

CHAPTER 24

Measuring the Cost of Living

PRINCIPLES OF
Economics

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Premium PowerPoint Slides
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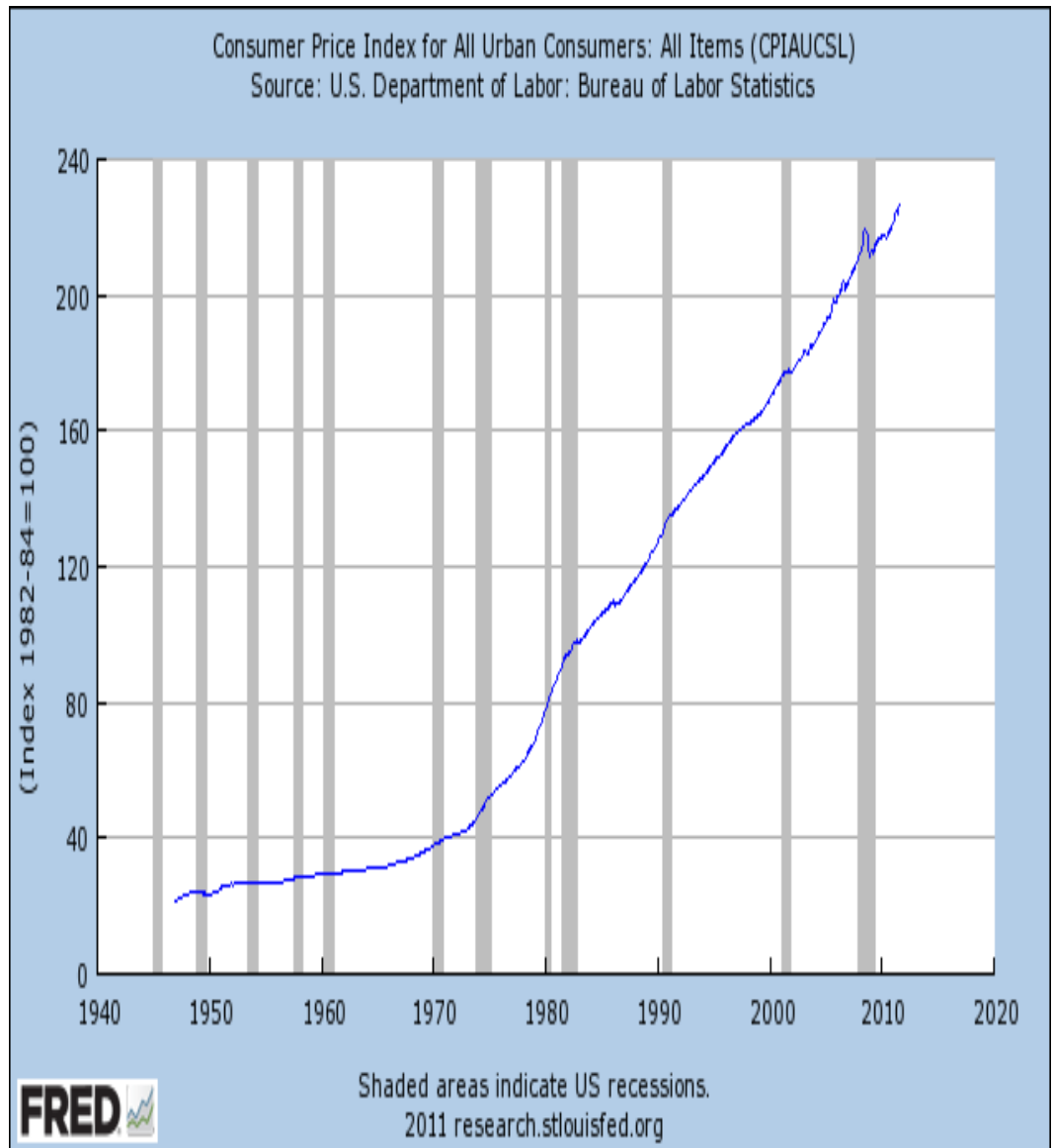


In this chapter, look for the answers to these questions:

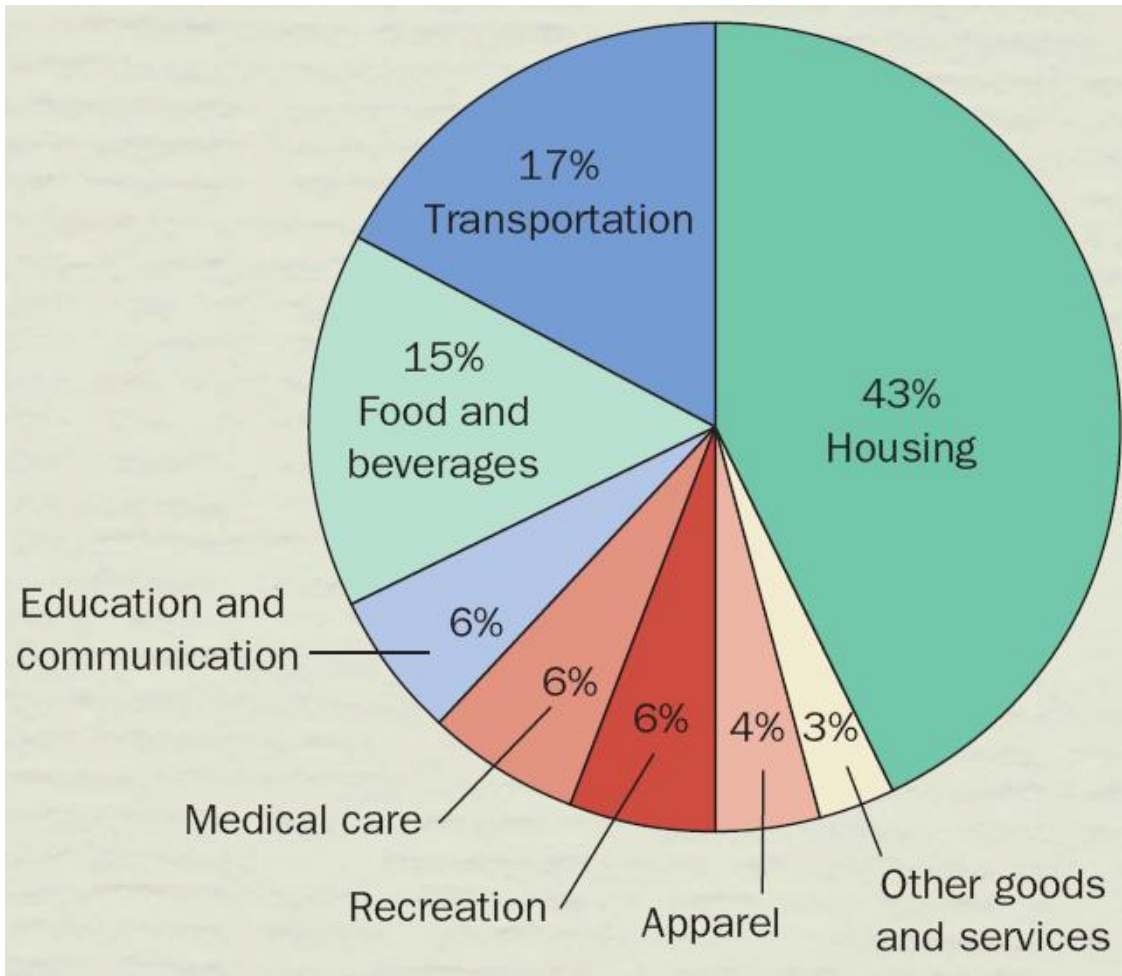
- What is the Consumer Price Index (CPI)?
How is it calculated? What's it used for?
- What are the problems with the CPI? How serious are they?
- How does the CPI differ from the GDP deflator?
- How can we use the CPI to compare dollar amounts from different years? Why would we want to do this, anyway?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

The Consumer Price Index (CPI)

- measures the
typical consumer's
- the basis of cost of
living adjustments
(COLAs) in many
contracts and in



The typical basket of goods and services



This figure shows how the typical consumer divides spending among various categories of goods and services. The Bureau of Labor Statistics calls each percentage the “relative importance” of the category.

