Labor Market - Part 1

EC 313, Macroeconomics

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Book Chapter 6

Overview

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Motivation

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In the medium run, prices change!

- goods price (price)
- labor price (wage)

Overview

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- As unemployment falls, **wages rise**.
- As total wages rise, production costs rise.
- As production costs rise, **goods prices increase**!

Overview

Objective

Answer questions about the **medium run**.

Model the relationship between the **price level, P**, **wages, W**, and **employment** to show how **prices** and **output** are determined over time!

Building block for (aggregate-demand and aggregate-supply) **AD-AS** model.

Unemployment

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Calculation

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$$\underbrace{L}_{LaborForce} = \underbrace{N}_{employment} + \underbrace{U}_{unemployment}$$

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- **Unemployment Rate (u)**: The ratio of the number of people unemployed to the number of people in the labor force.

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

Unemployment

Measurement

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- **Current Population Survey (CPS)** is used in the US. Fifty thousand households are interviewed each month.
- Who is unemployed?
    - Anyone who does not have a job has been looking for a job in the last four weeks and is currently available for work.

Measurement

Not in the labor force: Anyone who does not have a job and has not tried to get a job in the last four weeks. These individuals **do not** count towards our unemployment measure.

- One type of individual who is not in the labor force is a **discouraged worker**.
- **Discouraged workers**: People who stop looking for a job because they fear that they won't be able to find a job even if they look.

Unemployment

Definitions

Population: The total number of people that are residents of a country.

Non-institutionalized Civilian Population: The total civilian population that is available for work: calculated as total population minus individuals under the age of 16, in prison, or the armed forces.

Labor Force: The sum of non-institutionalize individuals either working or looking for work.

Unemployment Rate: The ratio of unemployed individuals to the total labor force.

Participation Rate: The ratio of the labor force to the non-institutionalized civilian population. This is the ratio of individuals working or trying to work for all individuals capable of working.

Calculation Example

Suppose the US Economy is comprised of **20 non-institutionalized individuals**. **5 people have jobs**. **5 people don't have jobs but are looking**. **10 people don't have jobs and aren't looking for a job**. Calculate:

- Labor Force (LF):
  - **5** + **5** = 10

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- Unemployment Rate (u):
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- Labor Force Participation Rate (LFP):
  - (LF)/**20** = 50%

Calculation Example

Suppose the US Economy is comprised of **20 non-institutionalized individuals**. **5 people have jobs**. **5 people don't have jobs but are looking**. **10 people don't have jobs and aren't looking for a job**. Now 3 people who were unemployed stop looking for work and 1 person who was employed loses their job (but continues looking for a job).

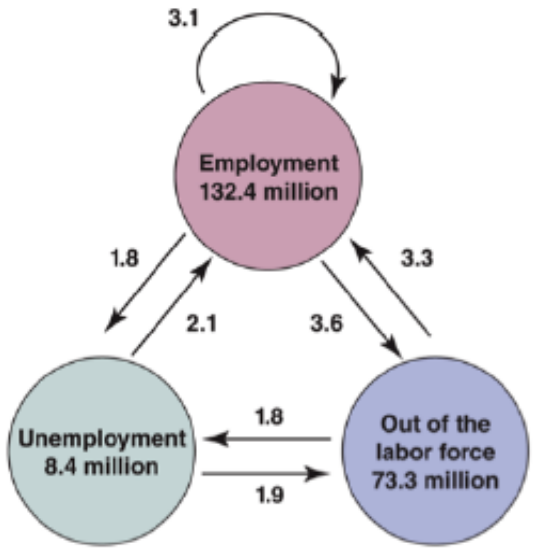
- What is the unemployment rate now?
  - employment: 5 - 1 = 4
  - unemployment: 5 + 1 - 3 = 3
  - unemployment rate: 3 / (4 + 3) = 42.9%

The Unemployment Rate has decreased even though there is actually one fewer employed person in the economy!!!

U.S. Labor Market Features:

6-1 A Tour of the Labor Market

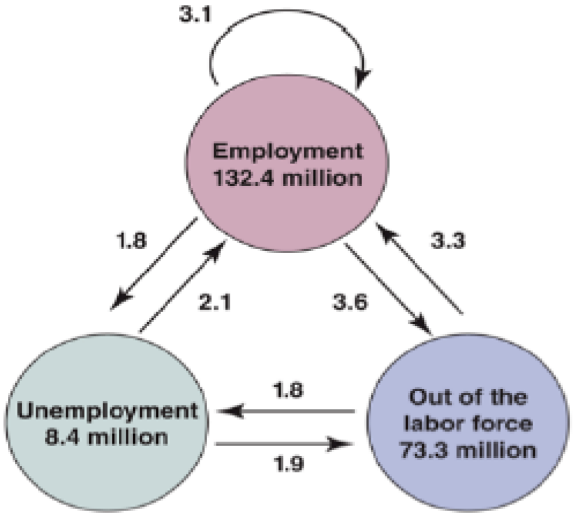
Figure 6-2 Average Monthly Flows between Employment, Unemployment, and Nonparticipation in the United States, 1994 to 2011 (millions)



