24 Measuring the Cost of Living

PRINCIPLES OF

ECONOMICS

FOURTH EDITION

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**PowerPoint® Slides
by Ron Cronovich**

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?

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.

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.

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.

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

EXAMPLE

basket: {4 pizzas, 10 lattes}

year	price of pizza	price of latte	cost of basket
2003	$10	$2.00	$10 x 4 + $2 x 10 = $60
2004	$11	$2.50	$11 x 4 + $2.5 x 10 = $69
2005	$12	$3.00	$12 x 4 + $3 x 10 = $78

Compute CPI in each year:

Inflation rate:

2003:   100 x ($60/$60) = 100

15%

2004:   100 x ($69/$60) = 115

13%

2005:   100 x ($78/$60) = 130

ACTIVE LEARNING 1:
Calculate the CPI

The basket contains
20 movie tickets
and 10 textbooks.

The table shows their
prices for 2004-2006.

The base year is 2004.

	movie tickets	text-books
2004	$10	$50
2005	$10	$60
2006	$12	$60

A. How much did the basket cost in 2004?

B. What is the CPI in 2005?

C. What is the inflation rate from 2005-2006?

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ACTIVE LEARNING 1: Answers

The basket contains 20 movie tickets and 10 textbooks.

	movie tickets	text-books
2004	$10	$50
2005	$10	$60
2006	$12	$60

A. How much did the basket cost in 2004?

($10 x 20) + ($50 x 10) = $700

The basket contains 20 movie tickets and 10 textbooks.

	movie tickets	text-books
2004	$10	$50
2005	$10	$60
2006	$12	$60

B. What is the CPI in 2005?

cost of basket in 2005
= ($10 x 20) + ($60 x 10) = $800

CPI in 2005 = 100 x ($800/$700) = 114.3

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The basket contains 20 movie tickets and 10 textbooks.

	movie tickets	text-books
2004	$10	$50
2005	$10	$60
2006	$12	$60

C. What is the inflation rate from 2005-2006?

cost of basket in 2006

= ($12 x 20) + ($60 x 10) = $840

CPI in 2006 = 100 x ($840/$700) = 120

Inflation rate = (120 – 114.3)/114.3 = 5%

What's in the CPI's Basket?

Pie chart legend:
- Housing — 42%
- Transportation — 17%
- Food & Beverages — 15%
- Medical care — 6%
- Recreation — 6%
- Education and communication — 6%
- Apparel — 4%
- Other — 4%
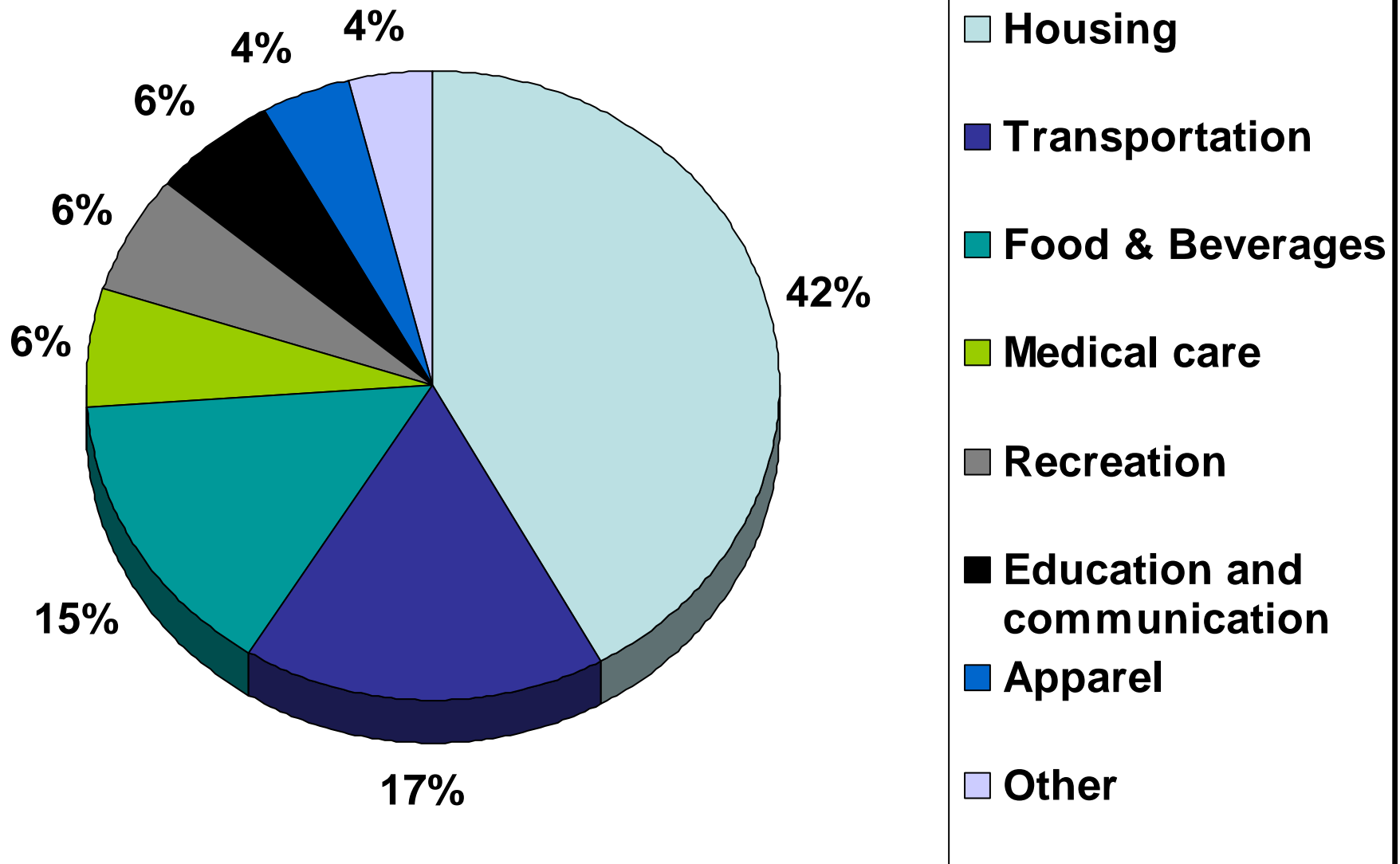
Problems With the CPI:
Substitution Bias