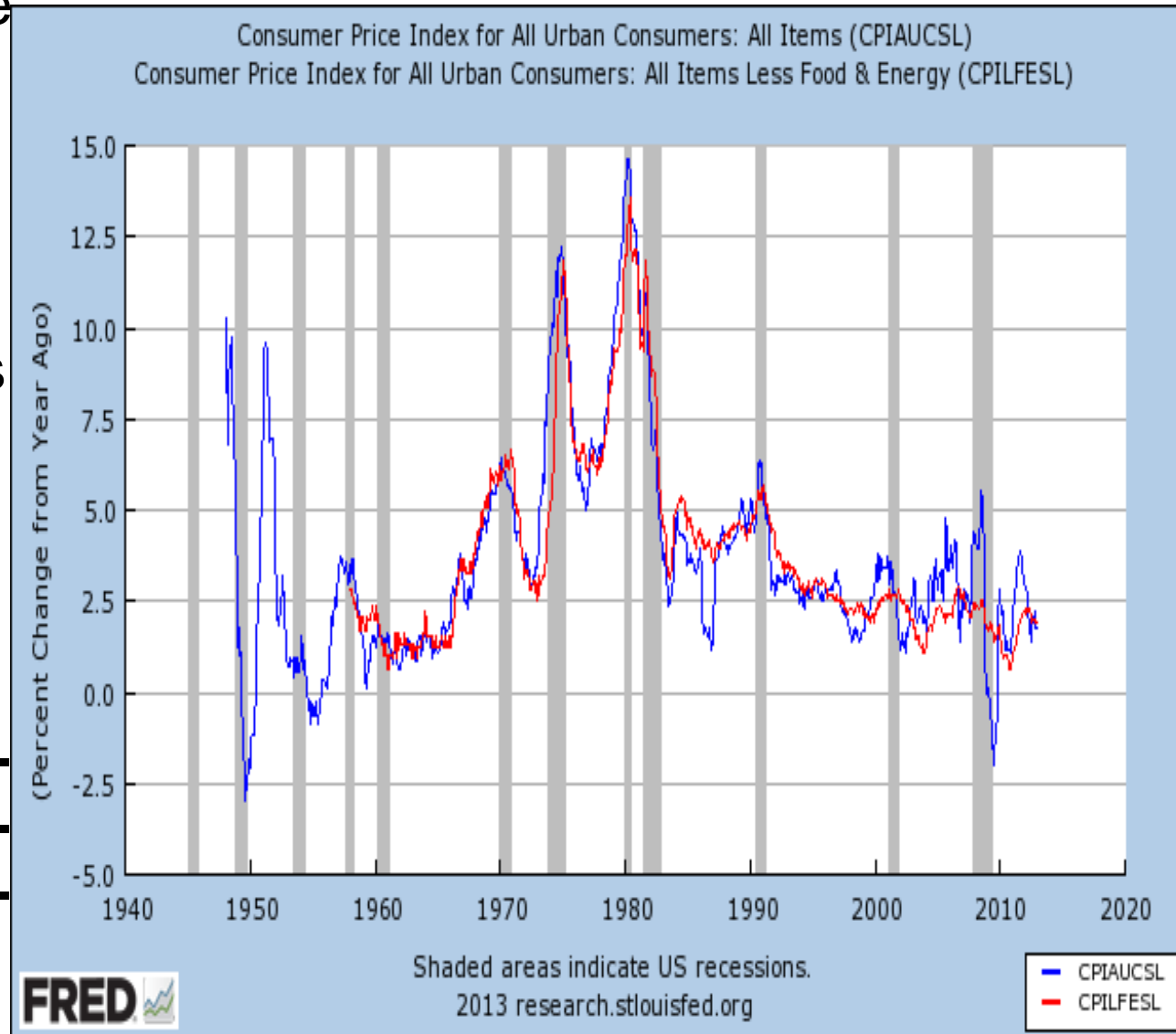
Core CPI

- Is considered to be a more accurate measure of the increase in prices over time.

- Core CPI excludes

which are very volatile from one period to the next.

over the last year in January 2013



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.

How the CPI Is Calculated

4.

The CPI in any year equals (U.S. is 1982-1984)

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

5. *Compute the inflation rate.*

The percentage change in the CPI from the preceding period.

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

EXAMPLE

basket: {4 pizzas, 10 lattes}

<i>year</i>	<i>price of pizza</i>	<i>price of latte</i>	<i>cost of basket</i>
2007	\$10	\$2.00	$\$10 \times 4 + \$2 \times 10 = \$60$
2008	\$11	\$2.50	$\$11 \times 4 + \$2.5 \times 10 = \$69$
2009	\$12	\$3.00	$\$12 \times 4 + \$3 \times 10 = \$78$

Compute CPI in each year using 2007 base year:

Inflation rate:

$$\begin{array}{lcl} 2007: & 100 \times (\$60/\$60) = 100 & \left. \begin{array}{c} \text{ } \\ \text{ } \\ \text{ } \end{array} \right\} \begin{array}{c} \text{ } \\ \text{ } \\ \text{ } \end{array} = \frac{115 - 100}{100} \times 100\% \\ 2008: & 100 \times (\$69/\$60) = 115 & \\ 2009: & 100 \times (\$78/\$60) = \underline{\hspace{1cm}} & \end{array}$$

ACTIVE LEARNING **1**

Calculate the CPI

CPI basket:

{10 lbs beef,
20 lbs chicken}

The CPI basket cost \$120
in 2004, the base year.

	<i>price of beef</i>	<i>price of chicken</i>
2004	\$4	\$4
2005	\$5	\$5
2006	\$9	\$6

A. Compute the CPI in 2005.

B. What was the CPI inflation rate from 2005-2006?

ACTIVE LEARNING 1

Answers

CPI basket:

{10 lbs beef,
20 lbs chicken}

The CPI basket cost \$120
in 2004, the base year.

	<i>price of beef</i>	<i>price of chicken</i>
2004	\$4	\$4
2005	\$5	\$5
2006	\$9	\$6

A. Compute the CPI in 2005:

Cost of CPI basket in 2005

CPI in 2005 = _____

ACTIVE LEARNING 1

Answers

CPI basket:

{10 lbs beef,
20 lbs chicken}

The CPI basket cost \$120
in 2004, the base year.

	<i>price of beef</i>	<i>price of chicken</i>
2004	\$4	\$4
2005	\$5	\$5
2006	\$9	\$6

B. What was the inflation rate from 2005-2006?

Cost of CPI basket in 2006

$$= (\$9 \times 10) + (\$6 \times 20) = \$210$$

$$\text{CPI in 2006} = 100 \times (\$210/\$120) = 175$$

$$\text{CPI inflation rate} = (175 - 125)/125 = \underline{\hspace{2cm}}$$

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

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 _____ increases in the cost of living.

