Chapter 2
Overview of the Labor Market

Summary

The purpose of Chapter 1 was to introduce the methodology of modern labor economics, particularly the art of model building. In Chapter 2, the discussion shifts from models in general to the demand and supply model of the labor market. This is one of the most important positive economic models of the labor market, and it forms the foundation for most of the chapters that follow.

In the demand and supply model of the labor market, firms are the buyers and individuals are the sellers of labor services. Although this represents a reversal of the roles played in traditional product markets, the labor and product market roles are linked. A firm's success in the product market will influence its decision about how much labor to demand. The prices consumers face in the product markets determine the real purchasing power of the wages they earn, and wages in turn influence labor supply behavior. Before summarizing the demand and supply model of the labor market, it may be helpful to briefly review the labor market definitions, facts, and trends also presented in Chapter 2.

Labor markets can be national or local depending on how far buyers and sellers are willing to search. Sometimes, when firms follow strict practices such as filling key positions only from within the firm (as in some unionized workplaces and in some parts of the government), the labor market is so localized that it can be characterized as being internal to a particular firm.

All individuals aged 16 or older who are employed, waiting to be recalled from a layoff, or actively seeking work, are classified as being in the labor force. Those in the labor force who are not employed are classified as unemployed. Labor markets are very dynamic, and individuals are constantly flowing among the categories of employment, unemployment, and out of the labor force. The four major flows between labor market states are becoming unemployed due to either voluntary quits or involuntary layoffs, becoming employed either as a new hire or being recalled from a layoff, exiting the labor force by retiring or dropping out, and entering the labor force either as a new worker or reentering after dropping out.

In general, while the unemployment rate has fluctuated considerably over the years, the percentage of the population in the labor force, known as the labor force participation rate, has increased steadily. This increase has come about because of large and steady increases in the labor force participation rate for women. The labor force participation rate for men has been gradually falling throughout most of the 20th century.

The unemployment rate is computed by dividing the number of unemployed by the number in the labor force. Unemployment rates around 5% or less (in the United States) indicate tight markets, in which there are many job openings relative to workers. As the rate rises, labor markets become loose, and it is more difficult for workers to find a job and easier for firms to hire.
The types of work people do change over time. Employment in good-producing industries has fallen, while jobs in private-sector services increased rapidly. Workers have moved from manufacturing into wholesale and retail trade, education, health care, hospitality and leisure services, and professional and business services. Within sectors, the types of jobs have changed as well. For example, within the service sector, management, administrative, and sales jobs have increased as a percentage of total service employment.

The price per hour of the labor services that are bought and sold in the labor market is the wage rate. In thinking about wages, it is useful to distinguish between nominal wages (sometimes called money wages) and real wages. Nominal wages are what a worker earns in today’s current dollars, while real wages are computed by dividing nominal wages by an index of prices, usually the Consumer Price Index (CPI). This calculation essentially holds prices constant, leaving only the real physical output per hour that the wage could purchase. Real wages are useful because they allow one to compare workers’ actual ability to purchase goods and services over time. Constructing an index of real wages can further facilitate these comparisons.

**Example 1**

Table 2-1 presents data on average nominal wages and consumer prices for the years 1945, 1980, and 1997.

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Nominal Wage</th>
<th>Consumer Price Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1945</td>
<td>$1.02</td>
<td>100</td>
</tr>
<tr>
<td>1980</td>
<td>$7.27</td>
<td>458</td>
</tr>
<tr>
<td>1997</td>
<td>$13.38</td>
<td>892</td>
</tr>
</tbody>
</table>

The year 1945 was chosen as the base year for the price index, which means that its index number was set to 100. (The CPI is just the ratio, multiplied by 100, of the total expenditures needed to buy a certain bundle of goods in a particular year to the total expenditures needed to buy that same bundle of goods in the base year.) The index 458 for 1980 says that in general, prices were 4.58 times higher in 1980 than they were in 1945.

To construct the index of real wages (assuming 1945 is the base year), first express the nominal wages for each year as a percentage of the wage in 1945. This is done by dividing the nominal wage in each year by the wage in 1945 ($1.02) and multiplying by 100. The resulting index numbers are then divided by the CPI numbers (carried over from the previous table) and multiplied by 100 to form the index of real wages reported in Table 2-2.

