

The Labor Market, Wages, and Unemployment

— Week 4 —

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Summary

- 1 The U.S. Labor Market
- 2 Supply and Demand
- 3 Bathtub Model of Unemployment
- 4 Labor Markets around the World
- 5 How Much Is Your Human Capital Worth?
- 6 The Rising Return to Education
- 7 Required reading

I – The U.S. Labor Market

What is traded in this market?

- 1 The labor market determines both the price of labor and the quantity of labor, employment.
- 2 But before we start analyzing this market in detail, let's take a general look at how wages and employment have changed over time.
- 3 Sustained increases in standards of living are a recent phenomenon.

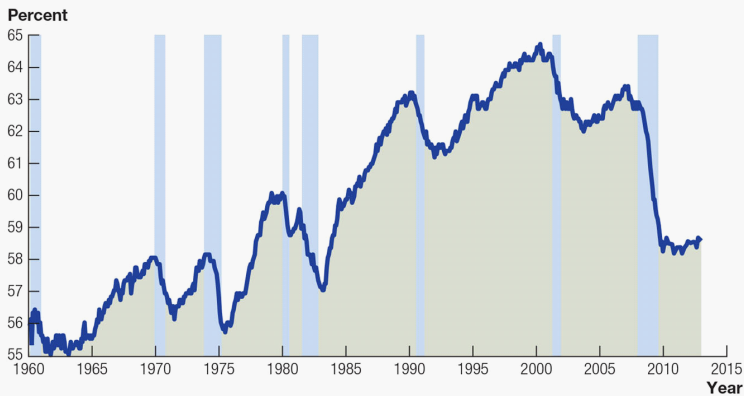
In the U.S. labor market

- 1 Wages account for two-thirds of per capita GDP.
- 2 Average wages have grown at 2 percent per year for the last century.
- 3 The employment-population ratio
 - 1 The fraction of the civilian population over the age of 16 that is working
- 4 This ratio:
 - 1 Has been increasing over time in large part due to the entry of women into the workforce.
 - 2 Decreases in times of a recession.

The employment-population ratio in the US

FIGURE 7.1

The Ratio of Employment to Population in the United States, 1960–2013



The labor force:composition (January 2010)

- 1 The labor forces defined as the sum of the employed and the unemployed

TABLE 7.1

The Composition of the U.S. Labor Force, January 2013

Civilian population, aged 16 and over	245 million
Labor force	156 million
Employed	143 million
Unemployed	12.3 million
Not in the labor force	89 million

The unemployment rate

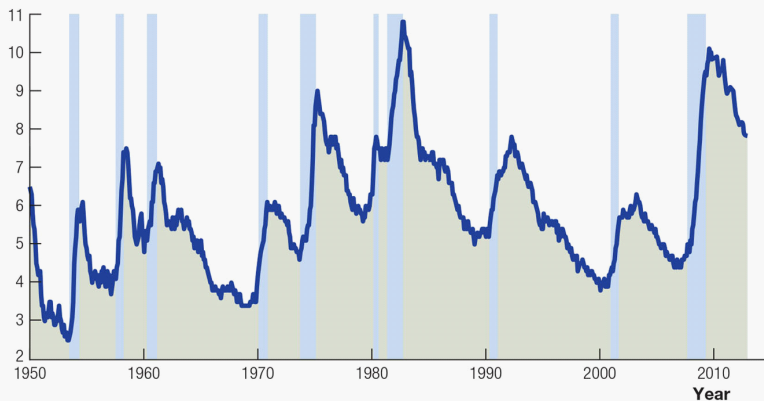
- ① The unemployment rate
 - ① The fraction of the labor force that is unemployed
- ② A person is unemployed if the following conditions hold:
 - ① She does not have a job that pays a wage or salary.
 - ② She actively looked for a job during the four weeks before measuring the unemployment rate.
 - ③ She is available to work.

