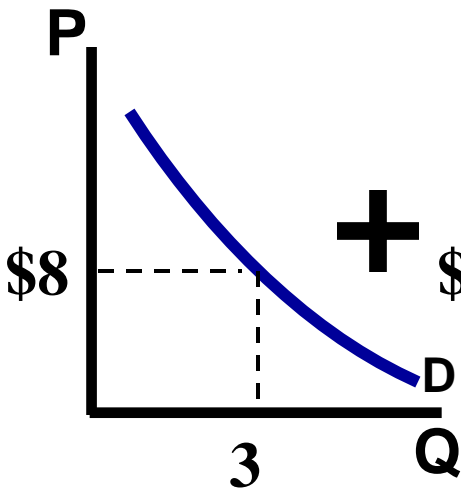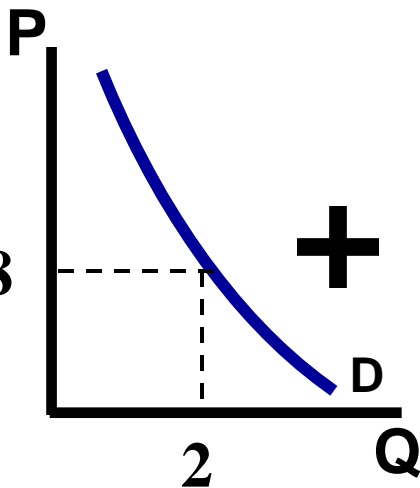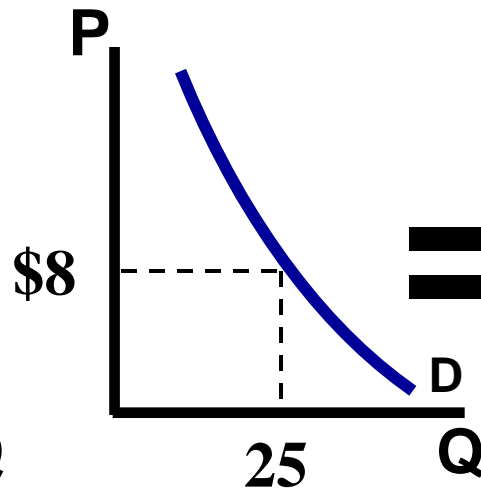
Who demands labor?

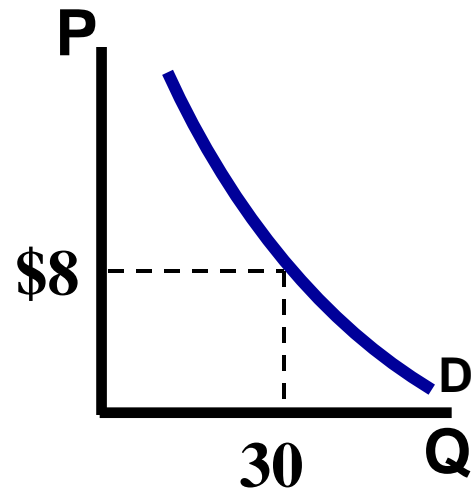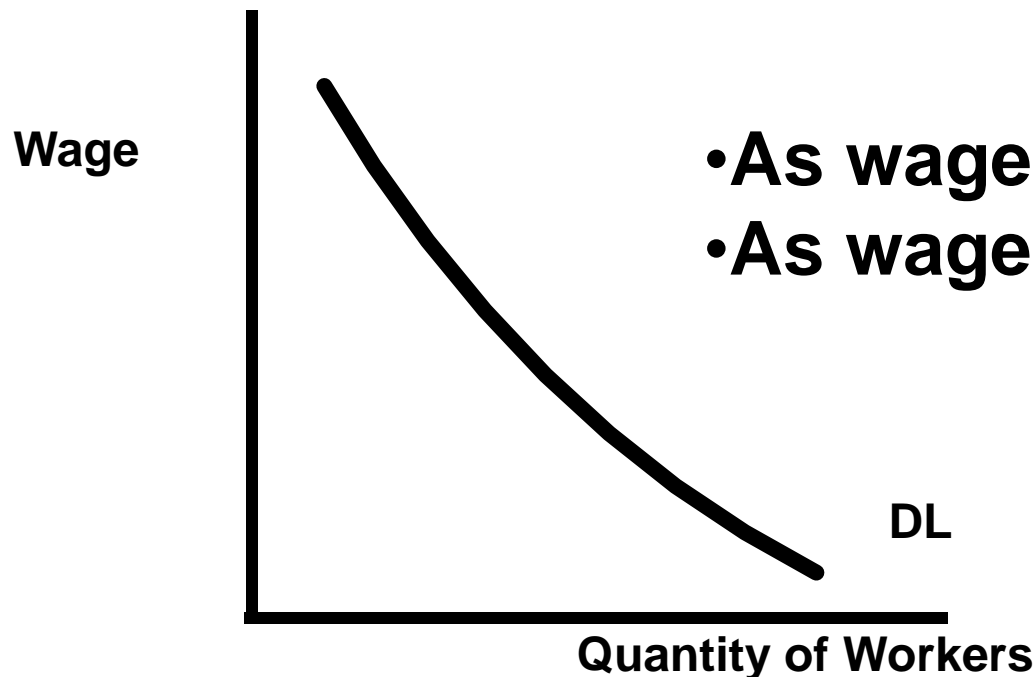- **FIRMS demand labor.**
- **Demand for labor shows the quantities of workers that firms will hire at different wage rates.**
- **Market Demand for Labor is the sum of each firm's MRP.**

Wage

- **As wage falls, Qd increases.**
- **As wage increases, Qd falls.**

DL

Quantity of Workers

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.**

Wage

Labor Supply

- **As wage increases, Qs increases.**
- **As wage decreases, Qs decreases.**

Quantity of Workers
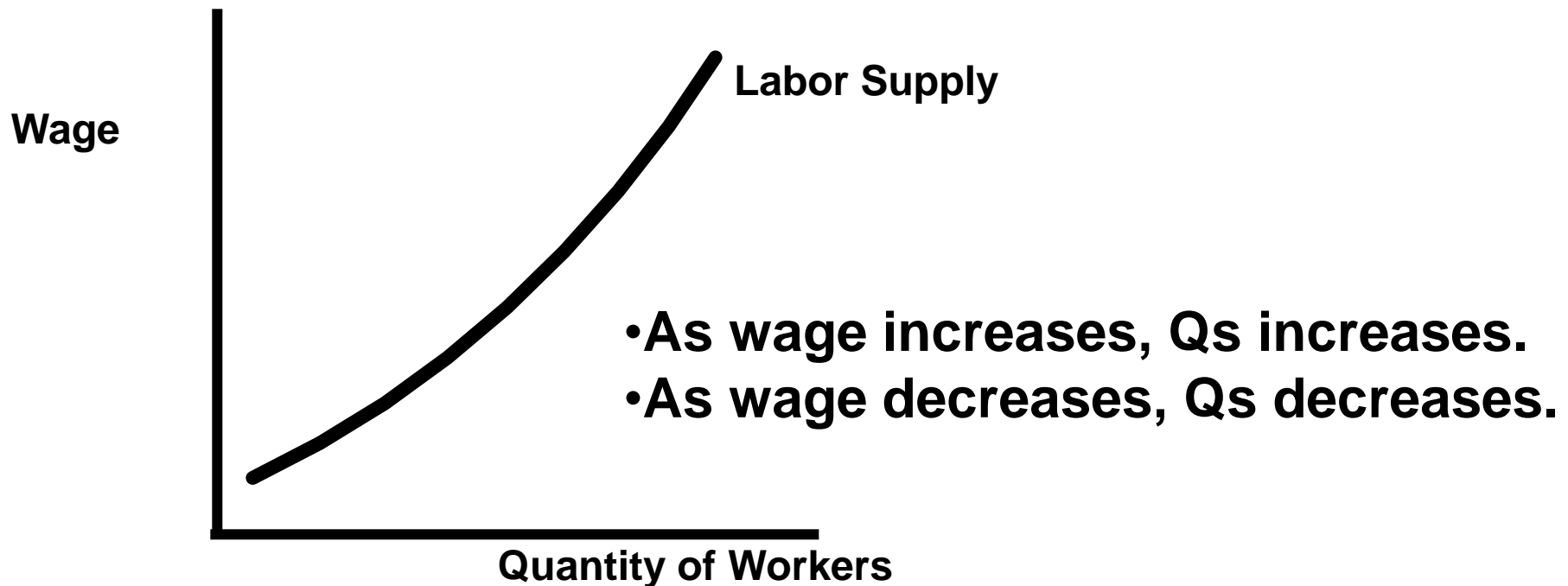
Equilibrium

Wage (the price of labor) is set by the market.
EX: Supply and Demand for Carpenters