Source: Calculated from the series constructed by Fleischman and Fallick, http://www.federalreserve.gov/econresdata/researchdata.htm

Unemployment

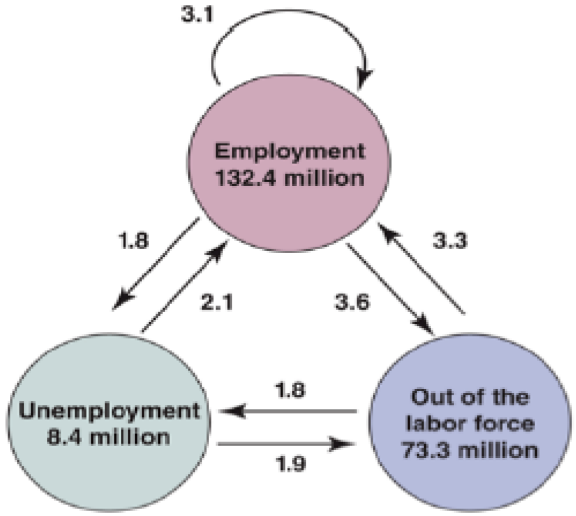
U.S. Labor Market Features:



From the previous graph, we can see that of the **8.4 million**, unemployed workers, each month, nearly half (2.1 million find jobs + 1.9 million leave LF) are no longer unemployed at the end of the month.

Unemployment

U.S. Labor Market Features:



Compute the unemployment rate in the U.S from this graph.

Unemployment

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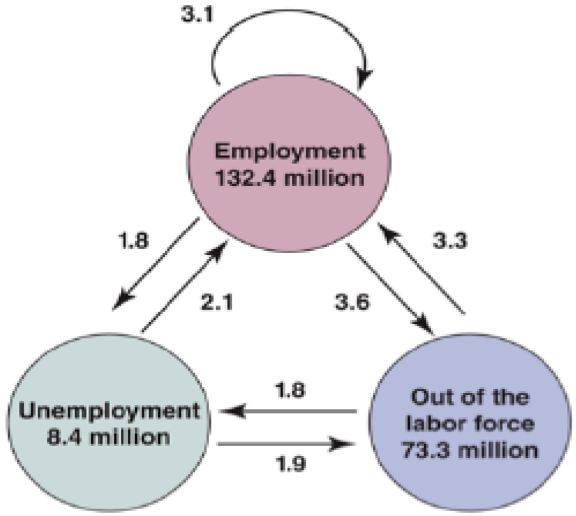


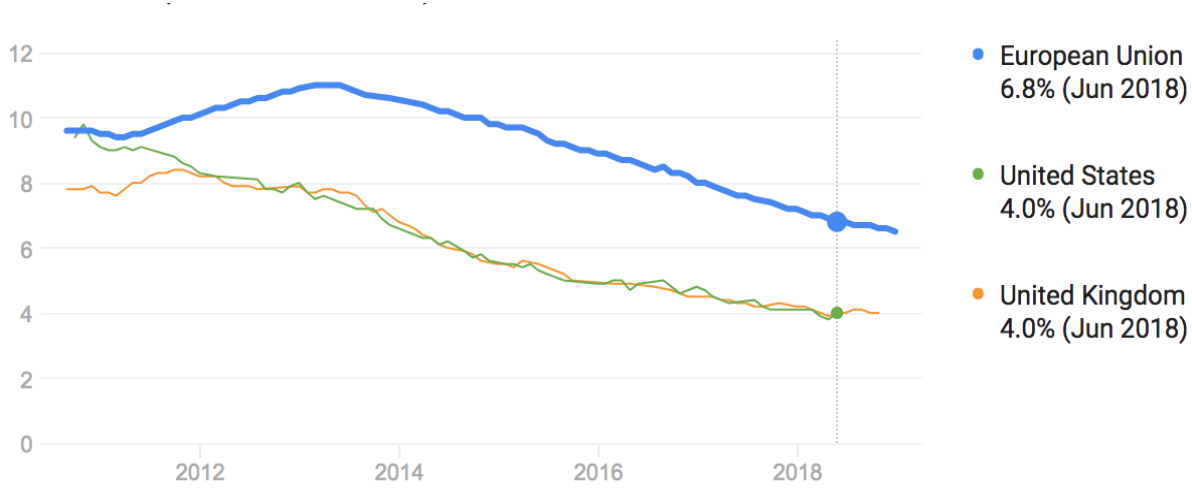
Compute the unemployment rate in the U.S from this graph.

$$
\begin{aligned}
Em &= 132.4 \\
Unem &= 8.4 \\
u &= \frac{Unem}{Em + Unem} \\
&= 8.4/(132.4 + 8.4) \approx 5.966\%
\end{aligned}
$$

Unemployment

U.S. Labor Market Features:

The unemployment rate in the US is usually much lower than in the European Union. The average duration of unemployment in the U.S. is 2-3 months, which is also much shorter than the European Union.



