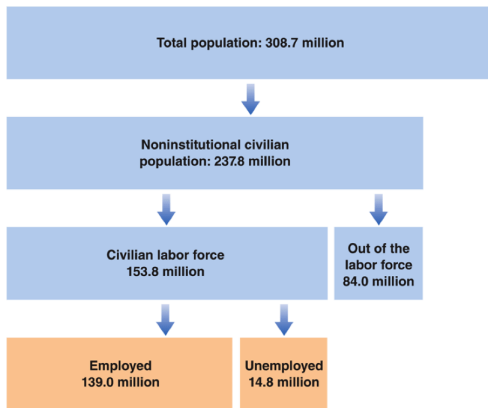


ECON 421: Business Fluctuations

Spring 2015
Tu 6:00PM–9:00PM
Section 102

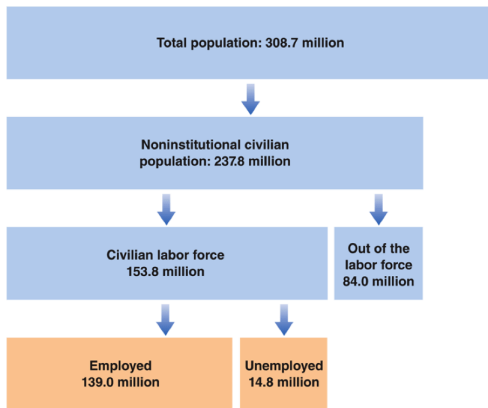
Created by
Richard Schwinn

Based on
Macroeconomics, Blanchard and Johnson [2011]



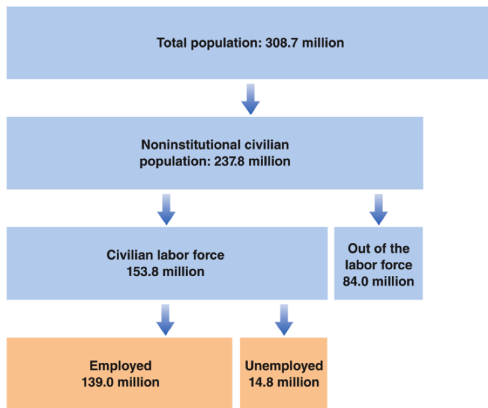
Source: Current Population Survey
<http://www.bls.gov/cps/>

- ▶ The **noninstitutional civilian population** is all people apart from those who are either under working age (under 16), in the armed forces, or behind bars. Thus it is the number of people potentially available for civilian employment. It was 237.8 million in 2010: A
- ▶ The **civilian labor force** is the sum of those either working or looking for work. It was only 153.8 million.
- ▶ The other 84 million people were out of the **labor force**, neither working in the market place nor looking for work.



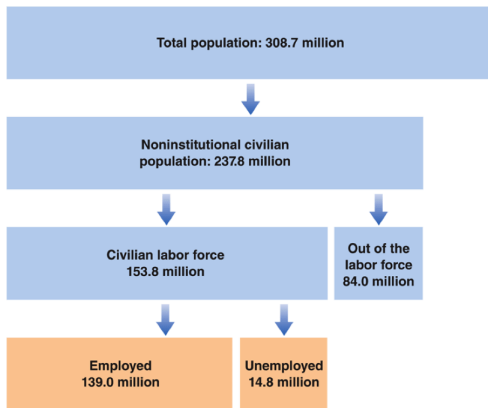
Source: Current Population Survey
<http://www.bls.gov/cps/>

- ▶ The **noninstitutional civilian population** is all people apart from those who are either under working age (under 16), in the armed forces, or behind bars. Thus it is the number of people potentially available for civilian employment. It was 237.8 million in 2010: A
- ▶ The **civilian labor force** is the sum of those either working or looking for work. It was only 153.8 million.
- ▶ The other 84 million people were out of the **labor force**, neither working in the market place nor looking for work.



Source: Current Population Survey
<http://www.bls.gov/cps/>

- ▶ The **noninstitutional civilian population** is all people apart from those who are either under working age (under 16), in the armed forces, or behind bars. Thus it is the number of people potentially available for civilian employment. It was 237.8 million in 2010: A
- ▶ The **civilian labor force** is the sum of those either working or looking for work. It was only 153.8 million.
- ▶ The other 84 million people were out of the **labor force**, neither working in the market place nor looking for work.



Source: Current Population Survey
<http://www.bls.gov/cps/>

- ▶ The **noninstitutional civilian population** is all people apart from those who are either under working age (under 16), in the armed forces, or behind bars. Thus it is the number of people potentially available for civilian employment. It was 237.8 million in 2010: A
- ▶ The **civilian labor force** is the sum of those either working or looking for work. It was only 153.8 million.
- ▶ The other 84 million people were out of the **labor force**, neither working in the market place nor looking for work.

Business
Fluctuations

Notes 06

Labor Market
Tour

The Large Flows
of Workers
The Large Flows
of Workers

Movements in
Unemployment

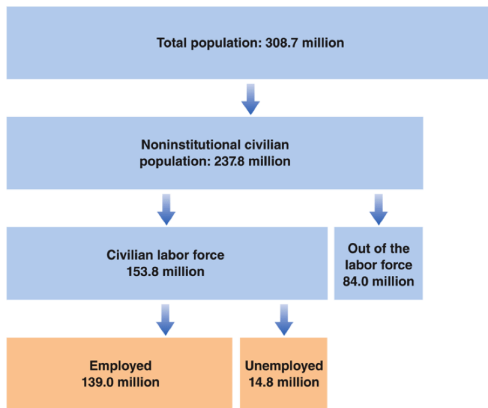
Wage
Determination

Price
Determination

The Natural
Rate of Unem-
ployment

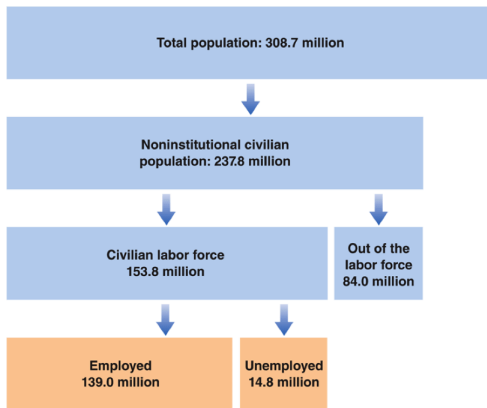
Practice
Problem

References



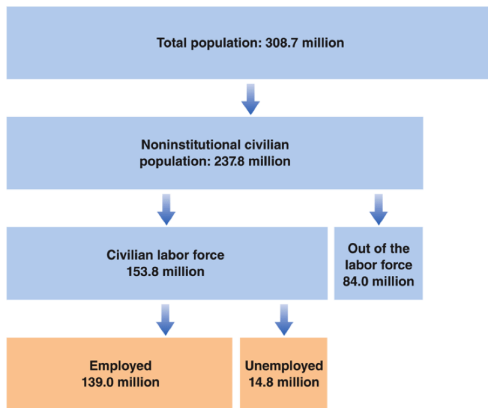
Source: Current Population Survey
<http://www.bls.gov/cps/>

- ▶ The **participation rate**, defined as the ratio of the labor force to the noninstitutional civilian population, was therefore $\frac{153.8}{237.8}$, or 64.7%.
- ▶ The **unemployment rate**, defined as the ratio of the unemployed to the labor force, was therefore $14.8/153.8 = 9.6$.
- ▶ The participation rate has steadily increased over time, mostly due to the increasing participation rate of women.
- ▶ Of those in the labor force, 139 million were employed, and 14.8 million were unemployed looking for work.



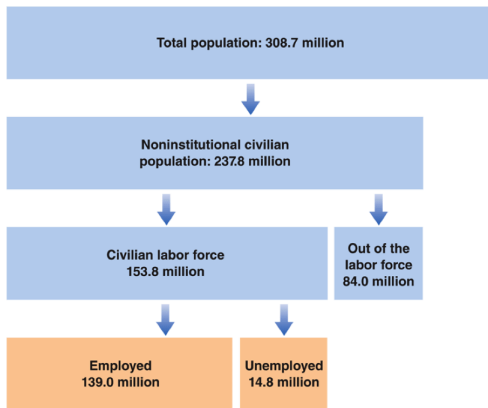
Source: Current Population Survey
<http://www.bls.gov/cps/>

- ▶ The **participation rate**, defined as the ratio of the labor force to the noninstitutional civilian population, was therefore $\frac{153.8}{237.8}$, or 64.7%.
- ▶ The **unemployment rate**, defined as the ratio of the unemployed to the labor force, was therefore $14.8/153.8 = 9.6$.
- ▶ The participation rate has steadily increased over time, mostly due to the increasing participation rate of women.
- ▶ Of those in the labor force, 139 million were employed, and 14.8 million were unemployed looking for work.



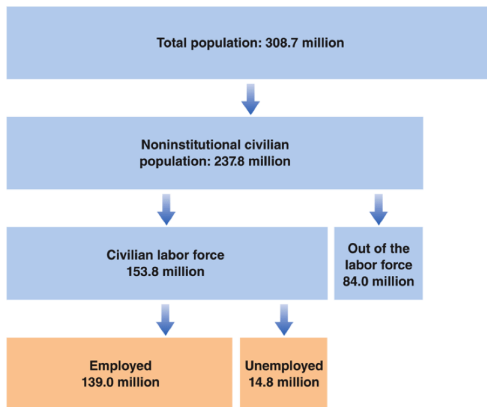
Source: Current Population Survey
<http://www.bls.gov/cps/>

- ▶ The **participation rate**, defined as the ratio of the labor force to the noninstitutional civilian population, was therefore $\frac{153.8}{237.8}$, or 64.7%.
- ▶ The **unemployment rate**, defined as the ratio of the unemployed to the labor force, was therefore $14.8/153.8 = 9.6$.
- ▶ The participation rate has steadily increased over time, mostly due to the increasing participation rate of women.
- ▶ Of those in the labor force, 139 million were employed, and 14.8 million were unemployed looking for work.