Wage

Labor Supply

$30hr

Labor Demand =
MRP

Quantity of Workers

Individual Firms

Wage

S_L=MRC

D_L=MRP

Q_e

Q
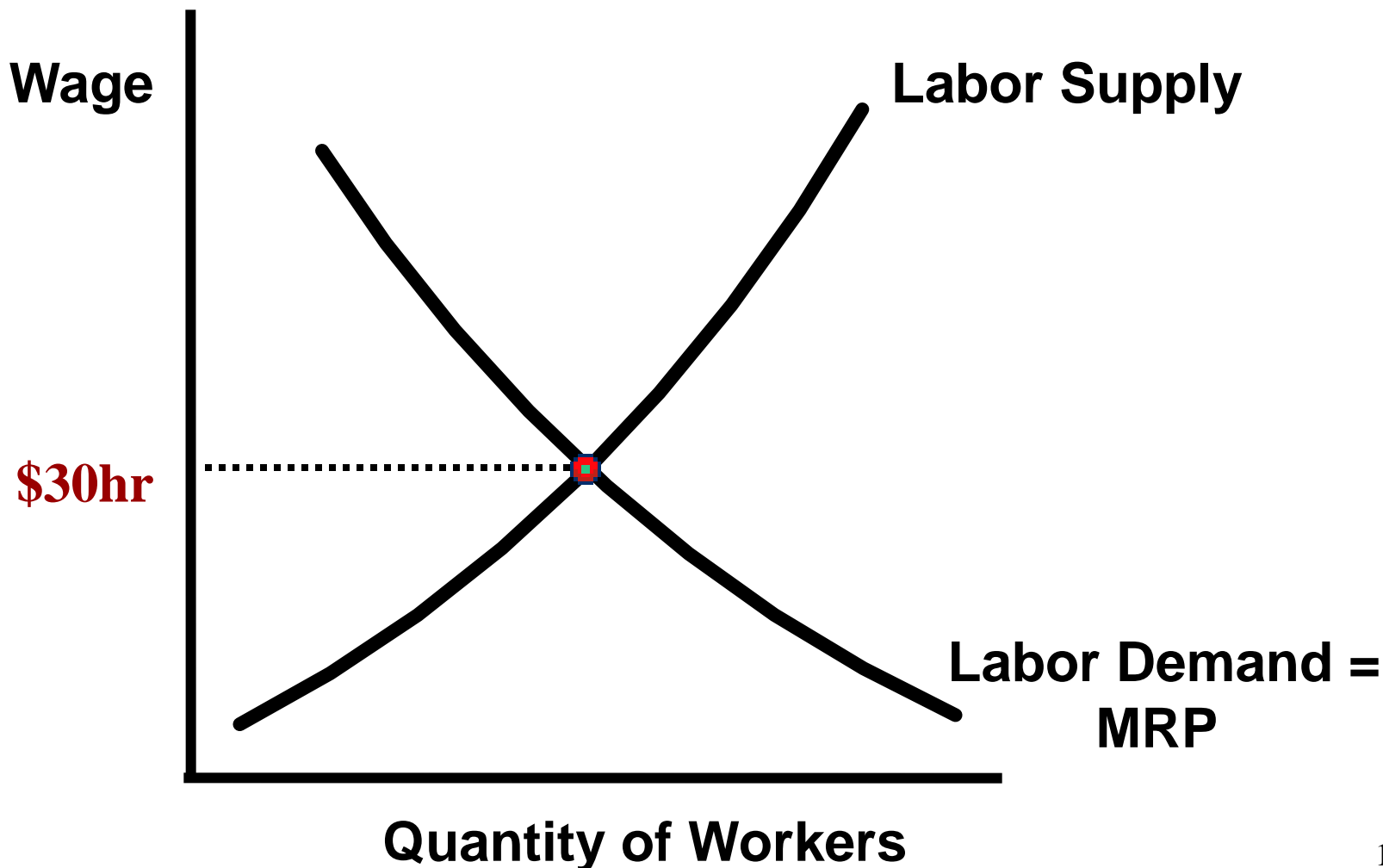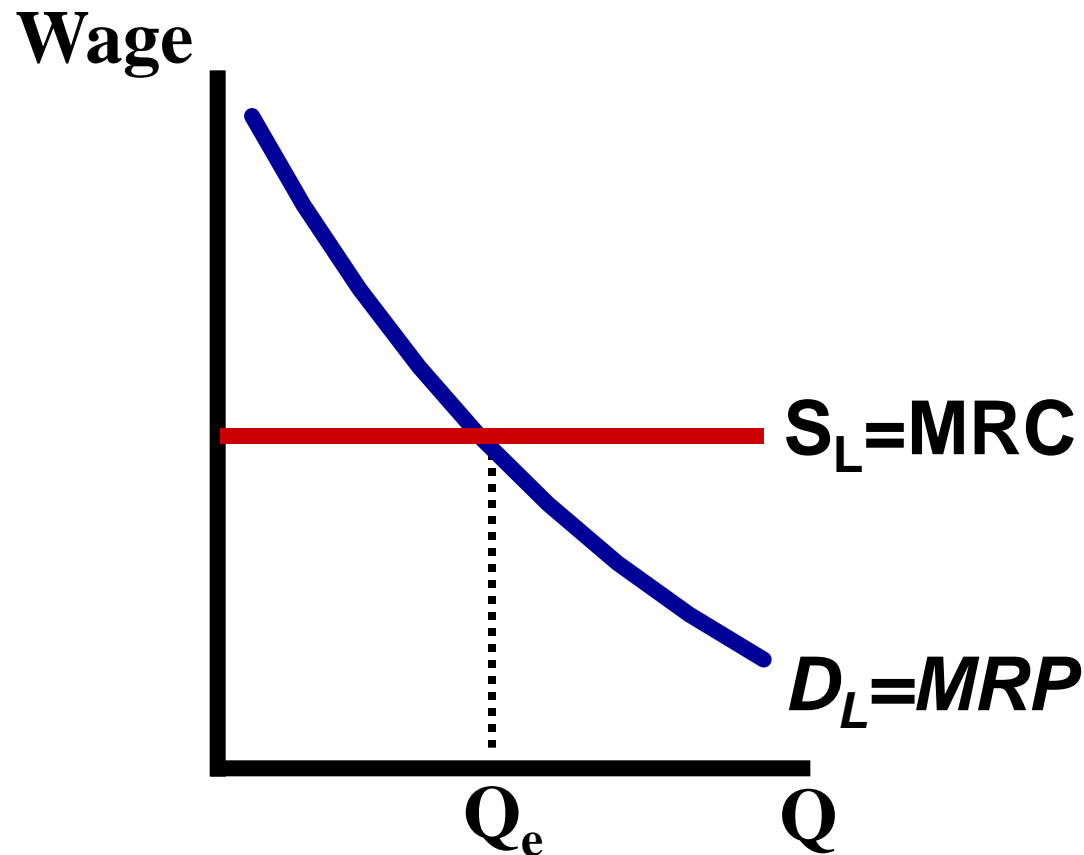
Example:

- **You hire workers to mow lawns. The wage for each worker is set at $100 a day.**
- **Each lawn mowed earns your firm $50.**
- **If you hire one work, he can mow 4 laws per day.**
- **If you hire two workers, they can mow 5 lawns per day together.**

1. **What is the MRC for each worker?**
2. **What is the first worker's MRP?**
3. **What is the second worker's MRP?**
4. **How many workers will you hire?**
5. **How much are you willing to pay the first worker?**
6. **How much will you actually pay the first worker?**
7. **What must happen to the wage in the market for you to hire the second worker?**

You're the Boss

- **You and your partner own a business.**
- **Assume the you are selling the goods in a perfectly competitive PRODUCT market so the price is constant at $10.**
- **Assume that you are hiring workers in a perfectly competitive RESOURCE market so the wage is constant at $20.**
- **Also assume the wage is the <u>ONLY</u> cost.**

To maximize profit how many workers should you hire?

Use the following data:

Workers	Total Product (Output)
0	0
1	7
2	17
3	24
4	27
5	29
6	30
7	27

Hint
How much is each worker worth?

Use the following data:

Price = $10 Wage = $20

Units of Labor	Total Product (Output)
0	0
1	7
2	17
3	24
4	27
5	29
6	30
7	27

1. What is happening to Total Product?

2. Why does this occur?

3. Where are the three stages?

Use the following data:

Units of Labor	Total Product (Output)	Marginal Product (MP)
0	0	-
1	7	7
2	17	10
3	24	7
4	27	3
5	29	2
6	30	1
7	27	-3

This shows the PRODUCTIVITY of each worker.

Why does productivity decrease?

Use the following data:

Units of Labor	Total Product (Output)	Marginal Product (MP)	Product Price	
0	0	-	0	
1	7	7	10	
2	17	10	10	
3	24	7	10	Price constant because we are in a perfectly competitive market.
4	27	3	10	
5	29	2	10	
6	30	1	10	
7	27	-3	10	

Use the following data: Price = $10 Wage = $20

Units of Labor	Total Product (Output)	Marginal Product (MP)	Product Price	Marginal Revenue Product	
0	0	-	0	0	
1	7	7	10	70	
2	17	10	10	100	**This shows how much each worker is worth**
3	24	7	10	70	
4	27	3	10	30	
5	29	2	10	20	
6	30	1	10	10	
7	27	-3	10	-30	

Use the following data:

Price = $10 Wage = $20

Units of Labor	Total Product (Output)	Marginal Product (MP)	Product Price	Marginal Revenue Product	Marginal Resource Cost
0	0	-	0	0	0
1	7	7	10	70	20
2	17	10	10	100	20
3	24	7	10	70	20
4	27	3	10	30	20
5	29	2	10	20	20
6	30	1	10	10	20
7	27	-3	10	-30	20

How many workers should you hire?

Drawing the Demand Curve for Resources

Yesterday's Activity

Units of Labor	Total Product (Output)	Marginal Product (MP)	Product Price	MRP	
0	0	-	0	0	
1	7	7	10	70	
2	17	10	10	100	**Shows how many workers a firm is willing and able to hire at different wages.**
3	24	7	10	70	
4	27	3	10	30	
5	29	2	10	20	
6	30	1	10	10	
7	27	-3	10	-30	

Use the following data:

Units of Labor	Total Product (Output)	Marginal Product (MP)	Product Price	MRP
0	0	-	0	0
1	7	7	10	70
2	17	10	10	100
3	24	7	10	70
4	27	3	10	30
5	29	2	10	20
6	30	1	10	10
7	27	-3	10	-30