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- Mobility (Language Barrier)
- Unemployment Benefits
- Participation Rate
- ...

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U.S. Labor Market Features:

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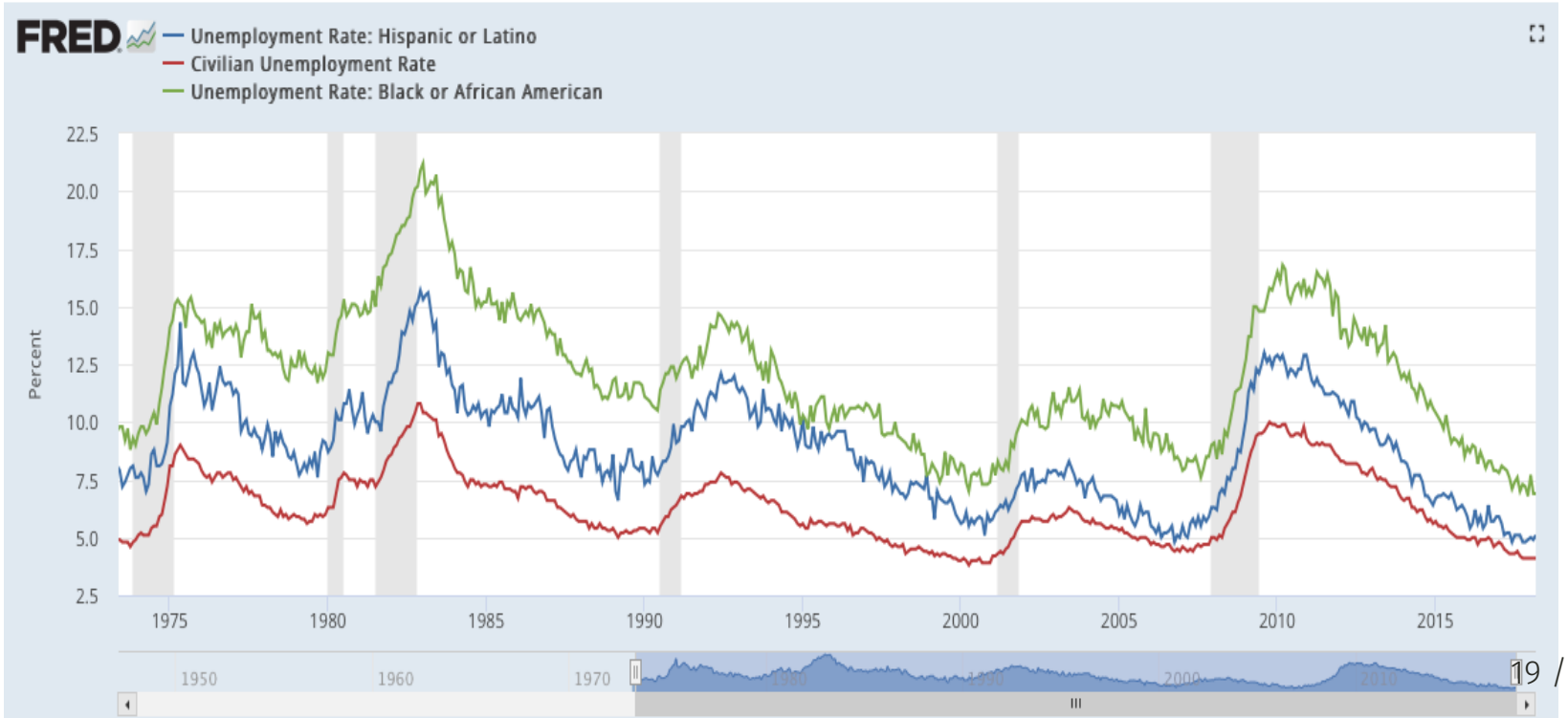