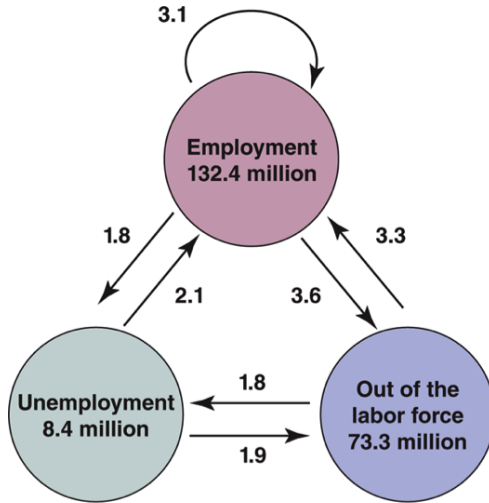
Source: Current Population Survey
<http://www.bls.gov/cps/>

- ▶ The **participation rate**, defined as the ratio of the labor force to the noninstitutional civilian population, was therefore $\frac{153.8}{237.8}$, or 64.7%.
- ▶ The **unemployment rate**, defined as the ratio of the unemployed to the labor force, was therefore $14.8/153.8 = 9.6$.
- ▶ The participation rate has steadily increased over time, mostly due to the increasing participation rate of women.
- ▶ Of those in the labor force, 139 million were employed, and 14.8 million were unemployed looking for work.

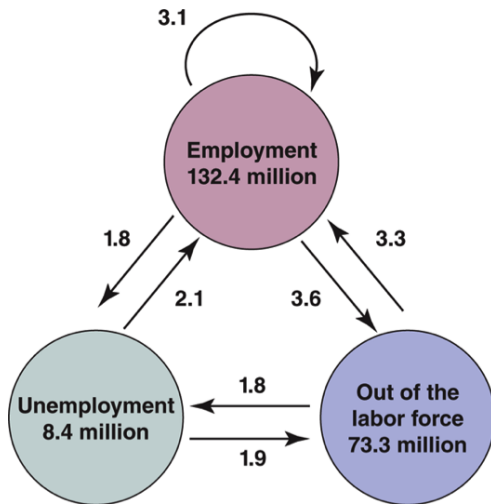


Source: Current Population Survey
<http://www.bls.gov/cps/>

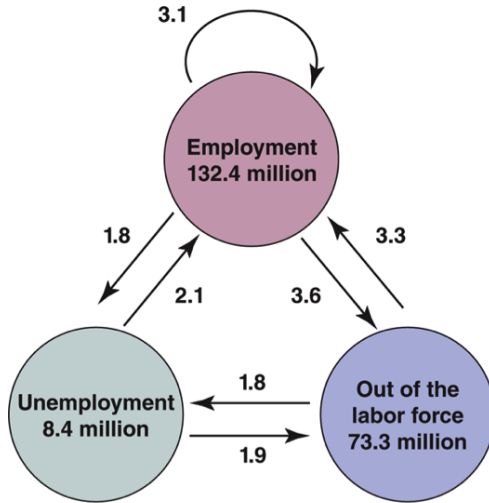
- ▶ The **participation rate**, defined as the ratio of the labor force to the noninstitutional civilian population, was therefore $\frac{153.8}{237.8}$, or 64.7%.
- ▶ The **unemployment rate**, defined as the ratio of the unemployed to the labor force, was therefore $14.8/153.8 = 9.6$.
- ▶ The participation rate has steadily increased over time, mostly due to the increasing participation rate of women.
- ▶ Of those in the labor force, 139 million were employed, and 14.8 million were unemployed looking for work.



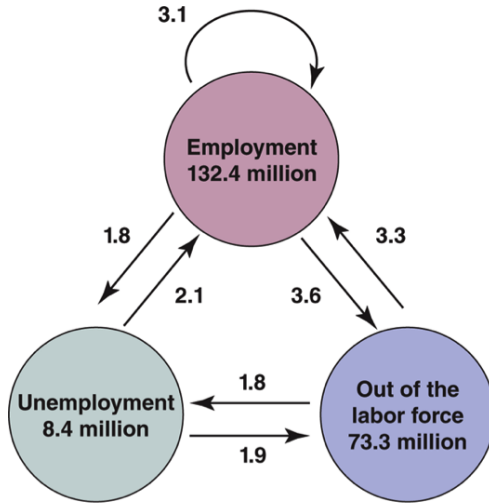
- ▶ **The Current Population Survey (CPS)** is the main source of statistics on the labor force, employment, participation, and earnings in the United States.
- ▶ **Seperations** occur when a person leaves their job.
- ▶ About three-fourths of all separations are usually **quits** workers leaving their jobs for what they perceive as a better alternative.
- ▶ The remaining one-fourth are **layoffs**.



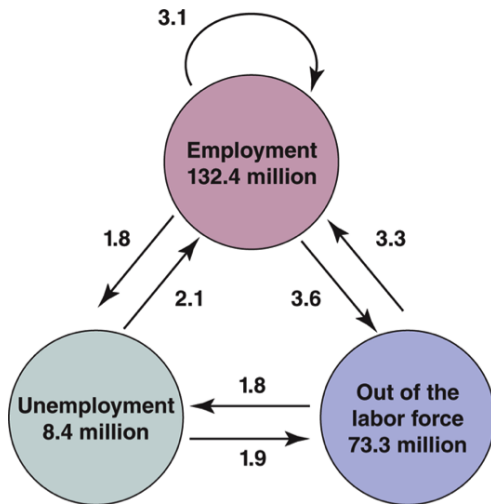
- ▶ **The Current Population Survey (CPS)** is the main source of statistics on the labor force, employment, participation, and earnings in the United States.
- ▶ **Seperations** occur when a person leaves their job.
- ▶ About three-fourths of all separations are usually **quits** workers leaving their jobs for what they perceive as a better alternative.
- ▶ The remaining one-fourth are **layoffs**.



- ▶ **The Current Population Survey (CPS)** is the main source of statistics on the labor force, employment, participation, and earnings in the United States.
- ▶ **Seperations** occur when a person leaves their job.
- ▶ About three-fourths of all separations are usually **quits** workers leaving their jobs for what they perceive as a better alternative.
- ▶ The remaining one-fourth are **layoffs**.

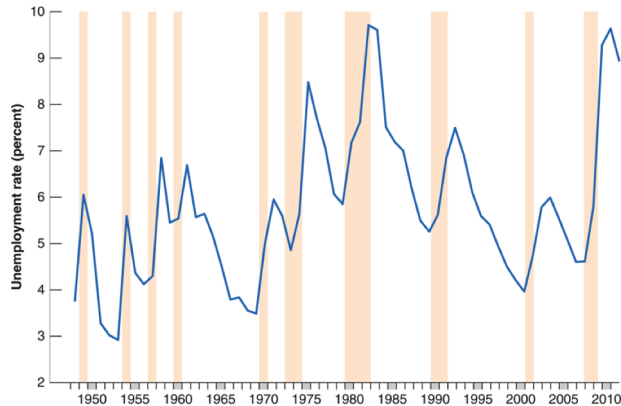


- ▶ **The Current Population Survey (CPS)** is the main source of statistics on the labor force, employment, participation, and earnings in the United States.
- ▶ **Seperations** occur when a person leaves their job.
- ▶ About three-fourths of all separations are usually **quits** workers leaving their jobs for what they perceive as a better alternative.
- ▶ The remaining one-fourth are **layoffs**.

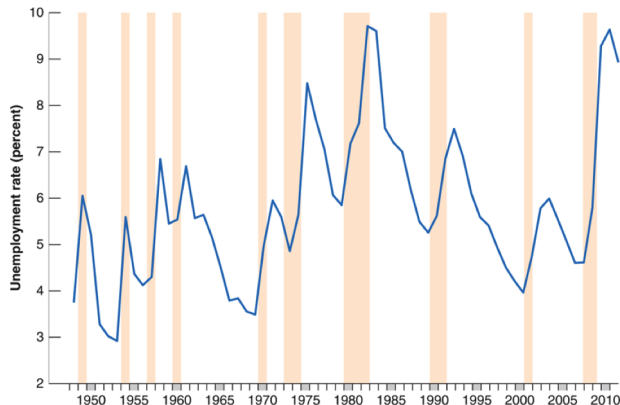


- ▶ **The Current Population Survey (CPS)** is the main source of statistics on the labor force, employment, participation, and earnings in the United States.
- ▶ **Seperations** occur when a person leaves their job.
- ▶ About three-fourths of all separations are usually **quits** workers leaving their jobs for what they perceive as a better alternative.
- ▶ The remaining one-fourth are **layoffs**.

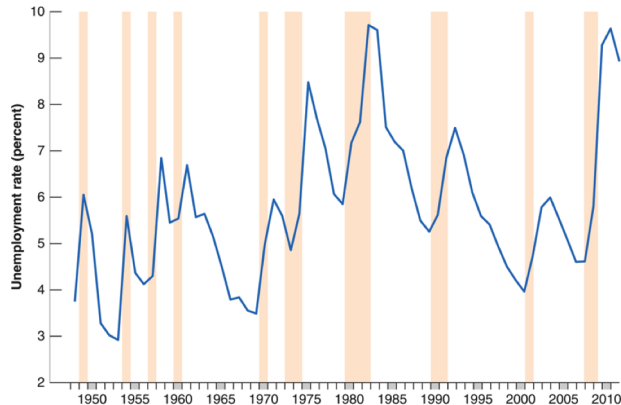
- ▶ First, after World War II, there was an upward trend in the unemployment rate until the mid-1980s
- ▶ Then after a self imposed recession, the unemployment rate declined.



