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?

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.

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

1. **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.
2. **Find the prices.** Find the prices of each of the goods and services in the basket for each point in time.
3. **Compute the basket’s cost.** Use the data on prices to calculate the cost of the basket of goods and services at different times.
4. 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.

\[
\text{Consumer price index} = \frac{\text{Price of basket of goods and services in one year}}{\text{Price of Basket in base year}} \times 100
\]
How the Consumer Price Index Is Calculated

5. Compute the inflation rate. The inflation rate is the percentage change in the price index from the preceding period.

- The inflation rate is calculated as follows:
  \[
  \text{Inflation Rate in Year 2} = \left( \frac{\text{CPI in Year 2} - \text{CPI in Year 1}}{\text{CPI in Year 1}} \right) \times 100
  \]

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Price of Hot Dogs</th>
<th>Price of Hamburger</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>$1</td>
<td>$2</td>
</tr>
<tr>
<td>2006</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2007</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

FYI: What Is in the CPI’s Basket?

- Transportation: 17%
- Food and beverages: 15%
- Housing: 42%
- Education and communication: 6%
- Medical care: 6%
- Recreation: 4%
- Apparel: 4%
- Other goods and services: 6%

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.
- 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.

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.
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 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.

CPI vs. GDP deflator

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 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.
- 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.

Dollar Figures from Different Times

- Do the following to convert dollar values from year T into today’s dollars:
  \[
  \text{Amount in today's dollars} = \frac{\text{Amount in year T’s dollars} \times \text{Price level today}}{\text{Price level in year T}}
  \]
Dollar Figures from Different Times

• Do the following to convert (inflate) Babe Ruth’s wages in 1931 to dollars in 2005:

\[
\text{Salary}_{2005} = \frac{\text{Salary}_{1931} \times \text{Price level in 2005}}{\text{Price level in 1931}}
\]

\[
= \frac{80,000 \times 195}{152} = \$1,026,316
\]

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.

<table>
<thead>
<tr>
<th>date</th>
<th>Price of gas</th>
<th>CPI</th>
<th>Gas price in 2005 dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/1981</td>
<td>$1.42/gallon</td>
<td>88.5</td>
<td>$3.15/gallon</td>
</tr>
<tr>
<td>8/2005</td>
<td>$2.50/gallon</td>
<td>196.4</td>
<td>$2.50/gallon</td>
</tr>
</tbody>
</table>

• 1981 gas price in 2005 dollars

\[
= \frac{1.42 \times 196.4}{88.5} = \$3.15
\]

• 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?

Solution

Convert 1980 salary into “today’s dollars”
$24,000 \times \frac{180}{90} = $48,000.
After adjusting for inflation, salary is higher today than in 1980.

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

<table>
<thead>
<tr>
<th>Film</th>
<th>Year of Release</th>
<th>Total Domestic Gross (in millions of 2004 dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gone with the Wind</td>
<td>1939</td>
<td>$1,254</td>
</tr>
<tr>
<td>Star Wars</td>
<td>1977</td>
<td>1,084</td>
</tr>
<tr>
<td>The Sound of Music</td>
<td>1960</td>
<td>470</td>
</tr>
<tr>
<td>E.T. The Extra-Terrestrial</td>
<td>1982</td>
<td>864</td>
</tr>
<tr>
<td>The Ten Commandments</td>
<td>1956</td>
<td>801</td>
</tr>
<tr>
<td>Titanic</td>
<td>1997</td>
<td>789</td>
</tr>
<tr>
<td>Jaws</td>
<td>1975</td>
<td>783</td>
</tr>
<tr>
<td>Doctor Zhivago</td>
<td>1965</td>
<td>740</td>
</tr>
<tr>
<td>The Jungle Book</td>
<td>1967</td>
<td>662</td>
</tr>
<tr>
<td>Snow White and the Seven Dwarfs</td>
<td>1937</td>
<td>650</td>
</tr>
</tbody>
</table>

Indexation

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

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
Real and Nominal Interest Rates

- Interest represents a payment in the future for a transfer of money in the past.
- 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 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%.
- Real interest rate = Nominal interest rate – Inflation
  - = 15% – 10% = 5%

Figure 3 Real and Nominal Interest Rates

You borrowed $1,000 for one year. Nominal interest rate was 15%. During the year inflation was 10%. Real interest rate = Nominal interest rate – Inflation = 15% – 10% = 5%.