

**Key Ideas**

- o Firms are sellers in product markets and buyers in factor (resource) markets.
- o The demand for any resource is derived from the demand for the products that the resource can produce. Thus, resource demand depends on the price of the good or service that the resource produces and on the resources productivity in producing the good or service.
- o The demand curve for a resource in the short run is downward sloping because the marginal physical product (MPP) of additional inputs of a resource will decrease as a result of the law of diminishing marginal returns. In some textbooks, marginal physical product is called marginal product.
- o The resource demand curve for a firm selling in an imperfectly competitive market will be steeper than the resource demand curve for a firm selling in a perfectly competitive market. The steeper slope results from both a decrease in the marginal physical product and a decrease in the product price required to permit the firm to sell a larger output.
- o Given a downward-sloping marginal revenue product curve and the differences existing between supply and marginal resource cost in perfect competition and monopsony, a monopsonistic employer will pay a lower price (wage) and hire fewer units of a resource than a perfect competitor.
- o Economic rent is any payment to the supplier of a resource that is greater than the minimum amount required to employ the desired quantity of the resource to be supplied.
- o The equilibrium real interest rate influences the level of investment and helps allocate financial and physical capital to specific firms and industries.
- o Profits are the return to entrepreneurs for assuming risk and for organizing and directing economic resources.
- o Profits allocate resources according to the demands of consumers.

**Unit Outline:**

- A. Marginal Productivity and factor demand
  - 1. Resource demand as derived demand
  - 2. Marginal revenue product
  - 3. Rule for employing resources  $MRP=MRC$
  - 4. Changes in resource demand
- B. Determination of wages
  - 1. Perfect factor markets
  - 2. Imperfect factor markets
- C. Determination of rent, interest, and profit

A firm will continue to hire factors of production as long as its marginal revenue product (MRP) exceeds its marginal resource cost (MRC). A firm will not hire resources once MRC exceeds MRP.

A firm maximizes profits where a factor's marginal revenue product equals the factor's marginal resource cost. A firm maximizes profit where  $MRP = MRC$ . In a perfectly competitive labor market, a firm will hire workers until the last worker's wage (MRC) equals the marginal revenue product of that last worker hired.

When a combination of resources is employed in producing a good or service, the profit-maximizing rule is

$$\frac{MRP_1}{MRC_1} = \frac{MRP_k}{MRC_k} = \frac{MRP_a}{MRC_a} = 1$$

When a firm produces the profit-maximizing level of output, it must utilize a least cost combination of resources. The rule for a least-cost combination of resources is

$$\frac{MPP_1}{MRC_1} = \frac{MPP_k}{MRC_k} = \frac{MPP_a}{MRC_a}$$

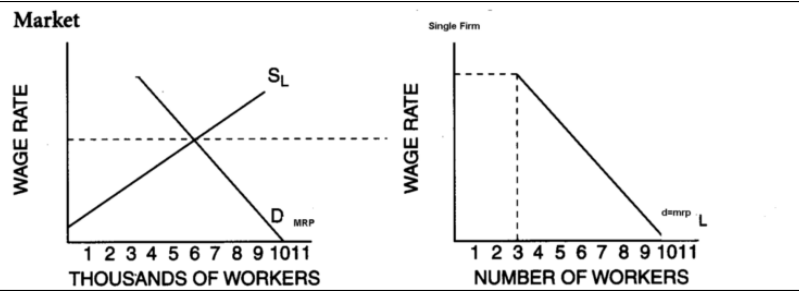
For a firm facing a perfectly competitive resource market, resource supply is perfectly elastic and equal to marginal resource cost at a market-determined price (wage) for the resource. Under monopsony or imperfect conditions of employment, both resource supply and marginal resource cost are positively sloped curves with the marginal resource cost being a value greater than the price (wage) for all units beyond the first unit of the resource employed.



Units of workers	total product	product price
0	0	\$1.50
1	5	\$1.40
2	9	\$1.30
3	13	\$1.20
4	16	\$1.10
5	18	\$1.00

The MRP of the third worker is \_\_\_\_\_

If the wage rate is constant and equals \$5 per hour, how many workers will a profit maximizing firm hire? \_\_\_\_\_



# of workers	Total Output	Product Price	TR	MR	MPP	MRP	Wage	Total labor cost	MFC
0	0	\$7					\$8		
1	10	\$6					\$10		
2	20	\$5					\$12		
3	25	\$4					\$14		
4	29	\$3					\$16		
5	32	\$2					\$18		
6	34	\$1					\$20		
How many workers will this firm employ? _____									
What wage will the workers be paid? _____									

- \*3. Assume the market for unskilled workers is perfectly competitive and in equilibrium. Then a minimum wage is imposed, which increases the wage rate of unskilled workers.
- (A) Use supply and demand analysis to explain how this increase in the wage rate will affect each of the following:
- (i) The number of workers employed in the market
  - (ii) The number of unskilled workers seeking employment in the market
- (B) Assume that the fast-food industry is perfectly competitive and employs only one factor of production: unskilled workers. Use supply and demand analysis to explain how the increase in the wage rate resulting from the imposition of the minimum wage will affect each of the following in the fast-food industry in the short run.
- (i) Price of fast food
  - (ii) Quantity of fast food produced



What is economic rent?									
What will happen if the price of capital rises?									
What is the resource that seeks the best opportunities for production, takes risks, innovates, and coordinates with all other resources?									
An increase in demand for a product will lead to a(n) _____ in demand for resources.									
In what market are firms the consumers and households the suppliers?									
When a resource is more productive, will the firm use more or less of it?									
A firm attempting to maximize profit will acquire additional resources until what point?									