The unemployment rate in the US

FIGURE 7.2

The U.S. Unemployment Rate, 1950–2013

Percent



The Dynamics of the Labor Market

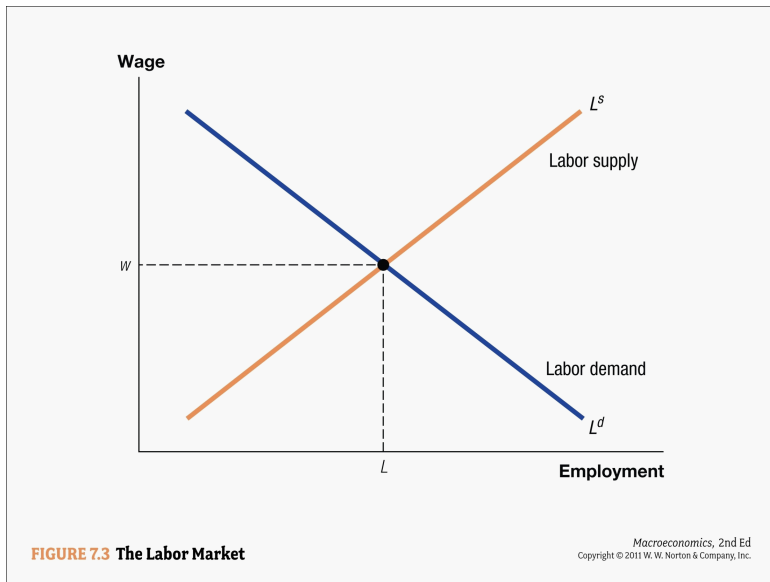
- 1 Job creation and job destruction in the United States
- 2 Occur each month
- 3 Are part of normal changes in the economy

II – Supply and Demand

Labor demand and labor supply curves

- 1 The labor demand curve slopes downward because of diminishing marginal product of labor (MPL).
- 2 The labor supply curve slopes upward because the price of leisure is higher when wages are higher.
- 3 The intersection of labor supply and demand determines the level of employment and the wage rate.
- 4 The labor market clears at the wage w and level of employment L such that the amount of labor supplied by workers equals the amount demanded by firms
- 5 See next figure.

The labor market clears



A Change in Labor Supply

- 1 If the government collects a tax on a worker's wage:
 - 1 The labor supply curve shifts left.
 - 2 A worker receives less money and supplies less labor—this applies to any wage.
 - 3 In order to be in equilibrium, firms must raise wages.

An Income Tax at rate "tau"

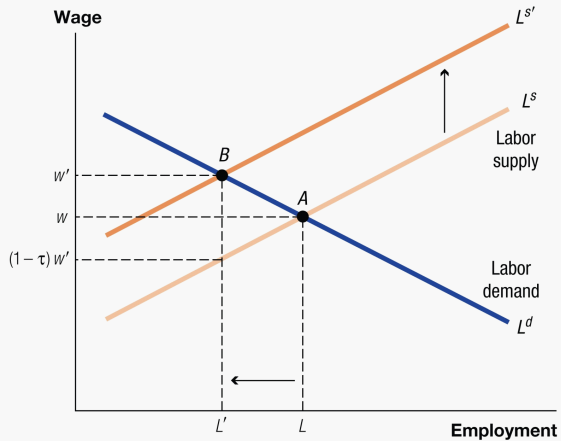


FIGURE 7.4 An Income Tax at Rate τ

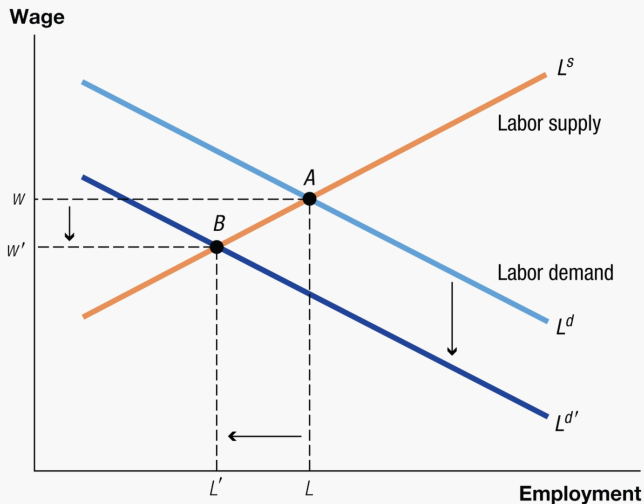
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A Change in Labor Demand

Suppose the government creates regulations making it harder to fire workers.

- 1 Firms will demand fewer workers.
- 2 Labor demand shifts left, causing wages and employment to fall.
- 3 The unemployment rate rises initially and recovers as discouraged workers drop out of the labor force.