Demand for this resource

Plotting the MRP/Demand curve

Demand=MRP

Wage Rate
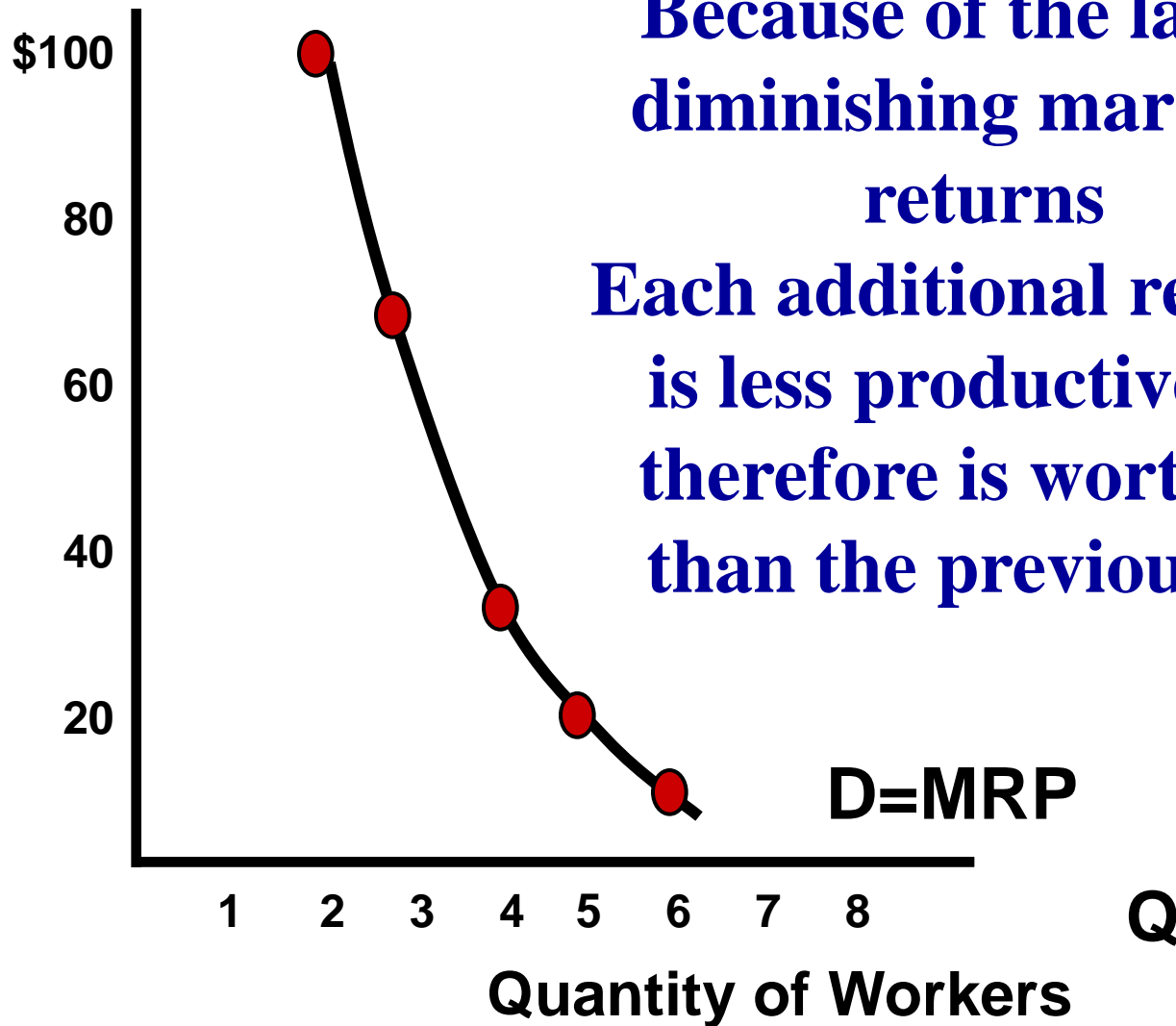
Why is it downward sloping?

Because of the law of diminishing marginal returns

Each additional resource is less productive and therefore is worth less than the previous one

D=MRP

$100

80

60

40

20

1 2 3 4 5 6 7 8

Q

Quantity of Workers

Demand=MRP

Wage Rate

This model applies to land, labor, and capital

Notice the inverse relationship between wage and quantity of resources demand

$100

80

60

40

20

D=MRP

1   2   3   4   5   6   7   8   **Q**

Quantity of Workers
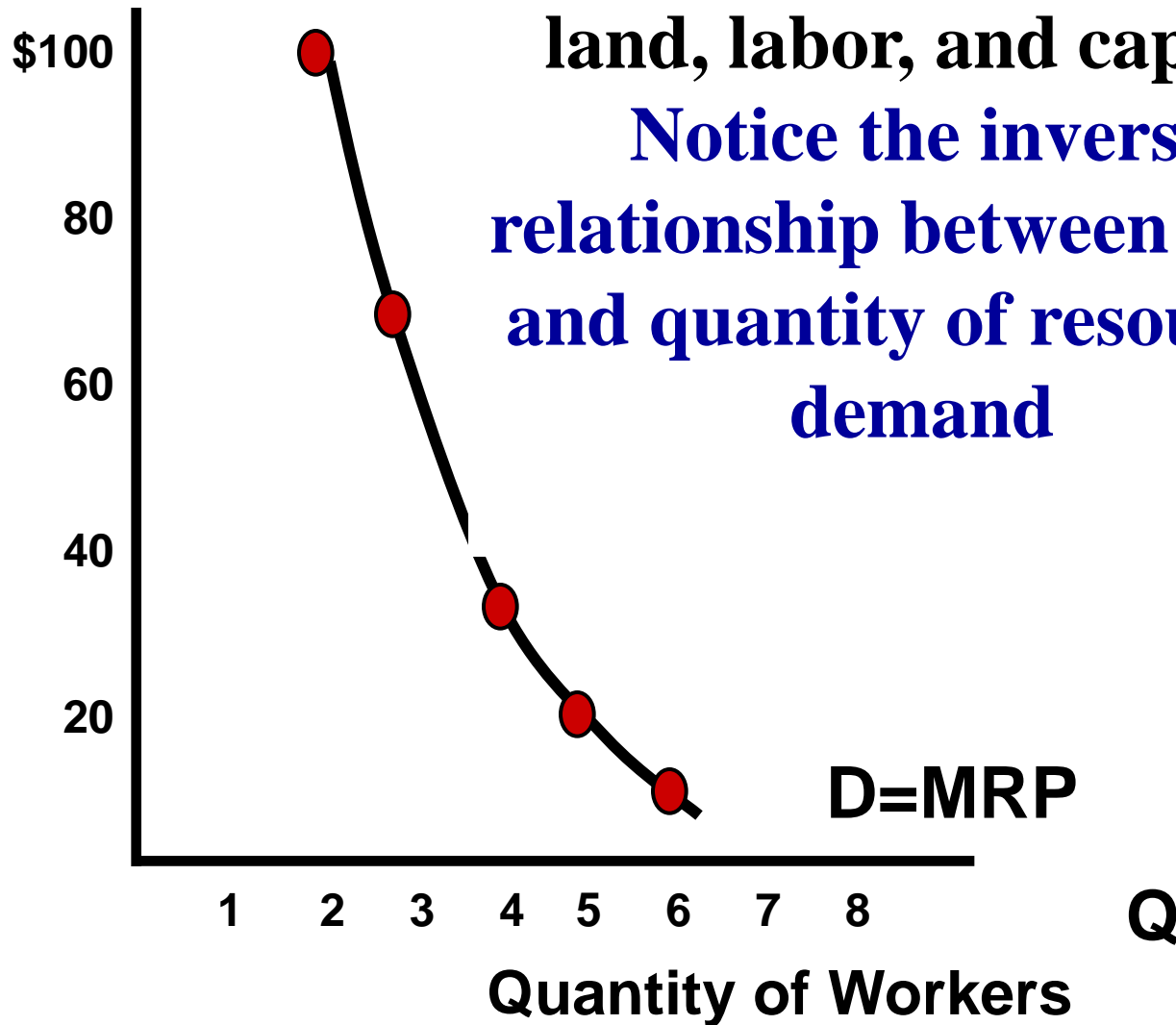
What happens if demand for the product increases?

Wage Rate

$100

80

MRP increases causing demand to shift right

60

40

$D_1 = MRP_1$

20

$D = MRP$

1 2 3 4 5 6 7 8 **Q**

Quantity of Workers
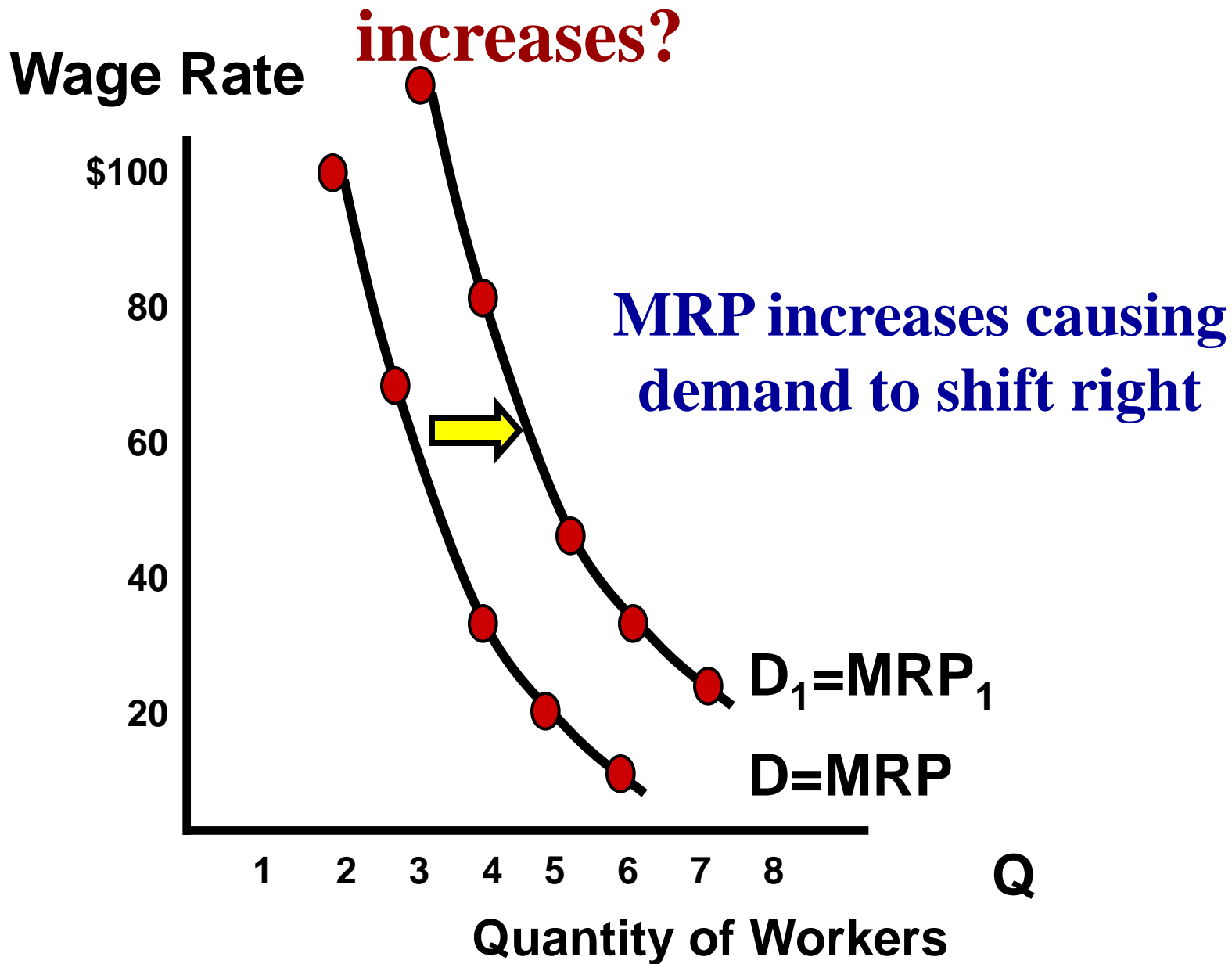
3 Shifters of Resource Demand

