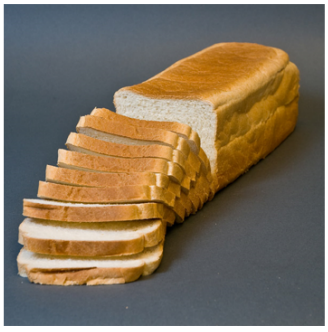
Chapter 9: Measuring the Cost of Living

Instructions: These are the notes for Chapter 9. Make sure you review the material presented here and read the corresponding chapters on the textbook: **Chapter 16 on Mankiw.**

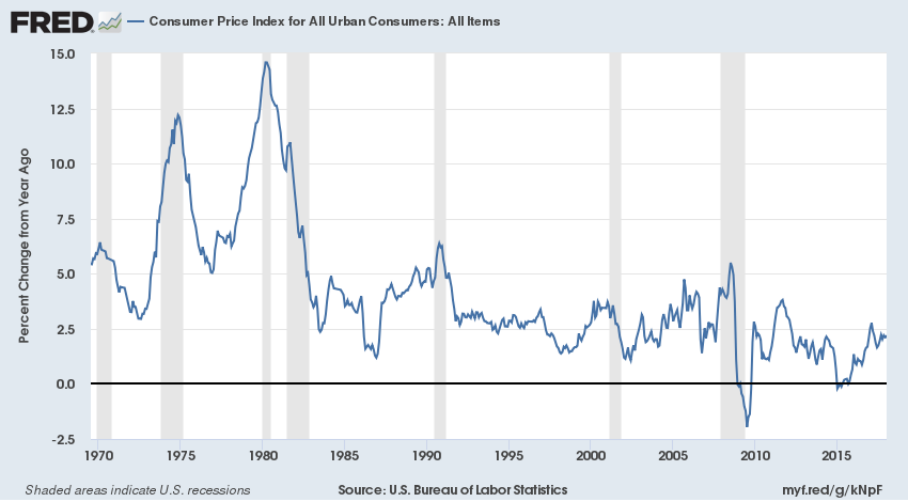
Inflation

- **Inflation** is a rise in the general level of prices.
- Not necessarily all prices, i.e. some prices may stay the same while others increase.
- Normally measured by using Consumer Price Index (CPI): a basket of goods.
- Inflation reduces the purchasing power of money!

- In 1988, a loaf of bread cost approximately 59 cents. In 2013, that same loaf of bread cost $1.42 (Bureau of Statistics).



Inflation in the U.S. over time



Consumer Price Index (CPI)

- **The Consumer Price Index (CPI)** is a measure of the overall cost of the goods and services bought by a typical consumer.
- The Bureau of Labor Statistics (BLS) surveys consumers to determine what's in the typical urban consumer's "shopping basket" every month and collects data on prices using this sample.
- Steps to calculate CPI:
  1. Fix the basket by choosing items in a typical shopping list.
  2. Collect the price information for each item.
  3. Compute the total cost of the basket using these prices.
  4. Choose a base year and compute the CPI.

$$CPI = \frac{cost\ of\ basket\ in\ current\ year}{cost\ of\ basket\ in\ base\ year} \times 100 \tag{1}$$

- Inflation rate is the percentage change in the CPI from the preceding period.

$$Inflation\ rate = \frac{CPI\ this\ year - CPI\ last\ year}{CPI\ last\ year} \times 100 \tag{2}$$

- Note that inflation rate can be negative, which is called **deflation.**

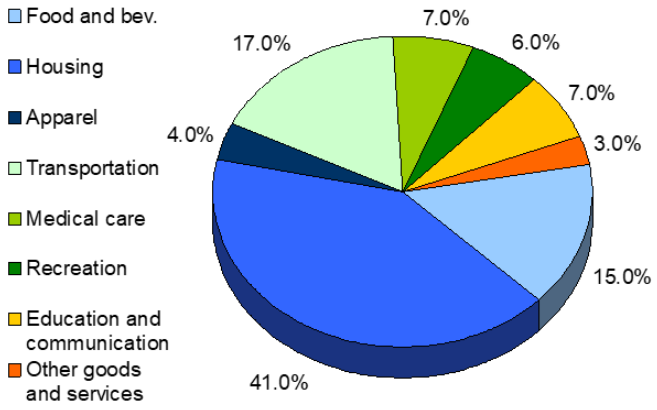
basket: {4 pizzas, 10 lattes}

year	price of pizza	price of latte	cost of basket
2010	\$10	\$2.00	\$10 x 4 + \$2 x 10 = \$60
2011	\$11	\$2.50	\$11 x 4 + \$2.5 x 10 = \$69
2012	\$14	\$3.00	\$14 x 4 + \$3 x 10 = \$86