The effect of a decline in labor demand



Wage Rigidity

- 1 Wages fail to adjust after a shock to labor demand or supply.
- 2 What happens if wages do not fall in the above demand shock example?
 - 1 The labor market will not clear and this results in a larger fall in employment. This formula can be applied even if the data does not exhibit constant growth.

Wage Rigidity

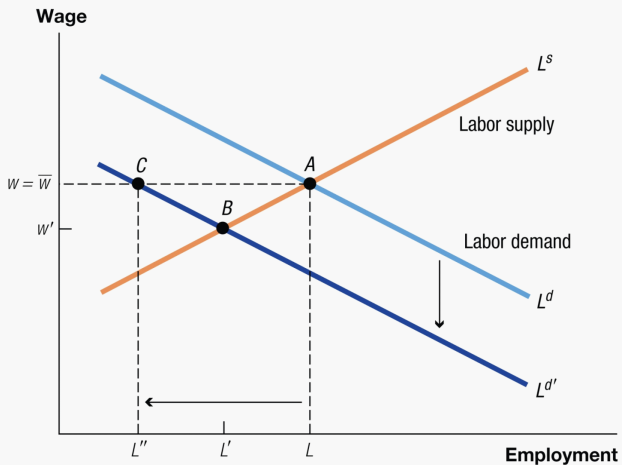


FIGURE 7.6 A Reduction in Labor Demand with Wage Rigidity

Different Kinds of Unemployment

- ① The natural rate of unemployment
 - ① Rate that would prevail if the economy were in neither a boom nor a bust
- ② Cyclical unemployment
 - ① The difference between the actual rate and the natural rate
 - ② Associated with short-run fluctuations in output
- ③ The natural rate of unemployment includes two components:
 - ① Frictional unemployment: workers being between jobs in the dynamic economy
 - ② Structural unemployment: labor market failing to match up workers and firms in the market
- ④ Actual unemployment is the sum of **frictional, structural, and cyclical** unemployment.

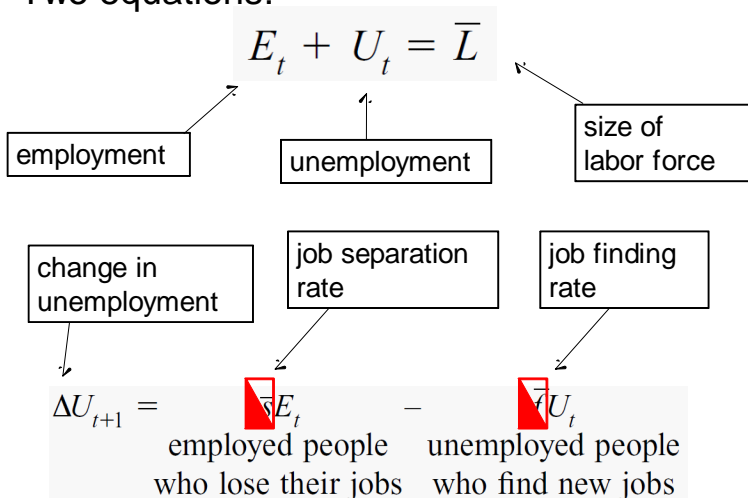
III – Bathtub Model of Unemployment

Bathtub model

- 1 Two endogenous variables: employment E and unemployment U
- 2 Model states how employment and unemployment evolve over time
- 3 Analogy: water entering and draining a bath tub at the same rate

Two equations

- Two equations:



Solving the model

- Set the change in unemployment to zero

$$\begin{aligned}
 0 &= \bar{s}E_t - \bar{f}U_t \\
 &= \bar{s}(\bar{L} - U_t) - \bar{f}U_t \\
 &= \bar{s}\bar{L} - (\bar{f} + \bar{s})U_t
 \end{aligned}$$

- Solve the equation for U

$$U^* = \frac{\bar{s}\bar{L}}{\bar{f} + \bar{s}}$$

Solving the model (cont.)

$$U^* = \frac{\bar{s}\bar{L}}{\bar{f} + \bar{s}}$$

- The unemployment rate is defined as the fraction of the labor force that is unemployed. Therefore:

$$u^* \equiv \frac{U^*}{\bar{L}} = \frac{\bar{s}}{\bar{f} + \bar{s}}$$

Solving the model (cont.)

$$u^* \equiv \frac{U^*}{L} = \frac{\bar{s}}{\bar{f} + \bar{s}}$$

- Insights of the model:
 - Only way to alter the natural rate of unemployment is:
 - change the job finding rate.
 - change the job separation rate.
 - Policies along these lines can have unintended consequences.

