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Measuring the Cost of Living

Measuring the Cost of Living

- Inflation refers to a situation in which the economy's overall price level is rising.
- The inflation rate is the percentage change in the price level from the previous period.

THE CONSUMER PRICE INDEX

- 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 reports the CPI each month.
- It is used to monitor changes in the cost of living over time.

THE CONSUMER PRICE INDEX

- When the CPI rises, the typical family has to spend more dollars to maintain the same standard of living.

How the Consumer Price Index Is Calculated

- ***Fix the Basket:*** Determine what prices are most important to the typical consumer.
 - The Bureau of Labor Statistics (BLS) identifies a market basket of goods and services the typical consumer buys.
 - The BLS conducts monthly consumer surveys to set the weights for the prices of those goods and services.

How the Consumer Price Index Is Calculated

- ***Find the Prices:*** Find the prices of each of the goods and services in the basket for each point in time.

How the Consumer Price Index Is Calculated

- ***Compute the Basket's Cost:*** Use the data on prices to calculate the cost of the basket of goods and services at different times.

How the Consumer Price Index Is Calculated

- ***Choose a Base Year and Compute the Index:***
 - Designate one year as the base year, making it the benchmark against which other years are compared.
 - Compute the index by dividing the price of the basket in one year by the price in the base year and multiplying by 100.

How the Consumer Price Index Is Calculated

- ***Compute the inflation rate:*** The inflation rate is the percentage change in the price index from the preceding period.

How the Consumer Price Index Is Calculated

- The Inflation Rate

- The *inflation rate* is calculated as follows:

$$\text{Inflation Rate in Year 2} = \frac{\text{CPI in Year 2} - \text{CPI in Year 1}}{\text{CPI in Year 1}} \times 100$$

Table 1 Calculating the Consumer Price Index and the Inflation Rate: An Example

Step 1: Survey Consumers to Determine a Fixed Basket of Goods

4 hot dogs, 2 hamburgers

Table 1 Calculating the Consumer Price Index and the Inflation Rate: An Example

Step 2: Find the Price of Each Good in Each Year

Year	Price of Hot Dogs	Price of Hamburgers
2001	\$1	\$2
2002	2	3
2003	3	4

Table 1 Calculating the Consumer Price Index and the Inflation Rate: An Example

Step 3: Compute the Cost of the Basket of Goods in Each Year

2001	$(\$1 \text{ per hot dog} \times 4 \text{ hot dogs}) + (\$2 \text{ per hamburger} \times 2 \text{ hamburgers}) = \8
2002	$(\$2 \text{ per hot dog} \times 4 \text{ hot dogs}) + (\$3 \text{ per hamburger} \times 2 \text{ hamburgers}) = \14
2003	$(\$3 \text{ per hot dog} \times 4 \text{ hot dogs}) + (\$4 \text{ per hamburger} \times 2 \text{ hamburgers}) = \20

Table 1 Calculating the Consumer Price Index and the Inflation Rate: An Example

Step 4: Choose One Year as a Base Year (2001) and Compute the Consumer Price Index in Each Year

2001	$(\$8/\$8) \times 100 = 100$
2002	$(\$14/\$8) \times 100 = 175$
2003	$(\$20/\$8) \times 100 = 250$