Problems with the CPI:

- 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.

Problems with the CPI

- Each of these problems causes the CPI to _____ cost of living increases.
- The BLS has made technical adjustments, but the CPI probably still overstates inflation by about _____.
- This is important because Social Security payments and many contracts have COLAs tied to the CPI.

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)

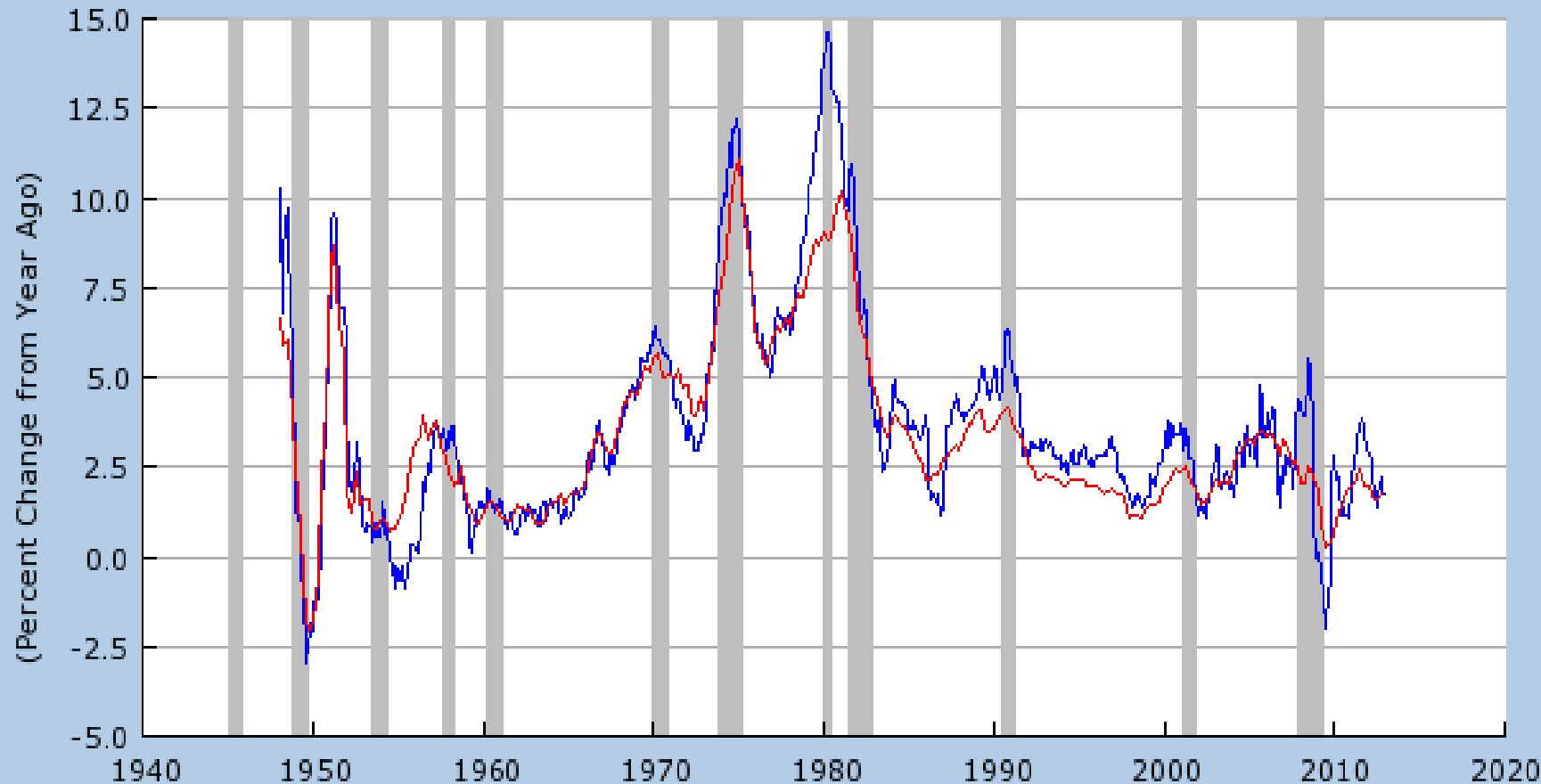
The basket:

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

This matters if different prices are
changing by different amounts.

Two Measures of Inflation, 1947-2012

Consumer Price Index for All Urban Consumers: All Items (CPIAUCSL)
Gross Domestic Product: Implicit Price Deflator (GDPDEF)



Shaded areas indicate US recessions.
2013 research.stlouisfed.org



— CPIAUCSL
— GDPDEF

ACTIVE LEARNING 3

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.

