Lecture 2 Unemployment, Inflation, and Interest Rate

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- For many people, the state of the economy can be summarized in just two measures: unemployment rate and inflation rate. This lecture discusses how the government measures unemployment and inflation rates. In particular, we look closely at the related statistics the federal government issues each month.
- As we will see in later lectures, although unemployment and inflation are important problems in the short run, the long-run success of an economy is best judged by its ability to generate high levels of real GDP per person.

The Road Ahead...

How to Measure Unemployment?

- Bureau of Census conducts Current Population Survey (CPS) to classify people as

  - employed (N): people who have job

  - unemployed (U): people who don't have job but are actively looking for one

  - not in labor force: neither, e.g. discouraged worker

- Bureau of Labor Statistics (BLS) uses CPS data to calculate

  - labor force (L) = N + U

  - unemployment rate (u) = U / L × 100% (series U-3)

  - participation rate = L / working-age population (civilian noninstitutional population) × 100%
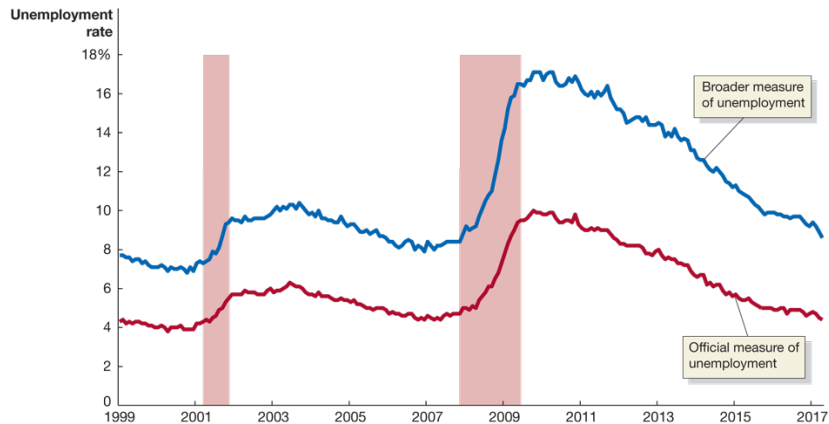
- Each month, the U.S. Census Bureau conducts the Current Population Survey to collect data needed to compute the unemployment rate. The bureau interviews adults in a sample of 60,000 households, chosen to represent the U.S. population, about the employment status of everyone in the household 16 years of age and older. The Department of Labor's Bureau of Labor Statistics (BLS) uses these data to calculate the monthly unemployment rate. People are considered:

  - employed if they worked during the week before the survey or if they were temporarily away from their jobs because they were ill, on vacation, on strike, or for other reasons

  - unemployed if they did not work in the previous week but were available for work and had actively looked for work at some time during the previous four weeks

  - not in the labor force if they do not have a job and are not actively looking for a job

Working-Age Population
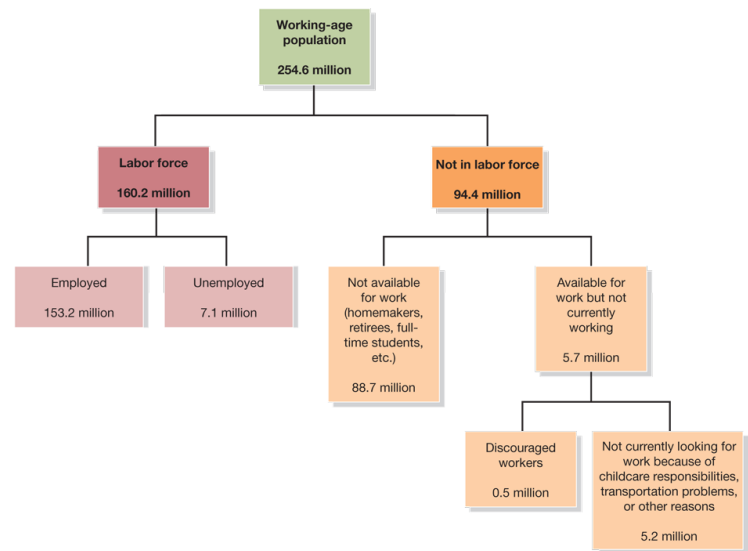
▶ Employment status, April 2017 (source: BLS)

Broader Measure of Unemployment

Unemployment rate

Broader measure of unemployment

Official measure of unemployment

▶ Series U-6 = U-3 + discouraged + part-time (source: BLS)

▶ Official U-3 is not exact measure of joblessness

- The red line shows the official measure of the unemployment rate.
- The blue line shows what the unemployment rate would be if the BLS had counted as unemployed (1) people who were available for work but not actively looking for jobs and (2) people who were in part-time jobs but wanted full-time jobs.
- The difference between the two measures of the unemployment rate is substantial and was particularly large during the slow recovery following the 2007–2009 recession.