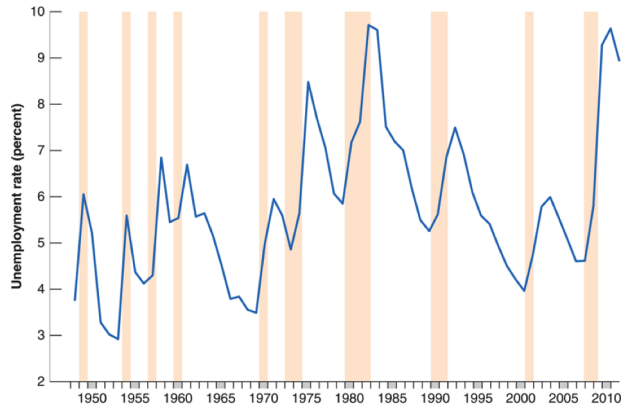
- ▶ First, after World War II, there was an upward trend in the unemployment rate until the mid-1980s
- ▶ Then after a self imposed recession, the unemployment rate declined.



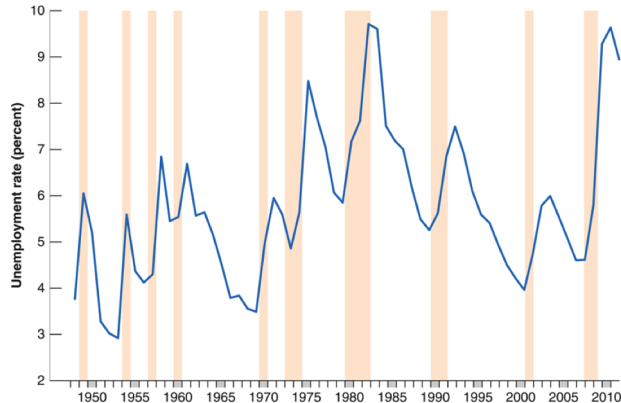
- ▶ First, after World War II, there was an upward trend in the unemployment rate until the mid-1980s
- ▶ Then after a self imposed recession, the unemployment rate declined.



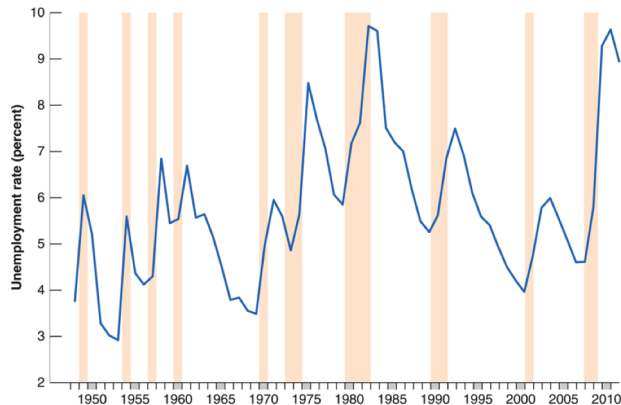
- ▶ Notice that, year-to-year fluctuations in the unemployment rate are associated with recessions and expansions.
- ▶ Thus, when the unemployment rate is high, the proportion of unemployed workers finding jobs is low.
- ▶ Finally, when the unemployment rate is high, the proportion of employed workers losing their jobs is high.



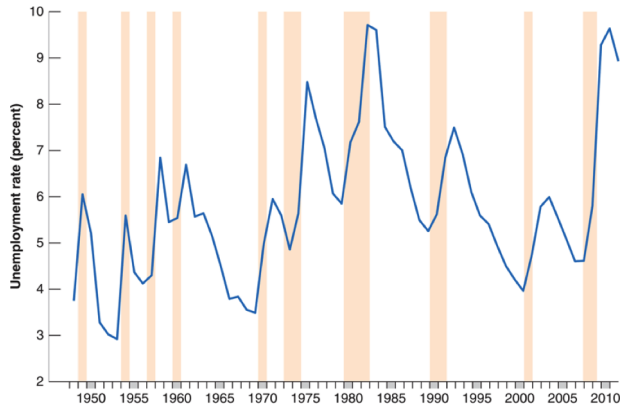
- ▶ Notice that, year-to-year fluctuations in the unemployment rate are associated with recessions and expansions.
- ▶ Thus, when the unemployment rate is high, the proportion of unemployed workers finding jobs is low.
- ▶ Finally, when the unemployment rate is high, the proportion of employed workers losing their jobs is high.



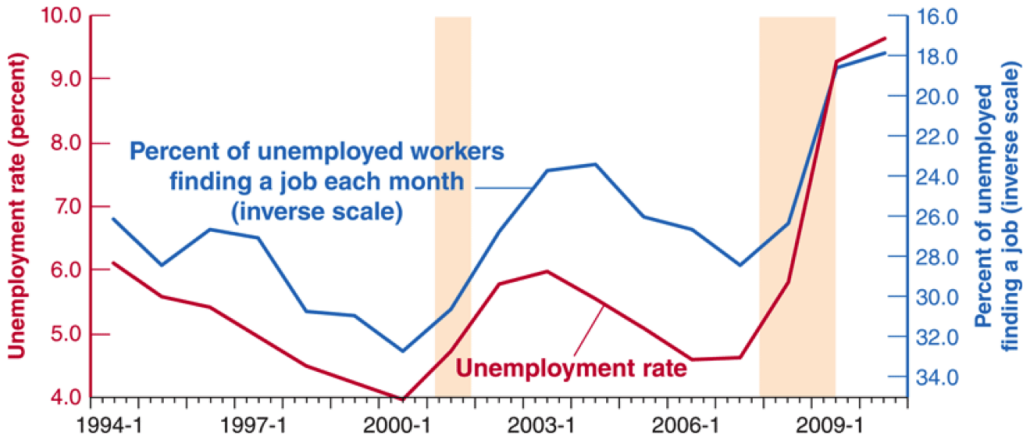
- ▶ Notice that, year-to-year fluctuations in the unemployment rate are associated with recessions and expansions.
- ▶ Thus, when the unemployment rate is high, the proportion of unemployed workers finding jobs is low.
- ▶ Finally, when the unemployment rate is high, the proportion of employed workers losing their jobs is high.



- ▶ Notice that, year-to-year fluctuations in the unemployment rate are associated with recessions and expansions.
- ▶ Thus, when the unemployment rate is high, the proportion of unemployed workers finding jobs is low.
- ▶ Finally, when the unemployment rate is high, the proportion of employed workers losing their jobs is high.

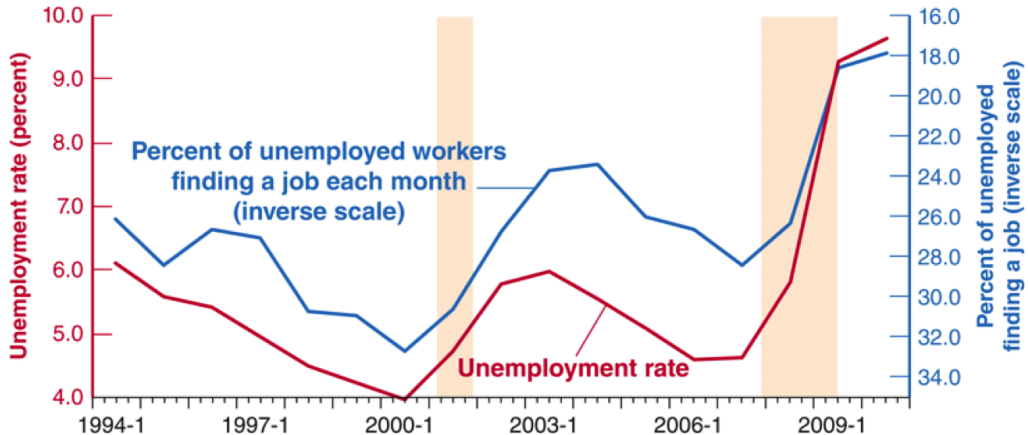


- Thus, when the unemployment rate is high, the proportion of unemployed workers finding jobs is low.



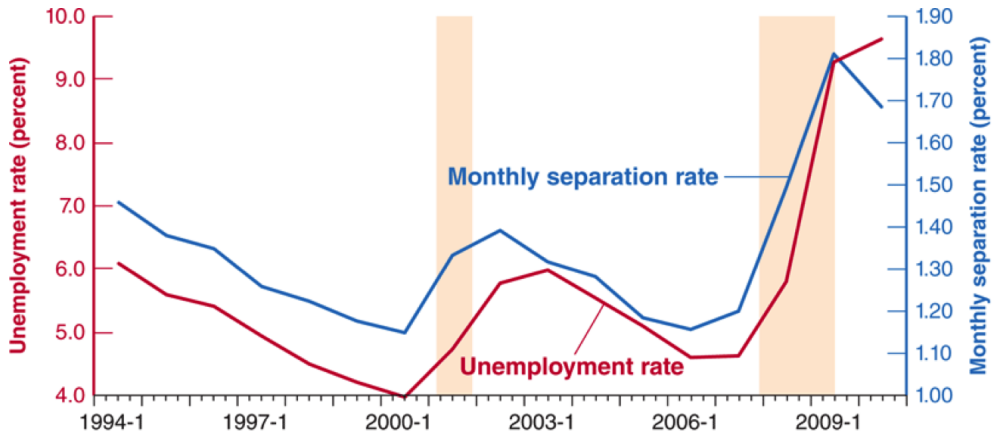
Source: See Figure 6-2.

- ▶ Thus, when the unemployment rate is high, the proportion of unemployed workers finding jobs is low.