1.) Changes in the Demand for the Product
- **Price increase of the product increases MRP and demand for the resource.**

2.) Changes in Productivity
- **Technological Advances increase Marginal Product and therefore MRP/Demand.**

3.) Changes in Price of Other Resources
- **Substitute Resources**
- **Ex: What happens to the demand for assembly line workers if price of robots falls?**
- **Complementary Resources**
- **Ex: What happens to the demand nails if the price of lumber increases significantly?**

Drawing the Demand Curve for Resources

Use the following data:

Price = $10 Wage = $20

Units of Labor	Total Product (Output)	Marginal Product (MP)	Product Price	Additional Revenue per worker	Additional Cost per worker
0	0	-	0	0	0
1	7	7	10	70	20
2	17	10	10	100	20
3	24	7	10	70	20
4	27	3	10	30	20

How would this change if the demand for the good increased significantly?
1. **Price of the good would increase.**
2. **Value of each worker would increase.**

Use the following data:

Price = $100 Wage = $20

Units of Labor	Total Product (Output)	Marginal Product (MP)	Product Price	Additional Revenue per worker
0	0	-	0	
1	7	7	100	
2	17	10	100	
3	24	7	100	
4	27	3	100	
5	29	2	100	
6	30	1	100	
7	27	-3	100	

Use the following data:

Price = $100 Wage = $20

Units of Labor	Total Product (Output)	Marginal Product (MP)	Product Price	Additional Revenue per worker	
0	0	-	0	0	
1	7	7	100	700	**Each worker is worth more!!**
2	17	10	100	1000	
3	24	7	100	700	
4	27	3	100	300	
5	29	2	100	200	**THIS IS DERIVED DEMAND.**
6	30	1	100	100	
7	27	-3	100	-300	

Use the following data:

Price = $10 Wage = $20

Units of Labor	Total Product (Output)	Marginal Product (MP)	Product Price	Additional Revenue per worker	Additional Cost per worker
0	0	-	0	0	0
1	7	7	10	70	20
2	17	10	10	100	20
3	24	7	10	70	20
4	27	3	10	30	20

How would this change if the productivity of each worker increased?

1. Marginal Product would increase.
2. Value of each worker would increase.

Use the following data:

Price = $10   Wage = $20

Units of Labor	Total Product (Output)	Marginal Product (MP)	Product Price	Additional Revenue per worker	
0	0	-	0	0	
1	70	70	10	700	**Each worker is worth more!**
2	170	100	10	1000	
3	240	70	10	700	
4	270	30	10	300	
5	290	20	10	200	**More demand for the resource.**
6	300	10	10	100	
7	270	-30	10	-300	

3 Shifters of Resource Demand

Identify the Resource and Shifter (*ceteris paribus*):

1. Increase in demand for microprocessors leads to a(n) _____ in the demand for processor assemblers.
2. Increase in the price for plastic piping causes the demand for copper piping to _____.
3. Increase in demand for small homes (compared to big homes) leads to a(n) _____ the demand for lumber.
4. For shipping companies, _____ in price of trains leads to decrease in demand for trucks.
5. Decrease in price of sugar leads to a(n) _____ in the demand for aluminum for soda producers.
6. Substantial increase in education and training leads to an _____ in demand for skilled labor.

3 Shifters of Resource Demand

Identify the Resource and Shifter (*ceteris paribus*):

1. Increase in demand for microprocessors leads to a(n) __increase__ in the demand for **processor assemblers**.
2. Increase in the price for plastic piping causes the demand for **copper piping** to __increase__.
3. Increase in demand for small homes (compared to big homes) leads to a(n) __decrease__ the demand for **lumber.**
4. For shipping companies, __decrease__ in price of **trains** leads to decrease in demand for trucks.
5. Decrease in price of sugar leads to a(n) __increase__ in the demand for **aluminum** for soda producers.
6. Substantial increase in education and training leads to an __increase__ in demand for **skilled labor**.

Resource Supply Shifters

Supply Shifters for Labor
1. **Number of qualified workers**
   - **Education, training, & abilities required**
2. **Government regulation/licensing**
   Ex: What if waiters had to obtain a license to serve food?
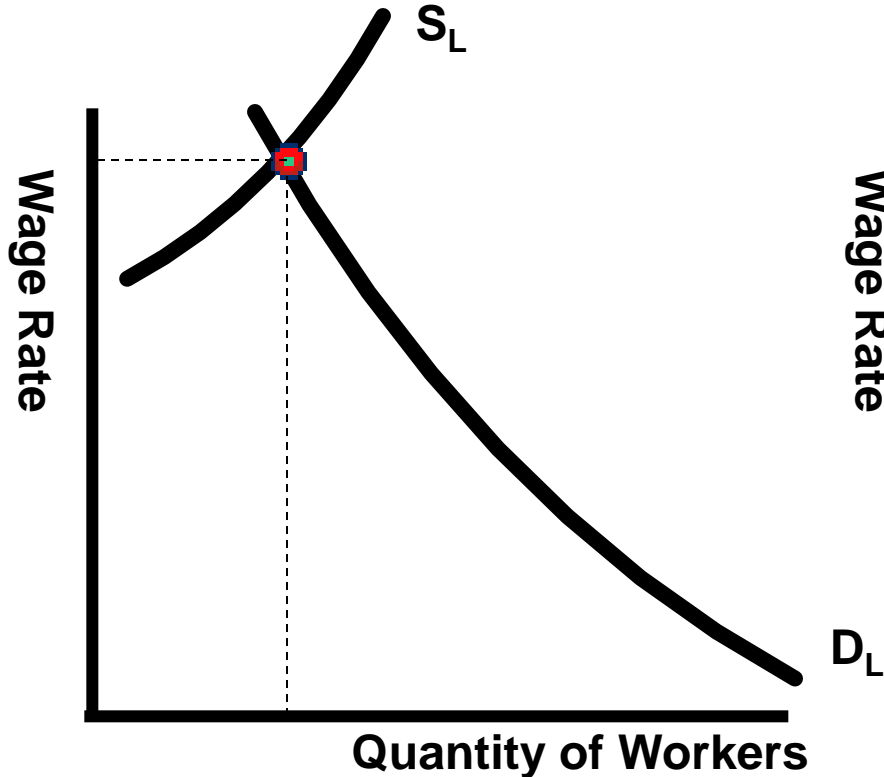3. **Personal values regarding leisure time and societal roles.**
   Ex: Why did the US Labor supply increase during WWII?
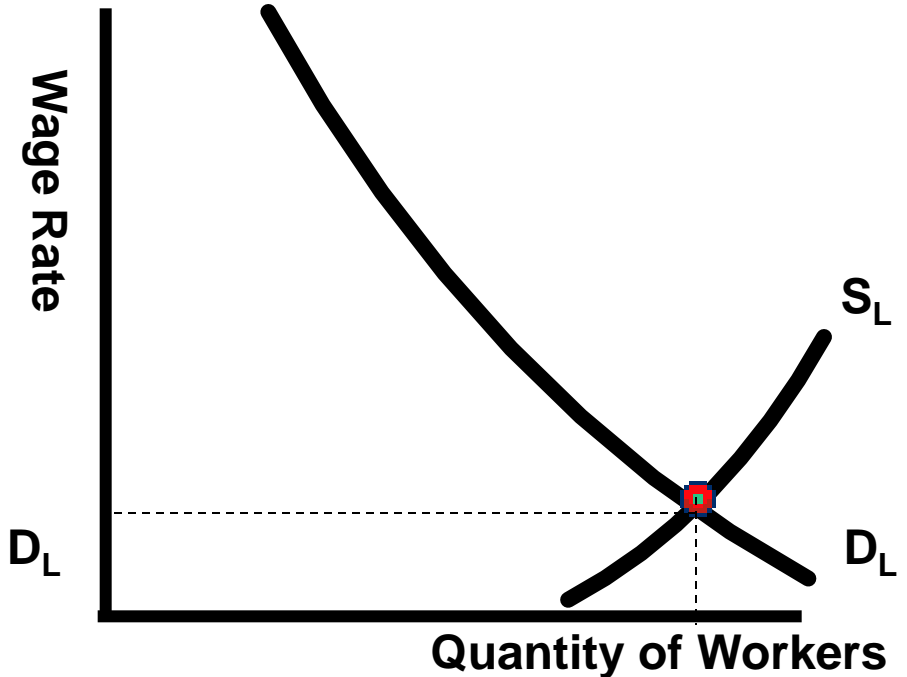
Why do some occupations get paid more than others?

With your partner...

Use supply and demand analysis to explain why surgeons earn an average salary of $137,050 and gardeners earn $13,560.

Supply and Demand For Surgeons

Supply and Demand For Gardeners

What are other reasons for differences in wage?