<table>
<thead>
<tr>
<th>Year</th>
<th>Index of Nominal Wages</th>
<th>Price Index</th>
<th>Index of Real Wages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1945</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1980</td>
<td>713</td>
<td>458</td>
<td>156</td>
</tr>
<tr>
<td>1997</td>
<td>1312</td>
<td>892</td>
<td>147</td>
</tr>
</tbody>
</table>

The index 156 for 1980 says that on average, real wages were 1.56 times higher in 1980 than they were in 1945, but only 1.47 times higher in 1997 than they were in 1945. Thus real wages fell between 1980 and 1997.
Examining the data on real wages suggests that for many workers, particularly less-skilled workers, real wages fell in the 1980s and rose in the 1990s, leading overall to a very slight increase from 1980 to 2003. However, this may not be completely accurate, in part due to problems with using the CPI as a price measure. Since the CPI measures the cost of a fixed bundle of goods, it does not allow for either the fact that consumers substitute products when relative prices change or for changes in quality of goods that consumers buy. Thus the CPI may be overstated by as much as 1%, suggesting that actual purchasing power may have risen modestly over the period.

In interpreting the real wage index numbers, it is important to keep in mind that wage earnings are only one component of the total compensation workers receive. Many employers now provide workers with a wide range of benefits such as health insurance, paid vacations, and pensions.

How are compensation and employment levels determined in labor markets? Labor market outcomes are the result of the forces of demand and supply. The key to properly using the demand and supply model of the labor market is to remember that it is only a model. It is made simple deliberately to highlight a few important factors. At any one time, it pushes a number of factors into the background by utilizing the assumption of ceteris paribus, i.e., by holding all else constant and allowing just one variable to change.

When economists talk about a firm’s demand for labor, they are referring to a schedule of wages and employment levels that represent the quantity of labor the firm would like to hire over a particular period of time (e.g., a year) at any given wage, holding all else constant. A table of numbers or a simple algebraic expression usually represents this schedule. For example, a hypothetical demand schedule could take the form of the data in Table 2-3.

<table>
<thead>
<tr>
<th>Wage ($)</th>
<th>Desired Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
</tr>
</tbody>
</table>

Alternatively, that same data could be represented algebraically by the equation

\[ L = 30 - 2.5W, \]

where \( W \) represents the wage and \( L \) the employment level.

In Figure 2-1, the demand schedule data are transferred to a graph, plotting the wage on the vertical axis and the employment level on the horizontal. The resulting graph (labeled \( D \)) is called a demand curve. Note that the wage is graphed on the vertical axis of the graph even though it plays the role of the independent variable in the construction of the demand schedule. To be more consistent with the graph, sometimes an algebraic demand schedule is written with the wage on the left side of the equation, which in this case would yield the equation

\[ W = 12 - 0.4L. \]

In the long-run (defined as a period of time in which there are no fixed inputs), demand curves are thought to slope downward for two reasons. As the wage rises, for example, holding all else constant, additional units of output become more costly to the firm and the firm has a tendency to cut back on its output. (The firm’s higher costs will usually translate into higher prices. As a result, consumers will want to buy less of the output, so the decision to reduce output is actually driven by end consumers.) When the firm produces less output, it uses fewer inputs. The resulting reduction in the quantity of labor demanded
is called the **scale effect** of a wage increase. Also, as the wage rises, the firm will try to minimize the effect of the increase on its total costs by substituting other inputs (e.g., capital) for labor. This is called the **substitution effect** of a wage increase. In the short-run (defined as a situation where the firm’s capital stock is fixed), the substitution effect cannot come into play, but the scale effect still operates to create a downward sloping demand curve.

In tracing out the demand curve $D$ in Figure 2-1, all other factors that can influence a firm’s hiring decision besides the wage rate have been held constant. If one of those factors is now allowed to change, holding the wage constant at any given level, the entire curve will shift. An increase in the demand for the product the firm produces, for example, tends to create a **scale** (or **output**) effect that shifts the entire schedule to the right, say to $D'$ in Figure 2-1, because it is now more profitable to produce goods and thus more profitable to hire workers. At any given wage (e.g., $6), the quantity demanded is now 10 units higher along curve $D'$.