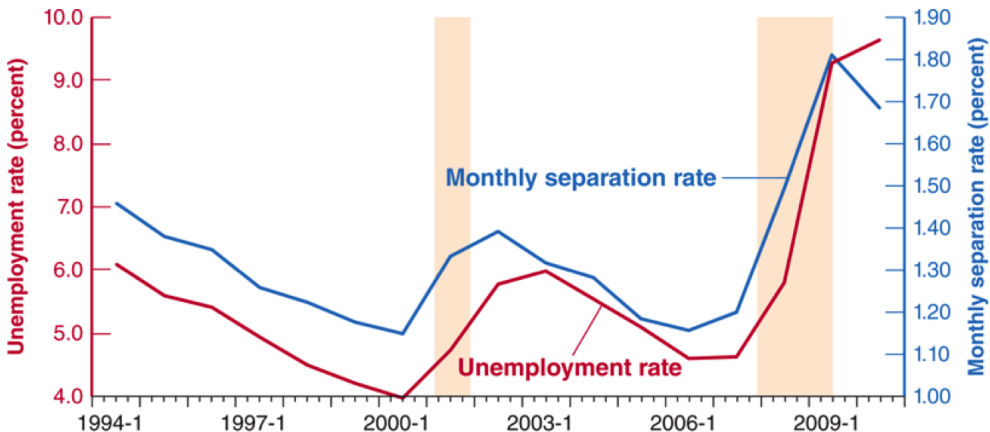
Source: See Figure 6-2.

- Finally note that when the unemployment rate is high, the proportion of employed workers losing their jobs is high.



Source: See Figure 6-2.

- ▶ Finally note that when the unemployment rate is high, the proportion of employed workers losing their jobs is high.



Source: See Figure 6-2.

Bargaining

Labor Market
TourMovements in
Unemploy-
mentWage
DeterminationBargaining
Efficiency Wages
Wages, Prices,
and
UnemploymentPrice
DeterminationThe Natural
Rate of Unem-
ploymentPractice
Problem

References

Wage bargaining between employers and employees takes many forms.

- ▶ In some occupations, wages are determined by collective bargaining between unions and firms.
- ▶ In the United States, less than 15% of workers are covered by collective bargaining agreements.
- ▶ Highly or uniquely skilled workers (e.g., athletes, entertainers) engage in individual bargaining with their employers.
- ▶ For jobs that require little skill, employers may make take-it-or-leave-it wage offers.

Bargaining

Business
Fluctuations

Notes 06

Labor Market
TourMovements in
Unemploy-
mentWage
DeterminationBargaining
Efficiency Wages
Wages, Prices,
and
UnemploymentPrice
DeterminationThe Natural
Rate of Unem-
ploymentPractice
Problem

References

Wage bargaining between employers and employees takes many forms.

- ▶ In some occupations, wages are determined by collective bargaining between unions and firms.
- ▶ In the United States, less than 15% of workers are covered by collective bargaining agreements.
- ▶ Highly or uniquely skilled workers (e.g., athletes, entertainers) engage in individual bargaining with their employers.
- ▶ For jobs that require little skill, employers may make take-it-or-leave-it wage offers.

Bargaining

Notes 06

Labor Market
Tour

Movements in
Unemployment

Wage
Determination

Bargaining
Efficiency Wages
Wages, Prices,
and
Unemployment

Price
Determination

The Natural
Rate of Unem-
ployment

Practice
Problem

References

Wage bargaining between employers and employees takes many forms.

- ▶ In some occupations, wages are determined by collective bargaining between unions and firms.
- ▶ In the United States, less than 15% of workers are covered by collective bargaining agreements.
- ▶ Highly or uniquely skilled workers (e.g., athletes, entertainers) engage in individual bargaining with their employers.
- ▶ For jobs that require little skill, employers may make take-it-or-leave-it wage offers.

Bargaining

Notes 06

Labor Market
Tour

Movements in
Unemploy-
ment

Wage
Determination

Bargaining
Efficiency Wages
Wages, Prices,
and
Unemployment

Price
Determination

The Natural
Rate of Unem-
ployment

Practice
Problem

References

Wage bargaining between employers and employees takes many forms.

- ▶ In some occupations, wages are determined by collective bargaining between unions and firms.
- ▶ In the United States, less than 15% of workers are covered by collective bargaining agreements.
- ▶ Highly or uniquely skilled workers (e.g., athletes, entertainers) engage in individual bargaining with their employers.
- ▶ For jobs that require little skill, employers may make take-it-or-leave-it wage offers.

Bargaining

Notes 06

Labor Market
Tour

Movements in
Unemploy-
ment

Wage
Determination

Bargaining
Efficiency Wages
Wages, Prices,
and
Unemployment

Price
Determination

The Natural
Rate of Unem-
ployment

Practice
Problem

References

Wage bargaining between employers and employees takes many forms.

- ▶ In some occupations, wages are determined by collective bargaining between unions and firms.
- ▶ In the United States, less than 15% of workers are covered by collective bargaining agreements.
- ▶ Highly or uniquely skilled workers (e.g., athletes, entertainers) engage in individual bargaining with their employers.
- ▶ For jobs that require little skill, employers may make take-it-or-leave-it wage offers.

Efficiency Wages

Notes 06

Labor Market Tour

Movements in Unemployment

Wage Determination

Bargaining Efficiency Wages Wages, Prices, and Unemployment

Price Determination

The Natural Rate of Unem- ployment

Practice Problem

References

Efficiency wage theories are motivated by the idea that labor productivity is related to the wage.

- ▶ Paying a high wage may improve employee morale.
- ▶ Alternatively, a high wage may reduce turnover, which can be advantageous to the firm if it takes time to train new workers.
- ▶ From this perspective, firms have an incentive to offer a wage above the **reservation wage** the wage at which a worker is indifferent between working or becoming unemployed.

Consider the effects of a raise from \$2.30 to \$5.00 at Ford:

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

Efficiency Wages

Notes 06

Labor Market
TourMovements in
Unemploy-
mentWage
DeterminationBargaining
Efficiency Wages
Wages, Prices,
and
UnemploymentPrice
DeterminationThe Natural
Rate of Unem-
ploymentPractice
Problem

References

Efficiency wage theories are motivated by the idea that labor productivity is related to the wage.

- ▶ Paying a high wage may improve employee morale.
- ▶ Alternatively, a high wage may reduce turnover, which can be advantageous to the firm if it takes time to train new workers.
- ▶ From this perspective, firms have an incentive to offer a wage above the **reservation wage** the wage at which a worker is indifferent between working or becoming unemployed.

Consider the effects of a raise from \$2.30 to \$5.00 at Ford:

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

Efficiency Wages

Notes 06

Labor Market Tour

Movements in Unemployment

Wage Determination

Bargaining Efficiency Wages Wages, Prices, and Unemployment

Price Determination

The Natural Rate of Unemployment

Practice Problem

References

Efficiency wage theories are motivated by the idea that labor productivity is related to the wage.

- ▶ Paying a high wage may improve employee morale.
- ▶ Alternatively, a high wage may reduce turnover, which can be advantageous to the firm if it takes time to train new workers.
- ▶ From this perspective, firms have an incentive to offer a wage above the **reservation wage** the wage at which a worker is indifferent between working or becoming unemployed.

Consider the effects of a raise from \$2.30 to \$5.00 at Ford:

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

Efficiency Wages

Notes 06

Labor Market
TourMovements in
UnemploymentWage
DeterminationBargaining
Efficiency Wages
Wages, Prices,
and
UnemploymentPrice
DeterminationThe Natural
Rate of UnemploymentPractice
Problem

References

Efficiency wage theories are motivated by the idea that labor productivity is related to the wage.

- ▶ Paying a high wage may improve employee morale.
- ▶ Alternatively, a high wage may reduce turnover, which can be advantageous to the firm if it takes time to train new workers.
- ▶ From this perspective, firms have an incentive to offer a wage above the **reservation wage** the wage at which a worker is indifferent between working or becoming unemployed.

Consider the effects of a raise from \$2.30 to \$5.00 at Ford:

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

Wage determination process depends on three main forces.

- ▶ First, wage outcomes depend on labor market conditions, which can be proxied by the unemployment rate (u).
 - ▶ When the unemployment rate is high, it is relatively easy for firms to replace workers
 - ▶ And difficult for workers to find new jobs, so worker bargaining power is low.
 - ▶ In addition, workers are highly motivated to work and are unlikely to quit, so the efficiency wage motive is weaker.
- ▶ Second, given the unemployment rate, there are institutional and structural factors that affect the bargaining power of workers relative to employers.
 - ▶ These factors are summarized by the variable z and
 - ▶ Include, among other things, the generosity of unemployment insurance and the level of the minimum wage.
- ▶ Finally, the nominal wage depends on the price level, because both workers and firms care about the real wage.
 - ▶ However, wages are changed infrequently, so the price level that matters is the one that prevails over the duration of the wage contract.
 - ▶ Since this future price level is unknown, wage determination depends on the expected price level.

Wage determination process depends on three main forces.

- ▶ First, wage outcomes depend on labor market conditions, which can be proxied by the unemployment rate (u).
 - ▶ When the unemployment rate is high, it is relatively easy for firms to replace workers
 - ▶ And difficult for workers to find new jobs, so worker bargaining power is low.
 - ▶ In addition, workers are highly motivated to work and are unlikely to quit, so the efficiency wage motive is weaker.
- ▶ Second, given the unemployment rate, there are institutional and structural factors that affect the bargaining power of workers relative to employers.
 - ▶ These factors are summarized by the variable z and
 - ▶ Include, among other things, the generosity of unemployment insurance and the level of the minimum wage.
- ▶ Finally, the nominal wage depends on the price level, because both workers and firms care about the real wage.
 - ▶ However, wages are changed infrequently, so the price level that matters is the one that prevails over the duration of the wage contract.
 - ▶ Since this future price level is unknown, wage determination depends on the expected price level.

Wage determination process depends on three main forces.

