Similarly, Figure 6-5 plots two variables against time: the unemployment rate (measured on the left vertical axis) and the monthly separation rate from employment (measured on the right vertical axis). The monthly separation rate is constructed by dividing the flow from employment (to unemployment and to "out of the labor force") during each month by the number of employed at the beginning of the month. The relation between the separation rate and the unemployment rate plotted in Figure 6-5 is not as tight as the relation plotted in Figure 6-4, but it is, nevertheless, quite visible. Higher unemployment implies a higher separation rate—that is, a higher chance of employed workers losing their jobs.

To be precise, we only learn from Figure 6-5 that, when unemployment is higher, separations are higher. Separations equal quits plus layoffs. We know from other sources that quits are lower when unemployment is high. It is more attractive to quit when there are plenty of jobs. So, if separations go up and quits go down, this implies that layoffs (which equal separations minus quits) go up even more than separations.

Let's summarize: When unemployment is high, workers are worse off in two ways:

- Employed workers face a higher probability of losing their jobs.
- Unemployed workers face a lower probability of finding jobs; equivalently, they can expect to remain unemployed for a longer time.

## 6-3 Wage Determination

Having looked at unemployment, let's turn to wage determination, and to the relation between wages and unemployment.

Wages are set in many ways. Sometimes they are set by **collective bargaining**, that is, bargaining between firms and unions. In the United States, however, collective bargaining plays a limited role, especially outside the manufacturing sector. Today, less than 15% of U.S. workers have their wages set by collective bargaining agreements. For the rest, wages are either set by employers or by bargaining between the employer and individual employees. The higher the skills needed to do the job, the more likely there is to be bargaining. Wages offered for entry-level jobs at McDonald's are on a take-it-or-leave-it basis. New college graduates, on the other hand, can typically negotiate a few aspects of their contracts. CEOs and baseball stars can negotiate a lot more.

Collective bargaining: bargaining between a union (or a group of unions) and a firm (or a group of firms).

There are also large differences across countries. Collective bargaining plays an important role in Japan and in most European countries. Negotiations may take place at the firm level, at the industry level, or at the national level. Sometimes, contract agreements apply only to firms that have signed the agreement. Sometimes they are automatically extended to all firms and all workers in the sector or the economy.

Given these differences across workers and across countries, can we hope to formulate anything like a general theory of wage determination? Yes. Although institutional differences influence wage determination, there are common forces at work in all countries. Two sets of facts stand out:

- Workers are typically paid a wage that exceeds their **reservation wage**, the wage that would make them indifferent between working or being unemployed. In other words, most workers are paid a high enough wage that they prefer being employed to being unemployed.
- Wages typically depend on labor market conditions. The lower the unemployment rate, the higher the wages. (I will state this more precisely in the next section.)

To think about these facts, economists have focused on two broad lines of explanation. The first is that even in the absence of collective bargaining, workers have some bargaining power that they can and do use to obtain wages above their reservation wages. The second is that firms may, for a number of reasons, want to pay wages higher than the reservation wage. Let's look at each explanation in turn.

## Bargaining

How much **bargaining power** a worker has depends on two factors. The first is how costly it would be for the firm to replace him, were he to leave the firm. The second is how hard it would be for him to find another job, were he to leave the firm. The more costly it is for the firm to replace him, and the easier it is for him to find another job, the more bargaining power he will have. This has two implications:

- How much bargaining power a worker has depends first on the nature of his job. Replacing a worker at McDonald's is not very costly. The required skills can be taught quickly, and typically, a large number of willing applicants have already filled out job application forms. In this situation, the worker is unlikely to have much bargaining power. If he asks for a higher wage, the firm can lay him off and find a replacement at minimum cost. In contrast, a highly skilled worker who knows in detail how the firm operates may be very difficult and costly to replace. This gives him more bargaining power. If he asks for a higher wage, the firm may decide that it is best to give it to him.
- How much bargaining power a worker has also depends on labor market conditions. When the unemployment rate is low, it is more difficult for firms to find acceptable replacement workers. At the same time, it is easier for workers to find other jobs. Under these conditions, workers are in a stronger bargaining position and may be able to obtain higher wages. Conversely, when the unemployment rate is high, finding good replacement workers is easier for firms, while finding another job is harder for workers. Being in a weak bargaining position, workers may have no choice but to accept a lower wage.

