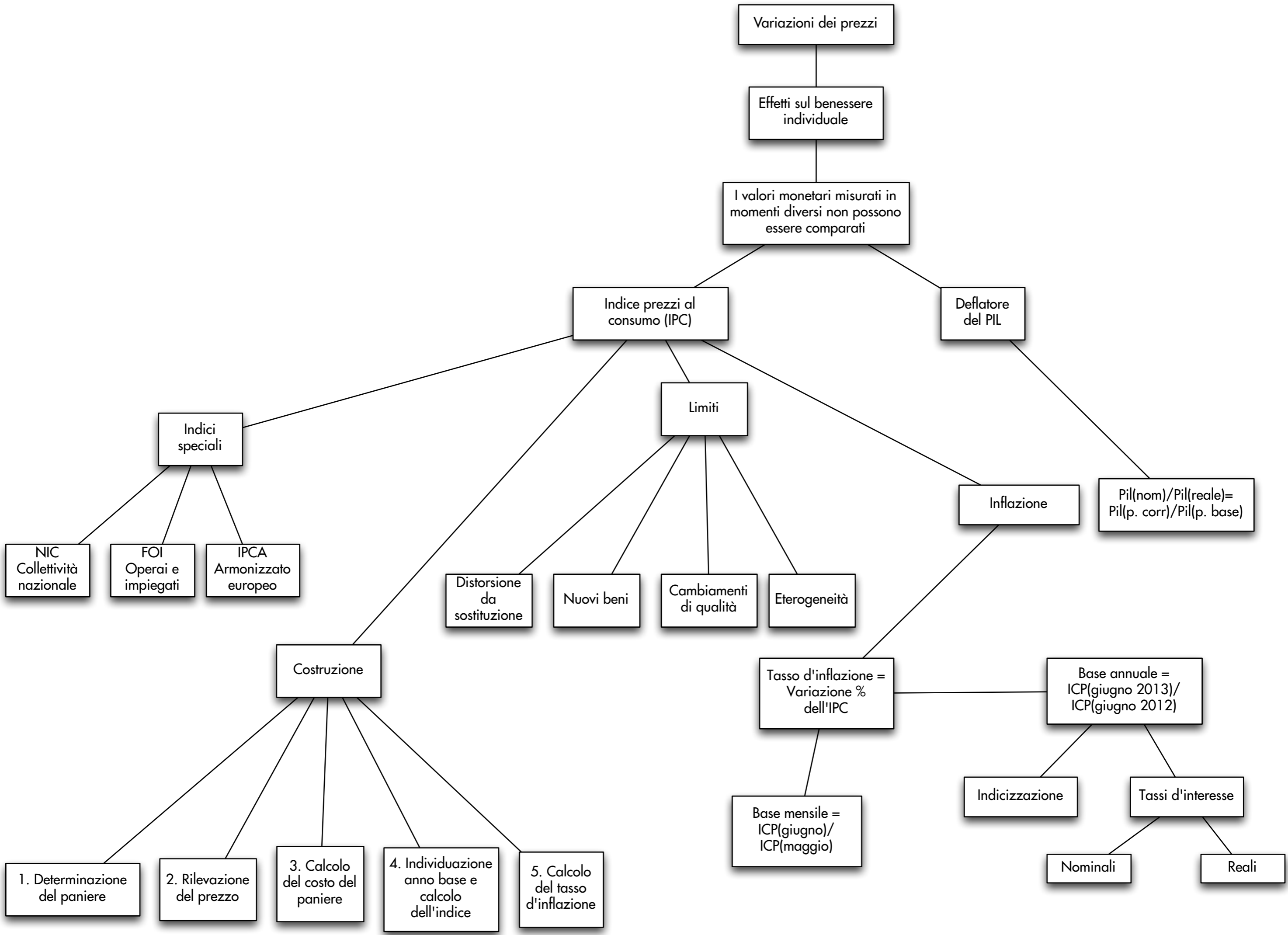




# Measuring the Cost of Living




## Chapter 24



# 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.

# The Inflation Rate

The **inflation rate** is calculated as follows:

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

# 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

# Calculating the Consumer Price Index and the Inflation Rate: An Example

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

<b>Year</b>	<b>Price of Hot dogs</b>	<b>Price of Hamburgers</b>
2001	\$1	\$2
2002	\$2	\$3
2003	\$3	\$4

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

# Calculating the Consumer Price Index and the Inflation Rate: An Example

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

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

# 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	$(250-175)/175 \times 100 = 43\%$





# Calculating the Consumer Price Index and the Inflation Rate: Another Example

 Base Year is 1998.

 Basket of goods in 1998 costs \$1,200.

 The same basket in 2000 costs \$1,236.

  $CPI = (\$1,236/\$1,200) \times 100 = 103.$

 Prices increased 3 percent between 1998 and 2000.

