

# Unemployment

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# Today's plan:

- Unemployment
  - Definition
  - Measurement
  
- Natural rate of unemployment.
  - Definition
  - Causes
  - Implications

# Unemployment

Our discussions of the labor market so far have ignored unemployment.

When we introduced the closed economy model, we assumed that the economy is always at full employment.

In reality, at any moment some people are unemployed.

Unemployment is one of the **most discussed macroeconomic variables**. Why?

- Strong indications in the empirical literature that the **unemployed suffer** quite a lot.
- **Macroeconomic efficiency**: we are not using our economy's resources fully!

We will start by defining unemployment and discussing how it is measured.

Then, we will discuss the unemployment in the long run: **the natural rate of unemployment**.

# Unemployment - Measurement

Let's start with some basic definitions:

- **Employed**: those who have jobs.
- **Unemployed**: those who are actively looking for jobs but do not have one.
- **Labor force**: the sum of employed and unemployed people.
- **Not in the labor force**: those who are not employed and not looking for a job.
- **Unemployment rate**: the percentage of the labor force that is unemployed.
- **Labor force participation rate**: the percentage of the working-age population that is in the labor force.
- **Employment to population ratio**: the percentage of the working-age population that is employed.

# Unemployment - Measurement

Who is **counted** as part of the **labor force**?

- People who are **employed**.
- People who are **unemployed**.
  - People who are not employed but are **actively looking** for a job.

Who is **not counted** as part of the **labor force**?

- Students
- Discouraged workers
- Retirees
- Those not working in the formal sector (underground economy)
- Those taking care of children or other family members (homemakers)

# Unemployment - Measurement

**Example:** Suppose adult population in a country is 100 people. 40 people are working at Hungarian, 5 are retired, 5 are homemakers, 10 are studying full time at Columbia, 10 are discouraged workers, 20 people have no job but are actively looking for one and 10 are working in the underground economy. Find:

- Labor force
- Unemployment rate
- Participation rate
- Employment to population ratio

*Answer:*

- $L = 60$
- $u = \frac{U}{L} = \frac{20}{60} = 33.3\%$
- $\frac{L}{100} = 60\%$
- $\frac{E}{100} = \frac{40}{100} = 40\%$

# Unemployment in the Long Run

We will focus on the causes of unemployment in the long run.

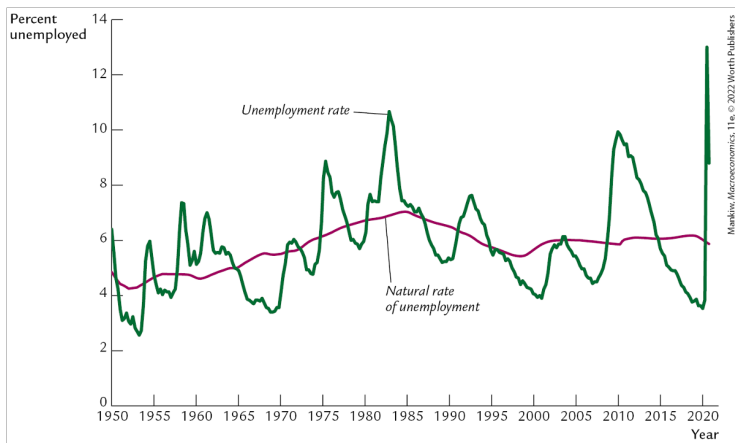
Unemployment in the long run is defined by the **Natural rate of unemployment**:

- The average rate of unemployment around which the economy fluctuates.
- The rate of unemployment toward which **the economy gravitates** in the **long run**.
- It's a consequence of labor market imperfections:
  - **Frictional unemployment**
  - **Structural unemployment**

Let's see how the unemployment rate and the natural rate of unemployment have evolved in the US over time!

# Natural Rate of Unemployment

The Unemployment Rate and the Natural Rate of Unemployment in the United States, 1950-2020



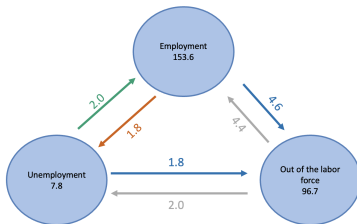


# Flows between employment, unemployment, and non-participation

Every day, some people:

- Lose their jobs and become unemployed.
- Find jobs and leave unemployment.
- Leave the labor force.
- Enter the labor force.

The next plot shows the average monthly flows, in millions, between employment, unemployment, and non-participation in the United States, 2014 to 2024.



# Model - Unemployment

We will develop a simple model to understand what determines the natural rate of unemployment.

We will use the following notation:

- $E$ : Number of **employed** workers.
- $U$ : Number of **unemployed** workers.
- $L$ : **Labor force**.

$$L = E + U$$

- $u$ : **Unemployment rate**.

$$u = \frac{U}{L}$$

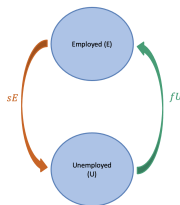
- $f$ : **job finding rate**: the fraction of **unemployed workers** who **find a job** each month.
- $s$ : **job separation rate**: the fraction of **employed workers** who **lose their jobs** each month.