## Efficiency Wages

Regardless of workers' bargaining power, firms may want to pay more than the reservation wage. They may want their workers to be productive, and a higher wage can help them achieve that goal. If, for example, it takes a while for workers to learn how to do a job correctly, firms will want their workers to stay for some time. But if workers are paid only their reservation wage, they will be indifferent to staying or leaving. In this case, many of them will quit, and the turnover rate will be high. Paying a wage above the reservation wage makes it financially attractive for workers to stay. It decreases turnover and increases productivity.

Behind this example lies a more general proposition. Most firms want their workers to feel good about their jobs. Feeling good promotes good work, which leads to higher productivity. Paying a high wage is one instrument the firm can use to achieve these goals. (See the *Focus* box on "Henry Ford and Efficiency Wages.") Economists call the theories that link the *productivity* or the *efficiency* of workers to the wage they are paid **efficiency wage theories**.

Like theories based on bargaining, efficiency wage theories suggest that wages depend on both the nature of the job and on labor market conditions:

- Firms—such as high-tech firms—that see employee morale and commitment as essential to the quality of their work will pay more than firms in sectors where workers' activities are more routine.
- Labor market conditions will affect the wage. A low unemployment rate makes it more attractive for employed workers to quit. When unemployment is low, it is easy to find another job. That means that when unemployment decreases, a firm that wants to avoid an increase in quits will have to increase wages to induce workers to stay with the firm. When this happens, lower unemployment will again lead to higher wages. Conversely, higher unemployment will lead to lower wages.

**Before September 11, 2001, the approach to airport security was to hire workers at low wages and accept the resulting high turnover. Now that airport security has become a much higher priority, the approach is to make the jobs more attractive and better paying, so as to get more motivated and more competent workers, and reduce turnover.**

## Henry Ford and Efficiency Wages

In 1914, Henry Ford—the builder of the most popular car in the world at the time, the Model-T—made a stunning announcement. His company would pay all qualified employees a minimum of $5 a day for an 8-hour day. This was a very large salary increase for most employees, who had been earning an average of $2.30 for a 9-hour day. From the point of view of the Ford company, this increase in pay was far from negligible—it represented about half of the company's profits at the time.

What Ford's motivations were is not entirely clear. Ford gave too many reasons for us to know which ones he actually believed. The reason was not that the company had a hard time finding workers at the previous wage. But the company clearly had a hard time retaining workers. There was a very high turnover rate, as well as high dissatisfaction among workers.

Whatever the reasons behind Ford's decision, the results of the wage increase were astounding, as Table 1 shows.

The annual turnover rate (the ratio of separations to employment) plunged from a high of 370% in 1913 to a low of 16% in 1915. (An annual turnover rate of 370% means that, on average, 31% of the company's workers left each month, so that over the course of a year, the ratio of separations to employment was 31% × 12 = 370%.) The layoff rate collapsed from 62% to nearly 0%. The average rate of absenteeism (not shown in the table), which ran at close to 10% in 1913, was down to 2.5% after one year. There is little question that higher wages were the main source of these changes.

Did productivity at the Ford plant increase enough to offset the cost of increased wages? The answer to this question is less clear. Productivity was much higher in 1914 than in 1913. Estimates of the productivity increases range from 30% to 50%. Despite higher wages, profits were also higher in 1914 than in 1913. But how much of this increase in profits was due to changes in workers' behavior, and how much was due to the increasing success of Model-T cars is harder to establish.

While the effects support efficiency wage theories, it may be that the increase in wages to $5 a day was excessive, at least from the point of view of profit maximization. But Henry Ford probably had other objectives as well, from keeping the unions out—which he did—to generating publicity for himself and the company—which he surely did.

*Source: Dan Raff and Lawrence Summers, "Did Henry Ford Pay Efficiency Wages?" NBER Working Paper, 2101, December 1986.*

FOCUS

**Table 1** Annual Turnover and Layoff Rates (%) at Ford, 1913–1915

| | 1913 | 1914 | 1915 |
|---|---|---|---|
| Turnover rate | 370 | 54 | 16 |
| Layoff rate | 62 | 7 | 0.1 |

## Wages, Prices, and Unemployment

We capture our discussion of wage determination by using the following equation:

$$W = P^e F(u,\ z) \qquad (-,+) \qquad (6.1)$$

The aggregate nominal wage $W$ depends on three factors:

- The expected price level $P^e$.
- The unemployment rate $u$.
- A catchall variable $z$ that stands for all other variables that may affect the outcome of wage setting.

