Chapter 8
The Labor Market: Employment, Unemployment, and Wages

After reading Chapter 8, THE LABOR MARKET: EMPLOYMENT, UNEMPLOYMENT, AND WAGES, you should be able to:

- List the three factors of production.
- Use supply and demand analysis to show how a factor’s equilibrium price and quantity are determined.
- Explain the relationship between opportunity cost and the supply of a factor.
- Explain how the demand curve for a factor is a derived demand curve and how it relates to the Marginal Product of a factor and the Marginal Revenue Product of the factor.
- Explain how labor markets differ from other factor markets and discuss what gives rise to Wage Differentials and the role of Human Capital.
- Explain the criteria necessary to be considered Unemployed and how to calculate the Unemployment Rate.
- Distinguish between Frictional Unemployment, Cyclical Unemployment and the Natural Rate of Unemployment.
- Explain Unions and long term contracts can lead to Wage Inflexibility and unemployment.

### Outline

I. Factor Markets
   A) The Factor Market is where firms buy and households supply inputs such as land, labor and capital.
   B) The quantity supplied of a factor generally increases when the factor’s price rises and depends on their opportunity costs. As the price of a factor increases, the greater the number of owners of that factor decide that this price exceeds the next best alternative use.
   C) The demand for a factor exists because the factor can be used to produce goods and services. Thus the demand for factors is a Derived Demand.
   D) The Marginal Product (MP) of a factor is the additional output produced when an additional unit of a factor is employed. The Marginal Revenue Product (MRP) of a factor is the extra revenue gained by hiring an extra unit of the factor. $MRP = MR \times MP$. The MRP is the firm’s factor demand curve.
   E) The firm’s demand curve for a factor is negatively sloped due to the law of diminishing marginal returns.
F) The market demand for a factor is the horizontal summation of each individual demands.

G) Equilibrium in the factor market is established at the factor price such that factor supply equals factor demand. The demand for a factor can increase (decreases) whenever MRP increases (decreases). MRP will change whenever the product price changes or there is a change in productivity.

II. Labor Markets

A) Workers’ wages and employment are determined by the equilibrium in the labor market. This is illustrated above, where the equilibrium wage is \( W \) and level of employment is \( L \).

B) Because it is illegal to buy or sell people, labor markets differ from other factor markets.
   1. People have preferences about different jobs.
   2. People can use their time for purposes other than working.
   3. People can join labor unions.

C) **Wage Differentials** between jobs are the result of differences in the supply curves for different jobs (some jobs are more desirable) and differences in the labor demand curves (some jobs require special talents). The first difference creates compensating wage differentials (less desirable jobs pay more than more desirable jobs); the second gives rise to noncompeting groups (groups of workers with skills so different that they do not compete for the same jobs).

D) At low wages, an increase in the wage raises the quantity of labor supplied; at high wages, an increase may lower the quantity of labor supplied. This is the **Backward Bending** supply of labor curve.

E) **Human Capital** refers to the investment people make in schooling, training, and health care. These investments raise people’s productivity and thereby increase their wages.

III. The Macroeconomic Labor Market

A) A person is **Unemployed** if they did not work during the previous week, they actively looked for work during the last four weeks, and are currently available for work.

B) The **Unemployment Rate** is the number of unemployed divided by the size of the **Labor Force**.

C) **Frictional Unemployment** is unemployment associated with the changing of jobs in a dynamic economy. **Cyclical Unemployment** is unemployment associated with general downturns in the economy.

D) In the macroeconomic labor market, the **Real Wage**, which is measured by money wages divided by the price level, determines the quantity of labor demanded and supplied.
   1. As the real wage increases firms will want to hire fewer workers; as it decreases, they will want to hire more.
   2. As the real wage increases more workers will want to work; as it decreases, less workers want to work.
   3. At the equilibrium real wage, the number of jobs available is equal to the number of qualified workers to fill those jobs.