ACTIVE LEARNING 3

Answers

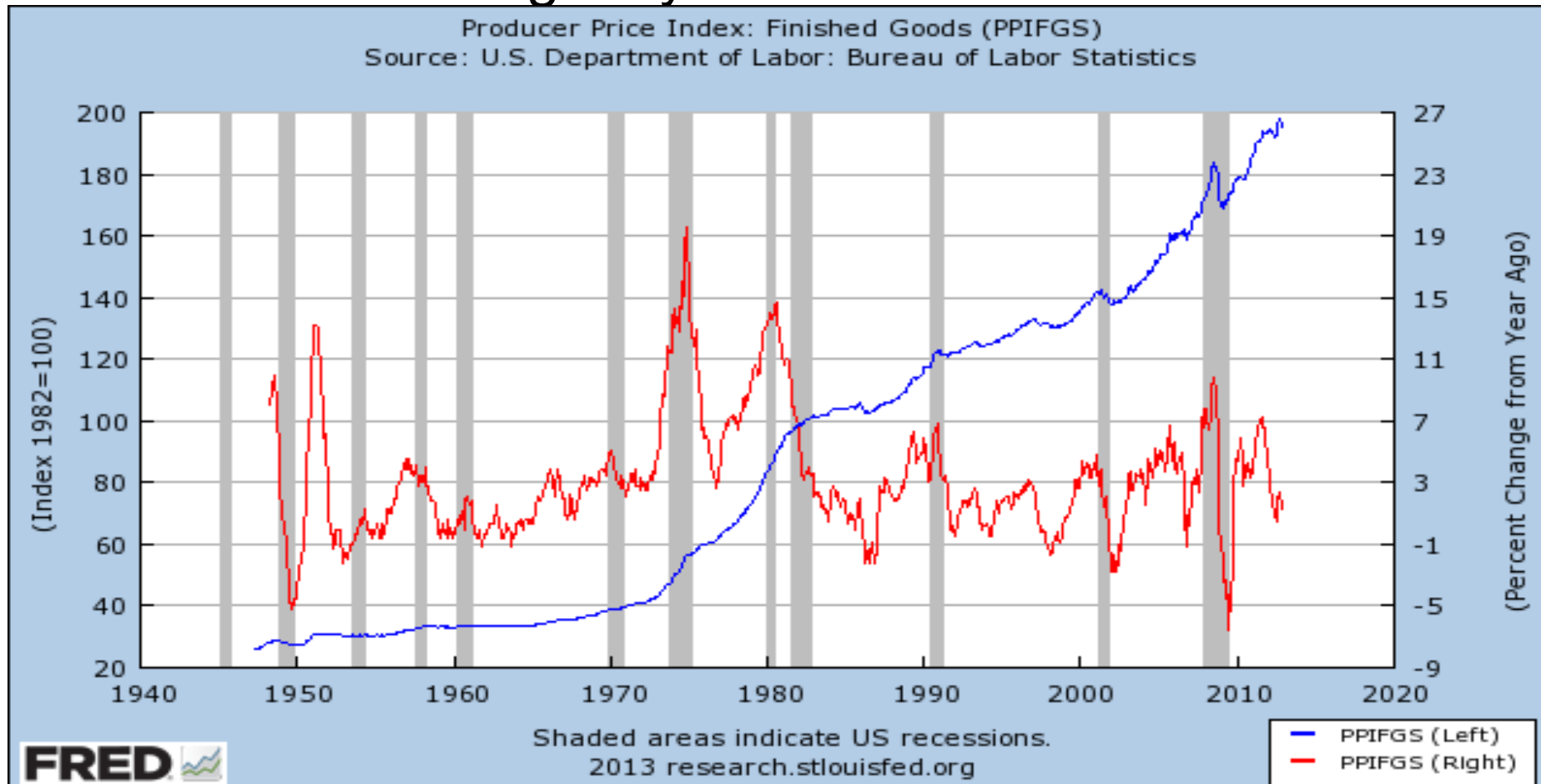
A. Starbucks raises the price of Frappuccinos.

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.

The Producer Price Index

- Producer price index (PPI)
 - Measure of the cost of a basket of goods and services bought by firms



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:

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 January 2013
- Does the min wage have more purchasing power in Dec. 1964 or January 2013?
- To compare, use CPI to convert 1964 figure into “today’s dollars”...

Correcting Variables for Inflation:

Comparing Dollar Figures from Different Times

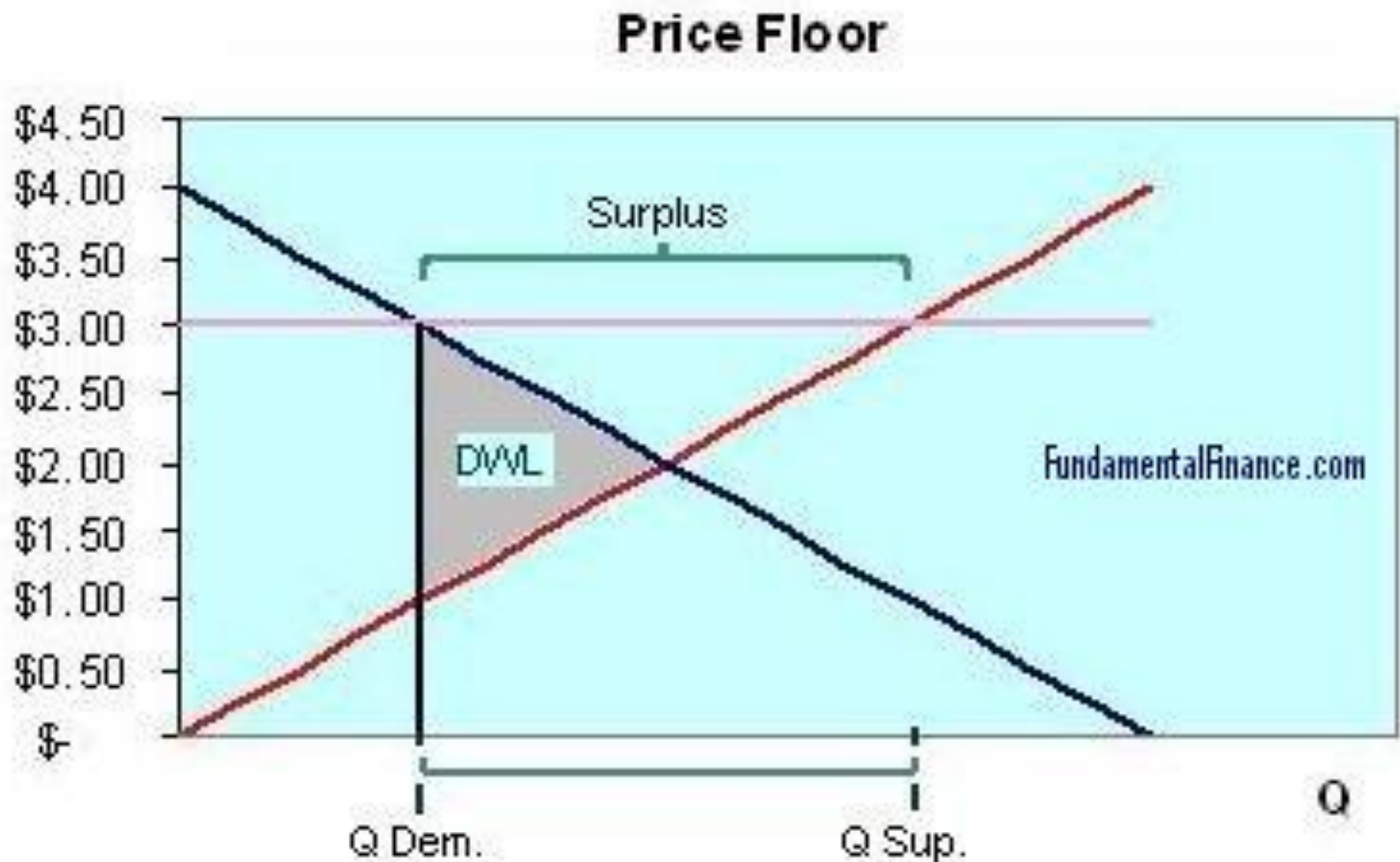
$$\begin{array}{ccccc} \text{Amount} & & \text{Amount} & & \text{Price level today} \\ \text{in today's} & = & \text{in year } T & \times & \frac{\quad}{\quad} \\ \text{dollars} & & \text{dollars} & & \text{Price level in year } T \end{array}$$

- In our example,
 - year T = 12/1964, “today” = 12/2011
 - Min wage = \$1.15 in year T
 - CPI = 30 in year T , CPI = 230 today