# GDP Deflator

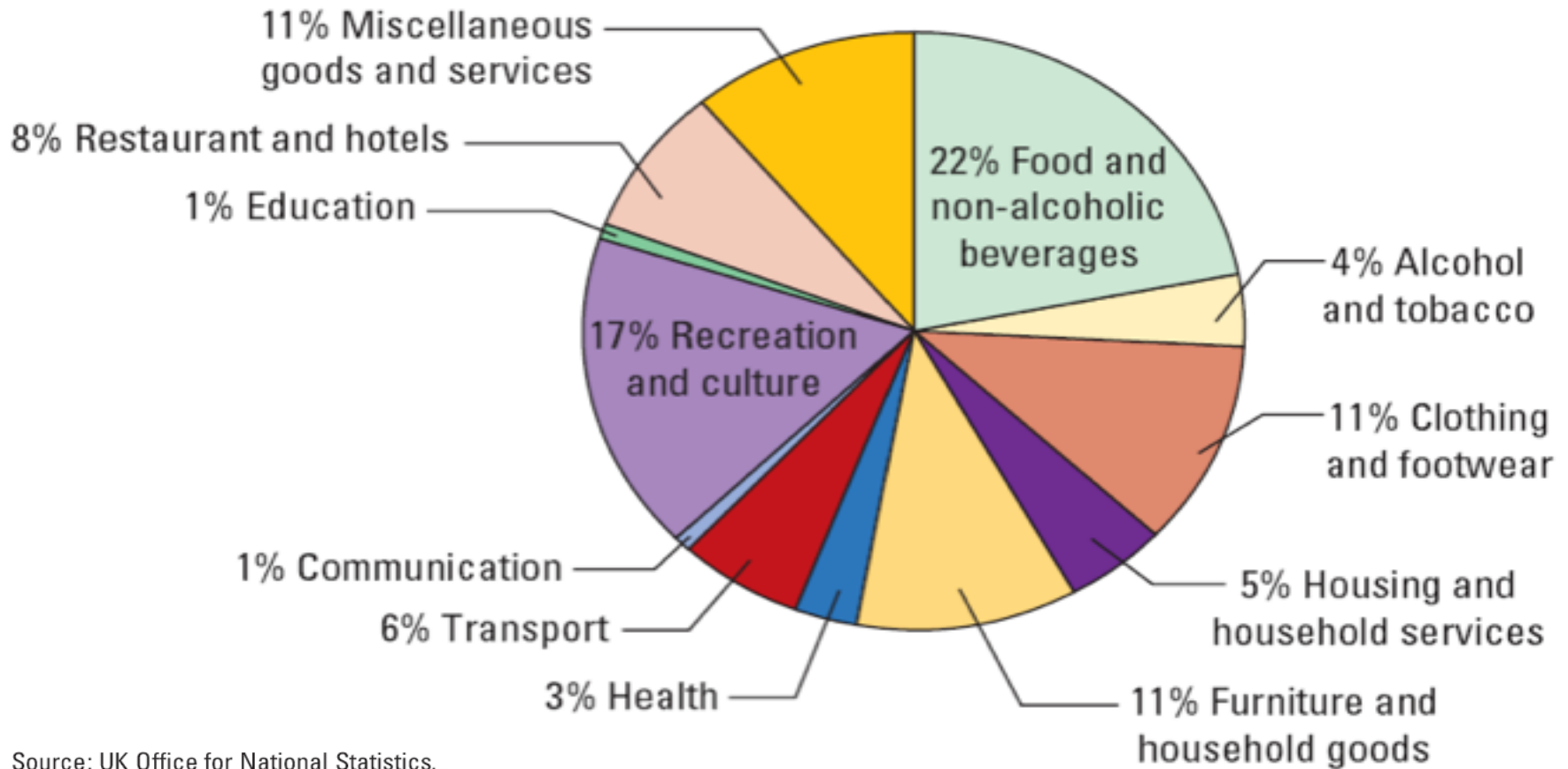
The GDP deflator is calculated as follows:

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

# Other Price Indexes

- ☒ 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.

# Figure 1 The Typical Basket of Goods and Services in the UK, 2009



Source: UK Office for National Statistics.

# **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

# 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.

# 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.



# 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.

# **Unmeasured Quality Changes**

**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.

# 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.

# Harmonized Indices of Consumer Prices

- The same method is used to calculate CPI throughout the EU
- This allows for direct comparison of inflation rates among EU member states.