Let's look at each factor.

## The Expected Price Level

First, ignore the difference between the expected and the actual price level, and ask: Why does the price level affect wages?

The answer: Because both workers and firms care about *real wages*, not nominal wages:

- Workers do not care about how many dollars they receive but about how many goods they can buy with those dollars. In other words, they do not care about the nominal wages they receive but about the nominal wages ($W$) they receive relative to the price of the goods they buy ($P$). They care about $W/P$.
- In the same way, firms do not care about the nominal wages they pay but about the nominal wages ($W$) they pay relative to the price of the goods they sell ($P$). So, they also care about $W/P$.

Think of it another way. If workers expect the price level—the price of the goods they buy—to double, they will ask for a doubling of their nominal wage. If firms expect the price level—the price of the goods they sell—to double, they will be willing to double the nominal wage. So, if both workers and firms expect the price level to double, they will agree to double the nominal wage, keeping the real wage constant. This is captured in Equation (6.1). A doubling in the expected price level leads to a doubling of the nominal wage chosen when wages are set.

An increase in the expected price level leads to an increase in the nominal wage, in the same proportion.

Return now to the distinction we set aside at the start of the paragraph: Why do wages depend on the *expected price level*, $P^e$, rather than on the *actual price level*, $P$? Because wages are set in nominal (dollar) terms, and when they are set, the relevant price level is not yet known.

For example, in most union contracts in the United States, nominal wages are set in advance for 3 years. Unions and firms have to decide what nominal wages will be over the following 3 years based on what they expect the price level to be over those 3 years. Even when wages are set by firms, or by bargaining between the firm and each worker, nominal wages are typically set for a year. If the price level goes up unexpectedly during the year, nominal wages are typically not readjusted. (How workers and firms form expectations of the price level will occupy us for much of the next three chapters; we will leave this issue aside for the moment.)

## The Unemployment Rate

Also affecting the aggregate wage in Equation (6.1) is the unemployment rate, $u$. The minus sign under $u$ indicates that an increase in the unemployment rate *decreases* wages.

The fact that wages depend on the unemployment rate was one of the main conclusions of our earlier discussion. If we think of wages as being determined by bargaining, then higher unemployment weakens workers' bargaining power, forcing them to accept lower wages. If we think of wages as being determined by efficiency wage considerations, then higher unemployment allows firms to pay lower wages and still keep workers willing to work.

An increase in unemployment leads to a decrease in the nominal wage.

## The Other Factors

The third variable in Equation (6.1), $z$, is a catchall variable that stands for all the factors that affect wages given the expected price level and the unemployment rate. By convention, I will define $z$ so that an increase in $z$ implies an increase in the wage (thus, the positive sign under $z$ in the equation). Our earlier discussion suggests a long list of potential factors here.

By the definition of $z$, an increase in $z$ leads to an increase in the nominal wage.

Take, for example, **unemployment insurance**—the payment of unemployment benefits to workers who lose their jobs. There are very good reasons why society

should provide some insurance to workers who lose their jobs and find it difficult to find another. But there is little question that, by making the prospects of unemployment less distressing, more generous unemployment benefits increase wages at a given unemployment rate. To take an extreme example, suppose unemployment insurance did not exist. Some workers would have little to live on and would be willing to accept very low wages to avoid remaining unemployed. But unemployment insurance does exist, and it allows unemployed workers to hold out for higher wages. In this case, we can think of $z$ as representing the level of unemployment benefits. At a given unemployment rate, higher unemployment benefits increase the wage.

It is easy to think of other factors. An increase in the minimum wage may increase not only the minimum wage, but also wages just above the minimum wage, leading to an increase in the average wage $W$, at a given unemployment rate. Or take an increase in employment protection, which makes it more expensive for firms to layoff workers. Such a change is likely to increase the bargaining power of workers covered by this protection (laying them off and hiring other workers is now more costly for firms), increasing the wage for a given unemployment rate.

We will explore some of these factors as we go along.

## 6-4 Price Determination

Having looked at wage determination, let's now turn to price determination.

The prices set by firms depend on the costs they face. These costs depend, in turn, on the nature of the **production function**—the relation between the inputs used in production and the quantity of output produced, and on the prices of these inputs.