IV – Labor Markets around the World

Some facts about international labor markets since 1980

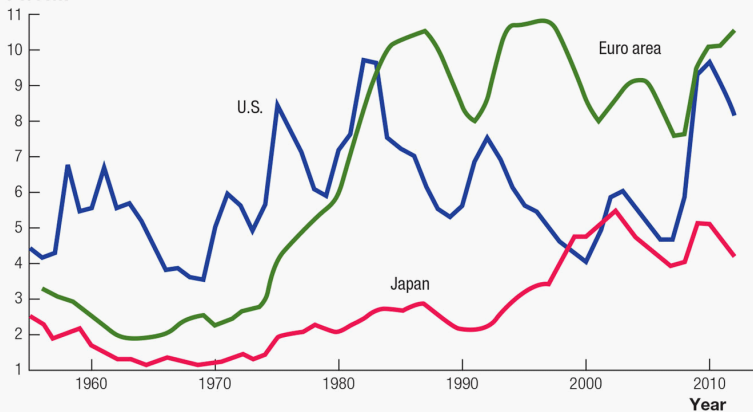
- 1 Unemployment in Europe: substantially above America's rate
- 2 Unemployment in Japan: historically below the United States.
- 3 European unemployment has increased dramatically because of:
 - 1 Adverse shocks and high oil prices.
 - 2 Inefficient labor market institutions in the form of higher unemployment and welfare benefits.
- 4 1990s hours worked in Europe much lower than 1970s levels.

Unemployment in 3 economic regions

FIGURE 7.7

Unemployment in the United States, Europe, and Japan,
1955–2012

Percent



GDP per capita is lower in Europe. Why?

- 1 People work less hours.
- 2 If working less is voluntary:
 - 1 Europeans enjoy leisure more and welfare is likely improved.
- 3 If working less is a result of distortions in the labor market:
 - 1 This outcome is likely not welfare enhancing

V – How Much Is Your Human Capital Worth?

The present discounted value of your lifetime income

- 1 The present discounted value of your lifetime income is likely greater than \$1 million.
- 2 Present discounted value
 - 1 The value of money you would need to put in the bank today to equal a given future value.
 - 2 Tells how much a future payment or a future flow of payments is worth today.
- 3 Equation for present discounted value

$$\text{Present Discounted Value} = \frac{\text{Future Value}}{(1 + r)^t}$$

r is the interest rate, t is time periods

The value of a stream of equal payments over a given number of years

- 1 Arrange the sum of each period's present discounted values into a geometric series.
- 2 Use the formula for a sum of a geometric series to calculate the present discounted value of the stream of payments.
- 3 If a is some number between 0 and 1, then calculating a geometric series is:

$$1 + a + a^2 + \dots + a^n = \frac{1 - a^{n+1}}{1 - a}$$

An example

- For example, the series for a \$100 initial payment for twenty years is:

$$pdv = pdv0 + pdv1 + pdv2 + \dots + pdv19$$

- Or:

$$pdv = \$100 \times \left[1 + \frac{1}{(1+R)} + \frac{1}{(1+R)^2} + \dots + \frac{1}{(1+R)^{19}} \right]$$

- From previous page: If $a = 1/(1+R)$, then:

$$pdv = \$100 \times \frac{1 - \left(\frac{1}{1+R}\right)^{20}}{1 - \frac{1}{1+R}}$$

An example (cont.)

$$pdv = \$100 \times \frac{1 - \left(\frac{1}{1+R}\right)^{20}}{1 - \frac{1}{1+R}}$$

- Letting the interest rate $R = .10$
- What is the pdv on \$100 over 20 years?
– \$936.