E) The **Natural Rate of Unemployment** is when there is an approximate balance between the number of unfilled jobs and the number of qualified job seekers. When the economy is operating with the natural rate, the only unemployment is cyclical.
F) Unemployment in excess of the natural rate can be created when nominal wages are inflexible. If the demand for labor falls because of a downturn in the economy and wages are inflexible then there is cyclical unemployment.

G) Long term contracts and Labor Unions—a collective organization of workers whose goal is to affect conditions of pay and employment—are two of the reasons why wages may be inflexible and some unemployment may persist.

■ Review Questions

True/False

If the statement is correct, write true in the space provided; if it is wrong, write false. Below the question give a short statement that supports your answer.

_____ 1. There is as much, or more, price searching in factor markets as in product markets.

_____ 2. Labor is a unique factor of production because its price is not determined by the supply and demand for it.

_____ 3. The supply curve for a factor of production typically shows that the higher the factor’s price, the greater the quantity that will be supplied.

_____ 4. Firms purchase factor inputs because the inputs directly yield satisfaction.

_____ 5. If the demand for wine falls so that the price and marginal revenue from wine falls, then the demand for grape pickers declines.

_____ 6. The marginal product of a worker does not depend on the quality and quantity of the machines with which he or she works.

_____ 7. Human capital refers to people who lend funds to firms for their investment in capital equipment.

_____ 8. A firm’s factor demand curve shifts to the right if either the marginal product of the factor increases or the marginal revenue from the production of output rises.

_____ 9. Noncompeting groups are groups of jobs that are very different.

_____ 10. The two goals of unions, higher pay and greater employment, are not in conflict with each other.

_____ 11. The notion of compensating wage differentials shows that, everything else equal, the wages paid for less desirable jobs will be higher than those paid for more desirable jobs.
Multiple Choice Questions

Circle the letter corresponding to the correct answer.

1. All of the following increase the wage paid to carpenters except
   (a) an increase in the demand for new houses.
   (b) a new belief among workers that carpentry is a less desirable job.
   (c) a fall in the price and marginal revenue of new houses.
   (d) the introduction of new saws that increase the marginal productivity of carpenters.
   (e) an increase in the demand for carpenters.

2. If the supply curve for a factor shifts to the right, the price of the factor will _______ while the quantity employed will _______.
   (a) rise; rise
   (b) rise; fall
   (c) not change; not change
   (d) fall; rise
   (e) fall; fall

3. The labor market is different from other factor markets for all of the following reasons except that
   (a) slavery is against the law.
   (b) people care about the jobs at which they work.
   (c) workers can engage in alternative activities such as household production.
   (d) unions may be formed.
   (e) the number of people willing to work does not depend on their wage.

4. Other things equal, wages in less desirable jobs are _______ wages in more desirable jobs.
   (a) more than
   (b) equal to
   (c) less than
   (d) sometimes more than and sometimes less than
   (e) not comparable to

5. Which of the following is best described as an investment in human capital?
   (a) The purchase of a new machine tool that only skilled workers can use.
   (b) Saving an additional $20,000 in a savings account that pays a higher interest rate.
   (c) Learning how to use a word processing program on a computer.
   (d) Quitting work to take a vacation.
   (e) None of the above are examples of acquiring human capital.
Essay Questions

Write a short essay or otherwise answer each question.

1. Use a supply and demand diagram to show what would happen to the wage of college professors if there were a general decline in demand for a college education.

2. Complete the following table:

<table>
<thead>
<tr>
<th>Quantity of Labor</th>
<th>Total Output</th>
<th>Marginal Product of Labor</th>
<th>Price of Output</th>
<th>Total Revenue</th>
<th>Marginal Revenue Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>XX</td>
<td>$2</td>
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<td>XXX</td>
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<td>1500</td>
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<td>$2</td>
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</tbody>
</table>

3. If labor costs $750, how many workers will the firm in Question 2 hire? Suppose labor costs fall to $350. How many workers will the firm then hire?