We will assume that firms produce goods using labor as the only factor of production. In this case, we can write the production function as follows:

$$Y = A N$$

where $Y$ is output, $N$ is employment, and $A$ is labor productivity. This way of writing the production function implies that **labor productivity**—output per worker—is constant and equal to $A$.

**Using a term from microeconomics: This assumption implies *constant returns to labor in production*. If firms double the number of workers they employ, they double the amount of output they produce.**

It should be clear that this is a strong simplification. In reality, firms use other factors of production in addition to labor. They use capital—machines and factories. They use raw materials—oil, for example. Moreover, there is technological progress, so that labor productivity, $A$, is not constant but steadily increases over time. We shall introduce these complications later. We will introduce raw materials in Chapter 7 when we discuss changes in the price of oil. We will focus on the role of capital and technological progress when we turn to the determination of output in the *long run* in Chapters 10 through 13. For the moment, though, this simple relation between output and employment will make our lives easier and still serve our purposes.

Given the assumption that labor productivity, $A$, is constant, we can make one further simplification. We can choose the units of output so that one worker produces one unit of output—in other words, so that $A = 1$. (This way we do not have to carry the letter $A$ around, and this will simplify notation.) With this assumption, the production function becomes

$$Y = N \qquad (6.2)$$

The production function $Y = N$ implies that the cost of producing one more unit of output is the cost of employing one more worker, at wage $W$. Using the terminology introduced in your microeconomics course: The marginal cost of production—the cost of producing one more unit of output—is equal to $W$.

If there was perfect competition in the goods market, the price of a unit of output would be equal to marginal cost: $P$ would be equal to $W$. But many goods markets are

not competitive, and firms charge a price higher than their marginal cost. A simple way of capturing this fact is to assume that firms set their price according to

$$P = (1 + \mu)W \tag{6.3}$$

where $\mu$ is the **markup** of the price over the cost. If goods markets were perfectly competitive, $\mu$ would be equal to zero, and the price $P$ would simply equal the cost $W$. To the extent they are not competitive and firms have market power, $\mu$ is positive, and the price $P$ will exceed the cost $W$ by a factor equal to $(1 + \mu)$.

## 6.5 The Natural Rate of Unemployment

Let's now look at the implications of wage and price determination for unemployment.

For the rest of this chapter, let's do so under the assumption that nominal wages depend on the actual price level, $P$, rather than on the expected price level, $P^e$ (why we make this assumption will become clear soon). Under this additional assumption, wage setting and price setting determine the equilibrium rate of unemployment. Let's see how.

◀ The rest of the chapter is based on the assumption that $P^e = P$.

### The Wage-Setting Relation

Given the assumption that nominal wages depend on the actual price level ($P$) rather than on the expected price level ($P^e$), Equation (6.1), which characterizes wage determination, becomes:

$$W = P\,F(u, z)$$

Dividing both sides by the price level,

$$\frac{W}{P} = \underset{(-,+)}{F(u, z)} \tag{6.4}$$

Wage determination implies a negative relation between the real wage, $W/P$, and the unemployment rate, $u$. *The higher the unemployment rate, the lower the real wage chosen by wage setters.* The intuition is straightforward. The higher the unemployment rate, the weaker the workers' position in bargaining, and the lower the real wage.

◀ "Wage setters" means unions and firms if wages are set by collective bargaining; individual workers and firms if wages are set on a case-by-case basis; and firms if wages are set on a take-it-or-leave-it basis.

This relation between the real wage and the rate of unemployment—let's call it the **wage-setting relation**—is drawn in Figure 6-6. The real wage is measured on the vertical axis. The unemployment rate is measured on the horizontal axis. The wage-setting relation is drawn as the downward-sloping curve $WS$ (for wage setting). The higher the unemployment rate, the lower the real wage.

