Chapter 8

The Labor Market
The goal of this chapter is to examine the behavior of labor markets. Specifically:

- How do people decide how much time to spend working?
- What determines the wage rate an employer is willing to pay?
- Why are some workers paid so much and others so little?
Learning Objectives

After completing this chapter, you should know:

1. The forces that influence the supply of labor.
2. Why the labor demand curve slopes downward.
Learning Objectives

3. How the equilibrium wage and employment levels are determined.
4. How a legal minimum wage alters market outcomes.
5. Why wages are so unequal.
Labor Supply

• The willingness and ability to work specific amounts of time at alternative wage rates in a given time period, *ceteris paribus*. 
Income versus Leisure

• The opportunity cost of working is the amount of leisure time that must be given up in the process.
• People have to fit everything they do into 24-hour days. An extra hour of work must replace an hour of leisure.
As the opportunity cost of work increases, we require higher rates of pay.

The marginal utility of income declines as more is earned.

The upward slope of an individual labor supply curve reflects:

- Increasing opportunity cost of labor.
- Decreasing marginal utility of income.
Market Supply of Labor

• **Market supply of labor** – the total quantity of labor that workers are willing and able to supply at alternative wage rates in a given time period, *ceteris paribus*.

• As labor-market entrants increase, the quantity of labor supplied goes up.
• *Demand for labor* – the quantities of labor employers are willing and able to hire at alternative wage rates in a given time period, *ceteris paribus.*
Derived Demand

- *Derived demand* – the demand for labor and other factors of production is *derived* from the demand for the final goods and services produced by these factors.
• The quantity of resources purchased by a business depends on the firm’s expected sales and output.
• Increased sales will increase a firm’s demand for labor (and other resources), and vice versa.
What Does Your Major Pay?

- Petroleum Engineering: $98,000
- Computer science: $58,400
- Civil engineering: $53,800
- Economics: $48,500
- Accounting: $44,300
- History: $39,000
- Philosophy: $38,306
- Sociology: $36,000
What Does Your Major Pay?

• A common thread among the higher paying professions is math skills.
• Graduates who can produce goods and services that are in great demand get higher pay.
The Wage Rate

• The quantity of labor demanded depends on its price – the **wage rate**.

• The higher the wage rate, the smaller the quantity of labor demanded, *ceteris paribus*, and vice versa.
Figure 8.2

Demand for labor

At lower wages, more labor is demanded.

WAGE RATE (dollars per hour)

W_1

W_2

0

L_1

L_2

QUANTITY OF LABOR (hours per month)
A worker’s value to the firm is his or her marginal physical product (MPP).

- **Marginal physical product**: the change in total output associated with one additional unit of an input:

\[
MPP = \frac{\text{Change in total output}}{\text{Change in quantity of labor}}
\]
In most situations, the marginal physical product *declines* as more workers are hired.
• Output must be sold, so the real value of a worker to the firm is the worker’s marginal revenue product (MRP).

– *Marginal revenue product* – the change in total revenue associated with one additional unit of input:

\[
MRP = \frac{\text{Change in total revenue}}{\text{Change in quantity of labor}}
\]
• MRP sets an upper limit to the wage rate an employer will pay.
The Law of Diminishing Returns

• The marginal physical product of labor (MPP) eventually *diminishes* as the quantity of labor employed increases.

• MPP declines because more people must share limited facilities.
• The law of diminishing returns – the MPP of a variable factor declines as more of it is employed with a given quantity of other (fixed) inputs.
Diminishing Marginal Revenue Product (MRP)

- As $MPP$ diminishes, so does $MRP$, since
  \[ MRP = MPP \times p \]
  where $p$ is the sales price of the product.
- If $p$ is assumed to be constant, then $MRP$ diminishes along with $MPP$. 
Table 8.1