- ▶ First, wage outcomes depend on labor market conditions, which can be proxied by the unemployment rate (u).
 - ▶ When the unemployment rate is high, it is relatively easy for firms to replace workers
 - ▶ And difficult for workers to find new jobs, so worker bargaining power is low.
 - ▶ In addition, workers are highly motivated to work and are unlikely to quit, so the efficiency wage motive is weaker.
- ▶ Second, given the unemployment rate, there are institutional and structural factors that affect the bargaining power of workers relative to employers.
 - ▶ These factors are summarized by the variable z and
 - ▶ Include, among other things, the generosity of unemployment insurance and the level of the minimum wage.
- ▶ Finally, the nominal wage depends on the price level, because both workers and firms care about the real wage.
 - ▶ However, wages are changed infrequently, so the price level that matters is the one that prevails over the duration of the wage contract.
 - ▶ Since this future price level is unknown, wage determination depends on the expected price level.

Wage determination process depends on three main forces.

- ▶ First, wage outcomes depend on labor market conditions, which can be proxied by the unemployment rate (u).
 - ▶ When the unemployment rate is high, it is relatively easy for firms to replace workers
 - ▶ And difficult for workers to find new jobs, so worker bargaining power is low.
 - ▶ In addition, workers are highly motivated to work and are unlikely to quit, so the efficiency wage motive is weaker.
- ▶ Second, given the unemployment rate, there are institutional and structural factors that affect the bargaining power of workers relative to employers.
 - ▶ These factors are summarized by the variable z and
 - ▶ Include, among other things, the generosity of unemployment insurance and the level of the minimum wage.
- ▶ Finally, the nominal wage depends on the price level, because both workers and firms care about the real wage.
 - ▶ However, wages are changed infrequently, so the price level that matters is the one that prevails over the duration of the wage contract.
 - ▶ Since this future price level is unknown, wage determination depends on the expected price level.

Wage determination process depends on three main forces.

- ▶ First, wage outcomes depend on labor market conditions, which can be proxied by the unemployment rate (u).
 - ▶ When the unemployment rate is high, it is relatively easy for firms to replace workers
 - ▶ And difficult for workers to find new jobs, so worker bargaining power is low.
 - ▶ In addition, workers are highly motivated to work and are unlikely to quit, so the efficiency wage motive is weaker.
- ▶ Second, given the unemployment rate, there are institutional and structural factors that affect the bargaining power of workers relative to employers.
 - ▶ These factors are summarized by the variable z and
 - ▶ Include, among other things, the generosity of unemployment insurance and the level of the minimum wage.
- ▶ Finally, the nominal wage depends on the price level, because both workers and firms care about the real wage.
 - ▶ However, wages are changed infrequently, so the price level that matters is the one that prevails over the duration of the wage contract.
 - ▶ Since this future price level is unknown, wage determination depends on the expected price level.

Wage determination process depends on three main forces.

- ▶ First, wage outcomes depend on labor market conditions, which can be proxied by the unemployment rate (u).
 - ▶ When the unemployment rate is high, it is relatively easy for firms to replace workers
 - ▶ And difficult for workers to find new jobs, so worker bargaining power is low.
 - ▶ In addition, workers are highly motivated to work and are unlikely to quit, so the efficiency wage motive is weaker.
- ▶ Second, given the unemployment rate, there are institutional and structural factors that affect the bargaining power of workers relative to employers.
 - ▶ These factors are summarized by the variable z and
 - ▶ Include, among other things, the generosity of unemployment insurance and the level of the minimum wage.
- ▶ Finally, the nominal wage depends on the price level, because both workers and firms care about the real wage.
 - ▶ However, wages are changed infrequently, so the price level that matters is the one that prevails over the duration of the wage contract.
 - ▶ Since this future price level is unknown, wage determination depends on the expected price level.

Wage determination process depends on three main forces.

- ▶ First, wage outcomes depend on labor market conditions, which can be proxied by the unemployment rate (u).
 - ▶ When the unemployment rate is high, it is relatively easy for firms to replace workers
 - ▶ And difficult for workers to find new jobs, so worker bargaining power is low.
 - ▶ In addition, workers are highly motivated to work and are unlikely to quit, so the efficiency wage motive is weaker.
- ▶ Second, given the unemployment rate, there are institutional and structural factors that affect the bargaining power of workers relative to employers.
 - ▶ These factors are summarized by the variable z and
 - ▶ Include, among other things, the generosity of unemployment insurance and the level of the minimum wage.
- ▶ Finally, the nominal wage depends on the price level, because both workers and firms care about the real wage.
 - ▶ However, wages are changed infrequently, so the price level that matters is the one that prevails over the duration of the wage contract.
 - ▶ Since this future price level is unknown, wage determination depends on the expected price level.

Wage determination process depends on three main forces.

- ▶ First, wage outcomes depend on labor market conditions, which can be proxied by the unemployment rate (u).
 - ▶ When the unemployment rate is high, it is relatively easy for firms to replace workers
 - ▶ And difficult for workers to find new jobs, so worker bargaining power is low.
 - ▶ In addition, workers are highly motivated to work and are unlikely to quit, so the efficiency wage motive is weaker.
- ▶ Second, given the unemployment rate, there are institutional and structural factors that affect the bargaining power of workers relative to employers.
 - ▶ These factors are summarized by the variable z and
 - ▶ Include, among other things, the generosity of unemployment insurance and the level of the minimum wage.
- ▶ Finally, the nominal wage depends on the price level, because both workers and firms care about the real wage.
 - ▶ However, wages are changed infrequently, so the price level that matters is the one that prevails over the duration of the wage contract.
 - ▶ Since this future price level is unknown, wage determination depends on the expected price level.

Wage determination process depends on three main forces.

- ▶ First, wage outcomes depend on labor market conditions, which can be proxied by the unemployment rate (u).
 - ▶ When the unemployment rate is high, it is relatively easy for firms to replace workers
 - ▶ And difficult for workers to find new jobs, so worker bargaining power is low.
 - ▶ In addition, workers are highly motivated to work and are unlikely to quit, so the efficiency wage motive is weaker.
- ▶ Second, given the unemployment rate, there are institutional and structural factors that affect the bargaining power of workers relative to employers.
 - ▶ These factors are summarized by the variable z and
 - ▶ Include, among other things, the generosity of unemployment insurance and the level of the minimum wage.
- ▶ Finally, the nominal wage depends on the price level, because both workers and firms care about the real wage.
 - ▶ However, wages are changed infrequently, so the price level that matters is the one that prevails over the duration of the wage contract.
 - ▶ Since this future price level is unknown, wage determination depends on the expected price level.

Wage determination process depends on three main forces.

- ▶ First, wage outcomes depend on labor market conditions, which can be proxied by the unemployment rate (u).
 - ▶ When the unemployment rate is high, it is relatively easy for firms to replace workers
 - ▶ And difficult for workers to find new jobs, so worker bargaining power is low.
 - ▶ In addition, workers are highly motivated to work and are unlikely to quit, so the efficiency wage motive is weaker.
- ▶ Second, given the unemployment rate, there are institutional and structural factors that affect the bargaining power of workers relative to employers.
 - ▶ These factors are summarized by the variable z and
 - ▶ Include, among other things, the generosity of unemployment insurance and the level of the minimum wage.
- ▶ Finally, the nominal wage depends on the price level, because both workers and firms care about the real wage.
 - ▶ However, wages are changed infrequently, so the price level that matters is the one that prevails over the duration of the wage contract.
 - ▶ Since this future price level is unknown, wage determination depends on the expected price level.

Wage determination process depends on three main forces.

- ▶ First, wage outcomes depend on labor market conditions, which can be proxied by the unemployment rate (u).
 - ▶ When the unemployment rate is high, it is relatively easy for firms to replace workers
 - ▶ And difficult for workers to find new jobs, so worker bargaining power is low.
 - ▶ In addition, workers are highly motivated to work and are unlikely to quit, so the efficiency wage motive is weaker.
- ▶ Second, given the unemployment rate, there are institutional and structural factors that affect the bargaining power of workers relative to employers.
 - ▶ These factors are summarized by the variable z and
 - ▶ Include, among other things, the generosity of unemployment insurance and the level of the minimum wage.
- ▶ Finally, the nominal wage depends on the price level, because both workers and firms care about the real wage.
 - ▶ However, wages are changed infrequently, so the price level that matters is the one that prevails over the duration of the wage contract.
 - ▶ Since this future price level is unknown, wage determination depends on the expected price level.

Wage Determination

Wage determination process depends on three main factors.

- ▶ First, wage outcomes depend on labor market conditions, which can be proxied by the unemployment rate (u).
- ▶ Second, given the unemployment rate, there are institutional and structural factors that affect the bargaining power of workers relative to employers.
- ▶ Finally, the nominal wage depends on the price level, because both workers and firms care about the real wage.

Combining these ideas we have that

$$W = P^e F(u, z)$$

Wage Determination

Wage determination process depends on three main factors.

- ▶ First, wage outcomes depend on labor market conditions, which can be proxied by the unemployment rate (u).
- ▶ Second, given the unemployment rate, there are institutional and structural factors that affect the bargaining power of workers relative to employers.
- ▶ Finally, the nominal wage depends on the price level, because both workers and firms care about the real wage.

Combining these ideas we have that

$$W = P^e F(u, z)$$

Wage Determination

Wage determination process depends on three main factors.

- ▶ First, wage outcomes depend on labor market conditions, which can be proxied by the unemployment rate (u).
- ▶ Second, given the unemployment rate, there are institutional and structural factors that affect the bargaining power of workers relative to employers.
- ▶ Finally, the nominal wage depends on the price level, because both workers and firms care about the real wage.

Combining these ideas we have that

$$W = P^e F(u, z)$$

Wage Determination

Notes 06

Labor Market Tour

Movements in Unemployment

Wage Determination

Bargaining Efficiency Wages, Prices, and Unemployment

Price Determination

The Natural Rate of Unemployment

Practice Problem

References

Wage determination process depends on three main factors.