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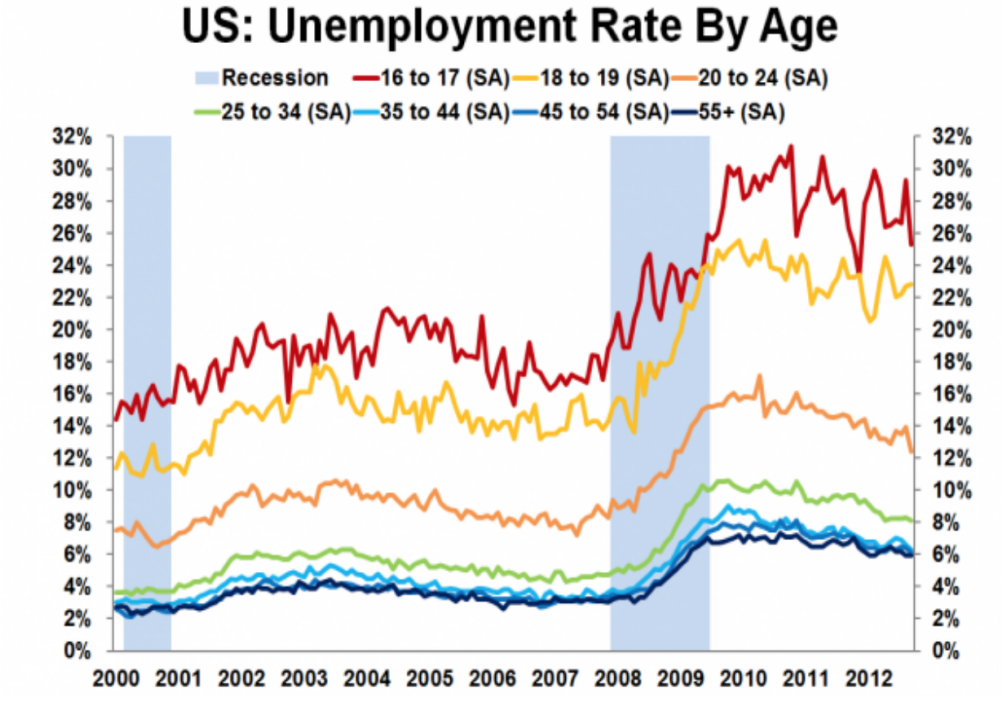

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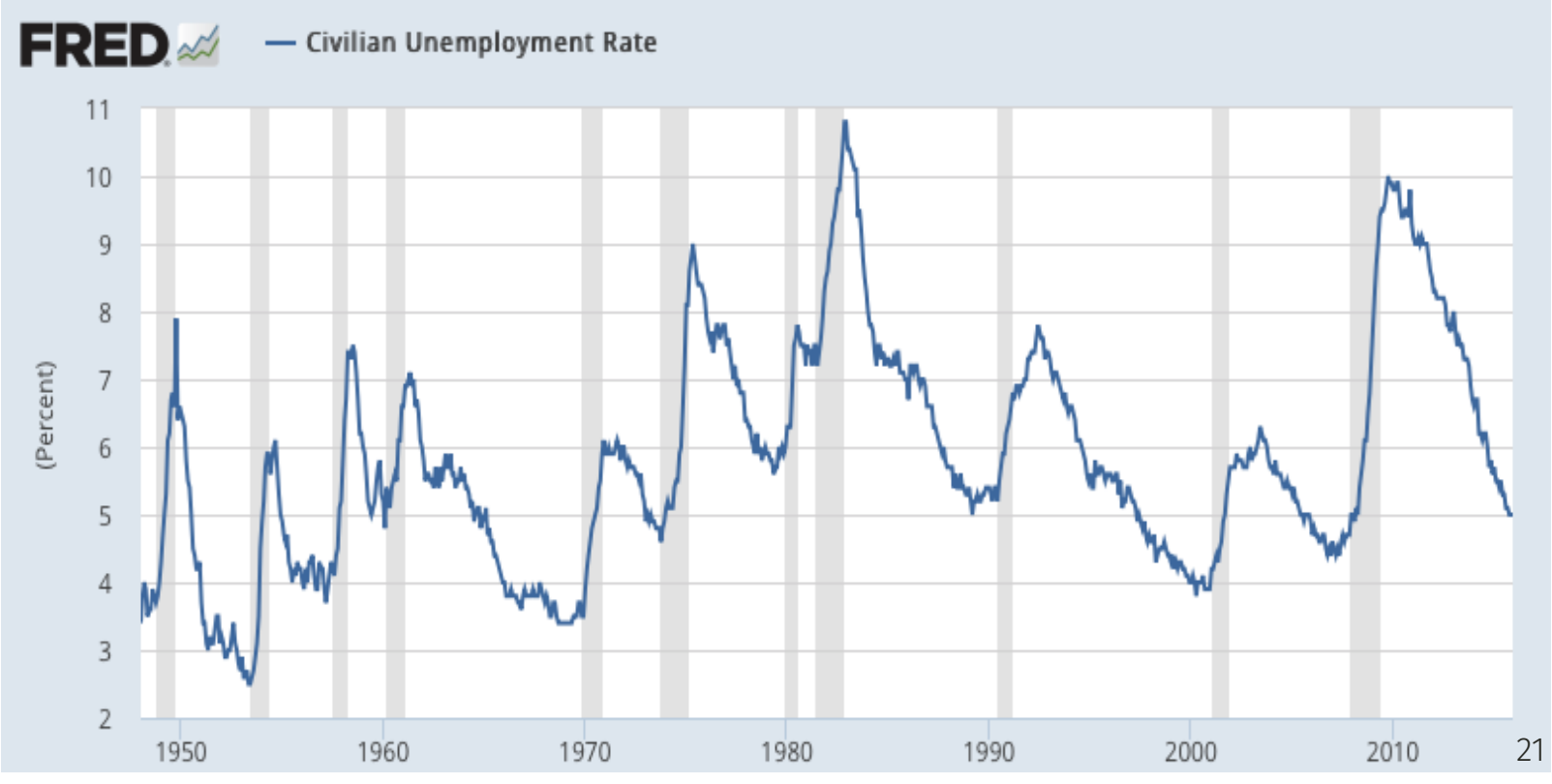
U.S. Labor Market Features:

Note: The unemployment rate is **correlated with recessions** (the grey vertical lines).



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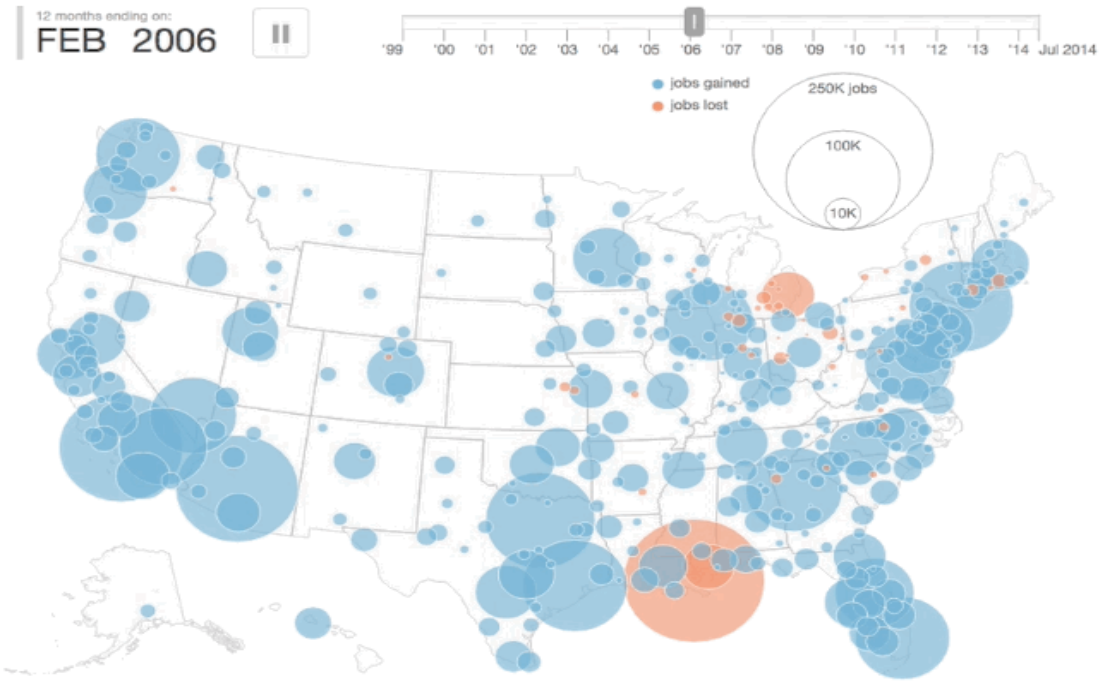

Unemployment

U.S. Labor Market Features:

When unemployment is high:

- Employed workers face **a higher probability** of losing their job.
- Unemployed workers face **a lower probability** of finding a new job.
- This means: the **likelihood** of becoming unemployed and the **duration** of unemployment are both increased when unemployment is high!

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By focusing on unemployment and not employment, we miss the impact of discouraged workers. Is this a problem?

Unemployment

U.S. Labor Market Features:

Recall: The LFPR= $\frac{\text{number of people in the labor force}}{\text{non-institutionalized civilian population}}$

Unemployment

U.S. Labor Market Features:

Q: Why did the labor force participation rate increase so steadily from the 1960s to the 1990s?