Number of bakers	#cookies per hour								
0	0								
1	100								
2	180								
3	240								
4	280								
5	300								
6	290								

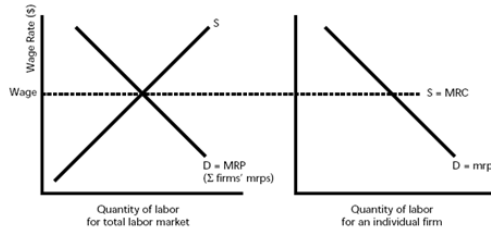
The law of diminishing marginal returns occurs after hiring which baker?

The marginal productivity of the 4th baker is

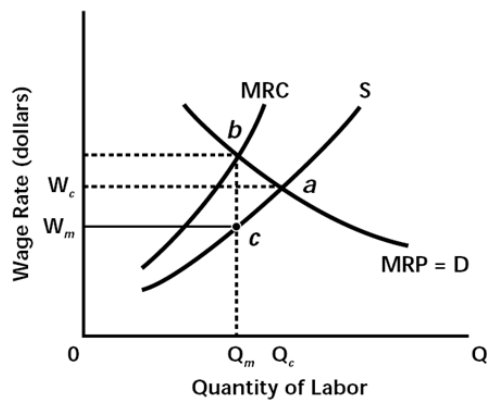
If the price per cookie is \$1 and each baker receives \$20 per hour, how many bakers will the owner hire?

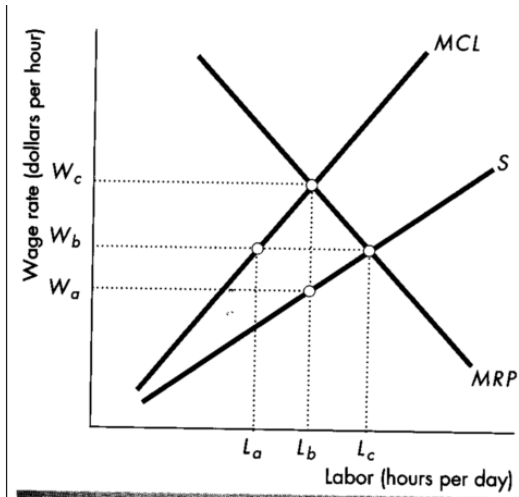
### Model 18

## The Supply of and Demand for Labor in a Competitive Labor Market



## The Wage Rate and Level of Employment in a Monopsonistic Labor Market





According to the chart above, if the workers are being paid \$4 per hour, how many workers would be hired?



Total Labor Units	Marginal Revenue Product
0	-
1	\$5.00
2	\$7.50
3	\$5.00
4	\$2.50
5	\$1.00
6	\$0



Workers	Apple Bushels / day	$MP_L$	$MRP_L$
0	0	-	-
1	40		
2	70		
3	90		
4	100		
5	105		
6	102		

- If apples sell for \$2 per bushel and workers can be hired in a competitive labor market for \$30 per day.
- How many workers should be hired?



- What if workers unionized and the wage rose to \$50?

- Larry's farm grows lettuce on his 1,000 acre farm. Larry hires unskilled labor in a labor-intensive farming operation. Larry operates in a perfectly competitive, constant cost lettuce industry and is currently in long run equilibrium.
  - Draw correctly labeled side-by side graphs for the lettuce market and *Larry's Lettuce Farm* and show each of the following
    - Market output and price, labeled as  $Q_M$  and  $P_M$ , respectively
    - Larry's output and price, labeled as  $Q_F$  and  $P_F$ , respectively
  - Draw a correctly labeled production function graph showing the relationship between marginal product and average product.
    - Identify the point of diminishing return
    - Identify the point where marginal cost is equal to average variable cost
  - Assume that Larry now employs a new technological development in planting and growing of lettuce that increases his output per acre. Using the graph that you have drawn in (B), show the impact of the new technology on the production function graph
  - Using the graphs in part (A) as a referent for your answers, explain how the new technology will effect following in the **short run**.
    - Larry's marginal revenue.
    - Larry's quantity of output. Explain
    - Larry's profit
    - The number of workers that Larry will hire
  - Indicate how each of the following will change in the **long run** as a result of the change in the technology.
    - The number of firms in the industry. Explain
    - Price
    - Industry output
    - Consumer surplus



**Problem 2:**

The labor market in the town of Postville, Iowa is perfectly competitive, and 50 percent of the labor force is employed in the meatpacking industry, a perfectly competitive product market.

- (a) Assume that the meatpacking manufacturer was forced to close their plant in Postville, Iowa. Using a correctly labeled supply and demand, graph, predict the impact that the closing the plant will have on each of the following.
  - i. The wage rate and number of workers employed in Postville, Iowa
  - ii. The number of workers in Postville, Iowa looking for work who cannot find employment at the wage rate you identified in (i)
- (b) Assume that the state of Iowa possesses a minimum wage law. What impact will an effective or binding minimum wage have on each of the following?
  - i. The wage rate and number of workers employed in Newton
  - ii. The number of workers in Newton looking for work who cannot find employment
- (c) Show and explain how the plant closing in Postville, Iowa will affect each of the following:
  - i. Postville's retail businesses
  - ii. The number of persons employed in Postville's retail businesses.