Changes in the price of other inputs the firm uses, like capital, produce an ambiguous effect on the position of the demand curve. A reduction in the price of capital, for example, would tend to produce a positive **scale** effect since the cost to the firm of producing another unit of output would be less. On the other hand, when the price of capital falls, **substitution** of more capital for the now relatively more expensive labor will occur. If the scale effect of the capital price decrease dominates the substitution effect, then the demand for labor will shift outward to the right. However, if the substitution effect of the capital price decrease dominates the scale effect, the labor demand curve will shift inward to the left.

It is also important to note that the analysis so far has referred only to the demand for labor by a particular firm. In general, it is possible to aggregate the labor demand schedules for individual firms to produce **industry or market demand** curves for particular categories of labor. These aggregate curves combine with labor supply to determine the various labor market outcomes.

The **supply** side of the labor market is modeled in a similar fashion to the demand side. For those who have already decided to work, the attractiveness of a particular occupation will be directly related to the wage it pays, holding all else constant. Thus the market supply curve for any particular occupation is upward sloping—more people will want to work in this occupation at $9.00 per hour than at $8.00. It will tend to shift outward to the right at any given wage if working conditions improve or wages in other occupations tend to fall. Even at $8.00 per hour, for example, a job offering flexible scheduling of hours may be more attractive to some than less flexible jobs paying $9.00 per hour.

One important difference between the demand and supply side of the labor market occurs at the level of the individual firm. Once a person has decided to join a particular occupation, the choice of which firm to work for is made on the basis of the wage that is offered, assuming all the other terms of employment are the same. Knowing this, an individual firm will be constrained to offer the going wage or risk losing all its
applicants to other employers of the same type of labor. The result is that the supply curve of labor facing any individual firm in a competitive environment is simply a horizontal line at the going wage rate. That is, the firm can hire as much or as little labor as it wants provided it pays the going wage. From the perspective of the supply side of the labor market, each firm is essentially a **wage taker**.

How is the going wage determined in a particular labor market? Left alone, markets tend to settle to a wage called the **market** or **equilibrium wage** (equilibrium meaning there is no tendency for change). The market wage is one that leads to the quantity of labor demanded being equal to the quantity of labor supplied. This occurs at the intersection of the demand and supply curves. The best way to see why this is the equilibrium wage is to look at other wage levels and see that a tendency for change exists at each.

### Example 2

Suppose the market demand and supply curves are given by the equations

- **Demand**: \( L_D = 60 - 5W \),
- **Supply**: \( L_S = 5W \),

where the subscripts \( D \) and \( S \) are used to distinguish between the quantity of labor demanded and the quantity of labor supplied. \( W \) is the real wage. These equations are shown graphically in Figure 2-2.

To understand where the equilibrium occurs, first consider a wage of $8. Note that at this wage, the quantity of labor supplied is 40, but the quantity of labor demanded is only 20. When such a **surplus** of labor (excess supply) exists, the tendency is for firms to experience many new applicants and low quit rates. The result is that firms start to offer lower wages (perhaps by just keeping nominal wages constant while prices are rising). As the wage falls, the quantity firms wish to hire starts to increase as we move down the market demand curve, and the quantity of people wishing to work in that occupation falls as we move down the market supply curve. These two forces combine to eliminate the excess supply. Hence, a wage of $8 could not be the equilibrium wage because a tendency for change still exists at that wage. When excess supply of labor exists, workers can be thought of as **overpaid** in an economic sense.
In the same way, it is clear that a wage of $4 cannot be the equilibrium wage. At a wage of $4, the quantity of labor demanded is 40 but the quantity of labor supplied is only 20. When such a shortage of labor (excess demand) exists, quit rates are high and the firm has trouble getting enough people to serve its customers. The result is that firms tend to raise wages. As they do, a reduction in the quantity of labor demanded and an increase in the quantity of labor supplied eliminate the shortage. When excess demand for labor exists, workers can be thought of as underpaid in an economic sense.