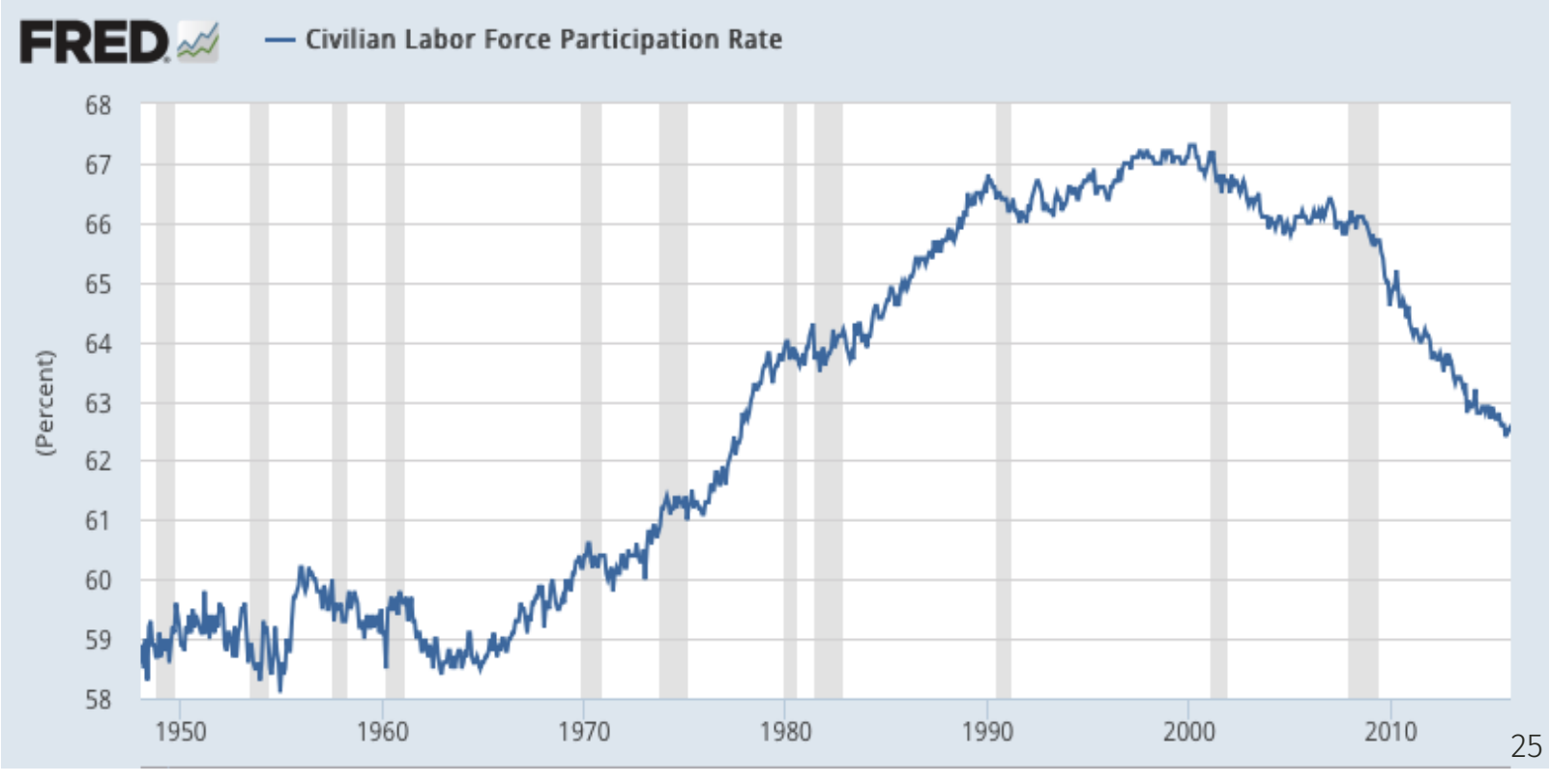

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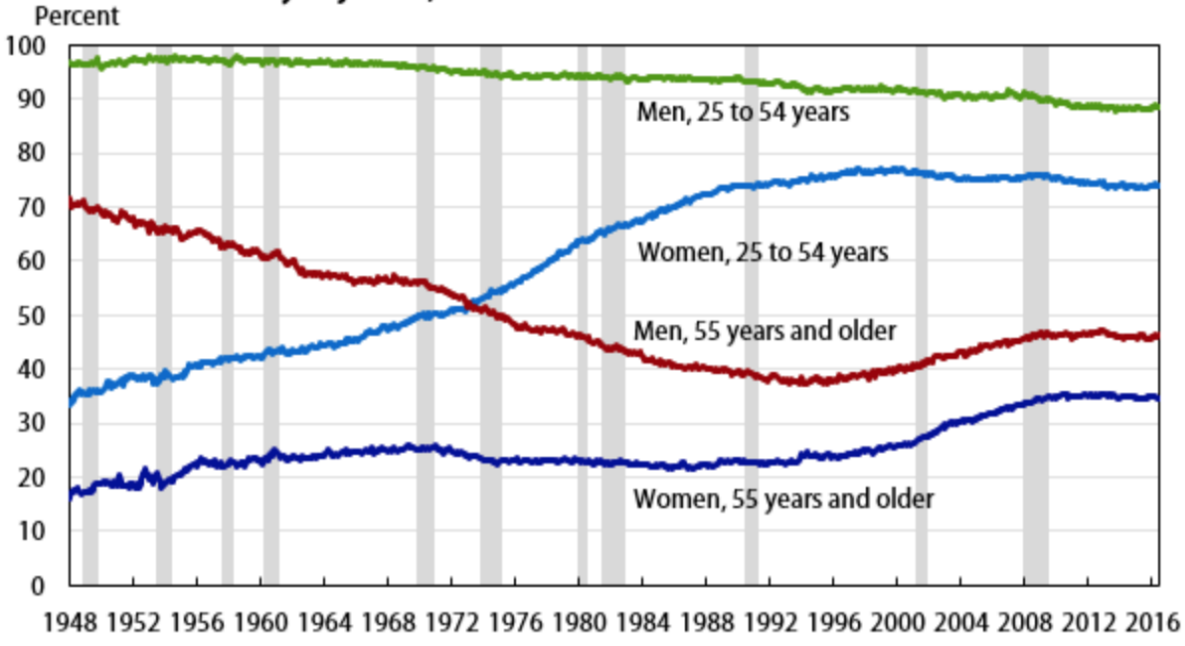
Figure 6. Labor force participation rates of selected age and gender groups, seasonally adjusted, 1948–2016



Note: Shaded areas represent recessions as determined by the National Bureau of Economic Research.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

Collective Bargaining:

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

- In the U.S., only 10% of workers have wages set by collective bargaining. In much of Europe, collective bargaining plays a much bigger role in wage determination.

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- College graduates have a greater ability to negotiate their contracts than workers in retail or food services.

Labor Supply

Labor Supply: Wage-Setting Relation

Q: Who supplies labor in the economy?

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- To understand the labor demand, we need to understand how **workers ask for a wage rate**.

Labor Supply: Wage-Setting Relation

Q: Who supplies labor in the economy?

- To understand the labor demand, we need to understand how **workers ask for a wage rate**.
- Workers consider
  - **Expected Price**
  - **Labor Market Condition**
  - **Other Factors**

Labor Supply: Wage-Setting Relation

Q: How can we create a general function to describe the supply side of labor?

Expectation Price: P^e $(+)$

- P^e is the **price expectation** for an average person in the economy. This average person could be an employer or employee.
- If people in the economy **expect the price to be high** in the future.
- The employees would want to **ask for a higher wage**, because they expect things are more expensive in the future, so they need a higher wage to match the expected higher price.
- Assumption: **Expected Future Price equals Current Price**: $P^e = P$

Labor Supply: Wage-Setting Relation

Q: How can we create a general function to describe the supply side of labor?

Unemployment Rate: u