- Over time, some prices rise faster than others.

- Consumers substitute toward goods that become relatively cheaper.

- The CPI misses this substitution because it uses a fixed basket of goods.

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

Problems With the CPI:
Introduction of New Goods

- When new goods become available, variety increases,

  allowing consumers to find products that more closely meet their needs.

- This has the effect of making each dollar 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.

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 quality improvements, as quality is hard to measure.

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

Problems With the CPI

- Each of these problems causes the CPI to overstate cost of living increases.

- The BLS has made technical adjustments, but the CPI probably still overstates inflation by about 0.5 percent per year.

- This is important, because Social Security payments and many contracts have COLAs tied to the CPI.

Two Measures of Inflation
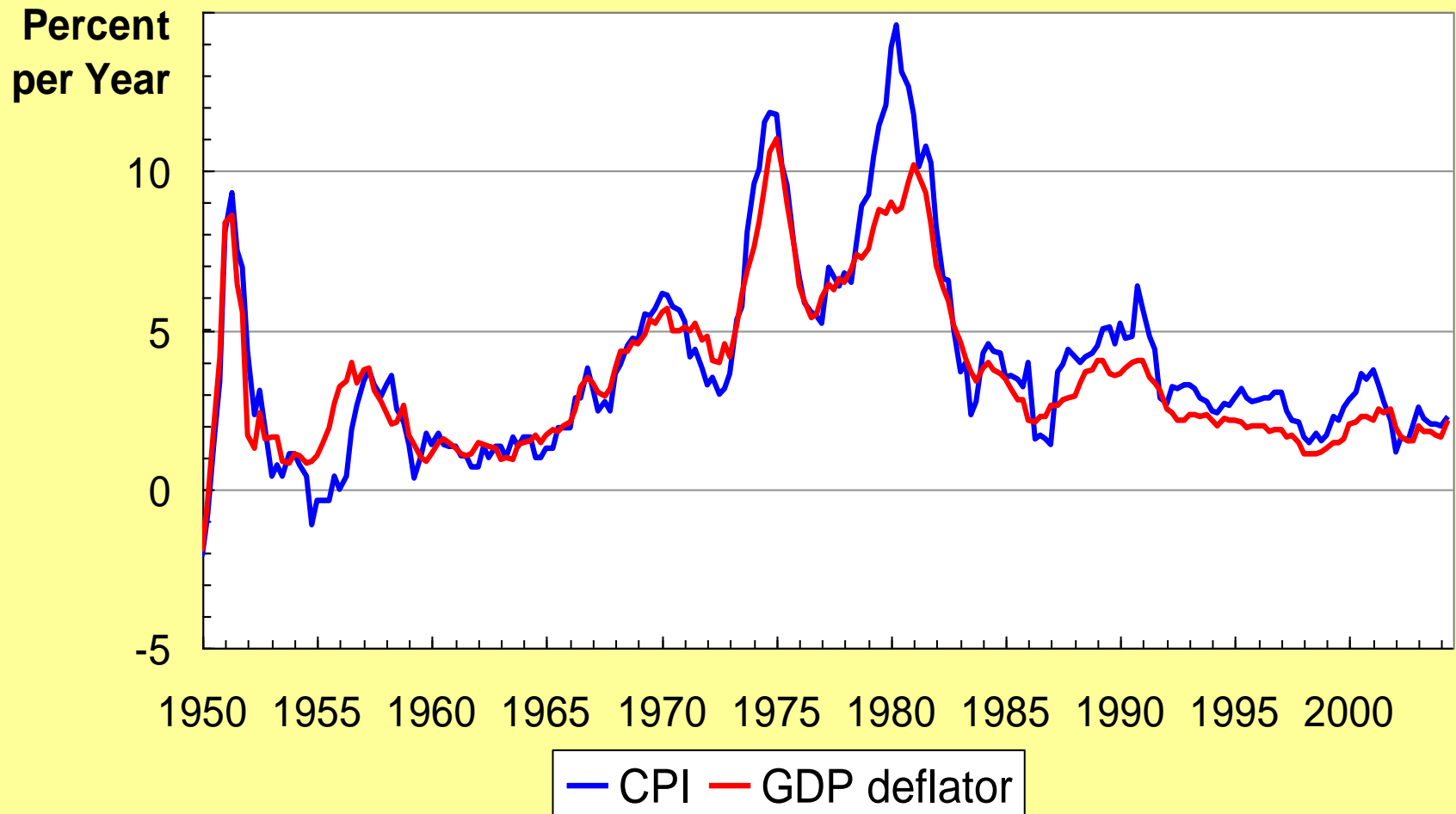
Contrasting the CPI and GDP Deflator

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.

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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ACTIVE LEARNING 2: Answers

A. Starbucks raises the price of Frappuccinos.

The CPI and GDP deflator both rise.

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

The GDP deflator rises, the CPI does not.

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

The CPI rises, the GDP deflator does not.