- ▶ First, wage outcomes depend on labor market conditions, which can be proxied by the unemployment rate (u).
- ▶ Second, given the unemployment rate, there are institutional and structural factors that affect the bargaining power of workers relative to employers.
- ▶ Finally, the nominal wage depends on the price level, because both workers and firms care about the real wage.

Combining these ideas we have that

$$W = P^e F(u, z)$$

Price Determination

Notes 06

Labor Market
TourMovements in
Unemploy-
mentWage
DeterminationPrice
DeterminationThe Natural
Rate of Unem-
ploymentPractice
Problem

References

- ▶ Assume that labor (N) is the only factor of production and that firms operate under constant returns to scale.

$$Y = N$$

- ▶ Next we assume that the goods market is imperfectly competitive, so firms have some market power. This implies that firms will set price to

$$P = (1 + \mu)W$$

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

Price Determination

Notes 06

Labor Market
TourMovements in
Unemploy-
mentWage
DeterminationPrice
DeterminationThe Natural
Rate of Unem-
ploymentPractice
Problem

References

- ▶ Recall that imperfectly competitive firms behave similarly to monopolies. In order to set the price so that marginal revenue (MR) equals marginal cost at the firm level they do this:
- ▶ Note that $\frac{P \times \Delta Q}{Q \times \Delta P} = \epsilon$ is the elasticity of demand and that $MR = MC$ for these firms. And across the economy $MC = W$.

$$\Delta TR = \Delta Q \times MR = \Delta P \times Q + \Delta Q \times P$$

$$MR = \frac{\Delta P \times Q + \Delta Q \times P}{\Delta Q}$$

$$MR = P + \frac{\Delta P \times Q}{\Delta Q}$$

Note that the elasticity of demand, ϵ , is $\frac{\Delta Q \times P}{\Delta P \times Q}$

$$MR = P \left(1 + \frac{\Delta P \times Q}{\Delta Q \times P} \right) = P \left(1 + \frac{1}{\epsilon} \right)$$

Next let $\epsilon = \frac{1 - \mu}{\mu}$ for convenience.

Then simplify to get

$$MR = P \left(\frac{1}{1 + \mu} \right)$$

Finally recall $MR = MC = W$

$$\frac{W}{P} = \left(\frac{1}{1 + \mu} \right)$$

Price Determination

Notes 06

Labor Market
TourMovements in
UnemploymentWage
DeterminationPrice
DeterminationThe Natural
Rate of UnemploymentPractice
Problem

References

- ▶ Recall that imperfectly competitive firms behave similarly to monopolies. In order to set the price so that marginal revenue (MR) equals marginal cost at the firm level they do this:
- ▶ Note that $\frac{P \times \Delta Q}{Q \times \Delta P} = \epsilon$ is the elasticity of demand and that $MR = MC$ for these firms. And across the economy $MC = W$.

$$\Delta TR = \Delta Q \times MR = \Delta P \times Q + \Delta Q \times P$$

$$MR = \frac{\Delta P \times Q + \Delta Q \times P}{\Delta Q}$$

$$MR = P + \frac{\Delta P \times Q}{\Delta Q}$$

Note that the elasticity of demand, ϵ , is $\frac{\Delta Q \times P}{\Delta P \times Q}$

$$MR = P \left(1 + \frac{\Delta P \times Q}{\Delta Q \times P} \right) = P \left(1 + \frac{1}{\epsilon} \right)$$

Next let $\epsilon = \frac{1 - \mu}{\mu}$ for convenience.

Then simplify to get

$$MR = P \left(\frac{1}{1 + \mu} \right)$$

Finally recall $MR = MC = W$

$$\frac{W}{P} = \left(\frac{1}{1 + \mu} \right)$$

Price Determination

Notes 06

Labor Market
TourMovements in
UnemploymentWage
DeterminationPrice
DeterminationThe Natural
Rate of Unem-
ploymentPractice
Problem

References

- ▶ Recall that imperfectly competitive firms behave similarly to monopolies. In order to set the price so that marginal revenue (MR) equals marginal cost at the firm level they do this:
- ▶ Note that $\frac{P \times \Delta Q}{Q \times \Delta P} = \epsilon$ is the elasticity of demand and that $MR = MC$ for these firms. And across the economy $MC = W$.

$$\Delta TR = \Delta Q \times MR = \Delta P \times Q + \Delta Q \times P$$

$$MR = \frac{\Delta P \times Q + \Delta Q \times P}{\Delta Q}$$

$$MR = P + \frac{\Delta P \times Q}{\Delta Q}$$

Note that the elasticity of demand, ϵ , is $\frac{\Delta Q \times P}{\Delta P \times Q}$

$$MR = P \left(1 + \frac{\Delta P \times Q}{\Delta Q \times P} \right) = P \left(1 + \frac{1}{\epsilon} \right)$$

Next let $\epsilon = \frac{1 - \mu}{\mu}$ for convenience.

Then simplify to get

$$MR = P \left(\frac{1}{1 + \mu} \right)$$

Finally recall $MR = MC = W$

$$\frac{W}{P} = \left(\frac{1}{1 + \mu} \right)$$

Price Determination

Notes 06

Labor Market
TourMovements in
UnemploymentWage
DeterminationPrice
DeterminationThe Natural
Rate of Unem-
ploymentPractice
Problem

References

- ▶ Recall that imperfectly competitive firms behave similarly to monopolies. In order to set the price so that marginal revenue (MR) equals marginal cost at the firm level they do this:
- ▶ Note that $\frac{P \times \Delta Q}{Q \times \Delta P} = \epsilon$ is the elasticity of demand and that $MR = MC$ for these firms. And across the economy $MC = W$.

$$\Delta TR = \Delta Q \times MR = \Delta P \times Q + \Delta Q \times P$$

$$MR = \frac{\Delta P \times Q + \Delta Q \times P}{\Delta Q}$$

$$MR = P + \frac{\Delta P \times Q}{\Delta Q}$$

Note that the elasticity of demand, ϵ , is $\frac{\Delta Q \times P}{\Delta P \times Q}$

$$MR = P \left(1 + \frac{\Delta P \times Q}{\Delta Q \times P} \right) = P \left(1 + \frac{1}{\epsilon} \right)$$

Next let $\epsilon = \frac{1 - \mu}{\mu}$ for convenience.

Then simplify to get

$$MR = P \left(\frac{1}{1 + \mu} \right)$$

Finally recall $MR = MC = W$

$$\frac{W}{P} = \left(\frac{1}{1 + \mu} \right)$$

Price Determination

Notes 06

Labor Market
TourMovements in
UnemploymentWage
DeterminationPrice
DeterminationThe Natural
Rate of Unem-
ploymentPractice
Problem

References

- ▶ Recall that imperfectly competitive firms behave similarly to monopolies. In order to set the price so that marginal revenue (MR) equals marginal cost at the firm level they do this:
- ▶ Note that $\frac{P \times \Delta Q}{Q \times \Delta P} = \epsilon$ is the elasticity of demand and that $MR = MC$ for these firms. And across the economy $MC = W$.

$$\Delta TR = \Delta Q \times MR = \Delta P \times Q + \Delta Q \times P$$

$$MR = \frac{\Delta P \times Q + \Delta Q \times P}{\Delta Q}$$

$$MR = P + \frac{\Delta P \times Q}{\Delta Q}$$

Note that the elasticity of demand, ϵ , is $\frac{\Delta Q \times P}{\Delta P \times Q}$

$$MR = P \left(1 + \frac{\Delta P \times Q}{\Delta Q \times P} \right) = P \left(1 + \frac{1}{\epsilon} \right)$$

Next let $\epsilon = \frac{1 - \mu}{\mu}$ for convenience.

Then simplify to get

$$MR = P \left(\frac{1}{1 + \mu} \right)$$

Finally recall $MR = MC = W$

$$\frac{W}{P} = \left(\frac{1}{1 + \mu} \right)$$

Price Determination

Notes 06

Labor Market
TourMovements in
UnemploymentWage
DeterminationPrice
DeterminationThe Natural
Rate of UnemploymentPractice
Problem

References

- ▶ Recall that imperfectly competitive firms behave similarly to monopolies. In order to set the price so that marginal revenue (MR) equals marginal cost at the firm level they do this:
- ▶ Note that $\frac{P \times \Delta Q}{Q \times \Delta P} = \epsilon$ is the elasticity of demand and that $MR = MC$ for these firms. And across the economy $MC = W$.

$$\Delta TR = \Delta Q \times MR = \Delta P \times Q + \Delta Q \times P$$

$$MR = \frac{\Delta P \times Q + \Delta Q \times P}{\Delta Q}$$

$$MR = P + \frac{\Delta P \times Q}{\Delta Q}$$

Note that the elasticity of demand, ϵ , is $\frac{\Delta Q \times P}{\Delta P \times Q}$

$$MR = P \left(1 + \frac{\Delta P \times Q}{\Delta Q \times P} \right) = P \left(1 + \frac{1}{\epsilon} \right)$$

Next let $\epsilon = \frac{1 - \mu}{\mu}$ for convenience.