Types of Unemployment

- ▶ We identify three types of unemployment
  - ▶ frictional: temporary unemployment due to process of matching workers with jobs
  - ▶ structural: longer unemployment due to mismatch b/w worker's skills/attributes and job requirements
  - ▶ cyclical: unemployment due to business cycle recession

- ▶ When cyclical unemployment drops to zero
  - ▶ economy is at full employment
  - ▶ natural rate of unemployment (u_n)
  - ▶ general consensus for U.S.: b/w 4% and 5%

- ▶ Why unemployment rate never falls to zero?

- The unemployment rate follows the business cycle, rising during recessions and falling during expansions. However, it never falls to zero. To understand why, we need to discuss three types of unemployment:
  - Workers have different skills, interests, and abilities, and jobs have different skill requirements, working conditions, and pay levels. Most workers spend at least some time in job search, just as most firms spend time searching for a new person to fill a job opening. Frictional unemployment is short-term unemployment that arises from the process of matching workers with jobs.

  - Structural unemployment arises from a persistent mismatch between the job skills or attributes of workers and the requirements of jobs. While frictional unemployment is short term, structural unemployment can last for longer periods because workers need time to learn new skills.

  - When the economy moves into a recession, many firms find their sales falling and cut back on production. As production falls, firms start laying off workers. Workers who lose their jobs because of a recession are cyclically unemployed.

U.S. Unemployment Rate
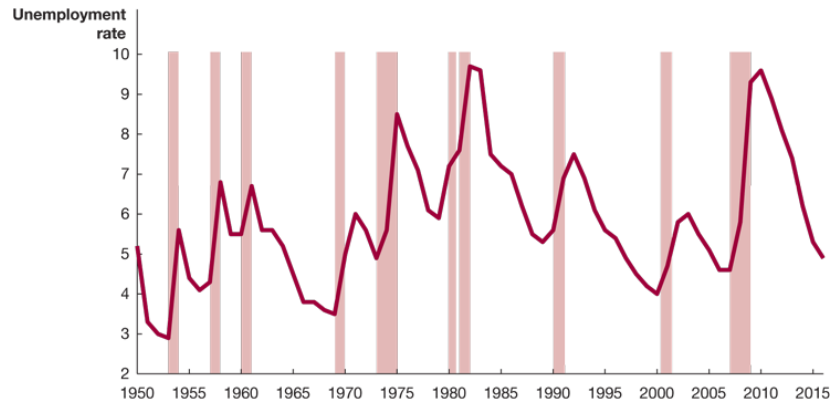
- ▶ U.S. unemployment rate, 1950-2016 (source: BLS)

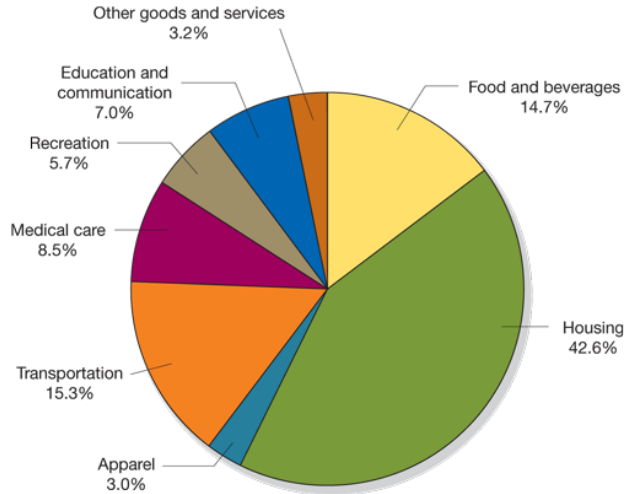- ▶ u rises during recessions and falls during expansions

The Road Ahead...

How to Measure Inflation

- Three common measures of price level

  - GDP deflator (broadest)

  - consumer price index (CPI): price of basket of goods and services purchased by consumer (cost of living)

  - producer price index (PPI): price received by producers of goods and services at all stages of production

- Changes in PPI signifies future movements in CPI

- Inflation rate is percentage increase in price level

$$\pi_t = \frac{P_t - P_{t-1}}{P_{t-1}} \times 100\%$$

- The price level measures the average prices of goods and services in the economy. In the last lecture, we introduced the GDP deflator, which is the broadest measure of the price level because it includes the price of every final good and service. But for some purposes, it is too broad.
- Here we will focus on measuring the price level by the consumer price index because changes in this index come closest to measuring changes in the cost of living as experienced by a typical household.
- While the CPI tracks the prices of goods and services purchased by a typical household, the PPI tracks the prices firms receive for goods and services at all stages of production. In particular, the PPI includes the prices of intermediate goods.
- The inflation rate is the percentage increase in the price level from one year to the next.

CPI Market Basket

Other goods and services 3.2%

Education and communication 7.0%

Recreation 5.7%

Medical care 8.5%

Transportation 15.3%

Apparel 3.0%

Food and beverages 14.7%

Housing 42.6%

▶ CPI market basket, December 2016 (source: BLS)

▶ Housing, transportation, and food make up about 75%

- To obtain prices of a representative group of goods and services, the BLS surveys 14,000 households nationwide on their spending habits. It uses the results of this survey to construct a market basket of 211 types of goods and services purchased by a typical urban family of four.