## Table 2 Inflation Rates Across the EU



Country	HICP in 2010
Austria	108.32
Belgium	110.42
Bulgaria	134.54
Cyprus	109.71
Czech Republic	113.1
Denmark	109.9
Estonia	123.93
Finland	109.53
France	107.34
Germany	107.7
Greece	112.91
Hungary	127.54
Ireland	105.2
Italy	108.3
Latvia	136.12
Lithuania	127.31
Luxembourg	111.66
Malta	108.13
Netherlands	106.55
Poland	114.5
Portugal	106.89
Romania	131.91
Slovakia	111.64
Slovenia	113.61
Spain	110.52
Sweden	110.44
United Kingdom	112.4

Source: Eurostat.

# 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

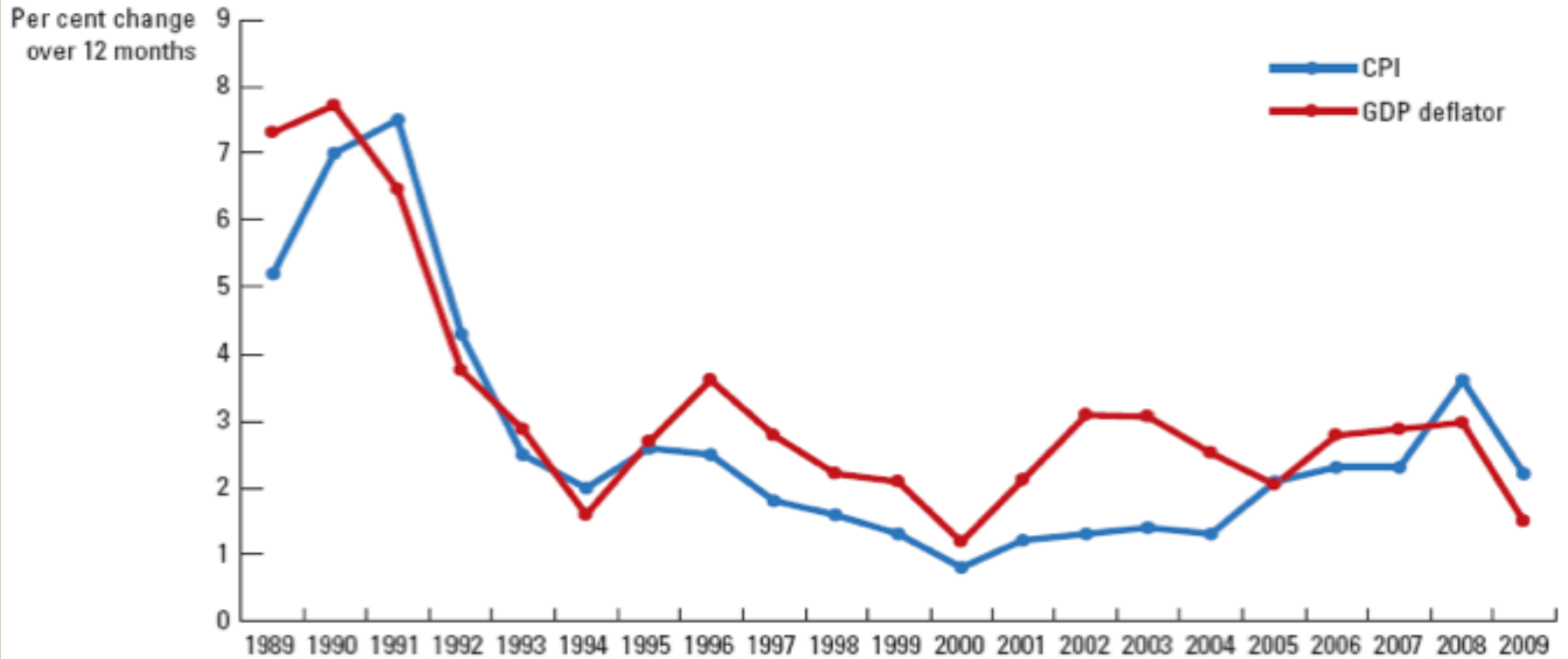
- ❏ The **consumer price index** compares the price of a *fixed basket* of goods and services to the price of the basket in the base year (only occasionally does the BLS change the basket)...
- ❏ ...whereas the **GDP deflator** compares the price of *currently produced* goods and services to the price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

# The GDP Deflator versus the Consumer Price Index

- The GDP deflator is calculated as follows:

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

# Figure 2 Two Measures of Inflation



Source: UK Office for National Statistics.