Labor Market Imperfections-
- **Insufficient/misleading job information-**
  - This prevents workers from seeking better employment.
- **Geographical Immobility-**
  - Many people are reluctant or too poor to move so they accept a lower wage
- **Unions**
  - Collective bargaining and threats to strike often lead to higher that equilibrium wages
- **Wage Discrimination-**
 - Some people get paid differently for doing the same job based on race or gender **(Very illegal!).**

Use side-by-side graphs to draw a perfectly competitive labor market and firm hiring workers

Wage is set by the market
Demand/MRP falls
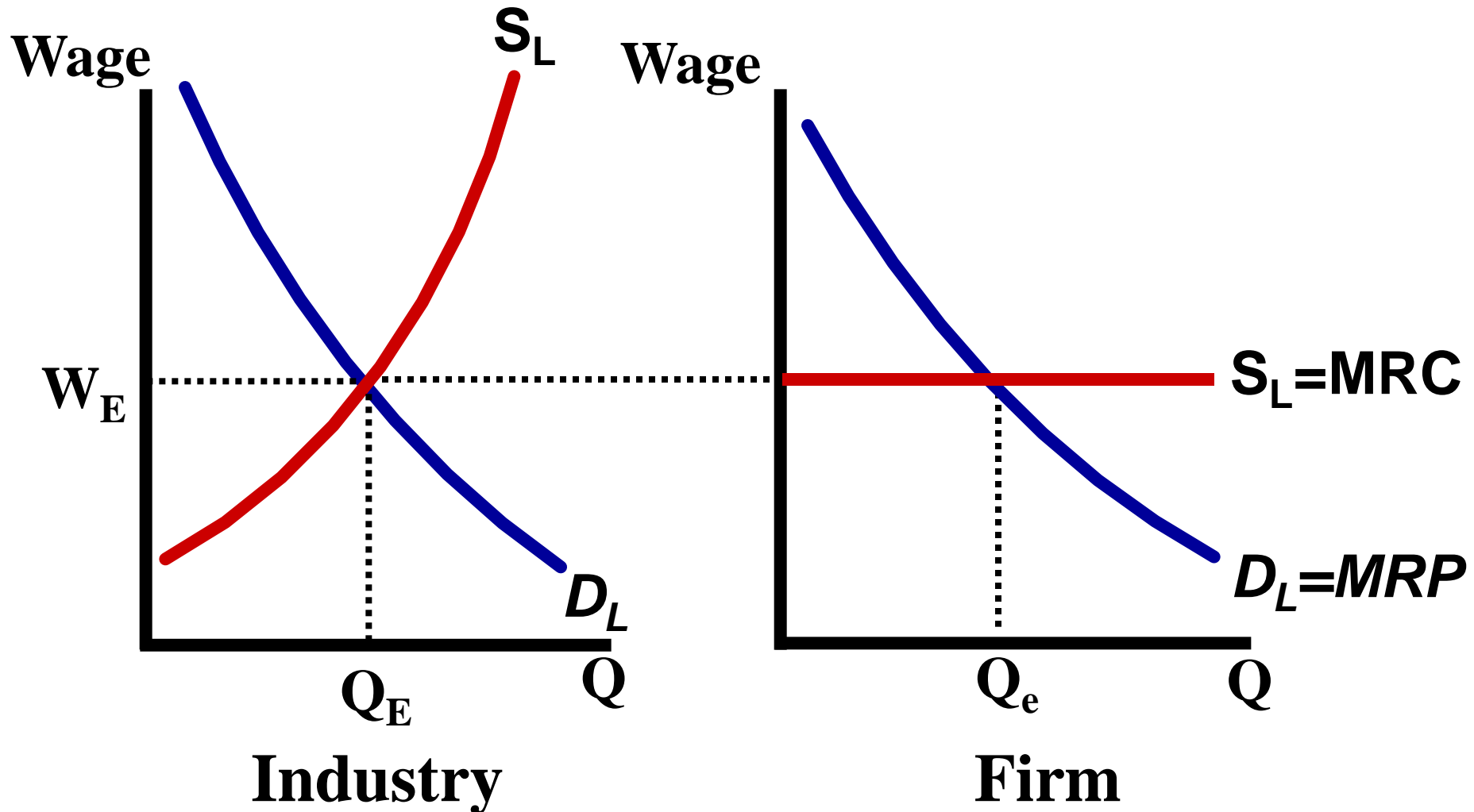
Wage

S_L

W_E

D_L

Q_E

Q

Industry

Wage

S_L=MRC

D_L=MRP

Q_e

Q

Firm

What happens to the wage and quantity in the market and firm if new workers enter the industry?

Industry

- Wage
- S_L
- W_E
- Q_E
- Q
- D_L

Firm

- Wage
- S_L=MRC
- D_L=MRP
- Q_e
- Q

What happens to the wage and quantity in the market and firm if new workers enter the industry?