Calculating the CPI

- Calculate the CPI in each year using 2010 as base year.
  - 2010: $(\$60/\$60) \times 100 = 100$
  - 2011: $(\$69/\$60) \times 100 = 115$
  - 2012: $(\$86/\$60) \times 100 = 143$
- Inflation between 2011-2010 is $(115 - 100)/100 \times 100 = \%15$
- Inflation between 2012-2011 is $(143 - 115)/115 \times 100 = \%24$

What is in the CPI Basket?



Problems with CPI: Substitution Bias

- Over time, some prices rise faster than others.
- Consumers substitute toward goods that become relatively cheaper, mitigating the effects of price increases.
- The CPI misses this substitution because it uses a fixed basket of goods.
- Thus, the CPI overstates increases in the cost of living.

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Calculating the CPI

- In reality, households would buy less pizza and more latte in 2012.
- Suppose in 2012, they buy 3 pizzas and 12 lattes.
- Actual cost of basket in 2012: $\$14 \times 3 + \$3 \times 12 = \$78$ (instead of what CPI reports: \$86).
- Change in prices (actual inflation) between 2012-2011 is $(\$78 - \$69)/\$69 \times 100 = 13\%$ instead of CPI inflation: 24%.

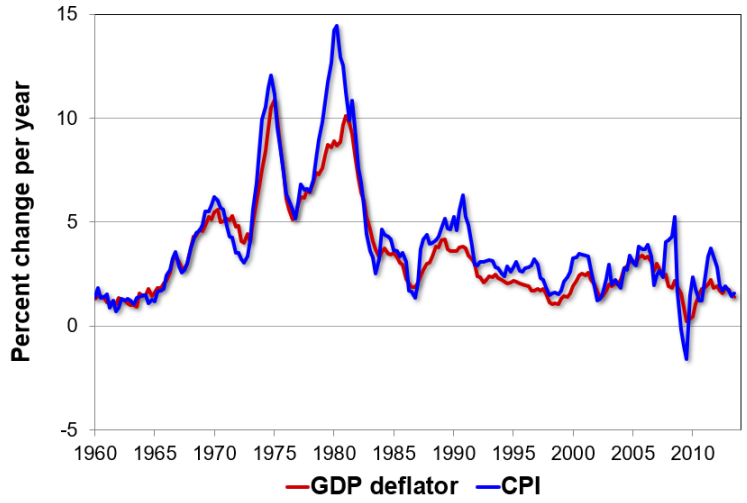
Problems with CPI: New Goods

- How to include PlayStation 5 to the basket and compare it with PlayStation 4?
- CPI misses this effect because it uses a fixed basket of goods.
- Updating the list does not fully solve the problem – can't compare apples and oranges!

Problems with CPI: Change in Quality

- Quality of products increases with better technology
  - Suppose Playstation 4 is released at \$300 and Playstation 5 at \$320. Did the price increase due to inflation or better quality?
- Bureau of Labor Statistics tries to correct for "quality" but quality is hard to measure.
- Causing CPI to overstate or understate the cost of living.

CPI vs. GDP Deflator



CPI vs. GDP Deflator

- Recall GDP Deflator measures the price changes in GDP (Y) = C + I + G + NX; whereas CPI uses a sample consumption basket: focusing on C and imports!
- GDP Deflator does not include imports as GDP only includes goods produced within the country.
- GDP is updated frequently including new items and new technologies; but CPI uses a fixed basket that is updated somewhat rarely.

Question

- In each scenario, determine the effects on the CPI and the GDP deflator.
  1. Starbucks raises the price of Frappuccinos.
  2. Caterpillar raises the price of the industrial tractors it manufactures at its Illinois factory.
  3. Armani raises the price of the Italian jeans it sells in the U.S.