*The minimum wage
in 1964 was \$8.82
in today's (2013) dollars.*

$$\text{\$8.82} = \$1.15 \times \frac{230}{30}$$

Deadweight Loss Potential Problem with Min Wage



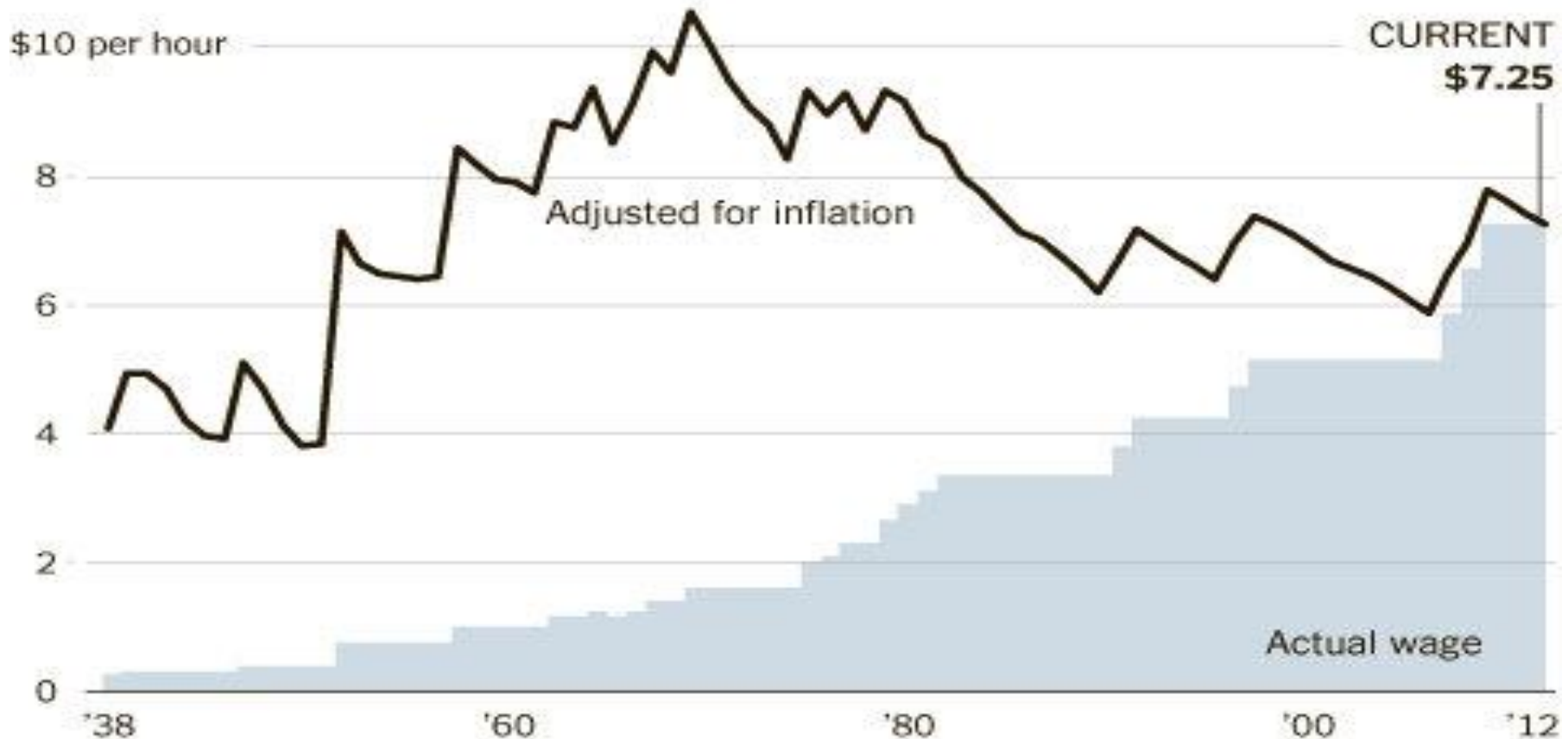
Correcting Variables for Inflation:

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.

The U.S. Minimum Wage in Current Dollars and Today's Dollars, 1938-2013

Federal minimum wage



Source: Department of Labor

THE NEW YORK TIMES

ACTIVE LEARNING 4

Converting to “today’s dollars”

Annual tuition and fees, average of all public four-year colleges & universities in the U.S.

- 1986-87: \$1,414 (1986 CPI = 110)
- 2012-13: \$8,655 (2013 CPI = 230)

After adjusting for inflation, did students pay more for college in 1986 or in 2013? Convert the 1986 figure to 2013 dollars and compare.

ACTIVE LEARNING 4

Answers

Annual tuition and fees, average of all public four-year colleges & universities in the U.S.

- 1986-87: \$1,414 (1986 CPI = 110)
- 2012-13: \$8,655 (2013 CPI = 230)

Solution

Convert 1986 figure into “today’s dollars”

Even after correcting for inflation, tuition and fees were much lower in 1986 than in 2013!

Correcting Variables for Inflation:

Real vs. Nominal Interest Rates

The nominal interest rate (i):

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

The real interest rate (r):

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

Real interest rate = $i - r$

=

Correcting Variables for Inflation:

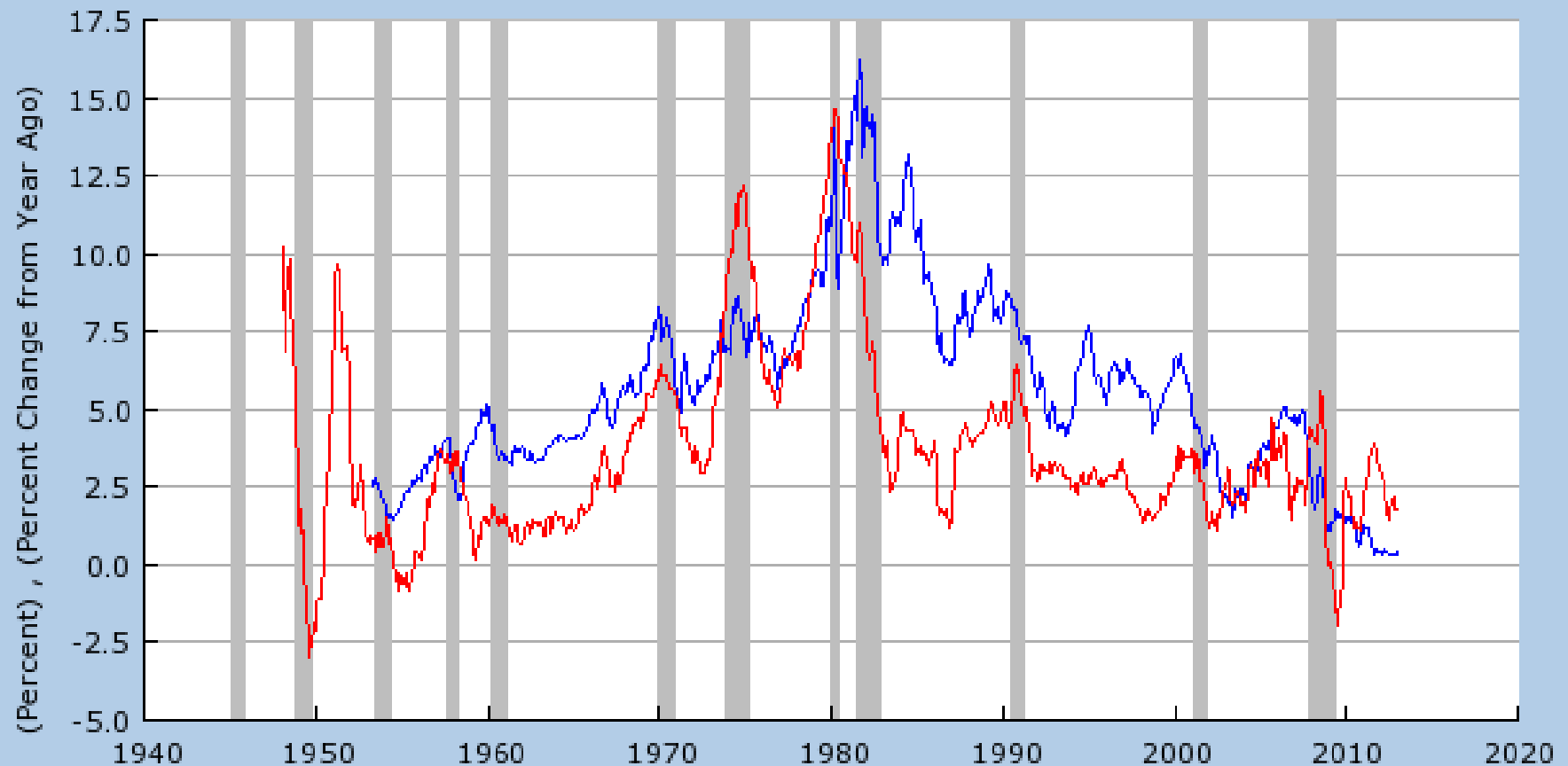
Real vs. Nominal Interest Rates

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
= _____
- The purchasing power of the \$1000 deposit
has grown _____

Real and Nominal Interest Rates in the U.S., 1950-2007

3-Year Treasury Constant Maturity Rate (GS3)
Consumer Price Index for All Urban Consumers: All Items (CPIAUCSL)

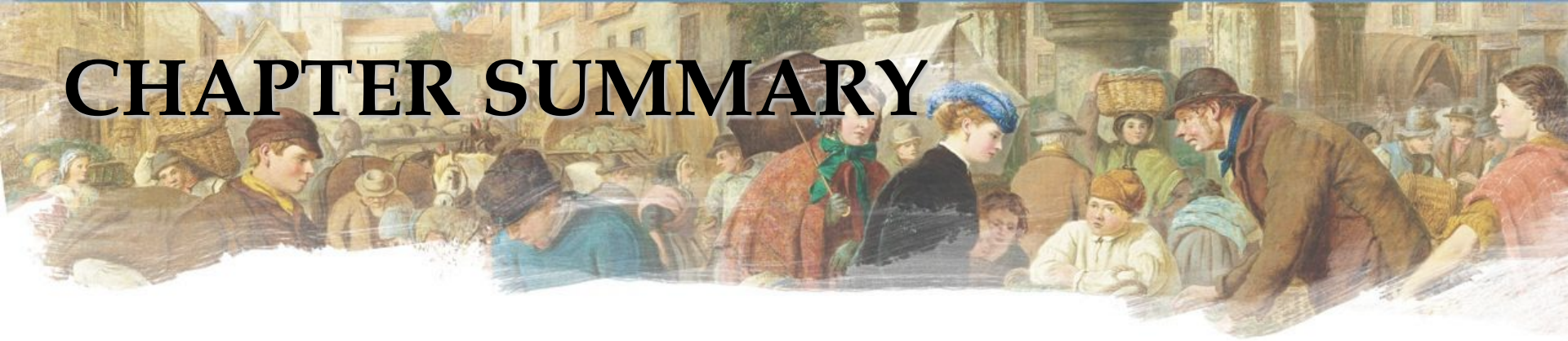


Shaded areas indicate US recessions.
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GS3
CPIAUCSL

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.