Chapter objectives

The natural rate of unemployment:
- what it means
- what causes it
- understanding its behavior in the real world

Key Concepts

- Natural rate of unemployment
- Frictional unemployment
- Structural unemployment
- Sectoral shift
- Unemployment insurance
- Wage rigidity
- Insiders and outsiders
- Efficiency wages
- Minimum wage

Natural Rate of Unemployment

- Natural rate of unemployment: the ______ rate of unemployment around which the economy fluctuates.
- actual unemployment =

  - In a recession, the actual unemployment rate _________ the natural rate.
  - In a boom, the actual unemployment rate ______________ the natural rate.
Actual and natural rates of unemployment in the U.S., 1960-2019

A first model of the natural rate

Notation:

\( L = \# \) of workers in labor force

\( E = \# \) of employed workers

\( U = \# \) of unemployed

\( U/L = \) unemployment rate

Assumptions:

1. \( L \) is exogenously fixed.

2. During any given month,
   \( s = \) fraction of employed workers that become separated from their jobs,
   \( f = \) fraction of unemployed workers that find jobs.

\( s = \) rate of job separations

\( f = \) rate of job finding

(both exogenous)

The transitions between employment and unemployment

Employed

Unemployed
The steady state condition

- Definition: the labor market is in **steady state**, or long-run equilibrium, if the unemployment rate is ________.
- The steady-state condition is:

\[ f \times U = s \times E \]

Solve for \( U/L \):

so,

Example:

- Each month, 1% of employed workers lose their jobs \( (s = 0.01) \)
- Each month, 19% of unemployed workers find jobs \( (f = 0.19) \)
- Find the natural rate of unemployment:

Active Learning:

- If the rate of separation is 0.03 and the rate of job finding is 0.21, what is the value of the natural rate of unemployment?

\[ s = \quad f = \]

Equilibrium:

\[ U/L = \]
**Policy Implication**

- How can a policy affect (reduce) the natural rate of unemployment?
- A policy will reduce the natural rate of unemployment only if it
  - _____ $s$, or
  - __________ $f$.
- Can you think of a policy that would be able to reduce the natural rate of unemployment?

**Why is there unemployment?**

- If job finding were instantaneous ($f = 1$), then all spells of unemployment would be brief, and the natural rate would be near zero.
- There are two reasons why $f < 1$:
  - 1. job search (________)
  - 2. wage rigidity (________)

**Job Search & Frictional Unemployment**

- **Frictional unemployment**: caused by the time it takes workers to search for a job
- occurs because
  - workers have different __________
  - jobs have __________
  - geographic mobility of workers __________
  - flow of information about vacancies and job candidates __________

**Sectoral Shocks**

- **Def.** Changes in the __________ among industries or regions.
- **Example:** __________ more jobs repairing __________, fewer jobs repairing __________
- **Example:** __________ labor demand increases in _______ sectors, decreases in __________ sectors
- Result: _______ unemployment
CASE STUDY:
Structural change over the long run

1960
57.9%
9.9%
28.0%

2017
4.2%
11%
77.4%
0.9%

More examples of sectoral shifts
- Industrial revolution (1800s): agriculture declines, manufacturing soars
- Energy crisis (1970s): demand shifts from larger cars to smaller ones
- Health care spending as % of GDP:
  1960: 5.2  2000: 13.8
  1980: 9.1  2010: 17.9

Unemployment insurance (UI)
- UI pays part of a worker’s former wages for a limited time after losing his/her job.
- UI __ search unemployment, because it:
  • __ the opportunity cost of being unemployed
  • __ the urgency of finding work $\rightarrow$ __ $f$

Benefits of UI
- By allowing workers more time to search, UI may lead to ______ matches between jobs and workers, which would lead to ______ productivity and ______ incomes.

Why is there unemployment?
The natural rate of unemployment:

\[
\frac{U}{L} = \frac{s}{s + f}
\]

- There are two reasons why $f < 1$:

  DONE ✓ 1. job search

  Next ➔ 2. wage rigidity
Unemployment from real wage rigidity

**Structural unemployment:** the unemployment resulting from ________ and ________.

If the real wage is stuck above the eq’m level, then there aren’t enough jobs to go around.

2. **Labor unions**

- Unions exercise monopoly power to secure higher wages for their members.
- When the union wage exceeds the eq’m wage, unemployment results.
- ________: Employed union workers whose interest is to keep wages high.
- ________: Unemployed non-union workers who prefer eq’m wages, so there would be enough jobs for them.