Wage

S_L

S_{L1}

W_E

W_1

D_L

Q_E Q_1

Q

Industry

Wage

$S_L = MRC$

$S_{L1} = MRC1$

$D_L = MRP$

Q_e Q_1

Q
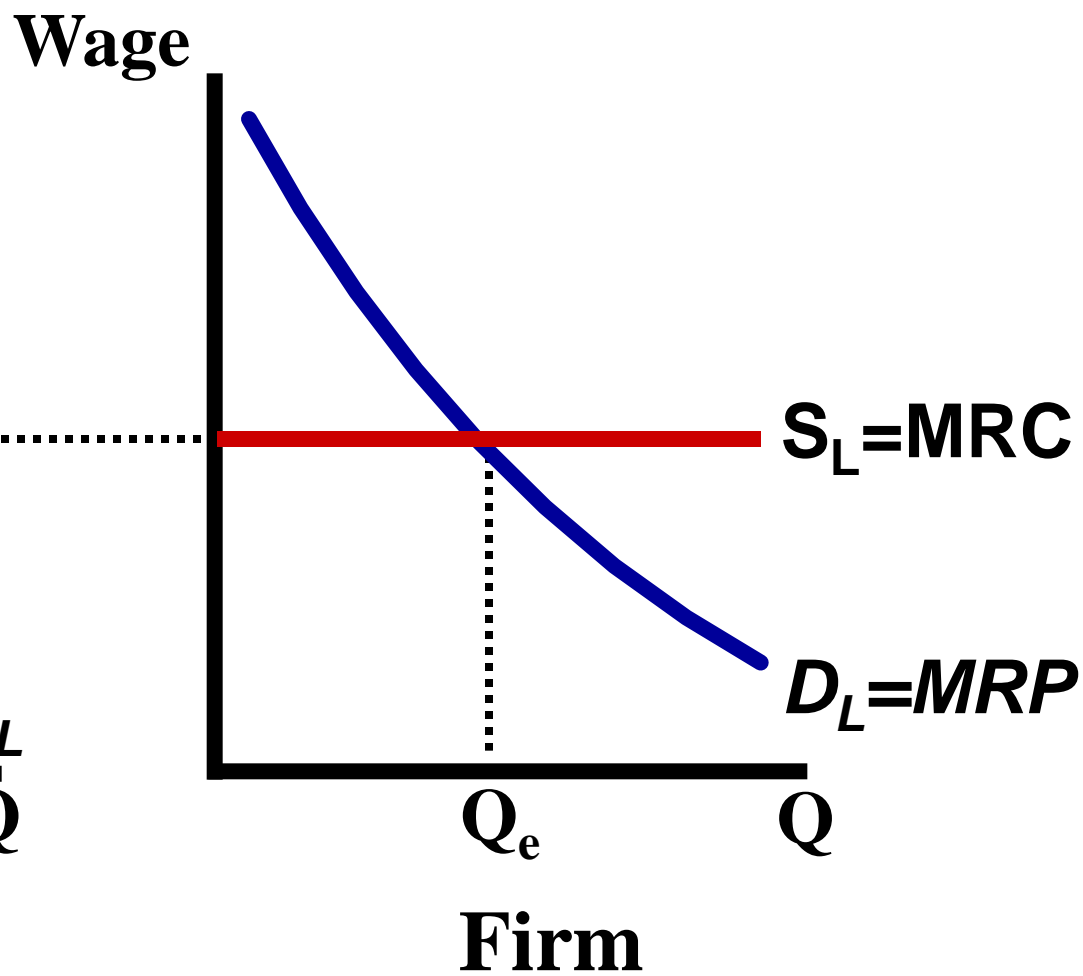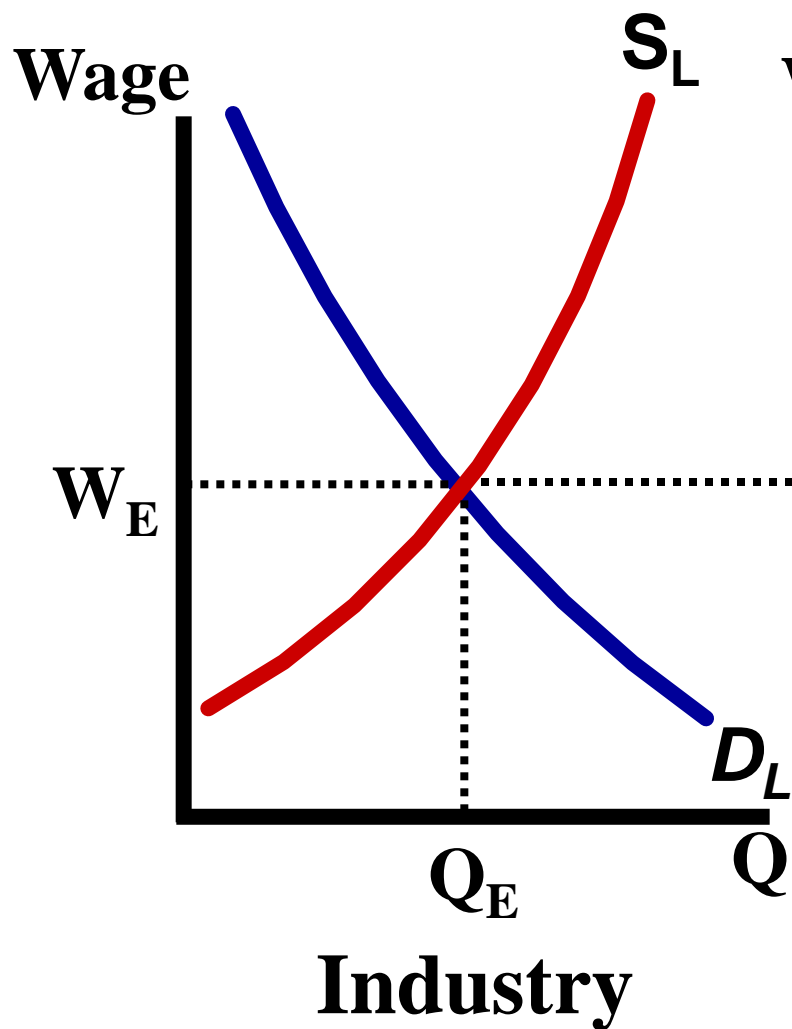
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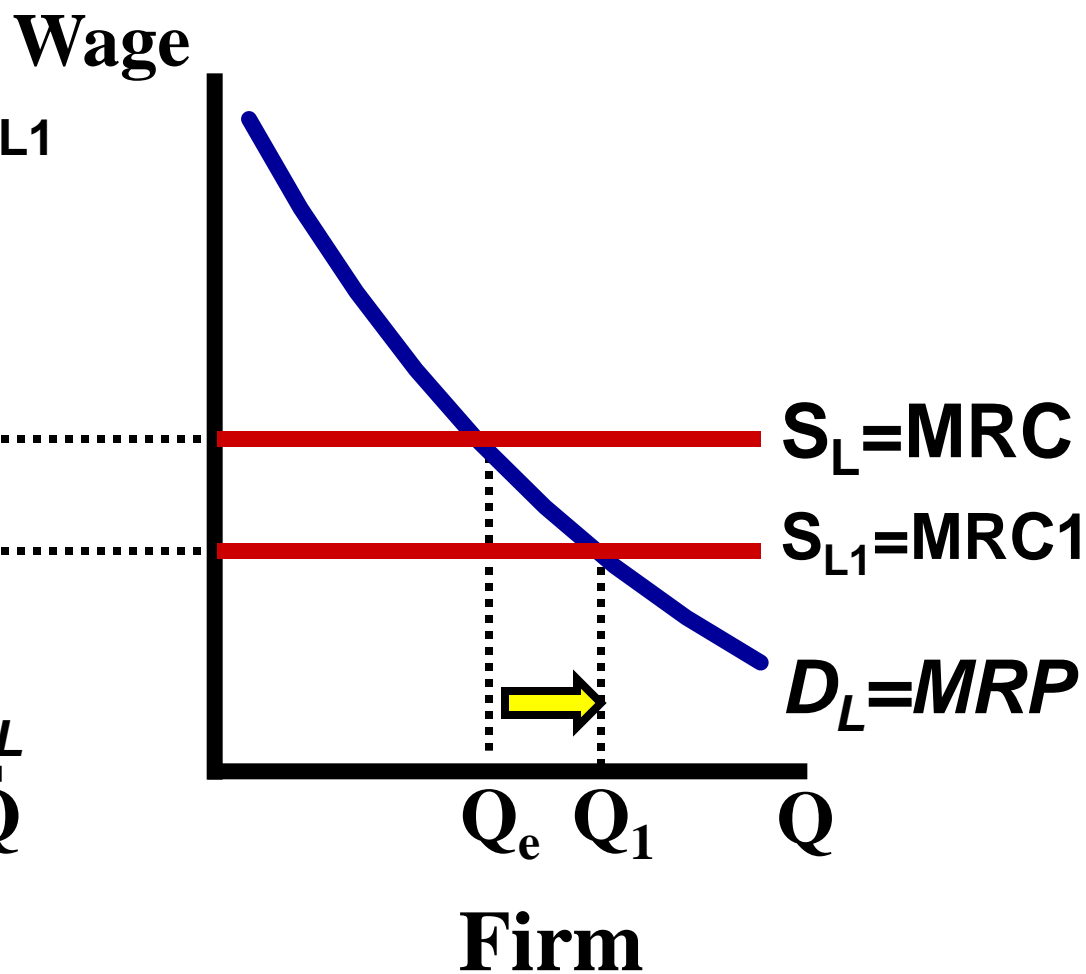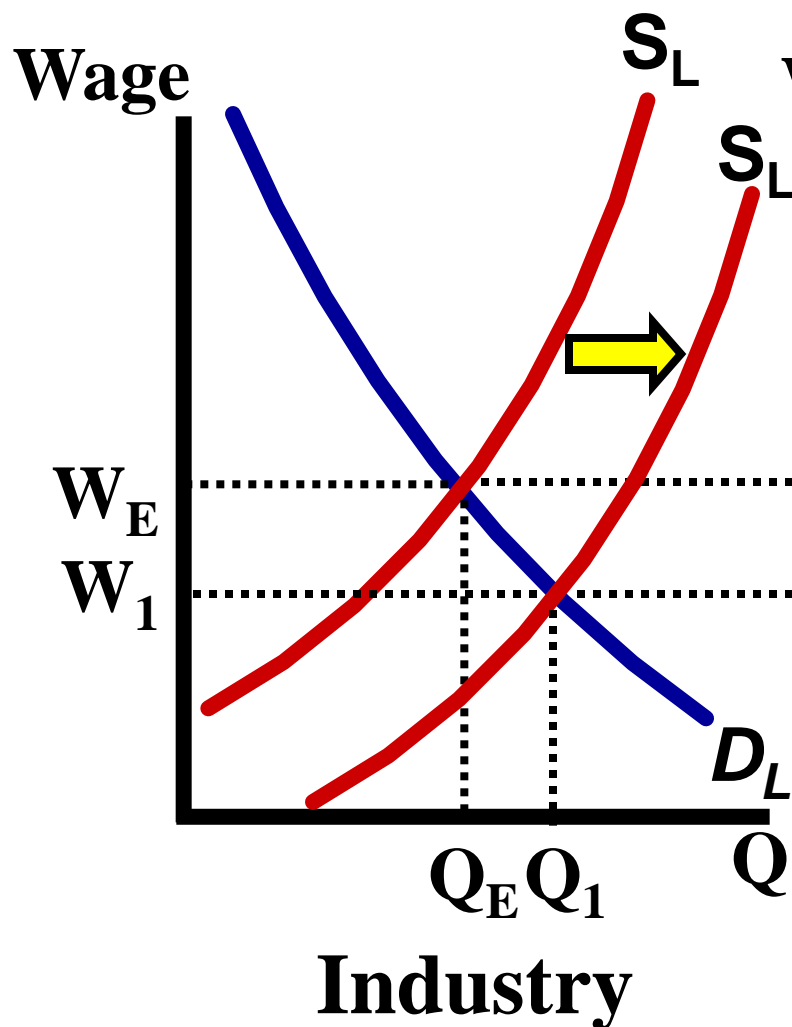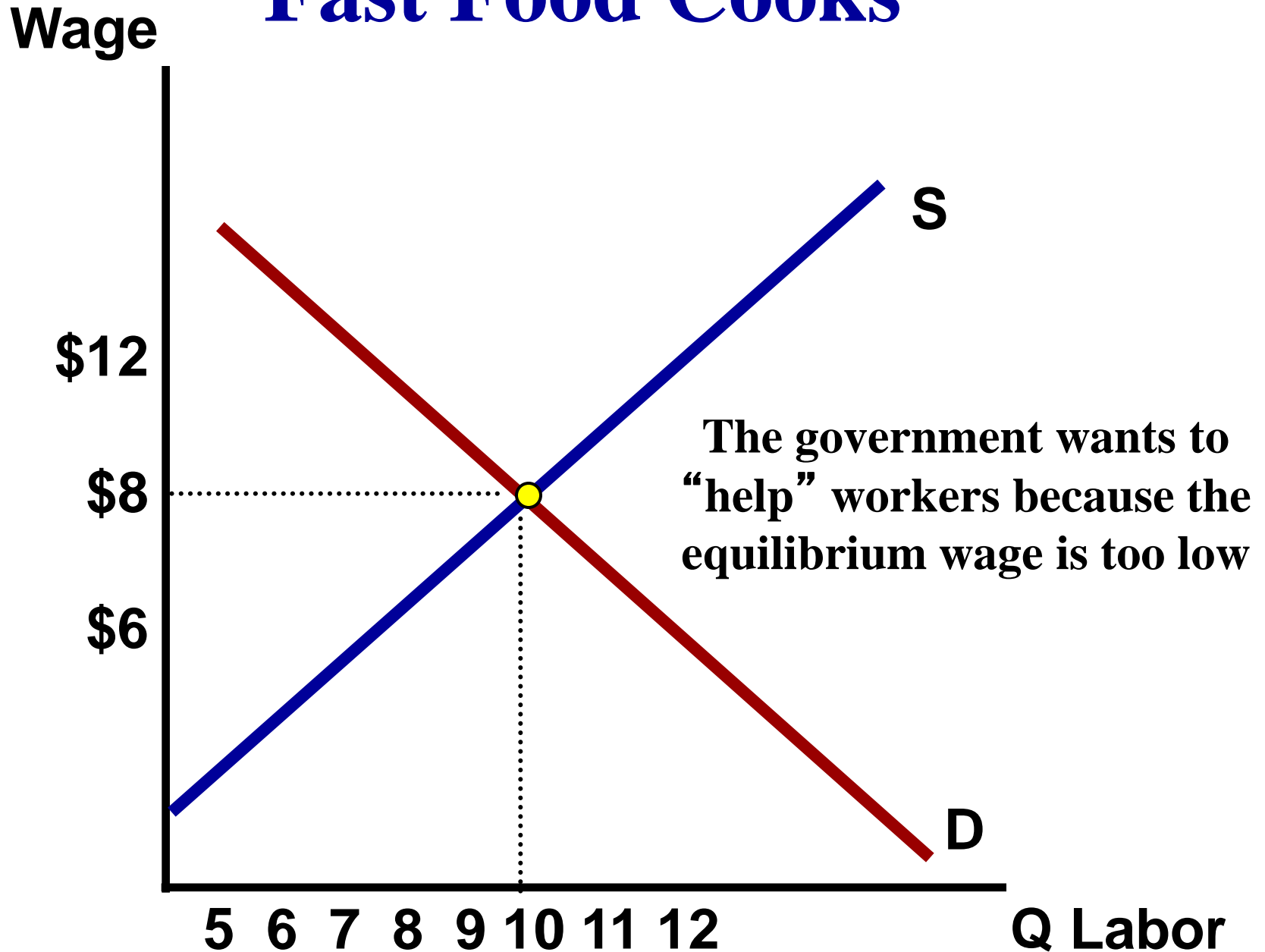
Minimum Wage

Assume the government was interest in increasing the federal minimum wage to $12 an hour

**Do you support this new law?
Why or why not**

Fast Food Cooks

Wage

$12

$8

$6

S

D

The government wants to "help" workers because the equilibrium wage is too low

5 6 7 8 9 10 11 12

Q Labor

47

Minimum Wage

Wage

S

$12

$8

$6

Above
Equilibrium!