- As the unemployment rate goes up, more people are looking for jobs and fewer firms hiring.
- It's harder for people to find a job
- The unemployed would ask for a lower wage.

Labor Supply: Wage-Setting Relation

Q: How can we create a general function to describe the supply side of labor?

Other things: z (+)

- Workers have a **reservation wage**: The lowest wage workers would accept to do a job. This is a mathematical simplification of **unemployment benefits**.
- The other factors: **bargaining power/skills**.
- ...

Labor Supply: Wage-Setting Relation

The wage setting equation (comes from workers):

$$W = PF\underbrace{(u, z)}_{(-,+)}$$

This means Wage, W, is a function of :

- Current Price P
- The unemployment rate u
- Other factors z.

Labor Supply: Wage-Setting Relation

In the end, we care about the **real wage** $\frac{W}{P}$, according to the labor supply, we have the following **Wage-Setting Relation**

$$\frac{W}{P} = F\underbrace{(u, z)}_{(-,+)}$$

- When unemployment rate, u, is high, workers demand a lower real wage
- When the other factor, skills or reservation wage, is high, workers demand a higher real wage.

Labor Demand

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Price-Setting Relation

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Price-Setting Relation

Q: Who demands labor in the economy?

- To understand the labor demand, we need to understand **firms incentives**.
- Firms do two things
  - **Buy input factor**, such as labor at price w
  - **Sell final products** at price P

Labor Demand

Price-Setting Relation

- The **prices** that a firm sets depends on the **costs** they face.
- These costs depend on the **production function**, the relation between **inputs** used in production, and the **quantity of output produced**.
- Assumption: **Labor (N)** is the only factor of production. The quantity of output is a **linear function** of labor.

$$Q = A * N$$

where we assume A is the **labor productivity**, which scales the ability of a worker to produce output. Together $A * N$ is called the **effective labor**.