4. If labor costs $750, but the price of the output produced by the firm in Question 2 rises to $4, how many workers will the firm hire?

5. Assume the price of output in Question 2 is $2, but because of the introduction of new technology, output at every level of labor input doubles. (1 worker produces 1000, 2 produce 1800, and so on.) If labor costs $750, how many workers will be hired?

Answers to Review Questions

True/False

1. False. To hire factors companies must compete with all other firms, not just with firms in the same industry. So most businesses have no market power when hiring factors of production.

2. False. As with any factor, the price of labor (its wage) is determined by the supply and demand for it.

3. True. The higher the factor’s price, the larger is the opportunity cost of failing to supply the factor.

4. False. Firms purchase factors because they can sell the output produced by the factors. This means the demand for factors is derived from the demand for the products produced.

5. True. The demand for grape pickers is derived from the demand for wine. If the demand for wine falls, the marginal revenue of wine declines so the marginal revenue product of the pickers falls.

6. False. The marginal product of a factor is influenced by the quality and quantity of the other factors with which it works. In this case, if the machines are very advanced, the worker’s marginal product will be high.

7. False. Human capital refers to the productivity-boosting investments people make in themselves.
8. True. The factor demand curve is the marginal revenue product. This increases (shifts to the right) if either the marginal revenue of extra output rises or if the factor’s marginal product rises.

9. False. Noncompeting groups are groups of workers whose talents are so different they do not compete with each other for jobs.

10. False. If the union gains higher pay, firms reduce their employment of the unionized workers.

11. True. Essentially, in order to attract workers to less desirable jobs, these jobs must pay higher wages to compensate for their unpleasantness.

**Multiple Choice Questions**

1. (c) The fall in the price of new houses lowers the additional revenue gained by hiring an extra carpenter (the marginal revenue product of the carpenter), so the demand for carpenters falls.

2. (d) This is precisely the same result we get in product markets when the supply of a commodity shifts to the right.

3. (e) The number of people willing to work generally, but not always, increases as the wage they can receive rises.

4. (a) The difference is a compensating wage differential.

5. (c) Acquiring the ability to use a word processing program means that the worker’s productivity has been enhanced. Moreover, this skill will not quickly disappear, so this is an example of human capital.

**Essay Questions**

1. A figure showing what occurs if the demand for college educations falls is above. The decrease in the demand for college education reduces the (derived) demand for college professors. As a result, the demand curve shifts to the left, as shown. Thus, the wage paid college professors falls (from $W$ to $W’$), and also the number of college professors employed falls (from $L$ to $L’$).
2. | Quantity of Labor | Total Output | Marginal Product of Labor | Price of Output | Total Revenue | Marginal Revenue Product |
<table>
<thead>
<tr>
<th></th>
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<td>1400</td>
<td>200</td>
<td>$2</td>
<td>$2800</td>
<td>$400</td>
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<td>1500</td>
<td>100</td>
<td>$2</td>
<td>$3000</td>
<td>$200</td>
</tr>
</tbody>
</table>

3. The marginal revenue product of the second worker is $800. Thus, when wages are $750 the company hires 2 workers, since the gain in revenue from the second worker ($800) exceeds the increase in costs ($750). If the wage falls to $350, 4 workers are hired. A fall in the wage raises the number of workers the firm demands.

4. If the product price doubles, the marginal revenue product doubles. In this case, the marginal revenue product of the fourth worker now equals $800, so 4 workers are hired. An increase in the product’s price causes an increase in the demand for factors (workers) used to produce the product, since factor demand is derived from the demand for the produced good.

5. If output doubles, the marginal product of labor doubles. This causes the marginal revenue product to double so that the marginal revenue product of the fourth worker becomes $800. Thus, the firm hires 4 workers. An increase in a factor’s marginal product raises the demand for that factor.