Table 1 Calculating the Consumer Price Index and the Inflation Rate: An Example

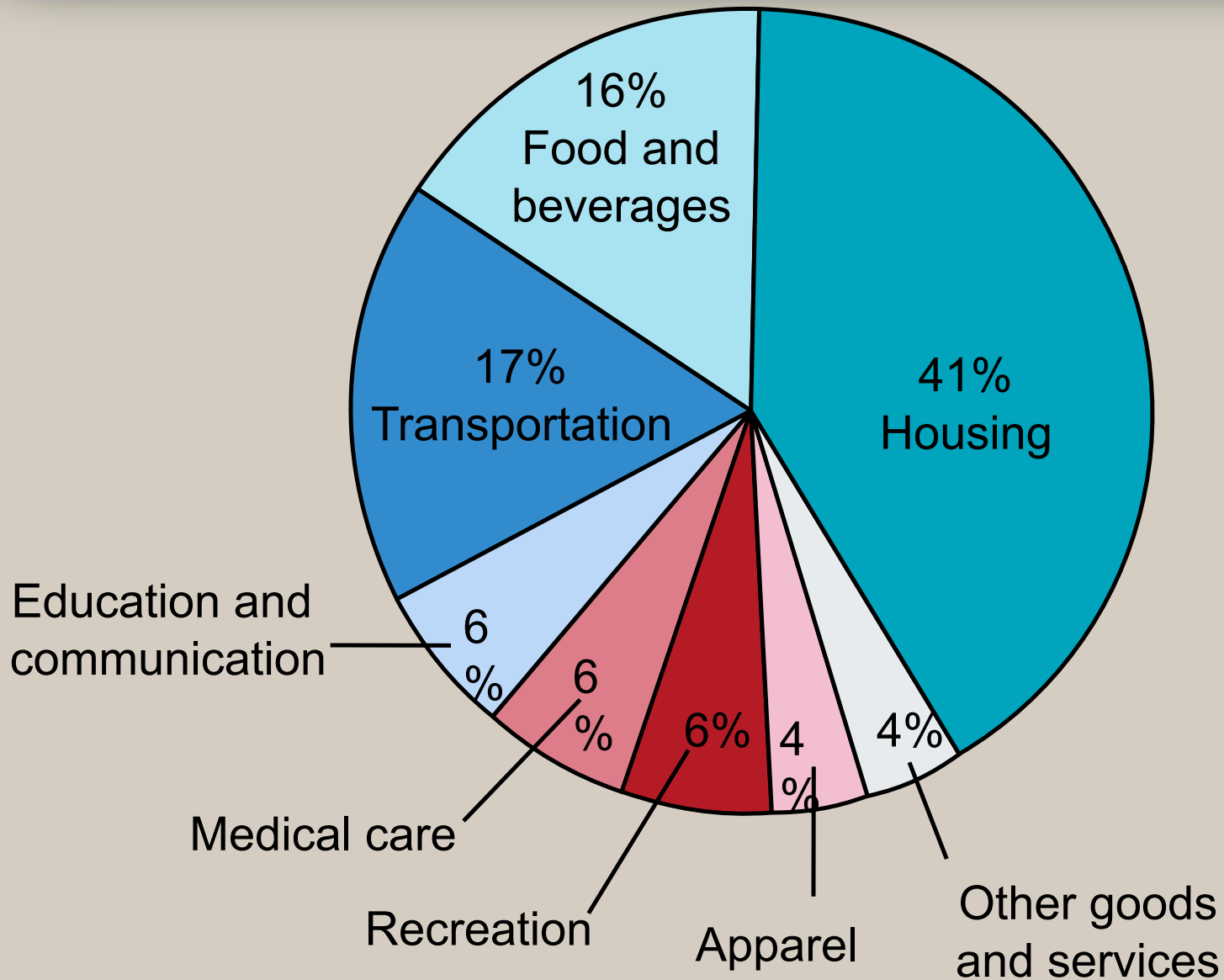
Step 5: Use the Consumer Price Index to Compute the Inflation Rate from Previous Year

2002	$(175 - 100)/100 \times 100 = 75\%$
2003	$(250 - 175)/175 \times 100 = 43\%$

How the Consumer Price Index Is Calculated

- Calculating the Consumer Price Index and the Inflation Rate: Another Example
 - Base Year is 2002.
 - Basket of goods in 2002 costs \$1,200.
 - The same basket in 2004 costs \$1,236.
 - $CPI = (\$1,236/\$1,200) \times 100 = 103$.
 - Prices increased 3 percent between 2002 and 2004.
 - <https://vecher.kz/korzina-zhizni-kakie-produkti-mozhno-priobresti-na-minimalnuyu-zarplatu>
 - <https://rebus-finance.kz/potrebitelskaja-korzina-kazahstana/>

FYI: What's in the CPI's Basket?



Problems in Measuring the Cost of Living

- The CPI is an accurate measure of the selected goods that make up the typical bundle, but it is not a perfect measure of the cost of living.

Problems in Measuring the Cost of Living

- Substitution bias
- Introduction of new goods
- Unmeasured quality changes

Problems in Measuring the Cost of Living

- Substitution Bias
 - The basket does not change to reflect consumer reaction to changes in relative prices.
 - Consumers substitute toward goods that have become relatively less expensive.
 - The index overstates the increase in cost of living by not considering consumer substitution.