### The Price-Setting Relation

Let's now look at implications of price determination. If we divide both sides of the price-determination equation, (6.3), by the nominal wage, we get

$$\frac{P}{W} = 1 + \mu \tag{6.5}$$

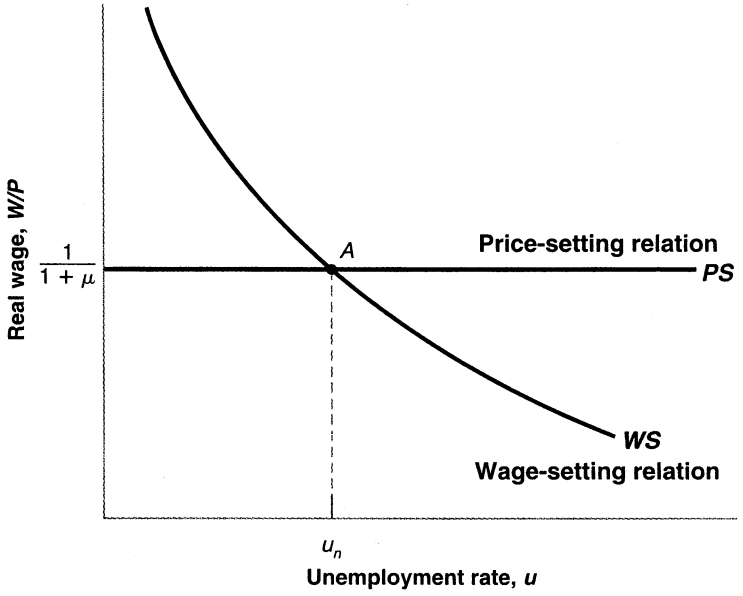
The ratio of the price level to the wage implied by the price-setting behavior of firms equals one plus the markup. Now invert both sides of this equation to get the implied real wage:

$$\frac{W}{P} = \frac{1}{1 + \mu} \tag{6.6}$$

**Figure 6-6**

***Wages, Prices, and the Natural Rate of Unemployment***

The natural rate of unemployment is the unemployment rate such that the real wage chosen in wage setting is equal to the real wage implied by price setting.


Note what this equation says: *Price-setting decisions determine the real wage paid by firms.* An increase in the markup leads firms to increase their prices given the wage they have to pay; equivalently, it leads to a decrease in the real wage.

The step from Equation (6.5) to Equation (6.6) is algebraically straightforward. But how price setting actually determines the real wage paid by firms may not be intuitively obvious. Think of it this way.

Suppose the firm you work for increases its markup, therefore increasing the price of its product. Your real wage does not change very much. You are still paid the same nominal wage, and the product produced by the firm is, at most, a small part of your consumption basket. Now suppose that not only the firm you work for, but also all the firms in the economy increase their markup. All the prices go up. Even if you are paid the same nominal wage, your real wage goes down. So, the higher the markup set by firms, the lower your real wage will be.

The **price-setting relation** in Equation (6.6) is drawn as the horizontal line *PS* (for price setting) in Figure 6-6. The real wage implied by price setting is $1/(1 + \mu)$; it does not depend on the unemployment rate.

## Equilibrium Real Wages and Unemployment

Equilibrium in the labor market requires that the real wage chosen in wage setting be equal to the real wage implied by price setting. (This way of stating equilibrium may sound strange if you learned to think in terms of labor supply and labor demand in your microeconomics course. The relation between wage setting and price setting on the one hand, and labor supply and labor demand on the other, is closer than it looks at first and is explored further in the appendix at the end of this chapter.) In Figure 6-6, equilibrium is therefore given by point *A*, and the equilibrium unemployment rate is given by $u_n$.

We can also characterize the equilibrium unemployment rate algebraically; eliminating *W/P* between Equations (6.4) and (6.6) gives

$$F(u_n, z) = \frac{1}{1 + \mu} \tag{6.7}$$

The equilibrium unemployment rate, $u_n$, is such that the real wage chosen in wage setting—the left side of Equation (6.7)—is equal to the real wage implied by price setting—the right side of Equation (6.7).

The equilibrium unemployment rate $u_n$ is called the **natural rate of unemployment** (which is why I used the subscript $n$ to denote it). The terminology has become standard, so I will adopt it, but this is actually a bad choice of words. The word "natural" suggests a constant of nature, one that is unaffected by institutions and policy. As its derivation makes clear, however, the "natural" rate of unemployment is anything but natural. The positions of the wage-setting and price-setting curves, and thus the equilibrium unemployment rate, depend on both $z$ and $u$. Consider two examples:

"Natural," in *Webster's Dictionary,* means "in a state provided by nature, without man-made changes."

- *An increase in unemployment benefits.* An increase in unemployment benefits can be represented by an increase in $z$. Because an increase in benefits makes the prospect of unemployment less painful, it increases the wage set by wage setters at a given unemployment rate. So, it shifts the wage-setting relation up, from $WS$ to $WS'$ in Figure 6-7. The economy moves along the $PS$ line, from $A$ to $A'$. The natural rate of unemployment increases from $u_n$ to $u'_n$.