Correcting Variables for Inflation

- Highest Grossing Domestic Movies of All Time
  - Star Wars: The Force Awakens: $936,662,225
  - Gone with the Wind: $198,676,459 (once adjusted for inflation $1,808,299,403)

- Inflation makes it harder to compare dollar amounts from different times.
- Example: the federal minimum wage (current dollars)
  - $1.25 in 1963
  - $7.25 in 2013
- How does the purchasing power in 1963 or 2013 compare?
- We can use CPI to convert 1963 dollars into 2013 dollars.

$$\text{Amount in today's dollars} = \text{Amount in year } T \text{ dollars} \times \frac{\text{CPI today}}{\text{CPI in year } T}$$

- In our example, year T is 1963; today is 2013.
- Minimum wage in year T was $1.25.
- We can look up and find out CPI = 30.9 in year T, CPI = 234.6 today.
- $1.25 $\times$ (234.6/30.9) = $9.49.
- The minimum wage in 1963 was $9.49 in 2013 dollars (more than the minimum wage in 2013: $7.25).

Question

- In 1931, President Herbert Hoover was paid a salary of $75,000. Government statistics show a consumer price index of 15.2 for 1931 and 237 for 2015. President Hoover's 1931 salary was equivalent to a 2015 salary of about
  a. $4,965
  b. $1,169,408
  c. $1,057,894
  d. $16,080,001

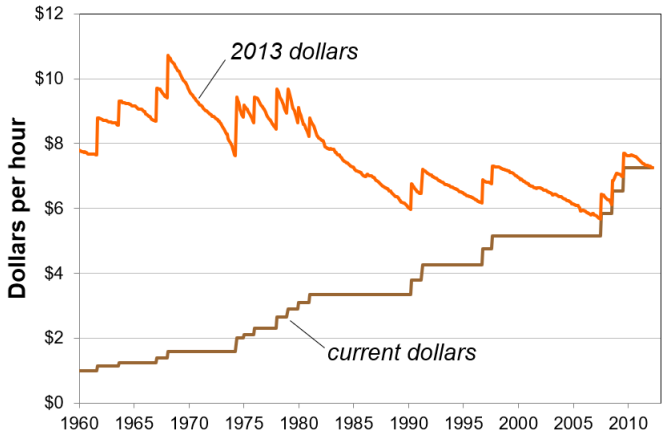
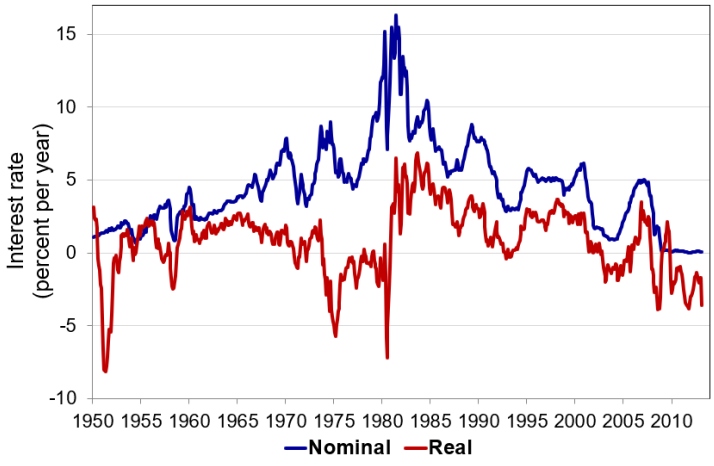


Figure 1: The U.S. minimum wage over time

Correcting Variables for Inflation: Real vs. Nominal Interest Rate

- **Nominal interest rate** is the interest rate not corrected for inflation.
  - Shown in your account or statement
- **Real interest rate** is corrected for inflation.
  - Normally not shown in your account or statement.
- Real interest rate = (nominal interest rate) – (inflation rate)
- Example: Deposit $1,000 for one year.
  - Nominal interest rate is 9%.
  - During that year, inflation was 3.5%.
  - Real interest rate = 9.0% – 3.5% = 5.5%
  - Your $1000 deposit actually brings you 5.5%.

Correcting Variables for Inflation: Real vs. Nominal Interest Rate



Causes of Inflation

- Why does inflation occur?
  - Inflation is almost completely a result of an increase in the money supply.
  - When the government increases the amount of money in circulation – the value of money falls.
  - This leads to an increase in the inflation rate.

Summary

- The Consumer Price Index is a measure of the cost of living. The CPI tracks the cost of the typical consumer's "basket" of goods & services.
- The CPI is used to make Cost of Living Adjustments and to correct economic variables for the effects of inflation.
- The real interest rate is corrected for inflation and is computed by subtracting the inflation rate from the nominal interest rate.