<table>
<thead>
<tr>
<th>Number of Pickers (per Hour)</th>
<th>Total Strawberry Output (Boxes per Hour)</th>
<th>Price of Strawberries (per Box)</th>
<th>Total Strawberry Revenue (per Hour)</th>
<th>Marginal Revenue Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>$2</td>
<td>0</td>
<td>$10</td>
</tr>
<tr>
<td>1 (Marvin)</td>
<td>5</td>
<td>$2</td>
<td>$10</td>
<td>$10</td>
</tr>
<tr>
<td>2 (George)</td>
<td>10</td>
<td>$2</td>
<td>$20</td>
<td>$8</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>$2</td>
<td>$28</td>
<td>$6</td>
</tr>
<tr>
<td>4</td>
<td>17</td>
<td>$2</td>
<td>$34</td>
<td>$4</td>
</tr>
<tr>
<td>5</td>
<td>19</td>
<td>$2</td>
<td>$38</td>
<td>$2</td>
</tr>
<tr>
<td>6</td>
<td>20</td>
<td>$2</td>
<td>$40</td>
<td>$0</td>
</tr>
<tr>
<td>7</td>
<td>20</td>
<td>$2</td>
<td>$40</td>
<td>$0</td>
</tr>
<tr>
<td>8</td>
<td>18</td>
<td>$2</td>
<td>$36</td>
<td>$-4</td>
</tr>
<tr>
<td>9</td>
<td>15</td>
<td>$2</td>
<td>$30</td>
<td>$-6</td>
</tr>
</tbody>
</table>

The marginal revenue product is calculated as the change in total revenue divided by the change in the number of pickers.
The Hiring Decision

• The number of workers that will be hired is determined by the demand for and the supply of labor.

• An employer is willing to pay a worker no more than his or her MRP.

• However, in a typical work situation, all workers would receive the same wage rate.
The Firm’s Demand for Labor

• A firm will continue to hire as long as the next worker’s MRP is greater than the market wage rate.

• Hiring will stop when the last worker hired has an \( \text{MRP} = \text{wage} \).

• The MRP curve is the labor demand curve.
Figure 8.4

The graph illustrates the Marginal Revenue Product (MRP) of labor. The MRP is shown as a downward-sloping line, indicating that as the quantity of labor increases, the marginal revenue product decreases. The wage rate is shown as a horizontal line. The point where the MRP line intersects the wage rate line is labeled C. According to the graph, hiring continues until MRP = wage.
Market Equilibrium

• The market demand for labor depends on:
  – The number of employers.
  – The MRP of labor in each firm and the industry.

• The market supply of labor depends on:
  – The number of workers.
  – Each workers’ willingness to work at alternative wage rates.
Equilibrium Wage

• The intersection of the market supply and demand curves establishes the equilibrium wage.

• It is the *only* wage where the quantity of labor supplied equals the quantity of labor demanded.
The following changes in market conditions will alter wages and employment levels.

- Changes in labor productivity.
- Changes in the price of the good produced by labor.
- Changes in the legal minimum wage.
- The actions of labor unions.
Changes in Productivity

- If labor productivity ($MPP$) rises, wages can increase without sacrificing jobs.
- MRP will shift right and equilibrium can occur at a higher level of employment.
Changes in Price

- As the market price increases, MRP shifts to the right, and equilibrium can occur at a higher level of employment.
• Minimum wages are mandated by Congress.

• Effects of a minimum wage:
  – Reduces the quantity of labor demanded.
  – Increases the quantity of labor supplied.
  – Creates a market surplus.
  – Some workers end up better off while others end up worse off (a tradeoff).
Labor Unions

- Workers may form a labor union and bargain collectively with employers to get higher wages.
- A union must exclude some workers from the market to get and maintain an above-equilibrium wage.
• Unions decrease wages in non-union industries.
  – Excluded workers increase non-union labor supply.
Should CEO Pay Be Capped?

• Critics of chief executive officer (CEO) pay want to revise the process used to set CEO pay levels.
• The MRP of a CEO is difficult to assess.
• CEO salaries are higher because they reflect the CEO’s opportunity wage:
  – *Opportunity wage* is the highest wage an individual would earn in his or her best alternative job.
What We Learned

1. People work to acquire income needed to buy desired goods and services. They sacrifice leisure time, the opportunity cost of working.

2. The labor demand curve reflects MRP, which diminishes as additional workers are hired in a fixed-size facility. Labor demand is a downward sloping curve.
3. The equilibrium wage and employment level are determined by the intersection of labor supply and labor demand curves.

4. Imposing a legal minimum wage above equilibrium creates a surplus of workers as more seek work but firms reduce the number of jobs available.
5. The differences in MRP among positions explain a lot of wage inequality. Positions with greater productivity making products in greater demand will command higher wages.