Problems in Measuring the Cost of Living

- Introduction of New Goods
 - The basket does not reflect the change in purchasing power brought on by the introduction of new products.
 - New products result in greater variety, which in turn makes each dollar more valuable.
 - Consumers need fewer dollars to maintain any given standard of living.

Problems in Measuring the Cost of Living

- Unmeasured Quality Changes
 - If the quality of a good rises from one year to the next, the value of a dollar rises, even if the price of the good stays the same.
 - If the quality of a good falls from one year to the next, the value of a dollar falls, even if the price of the good stays the same.
 - The BLS tries to adjust the price for constant quality, but such differences are hard to measure.

Problems in Measuring the Cost of Living

- The substitution bias, introduction of new goods, and unmeasured quality changes cause the CPI to overstate the true cost of living.
 - The issue is important because many government programs use the CPI to adjust for changes in the overall level of prices.
 - The CPI overstates inflation by about 1 percentage point per year.

The GDP Deflator versus the Consumer Price Index

- The GDP deflator is calculated as follows:

$$\text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$$

The GDP Deflator versus the Consumer Price Index

- The BLS calculates other prices indexes:
 - The index for different regions within the country.
 - The *producer price index*, which measures the cost of a basket of goods and services bought by firms rather than consumers.
 - https://www.inform.kz/ru/kak-rasschityvaetsya-infl-yaciya_a3968905

The GDP Deflator versus the Consumer Price Index

- Economists and policymakers monitor both the GDP deflator and the consumer price index to gauge how quickly prices are rising.
- There are two important differences between the indexes that can cause them to diverge.

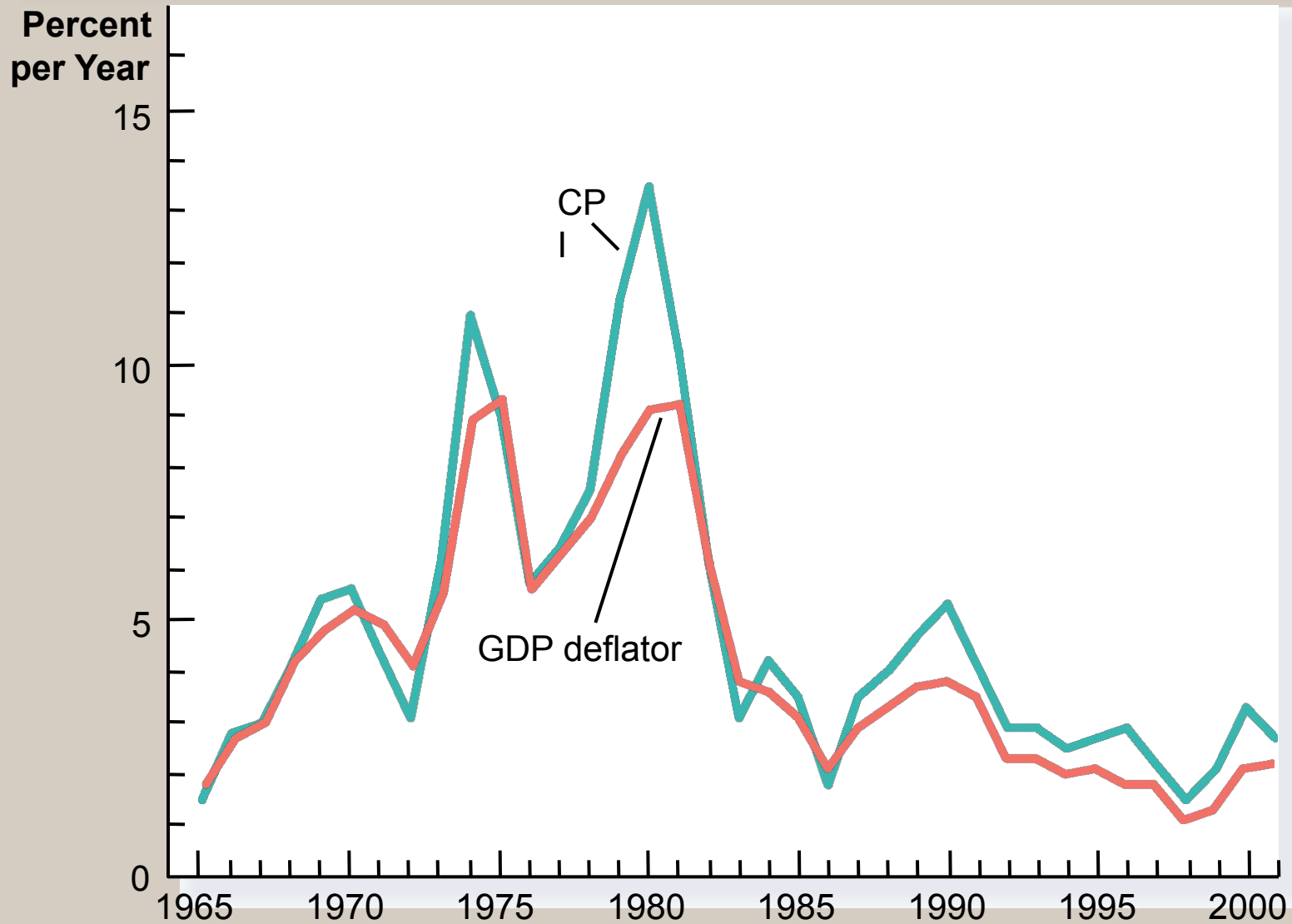
The GDP Deflator versus the Consumer Price Index

