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Principles of
**Macroeconomics**
Sixth Edition

**11**

Measuring the Cost of
Living

*Premium*
*PowerPoint*
*Slides by*
*Ron Cronovich*

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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 basis of

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## How the CPI Is Calculated

1.

The Bureau of Labor Statistics (BLS) surveys consumers to determine what's in the typical consumer's "shopping basket."

2.

The BLS collects data on the prices of all the goods in the basket.

3.

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

5.  **Compute the inflation rate.**
    The percentage change in the CPI from the preceding period.

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## EXAMPLE     basket: {4 pizzas, 10 lattes}

| year | price of pizza | price of latte | cost of basket |
|------|------|------|------|
| 2010 | $10 | $2.00 | |
| 2011 | $11 | $2.50 | |
| 2012 | $12 | $3.00 | |

Compute CPI in each year using 2010 base year:

2010:

2011:

2012:

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## Calculate the CPI

CPI basket:
  {10 lbs beef,
   20 lbs chicken}

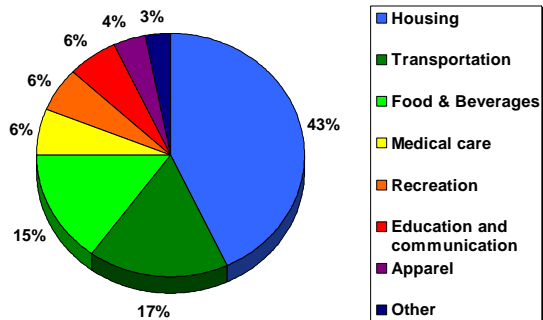The CPI basket cost $120 in 2010, the base year.

|      | price of beef | price of chicken |
|------|---------------|------------------|
| 2010 | $4            | $4               |
| 2011 | $5            | $5               |
| 2012 | $9            | $6               |

A. Compute the CPI in 2011.

B. What was the CPI inflation rate from 2011–2012?

## Answers

## What's in the CPI's Basket?



- Housing — 43%
- Transportation — 17%
- Food & Beverages — 15%
- Medical care — 6%
- Recreation — 6%
- Education and communication — 6%
- Apparel — 4%
- Other — 3%

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## Substitution bias

CPI basket:
  {10# beef,
   20# chicken}

| | beef | chicken | cost of CPI basket |
|------|------|---------|---------------------|
| 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.

## Answers

## Problems with the CPI:
### *Substitution Bias*

§ Over time, some prices rise faster than others.

§ 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

§ The CPI misses this effect because

§ Thus,

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## Problems with the CPI:
### *Unmeasured Quality Change*

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§ The BLS tries to account for quality changes but probably misses some, as quality is hard to measure.

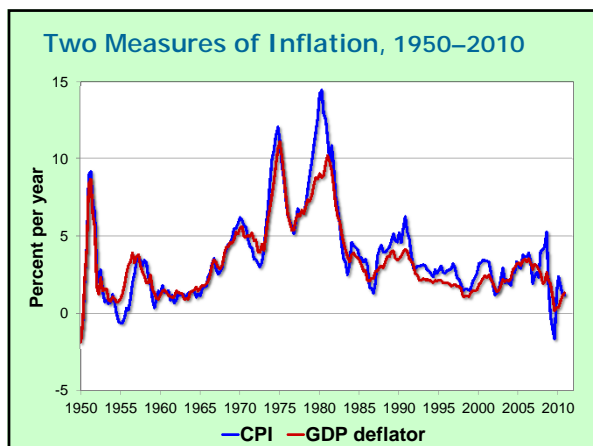§ Thus, the CPI overstates increases in the cost of living.

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## Problems with the CPI

§ Each of these problems causes

§ The BLS has made technical adjustments, but the CPI probably still overstates inflation by about

§ This is important because

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## Two Measures of Inflation, 1950–2010

Percent per year

—CPI —GDP deflator

## Contrasting the CPI and GDP Deflator

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### CPI vs. GDP deflator

In each scenario, determine the effects on the CPI and the GDP deflator.

**A.** Starbucks raises the price of Frappuccinos.

**B.** Caterpillar raises the price of the industrial tractors it manufactures at its Illinois factory.

**C.** Armani raises the price of the Italian jeans it sells in the U.S.

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### Correcting Variables for Inflation:
### Comparing Dollar Figures from Different Times

§ Inflation makes it harder to compare dollar amounts from different times.

§ Example:  the minimum wage
   § $1.15 in Dec 1964
   § $7.25 in Dec 2010

§ Did min wage have more purchasing power in Dec 1964 or Dec 2010?

§ To compare,

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### Correcting Variables for Inflation:
### Comparing Dollar Figures from Different Times

Amount
in today's  =
dollars

§ In our example,
   § "year $T$" is 12/1964,  "today" is 12/2010
   § Min wage was $1.15 in year $T$
   § CPI = 31.3 in year $T$,  CPI = 220.3 today

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## Correcting Variables for Inflation:
## Comparing Dollar Figures from Different Times

§ Researchers, business analysts, and policymakers often use this technique to convert a time series of current-dollar (nominal) figures into constant-dollar (real) figures.

§ They can then see how a variable has changed over time after correcting for inflation.

§ Example: the minimum wage, from Jan 1960 to Dec 2010…

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## The U.S. Minimum Wage in Current Dollars and Today's Dollars, 1960–2010
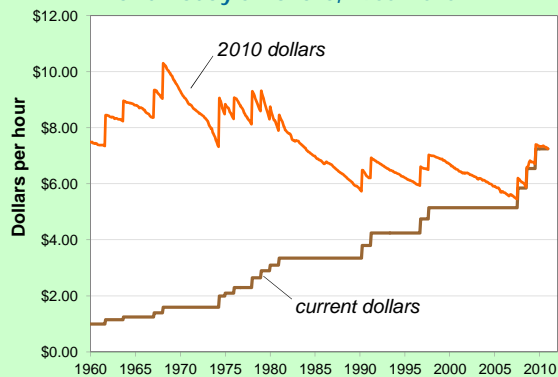


### ACTIVE LEARNING 4
## Comparing tuition increases

| Tuition and Fees at U.S. Colleges and Universities | | |
|---|---|---|
|  | 1990 | 2010 |
| Private non-profit 4-year | $9,340 | $27,293 |
| Public 4-year | $1,908 | $7,605 |
| Public 2-year | $906 | $2,713 |
| CPI | 130.7 | 218.1 |

*Instructions:* Express the 1990 tuition figures in 2010 dollars, then compute the percentage increase for all three types of schools. Which type experienced the largest increase in real tuition costs?

**Answers**

|  | 1990 | 2010 | % change |
|---|---|---|---|
| CPI | 130.7 | 218.1 | |
| Private non-profit 4-year (current $) | $9,340 | $27,293 | |
| Private non-profit 4-year (2010 $) | | | |
| Public 4-year (current $) | $1,908 | $7,605 | |
| Public 4-year (2010 $) | | | |
| Public 2-year (current $) | $906 | $2,713 | |
| Public 2-year (2010 $) | | | |

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## Correcting Variables for Inflation: Indexation

For example, the increase in the CPI automatically determines

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## Correcting Variables for Inflation: Real vs. Nominal Interest Rates

The nominal interest rate:

The real interest rate:

Real interest 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

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### Real and Nominal Interest Rates in the U.S., 1950–2010