The only wage where there is no tendency for change is $6. At this wage, the quantity of labor demanded and the quantity of labor supplied are equal at 30 units. This wage and employment level can be determined algebraically by solving for that wage \( W^* \) that equates \( LD \) and \( LS \).

\[
LD = LS \Rightarrow 60 - 5W = 5W \Rightarrow W^* = 6\.
\]

An alternative way to view equilibrium is to realize that at any wage and employment level other than the equilibrium, it is possible to make someone better off without making anyone worse off. That is, the possibility for mutually beneficial exchange still exists. In the language of Chapter 1, the condition for Pareto efficiency is not satisfied at outcomes other than the equilibrium.

To see why this is true requires viewing the demand and supply curves from a slightly different perspective. Instead of thinking of the demand curve as the quantity of labor the firms wish to hire at any given wage rate, think of the curve as representing, at any given employment level, the maximum a firm would be willing to pay for a unit of labor. Similarly, the supply curve could be viewed as representing, for any given employment level, the minimum that would be necessary to induce an individual to enter that market. This minimum acceptable wage is called the reservation wage.

With this perspective in mind, consider a situation where the same demand and supply curves as in Figure 2-2 pertain and suppose that currently 20 units of labor are transacted at a wage of $8. At this employment level, some firm will be willing to hire an additional unit of labor at a wage of $8 or below, and some worker would be willing to accept $4 or more for supplying additional labor. These tendencies are shown graphically by the arrows in Figure 2-3. Note that the current situation leaves a window of opportunity for one of the workers currently shut out of the market to strike a mutually beneficial deal with one of the firms.

![Figure 2-3](image)

Suppose a worker willing to work for $4 offers to work for $7. Since at least one firm is willing to hire at $8, the offer of $7 will seem like a bargain to it. The firm will gain $1 by hiring an additional unit of labor, and the worker will gain $3 by being hired. (The difference between what the worker is willing to accept and the wage actually attained is called economic rent.) Whenever the wage is above or below
equilibrium, thus creating an employment level below the equilibrium (note that employment can only occur along the heavier portions of the demand and supply curves in Figure 2-3), an opportunity exists for a mutually beneficial deal that will move employment closer to the equilibrium value.

While the demand and supply model predicts that the wages and employment levels will settle toward their equilibrium values, it is important to note that these values can change as the position of the demand and supply curves change. Changes in demand tend to push equilibrium wages and employment levels in the same direction (as demand goes up, both increase), while changes in supply tend to push wages and employment levels in opposite directions (as supply increases, the equilibrium wage falls and employment rises). When both curves shift at the same time, the effect on one of the outcomes can be ambiguous.

Sometimes wage and employment levels fail to reach their equilibrium values because of nonmarket forces such as minimum wage laws and unions. In an industry where a single union negotiates a wage above equilibrium that applies to all employees, the union effectively creates a horizontal supply curve at that wage (and makes the analysis identical to that for an effective minimum wage law). Other unions that directly limit and control the supply of labor effectively create a vertical supply curve to the left of the equilibrium employment level. While such arrangements make some people better off, they also tend to make some people worse off relative to the equilibrium outcome. Hence, the normative basis for such arrangements must rest on a principle other than that of mutually beneficial exchange. An examination of international differences in unemployment rates, particularly long-term unemployment rates, suggests that nonmarket forces are probably stronger in Europe than in the United States.

### Review Questions

Choose the letter that represents the BEST response.

**The Labor Market: Definitions, Facts, and Trends**

1. The labor force consists of
   a. all individuals aged 16 or older who are employed or unemployed.
   b. all individuals aged 16 or older who are employed or looking for work.
   c. all individuals aged 16 or older who are employed or waiting to be recalled from layoff.
   d. all of the above.

2. The labor force participation rate is defined as
   a. the percentage of the total population aged 16 or older that is in the labor force.
   b. the percentage of the total population aged 16 or older that is employed.
   c. the percentage of the labor force that is employed.
   d. either a or b.

3. The unemployment rate is defined as
   a. the number unemployed divided by the labor force.
   b. the number unemployed divided by the sum of the employed and unemployed.
   c. the percentage of the population aged 16 or older that is not employed.
   d. either a or b.