Then simplify to get

$$MR = P \left(\frac{1}{1 + \mu} \right)$$

Finally recall $MR = MC = W$

$$\frac{W}{P} = \left(\frac{1}{1 + \mu} \right)$$

Price Determination

Notes 06

Labor Market
TourMovements in
UnemploymentWage
DeterminationPrice
DeterminationThe Natural
Rate of Unem-
ploymentPractice
Problem

References

- ▶ Recall that imperfectly competitive firms behave similarly to monopolies. In order to set the price so that marginal revenue (MR) equals marginal cost at the firm level they do this:
- ▶ Note that $\frac{P \times \Delta Q}{Q \times \Delta P} = \epsilon$ is the elasticity of demand and that $MR = MC$ for these firms. And across the economy $MC = W$.

$$\Delta TR = \Delta Q \times MR = \Delta P \times Q + \Delta Q \times P$$

$$MR = \frac{\Delta P \times Q + \Delta Q \times P}{\Delta Q}$$

$$MR = P + \frac{\Delta P \times Q}{\Delta Q}$$

Note that the elasticity of demand, ϵ , is $\frac{\Delta Q \times P}{\Delta P \times Q}$

$$MR = P \left(1 + \frac{\Delta P \times Q}{\Delta Q \times P} \right) = P \left(1 + \frac{1}{\epsilon} \right)$$

Next let $\epsilon = \frac{1 - \mu}{\mu}$ for convenience.

Then simplify to get

$$MR = P \left(\frac{1}{1 + \mu} \right)$$

Finally recall $MR = MC = W$

$$\frac{W}{P} = \left(\frac{1}{1 + \mu} \right)$$

Price Determination

Notes 06

Labor Market
TourMovements in
UnemploymentWage
DeterminationPrice
DeterminationThe Natural
Rate of UnemploymentPractice
Problem

References

- ▶ Recall that imperfectly competitive firms behave similarly to monopolies. In order to set the price so that marginal revenue (MR) equals marginal cost at the firm level they do this:
- ▶ Note that $\frac{P \times \Delta Q}{Q \times \Delta P} = \epsilon$ is the elasticity of demand and that $MR = MC$ for these firms. And across the economy $MC = W$.

$$\Delta TR = \Delta Q \times MR = \Delta P \times Q + \Delta Q \times P$$

$$MR = \frac{\Delta P \times Q + \Delta Q \times P}{\Delta Q}$$

$$MR = P + \frac{\Delta P \times Q}{\Delta Q}$$

Note that the elasticity of demand, ϵ , is $\frac{\Delta Q \times P}{\Delta P \times Q}$

$$MR = P \left(1 + \frac{\Delta P \times Q}{\Delta Q \times P} \right) = P \left(1 + \frac{1}{\epsilon} \right)$$

Next let $\epsilon = \frac{1 - \mu}{\mu}$ for convenience.

Then simplify to get

$$MR = P \left(\frac{1}{1 + \mu} \right)$$

Finally recall $MR = MC = W$

$$\frac{W}{P} = \left(\frac{1}{1 + \mu} \right)$$

Price Determination

Notes 06

Labor Market
TourMovements in
UnemploymentWage
DeterminationPrice
DeterminationThe Natural
Rate of UnemploymentPractice
Problem

References

- ▶ Recall that imperfectly competitive firms behave similarly to monopolies. In order to set the price so that marginal revenue (MR) equals marginal cost at the firm level they do this:
- ▶ Note that $\frac{P \times \Delta Q}{Q \times \Delta P} = \epsilon$ is the elasticity of demand and that $MR = MC$ for these firms. And across the economy $MC = W$.

$$\Delta TR = \Delta Q \times MR = \Delta P \times Q + \Delta Q \times P$$

$$MR = \frac{\Delta P \times Q + \Delta Q \times P}{\Delta Q}$$

$$MR = P + \frac{\Delta P \times Q}{\Delta Q}$$

Note that the elasticity of demand, ϵ , is $\frac{\Delta Q \times P}{\Delta P \times Q}$

$$MR = P \left(1 + \frac{\Delta P \times Q}{\Delta Q \times P} \right) = P \left(1 + \frac{1}{\epsilon} \right)$$

Next let $\epsilon = \frac{1 - \mu}{\mu}$ for convenience.

Then simplify to get

$$MR = P \left(\frac{1}{1 + \mu} \right)$$

Finally recall $MR = MC = W$

$$\frac{W}{P} = \left(\frac{1}{1 + \mu} \right)$$

Price Determination

Notes 06

Labor Market
TourMovements in
UnemploymentWage
DeterminationPrice
DeterminationThe Natural
Rate of Unem-
ploymentPractice
Problem

References

- ▶ Recall that imperfectly competitive firms behave similarly to monopolies. In order to set the price so that marginal revenue (MR) equals marginal cost at the firm level they do this:
- ▶ Note that $\frac{P \times \Delta Q}{Q \times \Delta P} = \epsilon$ is the elasticity of demand and that $MR = MC$ for these firms. And across the economy $MC = W$.

$$\Delta TR = \Delta Q \times MR = \Delta P \times Q + \Delta Q \times P$$

$$MR = \frac{\Delta P \times Q + \Delta Q \times P}{\Delta Q}$$

$$MR = P + \frac{\Delta P \times Q}{\Delta Q}$$

Note that the elasticity of demand, ϵ , is $\frac{\Delta Q \times P}{\Delta P \times Q}$

$$MR = P \left(1 + \frac{\Delta P \times Q}{\Delta Q \times P} \right) = P \left(1 + \frac{1}{\epsilon} \right)$$

Next let $\epsilon = \frac{1 - \mu}{\mu}$ for convenience.

Then simplify to get

$$MR = P \left(\frac{1}{1 + \mu} \right)$$

Finally recall $MR = MC = W$

$$\frac{W}{P} = \left(\frac{1}{1 + \mu} \right)$$

The Natural Rate of Unemployment

The intersection of the forces underlying wage determination and price determination define a unique "natural" level of unemployment and real wage. Recall that wages, $W = P^e F(u, z)$. We can re-express this

$$\frac{W}{P^e} = F(u, z)$$

and $W(1 + \mu) = P$ can be re-expressed as

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

so by equating them we have

$$F(u, z) = \frac{1}{1 + \mu}.$$

The Natural Rate of Unemployment

The intersection of the forces underlying wage determination and price determination define a unique "natural" level of unemployment and real wage. Recall that wages, $W = P^e F(u, z)$. We can re-express this

$$\frac{W}{P^e} = F(u, z)$$

and $W(1 + \mu) = P$ can be re-expressed as

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

so by equating them we have

$$F(u, z) = \frac{1}{1 + \mu}.$$

The Natural Rate of Unemployment

The intersection of the forces underlying wage determination and price determination define a unique "natural" level of unemployment and real wage. Recall that wages, $W = P^e F(u, z)$. We can re-express this

$$\frac{W}{P^e} = F(u, z)$$

and $W(1 + \mu) = P$ can be re-expressed as

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

so by equating them we have

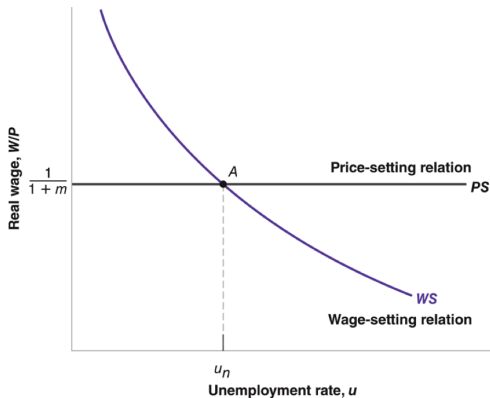
$$F(u, z) = \frac{1}{1 + \mu}.$$

Real Wages

Notes 06

Labor Market
TourMovements in
UnemploymentWage
DeterminationPrice
DeterminationThe Natural
Rate of UnemploymentFrom
Employment to
OutputPractice
Problem

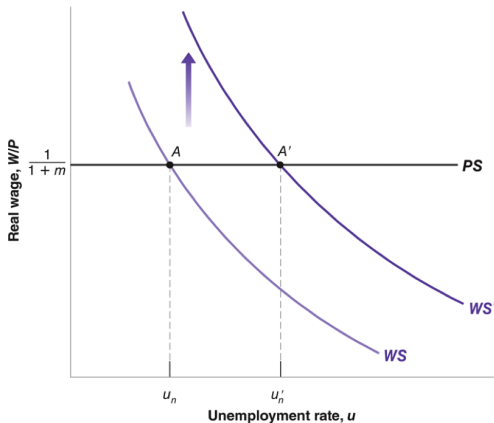
References



$$F(u, z) = \frac{1}{1 + \mu}$$

This graph shows that real wages and unemployment are explained by the convergence of several forces:

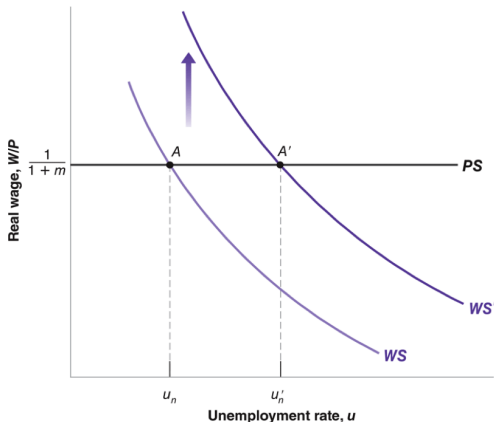
- ▶ The markup charged by firms μ ,
- ▶ Institutional and structural factors z , and
- ▶ Workers, bargaining power z .



$$F(u, z) = \frac{1}{1 + \mu}$$

Try to imagine two factors which could shift the wage setting curve upward.

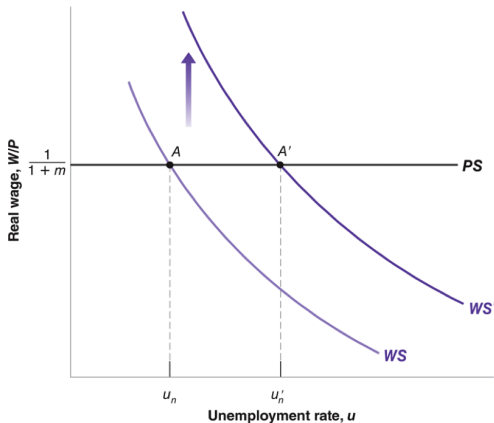
- ▶ An increase in unemployment benefits shifts the wage setting curve up.
- ▶ An increase in union bargaining power shifts the wage setting curve up.



$$F(u, z) = \frac{1}{1 + \mu}$$

Try to imagine two factors which could shift the wage setting curve upward.