We will **abstract** from **flows out** of the **labor force** and **into** the **labor force**

- As a consequence, the **labor force** is **constant**.

# Model - Unemployment

The flows between employment and unemployment are represented by the following diagram:



$s \cdot E$ : number of workers who **lose** their jobs each month and become **unemployed**.

$f \cdot U$ : number of workers who **find** a job each month and **leave unemployment**.

We want to find the **steady state** unemployment rate of the model:

- The **steady state** is the situation in which the **unemployment rate** is **constant**.
- It will be the **natural rate of unemployment** in our model.

# Model Unemployment

If the unemployment rate does not change, then the number of unemployed workers must be **constant**.

That is: **Number of employed people who lose their job** = **number of unemployed people who find a job**

$$s \cdot E = f \cdot U$$

Substitute  $E = L - U$  in the equation above:

$$s \cdot (L - U) = f \cdot U$$

Divide by  $L$ :

$$s \cdot \left(1 - \frac{U}{L}\right) = f \cdot \frac{U}{L}$$

Note that  $\frac{U}{L}$  is the unemployment rate  $u$ . Isolating  $u$ :

$$u = \frac{s}{s + f}$$

# Model - Unemployment

**Example:** Suppose we have 100 people in the economy, 90 are employed and 10 are unemployed. The job finding rate is 0.1 and the job separation rate is 0.20.

- What is the current unemployment rate?

*Answer:*  $u = 10/100 = 10\%$ .

- How many workers will lose their jobs this month?

*Answer:*  $s \cdot E = 0.20 \cdot 90 = 18$ .

- How many people will find a job this month?

*Answer:*  $f \cdot U = 0.1 \cdot 10 = 1$ .

- What will happen to the number of unemployed people in the next month?

*Answer:*  $U_{t+1} = U_t - 1 + 18 = 27$ .

- Is the economy in a steady state?

*Answer:* No, the unemployment rate will increase.

- What is the steady state unemployment rate?

*Answer:*  $u = \frac{0.20}{0.20+0.10} = 66.7\%$ .

# Model - Unemployment

We can rewrite the steady state unemployment rate as:

$$u = \frac{s}{s + f} = \frac{1}{1 + \frac{f}{s}}$$

An increase in the job finding rate  $f$  will decrease the unemployment rate:

- More people will find jobs each month, reducing the number of unemployed people.

An increase in the job separation rate  $s$  will increase the unemployment rate:

- More people will lose their jobs each month, increasing the number of unemployed people.

# Model Implications

A crucial implication of the model is that any policy aimed at lowering the natural rate of unemployment must:

- Reduce the rate of job separation or
- Increase the rate of job finding.

The model we developed is useful in relating the natural rate of unemployment to the job finding and job separation rates.

We will now discuss the causes of unemployment in the long run: labor market imperfections!

# Frictional Unemployment

Frictional unemployment is caused by the time it takes for workers to search for a job.

It exists even when wages are flexible, and there are enough jobs.

It occurs because:

- Workers have different abilities and preferences.
- Jobs have different skill requirements.
- Geographic mobility of workers is not instantaneous.
- Flow of information about vacancies and job candidates is imperfect.



# Sectoral Shifts

**Sectoral shifts:** changes in the composition of demand among industries or regions

They are an important **source** of **frictional unemployment**.

The economy is always changing, and some industries are growing while others are shrinking.

Take the invention of personal computers in the 1980s:

- The demand for typewriters decreased.
- Thus, the demand for labor by typewriter manufacturers decreased.
- At the same time, it increased the demand for labor in the electronics industry.

# Public Policy and Frictional Unemployment

Many public policies seek to decrease the natural rate of unemployment by reducing frictional unemployment:

- **Government employment agencies** disseminate information about job vacancies to match jobs and workers more efficiently.
- **Retraining programs**: designed to ease the transition of workers from shrinking industries to growing industries.

However, some public policies can increase frictional unemployment.

We will talk about one of them: **Unemployment Insurance**.

# Unemployment Insurance

**Unemployment Insurance:** a government program that partially protects workers' incomes when they become unemployed.

- Unemployed workers can **collect** a **fraction** of their **wages** for a certain period **after** losing their **jobs**.
- This **reduces the opportunity cost** of being unemployed.
  - Could lead to an increase in the separation rate.
- It also **reduces the urgency of finding work**.
  - Could lead to a decrease in the job finding rate.

Does this mean that UI is bad? **Absolutely not!**

- It provides a **safety net** for workers who lose their jobs.
- It allows workers to search for jobs that are a **better match** for their skills and preferences.
- Think about COVID-19: many workers lost their jobs due to the pandemic.
  - UI allowed them to stay afloat, at home, and curb the spread of the virus.