# **Dollar Figures from Different Times**

**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 1995:

$$\text{Salary}_{1999} = \text{Salary}_{1931} \times \frac{\text{Price level in 1999}}{\text{Price level in 1931}}$$

# Dollar Figures from Different Times



Do the following to convert (inflate) Babe Ruth's wages in 1931 to dollars in 1995:

$$\text{Salary}_{1999} = \text{Salary}_{1931} \times \frac{\text{Price level in 1999}}{\text{Price level in 1931}}$$

$$= \$80,000 \times \frac{166}{15.2}$$

$$= \$873,684$$

## Table 3 The Most Popular Movies of All Times, Inflation Adjusted

Film	Year of release
1. Gone with the Wind	1939
2. Star Wars	1977
3. The Sound of Music	1965
4. E.T.	1982
5. The Ten Commandments	1956
6. Titanic	1997
7. Jaws	1975
8. Doctor Zhivago	1965
9. Avatar	2009
10. The Jungle Book	1967

Source: *The Movie Times* (<http://www.the-movie-times.com/thrsdir/alltime.mv?adjusted+ByAG>).

# **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 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 inflation.

$$\text{Real interest rate} = (\text{Nominal interest rate} - \text{Inflation rate})$$

# Real and Nominal Interest Rates

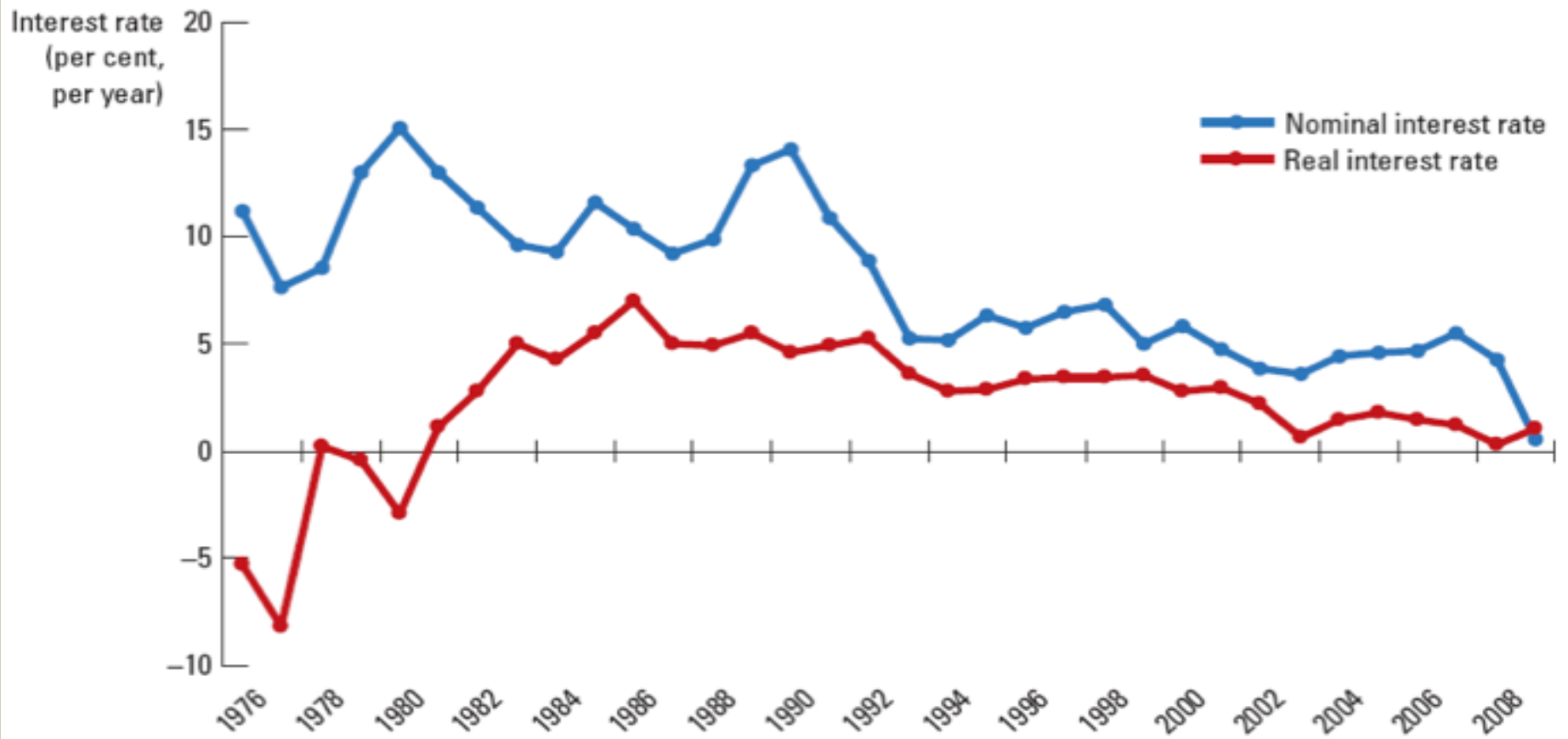
 You borrowed \$1,000 for one year.

 Nominal interest rate was 15%.

 During the year inflation was 10%.




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

# Figure 3 Real and Nominal Interest Rates





Source: Bank of England and UK Office for National Statistics.



# 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.**