D

5 6 7 8 9 10 11 12   Q Labor

Minimum Wage

Wage

Surplus of workers
(Unemployment)

S

$12

What's the result?
Q demanded falls.
Q supplied increases.

$8

$6

D

5 6 7 8 9 10 11 12

Q Labor

50
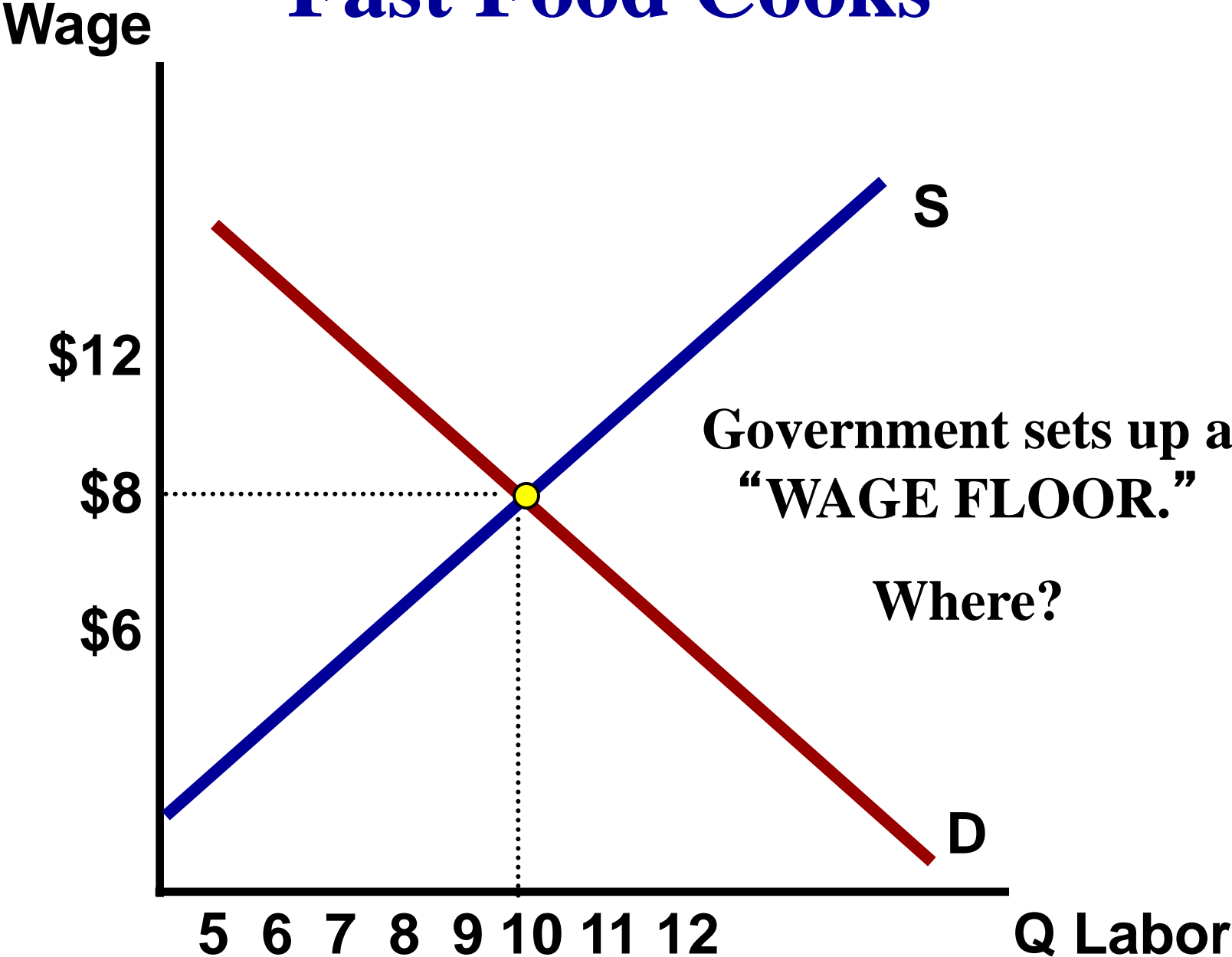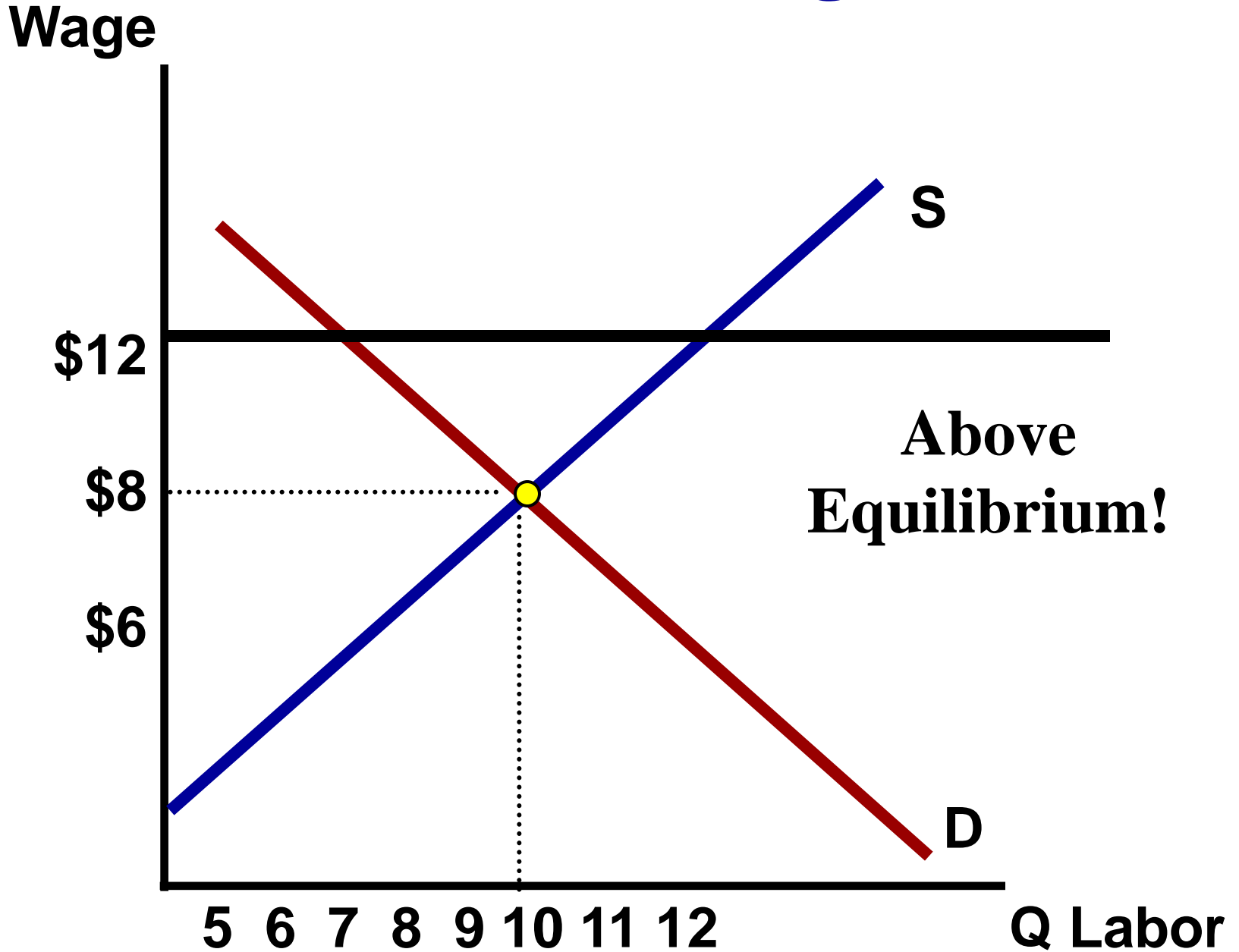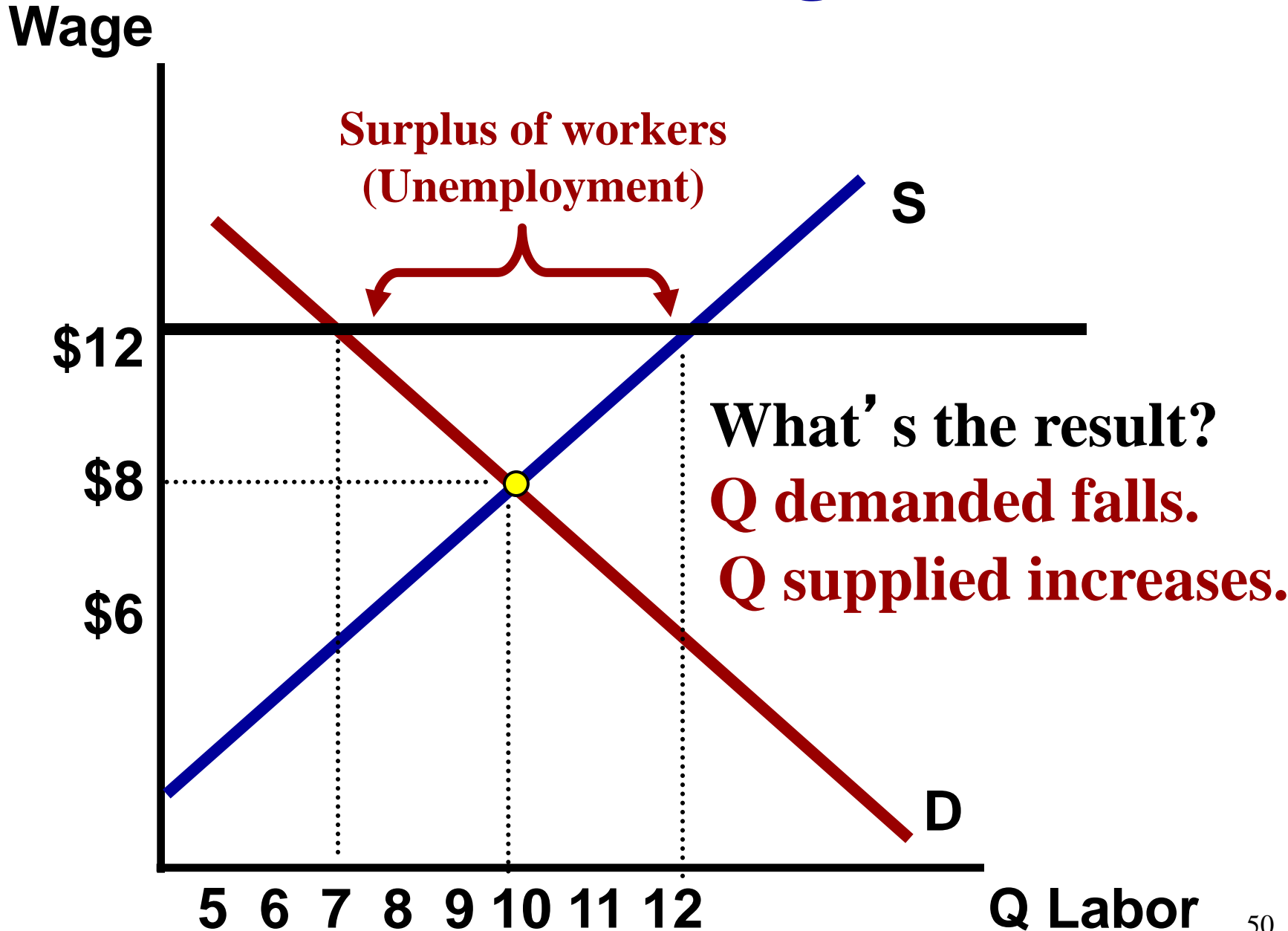
Is increasing minimum wage good or bad?