### Additional Questions

1. A bicycle manufacturer faces the following production schedule.

<table>
<thead>
<tr>
<th>Number of Workers</th>
<th>Number of Bicycles Produced Per Day</th>
<th>Marginal Product</th>
<th>Marginal Revenue Product $(P = $200)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>10</td>
<td></td>
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<tr>
<td>2</td>
<td>18</td>
<td>24</td>
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<tr>
<td>3</td>
<td>24</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>28</td>
<td>30</td>
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<td>5</td>
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</tr>
</tbody>
</table>

(a) Complete the table assuming the price of a bicycle is $200.

(b) How many workers will the manufacturer hire if the wage is $400? If there are no other additional costs, how much profit does the manufacturer earn?

(c) How many will the manufacturer hire if the wage falls to $1,600? How much profit does the manufacturer earn now?
2. Suppose that there are one hundred bicycle manufactures like the one in the previous problem. The supply of workers is given in the table below:

<table>
<thead>
<tr>
<th>Wage</th>
<th>Quantity of Workers Supplied</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2,000</td>
<td>1,000</td>
</tr>
<tr>
<td>$1,600</td>
<td>800</td>
</tr>
<tr>
<td>$1,200</td>
<td>600</td>
</tr>
<tr>
<td>$800</td>
<td>400</td>
</tr>
<tr>
<td>$400</td>
<td>200</td>
</tr>
</tbody>
</table>

(a) What is the equilibrium wage and how many workers will be hired in the market?
(b) How many workers does each firm hire and how much profit does the manufacturer earn?

3. (a) Suppose there are 80,000 employed persons and 10,000 unemployed persons. What is the unemployment rate?
(b) If the labor force is 250,000 and there are 225,000 employed persons, what is the unemployment rate?

4. What are the two objectives of unions and why are they incompatible?

**Answers**

1. (a)

<table>
<thead>
<tr>
<th>Number of Workers</th>
<th>Number of Bicycles Produced Per Day</th>
<th>Marginal Product</th>
<th>Marginal Revenue Product $(P = $200)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>10</td>
<td>$2,000</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
<td>8</td>
<td>$1,600</td>
</tr>
<tr>
<td>3</td>
<td>24</td>
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<td>$1,200</td>
</tr>
<tr>
<td>4</td>
<td>28</td>
<td>4</td>
<td>$800</td>
</tr>
<tr>
<td>5</td>
<td>30</td>
<td>2</td>
<td>$400</td>
</tr>
</tbody>
</table>

(b) If the wage is $400 the manufacturer will hire five workers: the number where the marginal revenue product is equal to the wage. If he hires five workers he will produce 30 bicycles and earn an economic profit of $4,000 ($200 \times 30 – $400 \times 5$).
(c) If the wage is $1,600 the manufacturer will hire two workers and he will produce 18 bicycles. The economic profit is $400.
2. (a) The demand for labor for an individual firm and the total market is given in the following table:

<table>
<thead>
<tr>
<th>Wage</th>
<th>Quantity Demanded (one firm)</th>
<th>Quantity Demanded (100 firms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2,000</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>$1,600</td>
<td>2</td>
<td>200</td>
</tr>
<tr>
<td>$1,200</td>
<td>3</td>
<td>300</td>
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<tr>
<td>$800</td>
<td>4</td>
<td>400</td>
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<td>$400</td>
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</tbody>
</table>

At a wage of $800 the quantity supplied is equal to the quantity demanded, which is 400.
(b) Each firm will hire four workers and produce 28 bicycles. Economic profit is $2,400.

3. (a) Unemployment rate = # unemployed / labor force = # unemployed / (#unemployed + #employed)
   Unemployment rate = 10,000/90,000 = 11.11%
   (b) Unemployment rate = 25,000/250,000 = 10.00%

4. The two objectives are higher pay and high employment for the union members. If the union wants to bargain for higher wages they may have to settle for a lower level of employment. Likewise if the want to increase the level of employment they may have to sacrifice higher wages.