Your human capital

- Example: Assume
 - The average income is \$56,000
 - No wage growth
 - An interest rate of 3 percent
 - A lifetime work span of 45 years
- The *pdv* of this stream of payments is 1.41 million dollars.

$$\begin{aligned}
 pdv &= \$56,000 \times \frac{1 - \left(\frac{1}{1+R}\right)^{45}}{1 - \frac{1}{1+R}} \\
 &= \$1.41 \text{ million.}
 \end{aligned}$$

VI – The Rising Return to Education

The premium to having a college degree

- ① Has been rising rapidly over the last forty years.
- ② Far outweighs the forgone wages and tuition costs of going to college.

The premium to having a college degree

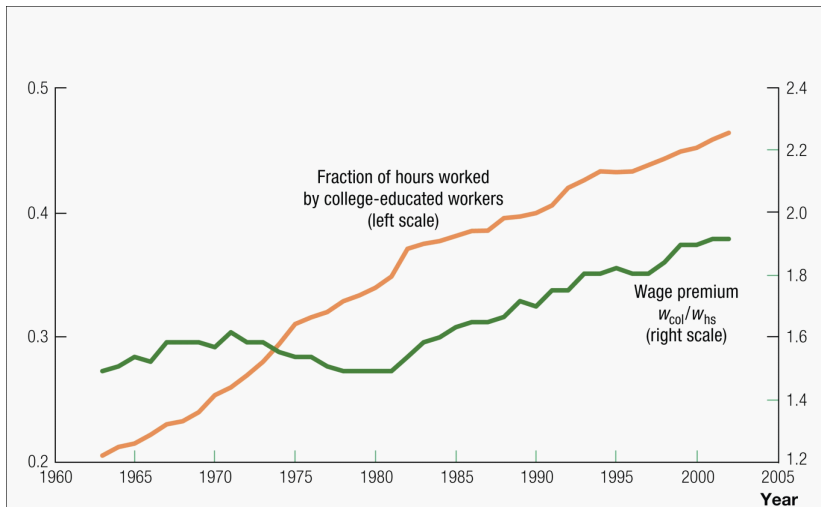


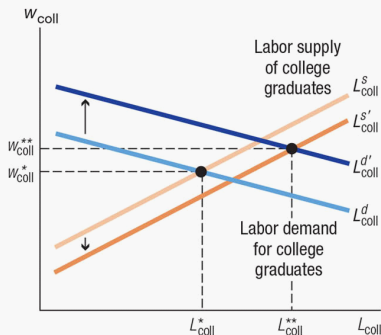
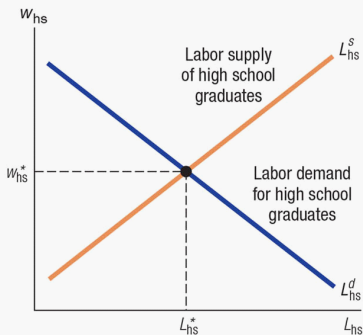
FIGURE 7.8 College Versus High School Wages and Employment, 1960–2005

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Understanding the rising returns to education

FIGURE 7.9

Understanding the Rising Return to Education

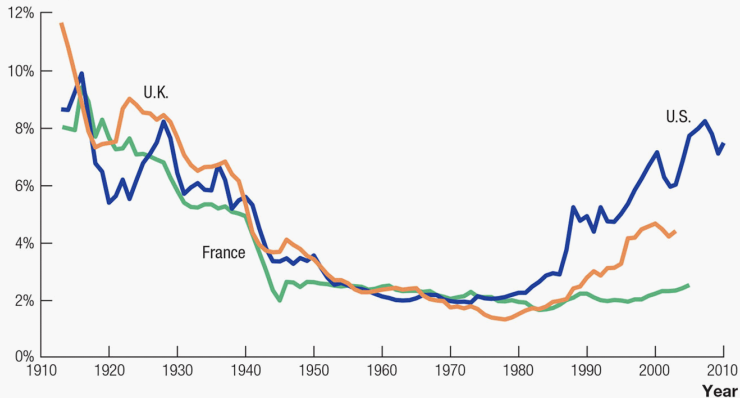


The effects of the increasing college premium

FIGURE 7.10

Income Inequality in the United States, the United Kingdom, and France, 1913–2010

Income share of
top 0.1 percent



VII – Required readings

Required reading

For this week you are required to read **Read Chapter 7** of our adopted textbook.



Charles I. Jones (2014). *Macroeconomics, Third Edition*, W. W. Norton & Company.