  In words: At a given unemployment rate, higher unemployment benefits lead to a higher real wage. A higher unemployment rate is needed to bring the real wage back to what firms are willing to pay.

An increase in unemployment benefits shifts the wage-setting curve up. The economy moves along the price-setting curve. Equilibrium unemployment increases.

This has led some economists to call unemployment a "discipline device." Higher unemployment is the device that returns wages to the level firms are willing to pay.

- *A less stringent enforcement of existing antitrust legislation.* To the extent that this allows firms to collude more easily and increase their market power, it leads to an increase in their markup—an increase in $\mu$. The increase in $\mu$ implies a decrease in the real wage paid by firms, and so it shifts the price-setting relation down, from $PS$ to $PS'$ in Figure 6-8. The economy moves along $WS$. The equilibrium moves from $A$ to $A'$, and the natural rate of unemployment increases from $u_n$ to $u'_n$.

  In words: By letting firms increase their prices given the wage, less stringent enforcement of antitrust legislation leads to a decrease in the real wage. Higher unemployment is required to make workers accept this lower real wage, leading to an increase in the natural rate of unemployment.

An increase in the markup shifts the price-setting curve (line in this case). The economy moves along the wage-setting curve. Equilibrium unemployment increases.

Factors like the generosity of unemployment benefits or antitrust legislation can hardly be thought of as the result of nature. Rather, they reflect various characteristics of the structure of the economy. For that reason, a better name for the equilibrium rate

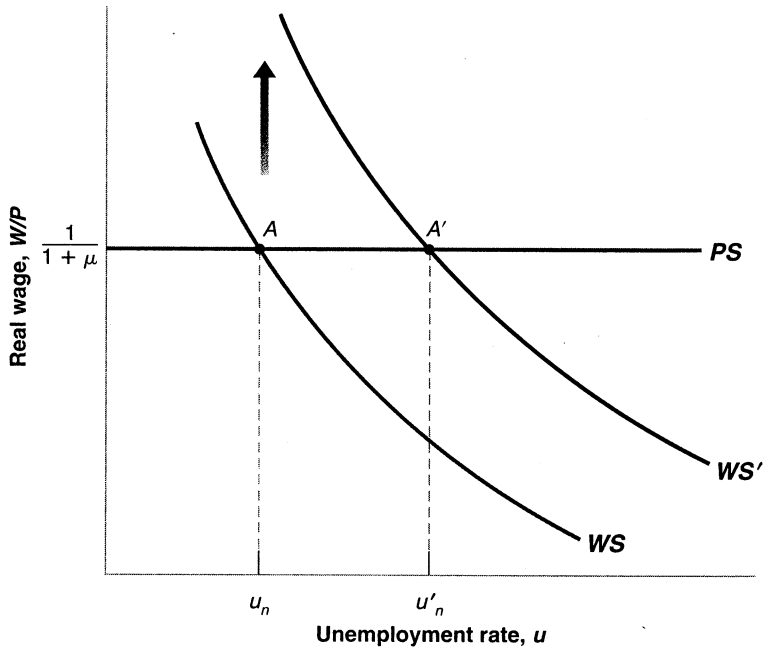



**Figure 6-7**

*Unemployment Benefits and the Natural Rate of Unemployment*

An increase in unemployment benefits leads to an increase in the natural rate of unemployment.

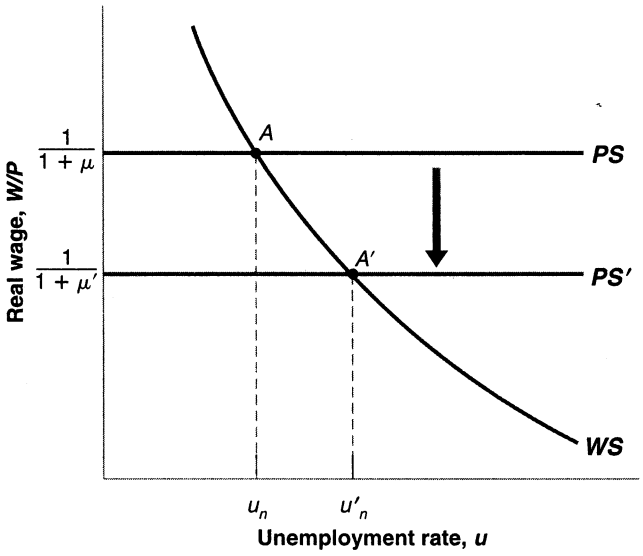
Active Graph

**Figure 6-8**

*Markups and the Natural Rate of Unemployment*

An increase in markups decreases the real wage and leads to an increase in the natural rate of unemployment.