- The *GDP deflator* reflects the prices of all goods and services *produced domestically*, whereas...
- ...the *consumer price index* reflects the prices of all goods and services *bought by consumers*.

The GDP Deflator versus the Consumer Price Index

- The *consumer price index* compares the price of a *fixed basket* of goods and services to the price of the basket in the base year (only occasionally does the BLS change the basket)...
- ...whereas the *GDP deflator* compares the price of *currently produced* goods and services to the price of the same goods and services in the base year.

Figure 2 Two Measures of Inflation



CORRECTING ECONOMIC VARIABLES FOR THE EFFECTS OF INFLATION

- Price indexes are used to correct for the effects of inflation when comparing dollar figures from different times.

Dollar Figures from Different Times

- Do the following to convert (inflate) Babe Ruth's wages in 1931 to dollars in 2001:

$$\text{Salary}_{2001} = \text{Salary}_{1931} \times \frac{\text{Price level in 2001}}{\text{Price level in 1931}}$$

$$= \$80,000 \times \frac{177}{15.2}$$

$$= \$931,579$$

Table 2 The Most Popular Movies of All Times, Inflation Adjusted

Film	Year of Release	Total Domestic Gross (in millions of 2001 dollars)
1. <i>Gone with the Wind</i>	1939	\$1,002
2. <i>Star Wars</i>	1977	866
3. <i>The Sound of Music</i>	1965	695
4. <i>E.T.: The Extra-Terrestrial</i>	1982	687
5. <i>Titanic</i>	1997	640
6. <i>The Ten Commandments</i>	1956	639
7. <i>Jaws</i>	1975	625
8. <i>Doctor Zhivago</i>	1965	591
9. <i>The Jungle Book</i>	1967	519
10. <i>Snow White and the Seven Dwarfs</i>	1937	518

Indexation

- When some dollar amount is automatically corrected for inflation by law or contract, the amount is said to be *indexed* for inflation.

Real and Nominal Interest Rates

- Interest represents a payment in the future for a transfer of money in the past.