# Structural Unemployment

**Structural unemployment:** There are two definitions:

- The unemployment that results from the **mismatch** between the **number of people who want to work** and the **number of jobs available**.
- The unemployment that results from the mismatch between the skills that workers have and the skills that employers want.

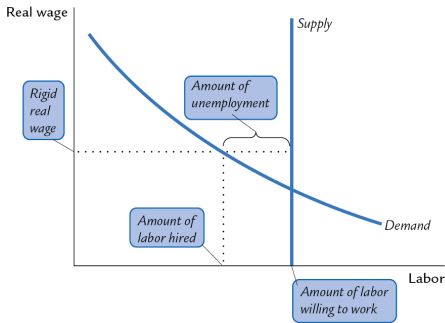
We will stick to the **first definition**.

An important source of structural unemployment is **wage rigidity**.

- **Wage rigidity:** the **failure** of **wages** to **adjust** to a level at which **labor supply equals labor demand**.
- Remember our discussion about one of the benefits of inflation!

# Wage rigidity

Why wage rigidity leads to unemployment?



- When the **real wage** is **above** the level that equilibrates supply and demand, the quantity of **labor supplied exceeds** the quantity **demand**.
- Firms must **ration** the scarce jobs among workers.
- This **reduces** the **job finding rate**.

# Wage rigidity

But why wages are rigid?

We will examine three causes of wage rigidity:

- Minimum wage laws
- Unions
- Efficiency wages

We will start with minimum wage laws.

- Minimum-wage laws set a legal minimum on the wages that firms pay their employees.
- In US, the federal minimum wage is \$7.25 per hour.
  - Some states have higher minimum wages, e.g: New York and California.
- It impacts most the least skilled and inexperienced workers.
  - For those, it increases the wage above the equilibrium wage, reducing the labor demand.
  - Economists believe its greatest impact is on teenage unemployment.

# Minimum wage laws

The minimum wage is a perennial source of political debate.

Proponents argue that it raises the income of the poorest workers.

Opponents argue that:

- It creates unemployment among the least skilled workers.
- It is poorly targeted:
  - Many minimum-wage earners are teenagers from middle-class homes working for discretionary spending money rather than heads of households.

Empirical evidence is mixed: different studies using varying data and methodologies often reach conflicting results.

# Unions and Collective Bargaining

A second cause of wage rigidity is the market power of **unions**:

- **Union**: a worker association that bargains with employers over wages, benefits, and working conditions.
- **Collective bargaining**: the process by which unions and firms agree on the terms of employment.

The **wages** of unionized workers **are not determined by supply and demand**.

- The final agreement **raises** the **wage above** the **equilibrium** wage.
- If the firm cannot afford the higher wage, it may lay off workers.
- This will **reduce** the **job finding rate** increasing structural unemployment.

Unions yield a conflict between the interests of insiders and outsiders!

- **Insiders**: workers currently **employed** who benefit from higher wages.
- **Outsiders**: workers who are **unemployed** or are seeking jobs.
  - At the (lower) equilibrium wage, they could be employed!



# Efficiency Wages

A third cause of wage rigidity is the **efficiency wage theory**.

**Efficiency wage**: a wage that employers set above the equilibrium wage as an incentive for better performance.

- It can **reduce turnover**.
- It can **attract** a better **pool** of **workers**.
- It can **reduce shirking**.

**Shirking** relates to a problem in economics called **Moral Hazard**:

- The tendency of people to **behave inappropriately** when their behavior is **imperfectly monitored**

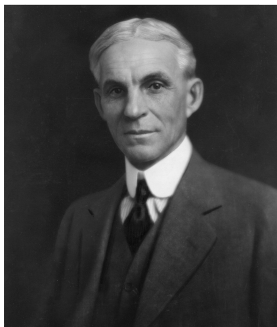
# Efficiency wages

Attracting a better pool of workers relates to a problem in economics called Adverse Selection:

- The tendency of people with more information (in this case, the workers, who know their own outside opportunities and productivity) to self-select in a way that disadvantages people with less information (the firm)

Who discovered the efficiency wage theory?

In practice: Henry Ford



# Henry Ford's \$5 Workday

In 1914, Henry Ford shocked the world by **doubling the wages** of his workers to \$5 a day.

Not surprisingly, long lines of jobseekers waited outside the Ford plant gates, hoping to be hired.

Why did Ford do this? He later said:

*We wanted to pay these wages so that the business would be on a lasting foundation. We were building for the future. A low wage business is always insecure. ... **The payment of five dollars a day** for an eight hour day was one of the finest **cost-cutting moves we ever made**.*

This is curious: Ford **raised wages** to **cut costs**!

Perhaps he had discovered the **efficiency wage theory**: paying higher wages can reduce turnover and increase worker effort.

- Evidence suggests that **absenteeism fell** by **75%** following the wage increase!