Price-Setting Relation

Do you think labor productivity is constant over time?

What do you think **labor productivity** depends on?

- Education
- Skills
- Technology
- ...

Labor Demand

Price-Setting Relation

The production function is given by: $Q = A * N$, or $N = \frac{1}{A} * Q$

Q: If the firm wants to increase production, Q, by 1 unit, how much more labor would the firm have to hire?

A: $\frac{1}{A}$ units of labor

Q: How much would the firm have to pay this much labor?

A: $\frac{1}{A} * W = \frac{W}{A}$ dollars

$\frac{W}{A}$ **is the marginal cost for the firm**.

Labor Demand

Price-Setting Relation

To produce one extra unit of production, Q, the firm has to pay extra $\frac{W}{A}$ dollars for labor. This unit of production is worth P dollars in the market.

Under Perfect Competition

- $P = \frac{W}{A}$

Under Imperfect Competition (more general case)

The firm can make a profit, so that

- P > $\frac{W}{A}$, more specifically, $P = (1 + m)\frac{W}{A}$ where m is called the mark-up $m > 0$.
- If the firms are perfectly competative, then $m = 0$.

Price-Setting Relation

Consider the general case with **Imperfect Competition**, the real wage, $\frac{W}{P}$, according to **Price-Setting Relation** from **Labor Demand** is:

$$\frac{W}{P} = \frac{A}{1+m}$$

This relation says:

- If the firm has access to better technology A, the firm can give a higher real wage to workers.
- If the firm has higher monopoly power, the firm gives a lower real wage to workers.

Labor Market Equilibrium

Labor Market Equilibrium

Equilibrium Real Wage

Labor Supply or Wage-Setting Relation (WS):

$$\frac{W}{P} = F\underbrace{(u, z)}_{(-,+)}$$

Labor Demand or Price-Setting Relation (PS):

$$\frac{W}{P} = \frac{A}{1+m}$$

Labor Market Equilibrium

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This labor market model is trying to explain **two variables of interest** in our economy:

- Real Wage $\frac{W}{P}$
- Unemployment Rate u

Labor Market Equilibrium

Equilibrium Real Wage

Labor Supply or Wage-Setting Relation (**WS**):

$$\frac{W}{P} = F\underbrace{(u, z)}_{(-,+)}$$

Real Wage $\frac{W}{P}$ **decreases** as Unemployment Rate u increases

Labor Market Equilibrium

Equilibrium Real Wage

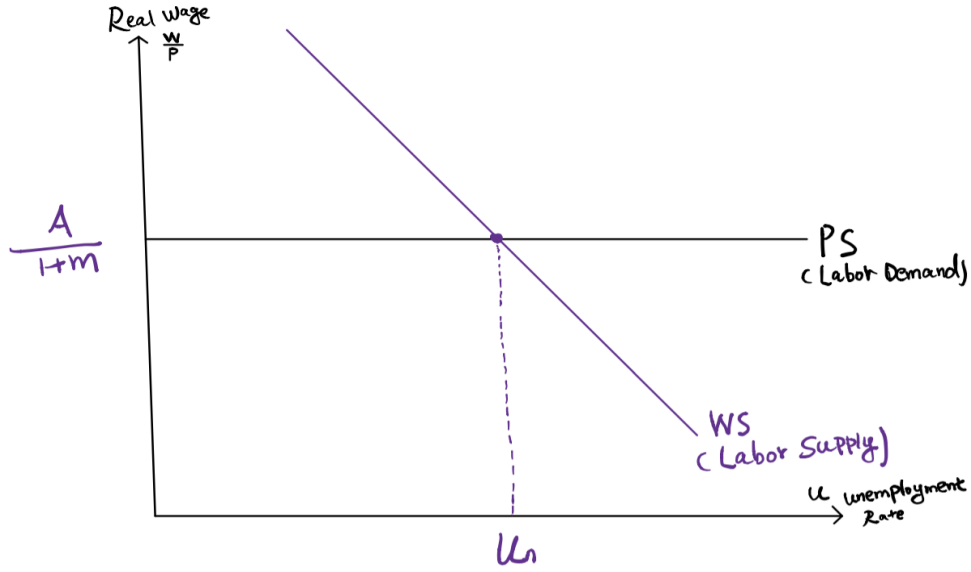
Labor Demand or Price-Setting Relation (**PS**):

$$\frac{W}{P} = \frac{A}{1+m}$$

Real Wage $\frac{W}{P}$ **does not change** as Unemployment Rate u increases

Labor Market Equilibrium

Equilibrium Real Wage



The Equilibrium Wage is equal to $\frac{A}{1+m}$

The Equilibrium Unemployment Rate is u_n, which is also called the natural unemployment rate.