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Principles of
Macroeconomics
Sixth Edition



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Measuring the Cost of Living

Premium
PowerPoint
Slides by
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*In this chapter,
look for the answers to these questions:*

- What is the Consumer Price Index (CPI)? How is it calculated? What's it used for?
- What are the problems with the CPI? How serious are they?
- How does the CPI differ from the GDP deflator?
- How can we use the CPI to compare dollar amounts from different years? Why would we want to do this, anyway?
- How can we correct interest rates for inflation?

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The Consumer Price Index (CPI)

- measures the typical consumer's cost of living
- the basis of cost of living adjustments (COLAs) in many contracts and in Social Security
- there aren't many contracts with COLAs, but Social Security has one

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How the CPI Is Calculated

- 1. Fix the "basket."**
The Bureau of Labor Statistics (BLS) surveys consumers to determine what's in the typical consumer's "shopping basket."
- 2. Find the prices.**
The BLS collects data on the prices of all the goods in the basket.
- 3. Compute the basket's cost.**
Use the prices to compute the total cost of the basket.

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How the CPI Is Calculated

4. Choose a base year and compute the index.

The CPI in any year equals

$$100 \times \frac{\text{cost of basket in current year}}{\text{cost of basket in base year}}$$

5. Compute the inflation rate.

The percentage change in the CPI from the preceding period.

$$\text{Inflation rate} = \frac{\text{CPI this year} - \text{CPI last year}}{\text{CPI last year}} \times 100\%$$

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The GDP Deflator (from chapter 10)

The GDP deflator is a measure of the overall level of prices.

Definition:

$$\text{GDP deflator} = 100 \times \frac{\text{nominal GDP}}{\text{real GDP}}$$

One way to measure the economy's **inflation rate** is to compute the percentage increase in the GDP deflator from one year to the next.

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EXAMPLE basket: {4 pizzas, 10 butter}

year	price of pizza	price of butter	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	\$12	\$3.00	\$12 x 4 + \$3 x 10 = \$78

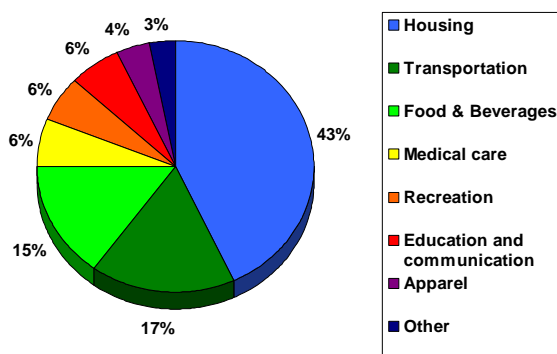
Compute CPI in each year using 2010 as base year:

$$\begin{aligned}
 2010: & 100 \times (\$60/\$60) = 100 \\
 2011: & 100 \times (\$69/\$60) = 115 \\
 2012: & 100 \times (\$78/\$60) = 130
 \end{aligned}$$

$15\% = \frac{115 - 100}{100} \times 100\%$
 $13\% = \frac{130 - 115}{115} \times 100\%$

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What's in the CPI's Basket?



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ACTIVE LEARNING 2

Substitution bias

CPI basket:

{10# beef,
20# chicken}

	<i>beef</i>	<i>chicken</i>	<i>cost of CPI basket</i>
2010	\$4	\$4	\$120
2011	\$5	\$5	\$150
2012	\$9	\$6	\$210

2010–11:

Households

bought CPI basket.

2012: Households bought {5 lbs beef, 25 lbs chicken}.

- A.** Compute cost of the 2012 household basket.
- B.** Compute % increase in cost of household basket over 2011–12, compare to CPI inflation rate.

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ACTIVE LEARNING 2

Answers

CPI basket:

{10# beef,
20# chicken}

	<i>beef</i>	<i>chicken</i>	<i>cost of CPI basket</i>
2010	\$4	\$4	\$120
2011	\$5	\$5	\$150
2012	\$9	\$6	\$210

Household

basket in 2012:

{5# beef,
25# chicken}

- A.** Compute cost of the 2012 household basket.

$$(\$9 \times 5) + (\$6 \times 25) = \$195$$

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ACTIVE LEARNING 2

Answers

CPI basket:

{10# beef,
20# chicken}

	<i>beef</i>	<i>chicken</i>	<i>cost of CPI basket</i>
2010	\$4	\$4	\$120
2011	\$5	\$5	\$150
2012	\$9	\$6	\$210

Household

basket in 2012:

{5# beef,
25# chicken}

- B.** Compute % increase in cost of household basket over 2011–12, compare to CPI inflation rate.

$$\text{Rate of increase: } (\$195 - \$150)/\$150 = 30\%$$

$$\text{CPI inflation rate from previous problem} = 40\%$$

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Problems with the 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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Problems with the CPI:
Introduction of New Goods

- The introduction of new goods increases variety, allows consumers to find products that more closely meet their needs.
- In effect, dollars become more valuable.
- The CPI misses this effect because it uses a fixed basket of goods.
- Thus, the CPI overstates increases in the cost of living.