- This figure shows the goods and services in the market basket, grouped into eight broad categories. Almost three-quarters of the market basket falls into just three categories: housing, transportation, and food.

- Each month, hundreds of BLS employees visit 23,000 stores in 87 cities and record prices of the goods and services in the market basket. Each price in the CPI is given a weight equal to the fraction of a typical family's budget spent on that good or service.

Calculating CPI

Product	1999 Quantity	1999 Price	2020 Price	2021 Price
Eye examinations	1	$50	$100	$85
Pizzas	20	$10	$15	$14
Books	20	$25	$25	$27.5

▶ Assume base year is 1999

▶ Calculate CPI for year 2020 & 2021

$$\text{CPI} = \frac{\text{expenditures in current year}}{\text{expenditures in base year}} \times 100$$

Answer: $P_{2020} = 120, \quad P_{2021} = 122$

▶ 2021 inflation: $\pi_{2021} = (122 - 120)/120 \times 100\% \approx 1.7\%$

Purchasing Power

Year	Nominal Average Hourly Earnings	CPI (1982-1984=100)
2020	$19.73	230
2021	$20.14	233
2022	$20.60	237

▶ Nominal variables are values in current-year dollars

▶ Calculate real values for years 2020-2022

$$\text{real variable} = \frac{\text{nominal variable}}{\text{current-year price index}} \times 100$$

Answer: $W_{2020} = \$8.59$, $W_{2021} = \$8.65$, $W_{2022} = \$8.70$

▶ Compare growth rates in nominal and real values

- You are likely to receive a much higher salary after graduation than your parents did 25 or more years ago, but prices 25 years ago were, on average, much lower than prices today.
- In other words, the purchasing power of a dollar was much higher 25 years ago because the prices of most goods and services were much lower.
- Price indexes such as the CPI give us a way of adjusting for the effects of inflation so that we can compare dollar values from different years.

The Road Ahead...

Real versus Nominal Interest Rates

- Interest rate is cost of borrowing funds

  - nominal interest rate (i): expressed in terms of units of national currency; borrowing $1 this year requires repaying $(1 + i)$ next year
    $\Rightarrow$ this year's price of one dollar relative to next year

  - real interest rate (r): expressed in terms of baskets of goods; borrowing one basket this year requires repaying $(1 + r)$ baskets next year
    $\Rightarrow$ this year's price of one basket relative to next year

- Borrowers/lenders care about r rather than i

- A useful (Fisher) relation

$$r_t \approx i_t - \pi_{t+1}^e \quad \text{for small } i_t \text{ and } \pi_{t+1}^e$$

- The difference between nominal and real values is important when money is being borrowed and lent. The interest rate is the cost of borrowing funds, expressed as a percentage of the amount borrowed.

  - The stated interest rate on a loan is the nominal interest rate.

  - The real interest rate corrects the nominal interest rate for the effect of inflation on purchasing power.

- It is impossible to know whether a particular nominal interest rate is "high" or "low". It all depends on the inflation rate. The real interest rate provides a better measure of the true cost of borrowing and the true return from lending than does the nominal interest rate.

- For example, when firms are deciding whether to borrow the funds to buy an investment good, such as a new factory, they will look at the real interest rate because it measures the true cost to the firm of borrowing.

U.S. Interest Rates
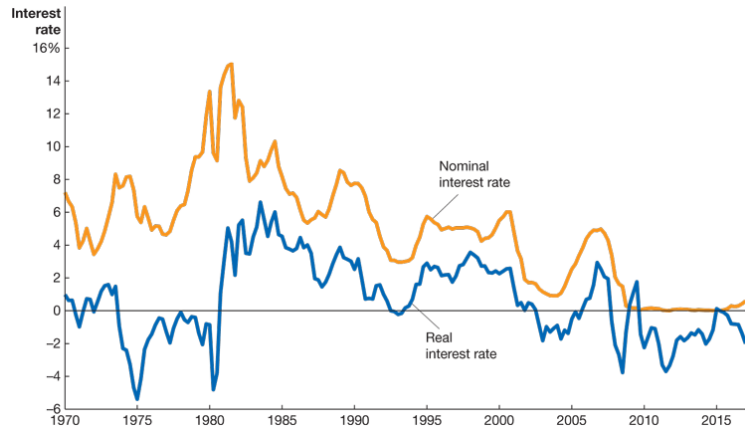
- i = interest rate on 3-month U.S. Treasury bills, π = percentage change in CPI (source: FRED)

- *ex-ante* versus *ex-post* real interest rates

Readings & Exercises

- ► Readings
  - ► HO: chapter 9
  - ► BJ: lecture 1 (sec. 2, 3, 4), lecture 5 (sec. 1), 12 (sec. 1) (supplementary)

- ► Exercises
  - ► HO: problem 1.7, 3.2, 4.6, 5.5, 6.6, D9.2
  - ► Derive Fisher relation