Correcting Variables for Inflation:
Comparing Dollar Figures from Different Times

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

- We can use the CPI to adjust figures so that they can be compared.

EXAMPLE: The High Price of Gasoline

- Price of a gallon of regular unleaded gas:

  $1.42 in March 1981

  $2.50 in August 2005

- To compare these figures, we will use the CPI to express the 1981 gas price in "2005 dollars," what gas in 1981 would have cost if the cost of living were the same then as in 2005.

- Multiply the 1981 gas price by the ratio of the CPI in 2005 to the CPI in 1981.

EXAMPLE: The High Price of Gasoline

date	Price of gas	CPI	Gas price in 2005 dollars
3/1981	$1.42/gallon	88.5	$3.15/gallon
8/2005	$2.50/gallon	196.4	$2.50/gallon

- 1981 gas price in 2005 dollars

  = $1.42 x 196.4/88.5

  = $3.15

- After correcting for inflation, gas was more expensive in 1981.

Exercise

1980: CPI = 90,
  avg starting salary for econ majors = $24,000

Today: CPI = 180,
  avg starting salary for econ majors = $50,000

Are econ majors better off today or in 1980?

Answers

1980: CPI = 90,
   avg starting salary for econ majors = $24,000

Today: CPI = 180,
   avg starting salary for econ majors = $50,000

Solution

Convert 1980 salary into "today's dollars"

$24,000 x (180/90) = $48,000.

After adjusting for inflation, salary is higher today than in 1980.

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Correcting Variables for Inflation: Indexation

A dollar amount is **indexed** for inflation
if it is automatically corrected for inflation
by law or in a contract.