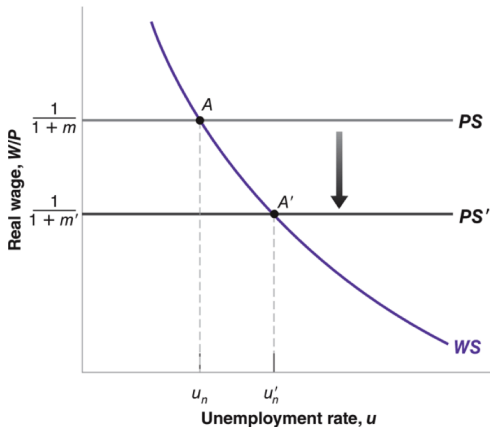
- ▶ An increase in unemployment benefits shifts the wage setting curve up.
- ▶ An increase in union bargaining power shifts the wage setting curve up.



$$F(u, z) = \frac{1}{1 + \mu}$$

Try to imagine two factors which could shift the wage setting curve upward.

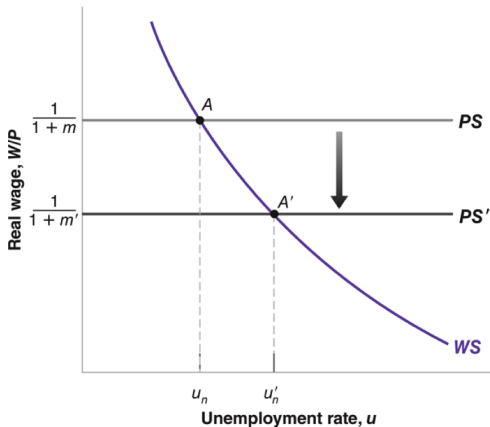
- ▶ An increase in unemployment benefits shifts the wage setting curve up.
- ▶ An increase in union bargaining power shifts the wage setting curve up.



$$F(u, z) = \frac{1}{1 + \mu}$$

Give two scenarios which could lead to an increase in markups and downward shift of the price setting curve.

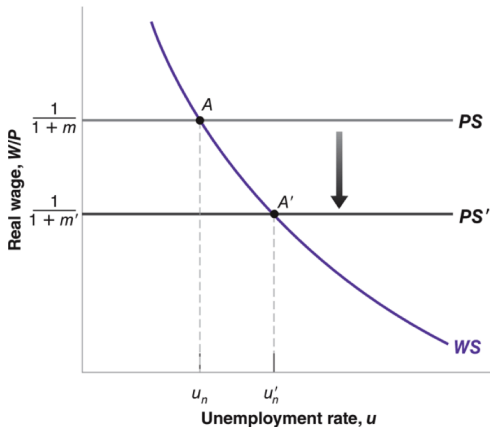
- ▶ Collusion of firms across the economy increases monopoly power. So firms increase their markups.
- ▶ A bad economy puts many firms out of business, reducing competition and thus allowing for higher markups.



$$F(u, z) = \frac{1}{1 + \mu}$$

Give two scenarios which could lead to an increase in markups and downward shift of the price setting curve.

- ▶ Collusion of firms across the economy increases monopoly power. So firms increase their markups.
- ▶ A bad economy puts many firms out of business, reducing competition and thus allowing for higher markups.

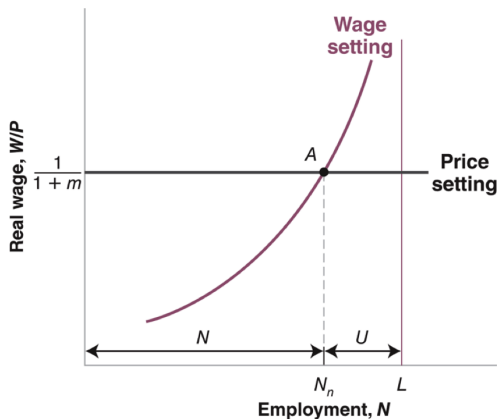


$$F(u, z) = \frac{1}{1 + \mu}$$

Give two scenarios which could lead to an increase in markups and downward shift of the price setting curve.

- ▶ Collusion of firms across the economy increases monopoly power. So firms increase their markups.
- ▶ A bad economy puts many firms out of business, reducing competition and thus allowing for higher markups.

Employment: An alternative view of the same graph



$$F(e, z) = \frac{1}{1 + \mu}$$

This graph contains information identical to the one we have been using.

It is useful to note that

$$u = \frac{U}{L} = \frac{\text{the unemployed}}{\text{the labor force}}$$

which implies the relation:

$$u = \frac{U}{L} = \frac{\text{the unemployed}}{\text{the labor force}} = \frac{L - N}{L} = 1 - \frac{N}{L}$$

- ▶ The first step follows from the definition of the unemployment rate (u).
- ▶ The second follows from the fact that, from the definition of the labor force, the level of unemployment (U) equals the labor force (L) minus employment (N).
- ▶ The third step follows from simplifying the fraction.
- ▶ Putting all three steps together: The unemployment rate u equals 1 minus the ratio of employment N to the labor force L .

It is useful to note that

$$u = \frac{U}{L} = \frac{\text{the unemployed}}{\text{the labor force}}$$

which implies the relation:

$$u = \frac{U}{L} = \frac{\text{the unemployed}}{\text{the labor force}} = \frac{L - N}{L} = 1 - \frac{N}{L}$$

- ▶ The first step follows from the definition of the unemployment rate (u).
- ▶ The second follows from the fact that, from the definition of the labor force, the level of unemployment (U) equals the labor force (L) minus employment (N).
- ▶ The third step follows from simplifying the fraction.
- ▶ Putting all three steps together: The unemployment rate u equals 1 minus the ratio of employment N to the labor force L .

It is useful to note that

$$u = \frac{U}{L} = \frac{\text{the unemployed}}{\text{the labor force}}$$

which implies the relation:

$$u = \frac{U}{L} = \frac{\text{the unemployed}}{\text{the labor force}} = \frac{L - N}{L} = 1 - \frac{N}{L}$$

- ▶ The first step follows from the definition of the unemployment rate (u).
- ▶ The second follows from the fact that, from the definition of the labor force, the level of unemployment (U) equals the labor force (L) minus employment (N).
- ▶ The third step follows from simplifying the fraction.
- ▶ Putting all three steps together: The unemployment rate u equals 1 minus the ratio of employment N to the labor force L .

It is useful to note that

$$u = \frac{U}{L} = \frac{\text{the unemployed}}{\text{the labor force}}$$

which implies the relation:

$$u = \frac{U}{L} = \frac{\text{the unemployed}}{\text{the labor force}} = \frac{L - N}{L} = 1 - \frac{N}{L}$$

- ▶ The first step follows from the definition of the unemployment rate (u).
- ▶ The second follows from the fact that, from the definition of the labor force, the level of unemployment (U) equals the labor force (L) minus employment (N).
- ▶ The third step follows from simplifying the fraction.
- ▶ Putting all three steps together: The unemployment rate u equals 1 minus the ratio of employment N to the labor force L .

It is useful to note that

$$u = \frac{U}{L} = \frac{\text{the unemployed}}{\text{the labor force}}$$

which implies the relation:

$$u = \frac{U}{L} = \frac{\text{the unemployed}}{\text{the labor force}} = \frac{L - N}{L} = 1 - \frac{N}{L}$$

- ▶ The first step follows from the definition of the unemployment rate (u).
- ▶ The second follows from the fact that, from the definition of the labor force, the level of unemployment (U) equals the labor force (L) minus employment (N).
- ▶ The third step follows from simplifying the fraction.
- ▶ Putting all three steps together: The unemployment rate u equals 1 minus the ratio of employment N to the labor force L .

Practice Problem

Suppose that the markup of goods prices over marginal cost is 5%, and that the wage-setting equation is $W = P(1 - u)$ where u is the unemployment rate.

1. What is the real wage, as determined by the price-setting equation?
2. What is the natural rate of unemployment?
3. Suppose that the markup of prices over costs increases to 10%. What happens to the natural rate of unemployment? Explain the logic behind your answer.

Solutions

Notes 06

Labor Market
TourMovements in
Unemploy-
mentWage
DeterminationPrice
DeterminationThe Natural
Rate of Unem-
ploymentPractice
Problem

References

Suppose that the markup of goods prices over marginal cost is 5%, and that the wage-setting equation is $W = P(1 - u)$ where u is the unemployment rate.

QUESTIONS:

1. What is the real wage, as determined by the price-setting equation?
2. What is the natural rate of unemployment?
3. Suppose that the markup of prices over costs increases to 10%. What happens to the natural rate of unemployment? Explain the logic behind your answer.

SOLUTIONS:

1. Recall that price setting equals the wage setting equation via the real wage:

$$\frac{1}{1+m} = \frac{W}{P} = F(u, z) = 1 - u.$$

Thus, according to the LHS, the $\frac{W}{P} = 0.952$.

2. Next solving $\frac{1}{1+0.5} = 1 - u$ for u , $u = 0.0476$.
3. Just solve $\frac{1}{1+0.1} = 1 - u$ for u , $u = 0.0909$.

Business
Fluctuations

Notes 06

Labor Market
Tour

Movements in
Unemploy-
ment

Wage
Determination

Price
Determination

The Natural
Rate of Unem-
ployment

Practice
Problem

References

Comments, questions, or concerns?

References

Olivier Jean Blanchard and David Johnson. *Macroeconomics*. Prentice Hall, 6th edition, 2011. ISBN 9780133061635.