Active Graph




This name has been suggested by Edmund Phelps, from Columbia University. For more on Phelps' contributions, see Chapters 8 and 27.

of unemployment would be the **structural rate of unemployment**, but so far, th name has not caught on.

## From Unemployment to Employment

Associated with the natural rate of unemployment is a **natural level of employmen** the level of employment that prevails when unemployment is equal to its natural rat

Let's review the relation between unemployment, employment, and the la force. Let $U$ denote unemployment, $N$ denote employment, and $L$ the labor force. T

$$u \equiv \frac{U}{L} = \frac{L - N}{L} = 1 - \frac{N}{L}$$

The first step follows from the definition of the unemployment rate, $u$. The secon follows from the fact that, from the definition of the labor force, the level of unemplo

$L = N + U \Rightarrow U = L - N$

ment, $U$, equals the labor force, $L$, minus employment, $N$. The third step follows fro simplifying the fraction. Putting all three steps together, the unemployment rate equals one minus the ratio of employment $N$ to the labor force $L$.

Rearranging to get employment in terms of the labor force and the unemployme rate gives

$$N = L(1 - u)$$

Employment $N$ is equal to the labor force $L$, times one minus the unemployme rate $u$.

So, if the natural rate of unemployment is $u_n$, and the labor force is equal to $L$, th natural level of employment $N_n$ is given by

$$N_n = L(1 - u_n)$$

For example, if the labor force is 150 million and the natural rate of unemplo ment is 5%, then the natural level of employment is 142.5 million.

## From Employment to Output

Finally, associated with the natural level of employment is the **natural level of outpu** the level of production when employment is equal to the natural level of employmen

Given the production function we used in this chapter ($Y = N$), the natural level of output $Y_n$ is easy to derive. It is given by

$$Y_n = N_n = L(1 - u_n)$$

Using Equation (6.7) and the relations between the unemployment rate, employment, and the output we just derived, the natural level of output satisfies the following equation:

$$F\left(1 - \frac{Y_n}{L}, z\right) = \frac{1}{1 + \mu} \tag{6.8}$$

The natural level of output ($Y_n$) is such that at the associated rate of unemployment ($u_n = 1 - Y_n/L$), the real wage chosen in wage setting—the left side of Equation (6.8)—is equal to the real wage implied by price setting—the right side of Equation (6.8). Equation (6.8) will turn out to be very useful in the next chapter.

We have gone through many steps in this section. Let's summarize.

Assume that the expected price level is equal to the actual price level. Then,

- The real wage chosen in wage setting is a decreasing function of the unemployment rate.
- The real wage implied by price setting is constant.
- Equilibrium in the labor market requires that the real wage chosen in wage setting be equal to the real wage implied by price setting. This determines the unemployment rate.
- This equilibrium unemployment rate is known as the natural rate of unemployment.
- Associated with the natural rate of unemployment is a natural level of employment and a natural level of output.

## 6-6 Where We Go from Here

We have just seen how equilibrium in the labor market determines the unemployment rate (we called this equilibrium rate of unemployment the natural rate of unemployment), which, in turn, determines the level of output (we called this level of output the natural level of output).

So, you may ask, what did we do in the previous three chapters? If equilibrium in the labor market determines the unemployment rate, and by implication, the level of output, why did we spend so much time looking at the goods and financial markets? What about our earlier conclusion that the level of output was determined by factors such as monetary policy, fiscal policy, consumer confidence, and so on—all factors that do not enter Equation (6.8) and, therefore, do not affect the natural level of output?

The key to the answer is simple:

- We have derived the natural rate of unemployment and the associated levels of employment and output under two assumptions. First, we have assumed equilibrium in the labor market. Second, we have assumed that the price level was equal to the expected price level.
- However, there is no reason for the second assumption to be true in the *short run.* The price level may well turn out to be different from what was expected when nominal wages were set. Hence, in the short run, there is no reason for unemployment to be equal to the natural rate or for output to be equal to its natural level.