GOOD IDEA-

We don't want poor people living in the street, so we should make sure they have enough to live on.

BAD IDEA-

Increasing minimum wage too much leads to more unemployment and higher prices.

Minimum Wage Worksheet

Maximizing Output

$$\frac{MPx}{P_x} = \frac{MPy}{P_y}$$

$10   **$5**

# Times Going	MP_R (Robots)	MP/P_R (Price$_R$ =$10)	MP_W (Workers)	MP/P_W (Price$_W$ =$5)
1st	30		20	
2nd	20		15	
3rd	10		10	
4th	5		5	

If you only have $35, what combination of robots and workers will maximize output?

Maximizing Output

$$\frac{MPx}{P_x} = \frac{MPy}{P_y}$$

$10 $5

# Times Going	MP_R (Robots)	MP/P_R (Price$_R$ =$10)	MP_W (Workers)	MP/P_W (Price$_W$ =$5)
1st	30	3	20	4
2nd	20	2	15	3
3rd	10	1	10	2
4th	5	.50	5	1

If you only have $35, the best combination is 2 robots and 3 workers?

FRQ

2. The John Lamb Company, a profit-maximizing firm producing widgets, is in a perfectly competitive widget market. Assume John Lamb employs a fixed number of employees and rents a machine for a variable number of hours from a perfectly competitive market.

  (a) Using correctly labeled side-by-side graphs of the factor market for machines and the John Lamb Company, show each of the following.

    (i) The equilibrium rental price of machines in the factor market, labeled as P_R

    (ii) John Lamb's equilibrium rental quantity of machines, labeled as Q_L

  (b) Assume that the popularity of widgets declines, decreasing the demand for widgets. What will happen to each of the following?

    (i) Marginal product curve for machine-hours

    (ii) Marginal revenue product curve for machine-hours. Explain.

  (c) John Lamb is employing the cost-minimizing combination of inputs. The marginal product of labor is 28 widgets per worker hour and the wage rate is $14 per hour. The marginal product of the machine is 60 widgets per machine-hour. What is the hourly rental price of a machine?

Resource Markets

Perfect Competition ←———————————————→ **Monopsony**

Imperfect Competition: Monopsony

Characteristics:
- **One firms hiring workers**
  - **The firm is large enough to manipulate the market**
- **Workers are relatively immobile**
- **To hire add**
- **Firm is wage maker**
  - **To hire additional workers the firm must increase**

Examples:
Central American Sweat Shops
Midwest small town with a large Car Plant
NCAA

Assume that this firm CAN'T wage discriminate and must pay each worker the same wage.

Acme Coal Mining Co.		
Wage rate (per hour)	Number of Workers	Marginal Resource Cost
$4.00	0	
4.50	1	
5.00	2	
5.50	3	
6.00	4	
7.00	5	
8.00	6	
9.00	7	
10.00	8	

Assume that this firm CAN'T wage discriminate and must pay each worker the same wage.

		o.
		st
7.0		11
8.0		13
9.00	7	15
10.00	8	17

MRC doesn't equal wage

Monopsony

If the firm can't wage discriminate, where is MRC?
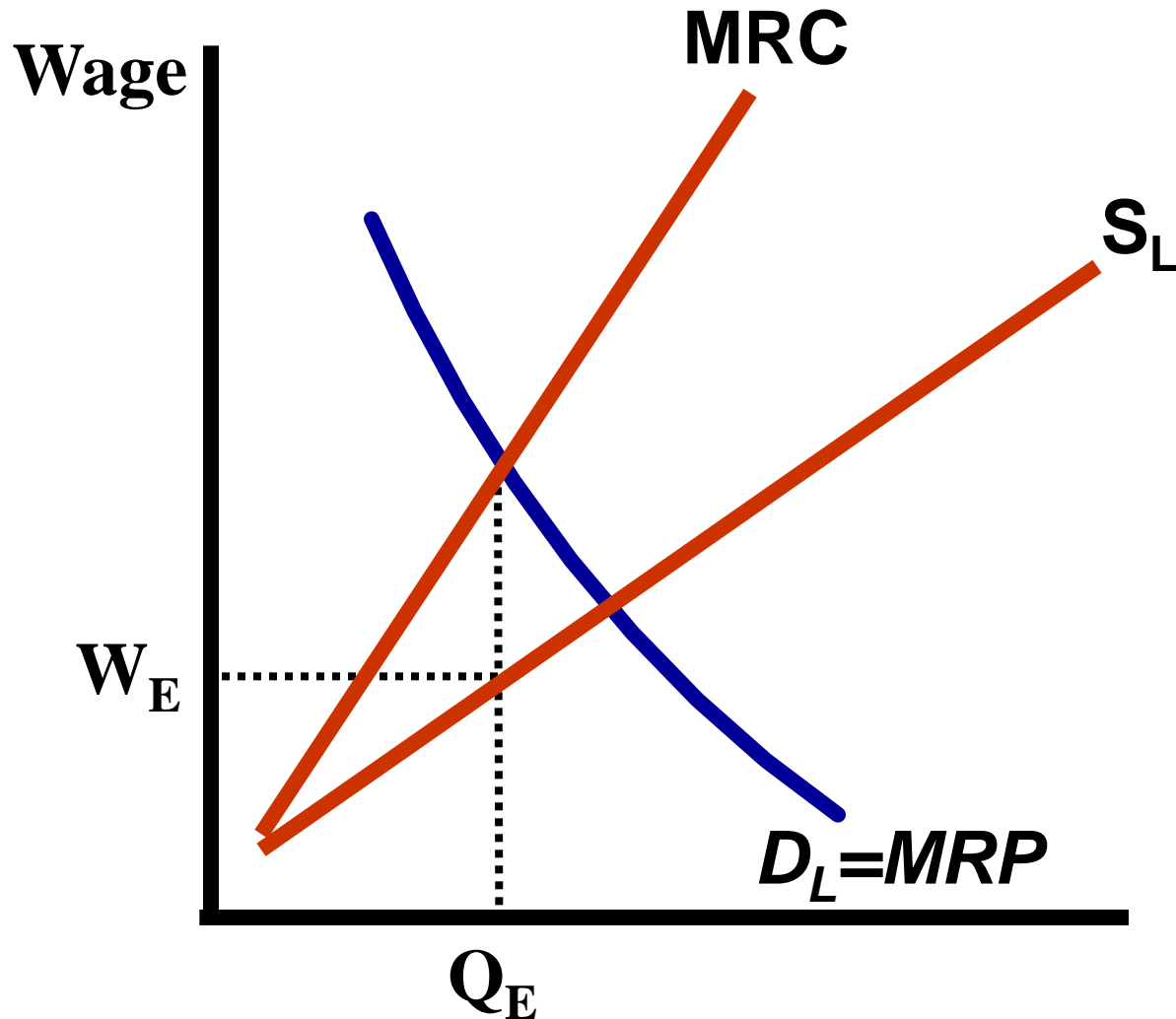
Labor Unions

Goal is to increasing wages and benefits

How do Unions Increase Wages?

1. **Convince Consumers to buy only Union Products**
   Ex: Advertising the quality of union/domestic products

2. **Lobbying government officials to increase demand**
   Ex: Teacher's Union petitions governor to increase spending.

3. **Increase the price of substitute resources**
   Ex: Unions support increases in minimum wage so employers are less likely to seek non-union workers

Labor Markets and Globalization

Why is Globalization Happening?

- **Globalization is the result of firms seeking lowest costs. Firms are seeking greater profits.**
- **Parts are made in China because labor in significantly cheaper.**

What is Outsourcing?

- **Outsourcing is when firms send jobs overseas.**

What types of jobs are outsourced?

- **For many years it was only unskilled jobs, but now other skilled jobs are sent overseas.**

Advantages and Disadvantages

Disadvantages

- **Increases U.S. unemployment**
- **Less US tax revenue generated from workers and corporations means less public benefits**
- **Foreign workers don't receive same protections as US workers**

Advantages

- **Lowers prices for nearly all goods and services**
- **Decreases world unemployment**
- **Improves quality of life and decreases poverty in less developed countries**