For example, the increase in the CPI automatically determines

- the COLA in many multi-year labor contracts
- the adjustments in Social Security payments and federal income tax brackets

Correcting Variables for Inflation:
Real vs. Nominal Interest Rates

The nominal interest rate:

- the interest rate <u>not</u> corrected for inflation
- the rate of growth in the dollar value of a deposit or debt

The real interest rate:

- corrected for inflation
- the rate of growth in the purchasing power of a deposit or debt

Real interest rate
  = (nominal interest rate) – (inflation rate)

Real and 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%.

Real and Nominal Interest Rates in the U.S.
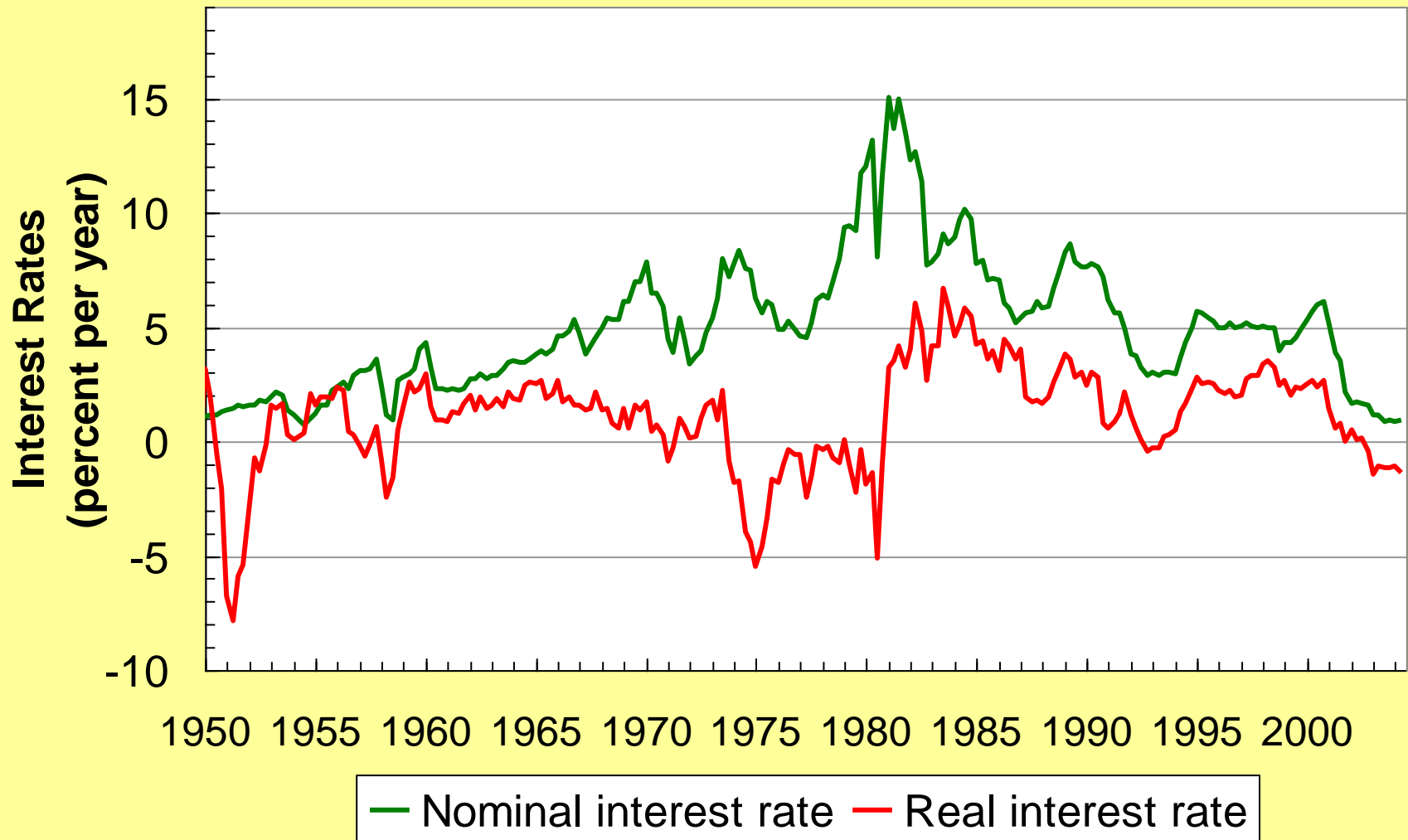
CHAPTER SUMMARY

- 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.