Reasons for wage rigidity

1. **The minimum wage**

- The min. wage may exceed the eq’m wage
  - Which workers are more likely to be impacted?
- Studies: a 10% increase in min. wage increases teen unemployment by ______

**Union membership and wage ratios by industry, 2011**

<table>
<thead>
<tr>
<th>industry</th>
<th># employed (1000s)</th>
<th>U % of total</th>
<th>wage ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private sector (total)</td>
<td>104,737</td>
<td>6.9</td>
<td>122.6</td>
</tr>
<tr>
<td>Government (total)</td>
<td>20,450</td>
<td>37.0</td>
<td>121.1</td>
</tr>
<tr>
<td>Construction</td>
<td>6,244</td>
<td>14.0</td>
<td>151.7</td>
</tr>
<tr>
<td>Mining</td>
<td>780</td>
<td>7.2</td>
<td>96.4</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>13,599</td>
<td>10.5</td>
<td>107.2</td>
</tr>
<tr>
<td>Retail trade</td>
<td>14,582</td>
<td>4.9</td>
<td>102.4</td>
</tr>
<tr>
<td>Transportation</td>
<td>4,355</td>
<td>20.4</td>
<td>123.5</td>
</tr>
<tr>
<td>Finance, insurance</td>
<td>6,111</td>
<td>1.1</td>
<td>90.2</td>
</tr>
<tr>
<td>Professional services</td>
<td>12,171</td>
<td>2.1</td>
<td>99.1</td>
</tr>
<tr>
<td>Education</td>
<td>4,020</td>
<td>13.0</td>
<td>112.6</td>
</tr>
<tr>
<td>Health care</td>
<td>15,835</td>
<td>7.5</td>
<td>114.9</td>
</tr>
</tbody>
</table>

_wage ratio = 100 × (union wage) / (nonunion wage)_
3. Efficiency wage theory

- Theories in which higher wages increase worker productivity by:
  - attracting higher
  - increasing worker
  - reducing
  - improving

- Firms ______ pay above-equilibrium wages to raise productivity.

- Result: __________ unemployment.

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**Question for discussion:**

- Use the material we’ve just covered to come up with a policy or policies to try to reduce the natural rate of unemployment.
- Note whether your policy targets frictional or structural unemployment.

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**The duration of U.S. unemployment,**

*average, Jan 1960 – June 2009*

<table>
<thead>
<tr>
<th># of weeks unemployed</th>
<th># of unemployed persons in group (% of all unemployed persons)</th>
<th>time spent unemployed by this group (% of time spent unemployed by all groups)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>42%</td>
<td>8.1%</td>
</tr>
<tr>
<td>5-14</td>
<td>30%</td>
<td>21.5%</td>
</tr>
<tr>
<td>15 or more</td>
<td>27%</td>
<td>70.4%</td>
</tr>
</tbody>
</table>

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**TREND: The natural rate rises over 1960-84, then falls over 1985-2005**

[Graph showing unemployment rates from 1965 to 2005 with shaded areas indicating U.S. recessions]
EXPLAINING THE TREND: The minimum wage

Dollars per hour

minimum wage in 2009 dollars

minimum wage in current dollars


EXPLAINING THE TREND: Union membership

<table>
<thead>
<tr>
<th>Union membership selected years</th>
<th>percent of labor force</th>
</tr>
</thead>
<tbody>
<tr>
<td>year</td>
<td></td>
</tr>
<tr>
<td>1930</td>
<td>12%</td>
</tr>
<tr>
<td>1945</td>
<td>35%</td>
</tr>
<tr>
<td>1954</td>
<td>35%</td>
</tr>
<tr>
<td>1970</td>
<td>27%</td>
</tr>
<tr>
<td>1983</td>
<td>20.1%</td>
</tr>
<tr>
<td>2012</td>
<td>11.3%</td>
</tr>
</tbody>
</table>

Since early 1980s, the natural rate and union membership have ________.

But, from 1950s to about 1980, the natural rate _____ while union membership _____.

EXPLAINING THE TREND: Sectoral shifts

Price per barrel of oil, in 2009 dollars


EXPLAINING THE TREND: Demographics

- 1970s:
The Baby Boomers were young.
Young workers change jobs more frequently (high value of __).

- Late 1980s through today:
  Baby Boomers aged. Middle-aged workers change jobs less often (low __).
Natural Rate of Unemployment and Policy

- Before the recession around 5%
  - Now estimates around ________%
    - Long-term unemployed → skills and attractiveness to employers
    - Heightened mismatch
    - Higher unemployment benefits

- Fed (______ mandate)
  - monetary policy?
  - NAIRU

Summary

1. The natural rate of unemployment
   - the long-run average or “steady state” rate of unemployment
   - depends on the rates of job separation and job finding

2. Frictional unemployment
   - due to the time it takes to match workers with jobs
   - may be increased by unemployment insurance

3. Structural unemployment
   - results from wage rigidity: the real wage remains above the equilibrium level
   - caused by: minimum wage, unions, efficiency wages

4. Behavior of the natural rate in the U.S.
   - rose from 1960 to early 1980s, then fell
   - possible explanations:
     - trends in real minimum wage,
     - union membership, prevalence of sectoral shifts, and aging of the Baby Boomers