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Problems with the CPI:
Unmeasured Quality Change

- Improvements in the quality of goods in the basket increase the value of each dollar.
- The BLS tries to account for quality changes but probably misses some, as quality is hard to measure.
- Thus, the CPI overstates increases in the cost of living.

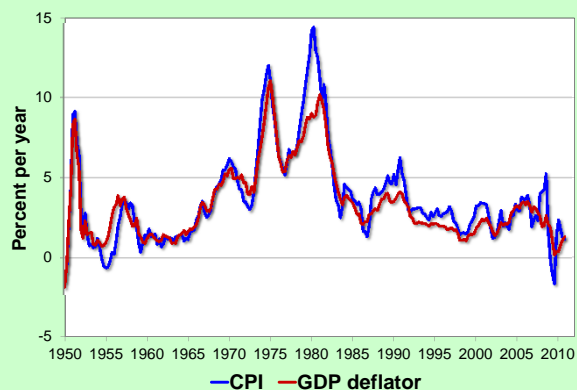
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Problems with the CPI

- Each of these problems causes the CPI to overstate cost of living increases.
- This is important because Social Security payments and many contracts have COLAs tied to the CPI.

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Two Measures of Inflation, 1950–2010



Contrasting the CPI and GDP Deflator

Imported consumer goods:

- included in CPI
- excluded from GDP deflator

Capital goods:

- excluded from CPI
- included in GDP deflator (if produced domestically)

The basket:

- CPI uses fixed basket
- GDP deflator uses basket of currently produced goods & services

This matters if different prices are changing by different amounts.

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Correcting Variables for Inflation: Very important! Real vs. Nominal Interest Rates

The nominal interest rate:

- the interest rate not corrected for inflation
- growth rate in dollar value of a deposit or debt
- the rate we always hear about
- NOT VERY INTERESTING

The real interest rate:

- corrected for inflation
- growth rate in purchasing power of a deposit or debt
- the rate we never hear about
- THE RATE THAT REALLY MATTERS!!!

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Correcting Variables for Inflation: Very important! Real vs. Nominal Interest Rates

The nominal interest rate:

- the interest rate not corrected for inflation

The real interest rate:

- corrected for inflation

Real interest rate

$$= (\text{nominal interest rate}) - (\text{inflation rate})$$

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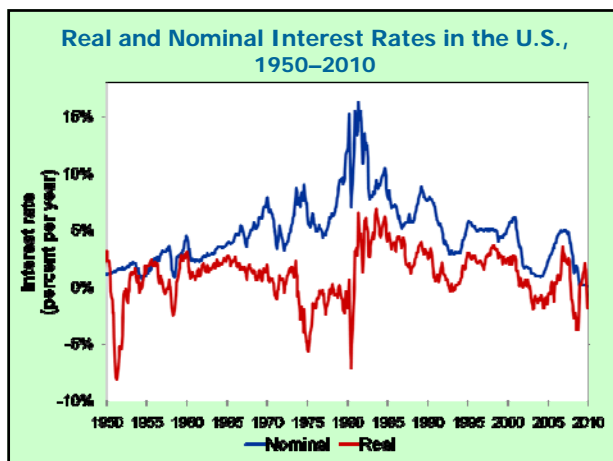
Correcting Variables for Inflation: Real vs. Nominal Interest Rates

Example:

- Deposit \$1,000 for one year.
- Nominal interest rate is 9%.
- During that year, inflation is 3.5%.
- Real interest rate
= Nominal interest rate – Inflation
= 9.0% – 3.5% = **5.5%**
- The purchasing power of the \$1000 deposit has grown 5.5%.

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Negative real interest rates are dangerous!!

- Lenders pay borrowers to take loans
 - They lose money
 - Eventually they figure this out
 - Then they raise real interest rates by a lot
- Borrowers get paid to take loans
 - They borrow a lot
 - When lenders raise interest rates, they can't pay
 - They default
- This is how you breed a financial crisis

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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.

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