Real and Nominal Interest Rates

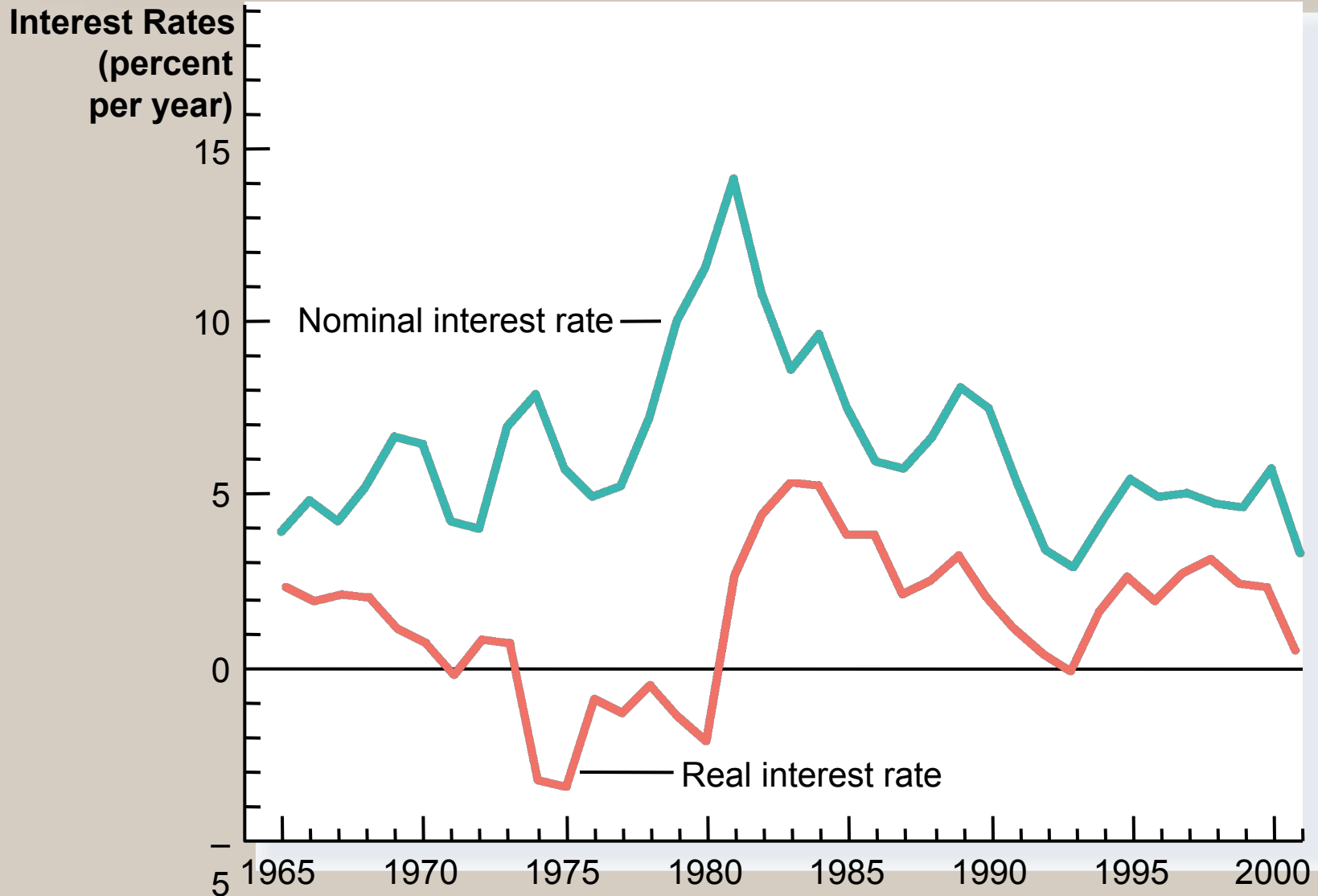
- The *nominal interest* rate is the interest rate usually reported and not corrected for inflation.
 - It is the interest rate that a bank pays.
- The *real interest rate* is the nominal interest rate that is corrected for the effects of inflation.

Real and Nominal Interest Rates

- You borrowed \$1,000 for one year.
- Nominal interest rate was 15%.
- During the year inflation was 10%.

$$\begin{aligned} \textit{Real interest rate} &= \textit{Nominal interest rate} - \\ &\quad \textit{Inflation} \\ &= 15\% - 10\% = 5\% \end{aligned}$$

Figure 3 Real and Nominal Interest Rates



Summary

- The consumer price index shows the cost of a basket of goods and services relative to the cost of the same basket in the base year.
- The index is used to measure the overall level of prices in the economy.
- The percentage change in the CPI measures the inflation rate.

Summary

- The consumer price index is an imperfect measure of the cost of living for the following three reasons: substitution bias, the introduction of new goods, and unmeasured changes in quality.
- Because of measurement problems, the CPI overstates annual inflation by about 1 percentage point.

Summary

- The GDP deflator differs from the CPI because it includes goods and services produced rather than goods and services consumed.
- In addition, the CPI uses a fixed basket of goods, while the GDP deflator automatically changes the group of goods and services over time as the composition of GDP changes.

Summary

- Dollar figures from different points in time do not represent a valid comparison of purchasing power.
- Various laws and private contracts use price indexes to correct for the effects of inflation.
- The real interest rate equals the nominal interest rate minus the rate of inflation.