

23

MEASURING THE COST OF LIVING

LEARNING OBJECTIVES:

By the end of this chapter, students should understand:

- how the consumer price index (CPI) is constructed.
- why the CPI is an imperfect measure of the cost of living.
- how to compare the CPI and the GDP deflator as measures of the overall price level.
- how to use a price index to compare dollar figures from different times.
- the distinction between real and nominal interest rates.

KEY POINTS:

1. 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 price level measures the inflation rate.
2. The consumer price index is an imperfect measure of the cost of living for three reasons. First, it does not take into account consumers' ability to substitute toward goods that become relatively cheaper over time. Second, it does not take into account increases in the purchasing power of a dollar due to the introduction of new goods. Third, it is distorted by unmeasured changes in the quality of goods and services. Because of these measurement problems, the CPI overstates annual inflation by about 1 percentage point.
3. Although the GDP deflator also measures the overall level of prices in the economy, it differs from the consumer price index because it includes goods and services produced rather than goods and services consumed. As a result, imported goods affect the consumer price index but not the GDP deflator. In addition, while the consumer price index uses a fixed basket of goods, the GDP deflator automatically changes the group of goods and services over time as the composition of GDP changes.
4. Dollar figures from different points in time do not represent a valid comparison of purchasing power. To compare a dollar figure from the past to a dollar figure today, the older figure should be inflated using a price index.

5. Various laws and private contracts use price indexes to correct for the effects of inflation. The tax laws, however, are only partially indexed for inflation.
6. A correction for inflation is especially important when looking at data on interest rates. The nominal interest rate is the interest rate usually reported; it is the rate at which the number of dollars in a savings account increases over time. By contrast, the real interest rate takes into account changes in the value of the dollar over time. The real interest rate equals the nominal interest rate minus the rate of inflation.

CHAPTER OUTLINE:

- I. The Consumer Price Index
 - A. Definition of **Consumer Price Index (CPI): a measure of the overall cost of the goods and services bought by a typical consumer.**
 - B. How the Consumer Price Index is Calculated

Table 23-1

1. Fix the basket.
 - a. The Bureau of Labor Statistics uses surveys to determine a representative bundle of goods and services purchased by a typical consumer.
 - b. Example: 4 hot dogs and 2 hamburgers.
2. Find the prices.
 - a. Prices for each of the goods and services in the basket must be determined for each time period.
 - b. Example:

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

3. Compute the basket's cost.
 - a. By keeping the basket the same, only prices are being allowed change. This allows us to isolate the effects of price changes over time.
 - b. Example:

$$\text{Cost in 2001} = (\$1 \times 4) + (\$2 \times 2) = \$8.$$

Cost in 2002 = $(\$2 \times 4) + (\$3 \times 2) = \$14$.

Cost in 2003 = $(\$3 \times 4) + (\$4 \times 2) = \$20$.

4. Choose a base year and compute the index.
 - a. The base year is the benchmark against which other years are compared.
 - b. The formula for calculating the price index is:

$$\text{CPI} = \left(\frac{\text{cost of basket in current year}}{\text{cost of basket in base year}} \right) \times 100$$

- c. Example (using 2001 as the base year):

CPI for 2001 = $(\$8)/(\$8) \times 100 = 100$.

CPI for 2002 = $(\$14)/(\$8) \times 100 = 175$.

CPI for 2003 = $(\$20)/(\$8) \times 100 = 250$.

5. Compute the inflation rate.
 - a. Definition of **Inflation Rate**: the percentage change in the price index from the preceding period.
 - b. The formula used to calculate the inflation rate is:

$$\text{inflation rate} = \left(\frac{\text{CPI}_{\text{Year 2}} - \text{CPI}_{\text{Year 1}}}{\text{CPI}_{\text{Year 1}}} \right) \times 100\%$$

- c. Example:

Inflation Rate for 2002 = $(175 - 100)/100 \times 100\% = 75\%$.

Inflation Rate for 2003 = $(250 - 175)/175 \times 100\% = 43\%$.

C. Another Important Price Index: The Producer Price Index

1. Definition of **Producer Price Index**: a measure of the cost of a basket of goods and services bought by firms.
2. Because firms pass on higher costs to consumers in the form of higher prices on products, the producer price index is believed to be helpful in predicting changes in the CPI.

D. FYI: What Is in the CPI's Basket?

Figure 23-1

1. Figure 23-1 shows the make-up of the market basket used to compute the CPI.

2. The largest category is housing, which makes up 40% of a typical consumer's budget.

E. *In the News: Shopping for the CPI*

1. There are approximately 300 employees of the Bureau of Labor Statistics who gather information on prices.
2. This is an article that appeared in *The Wall Street Journal* about these individuals.

F. Problems in Measuring the Cost of Living

1. Substitution Bias
 - a. When the price of one good changes, consumers often respond by substituting another good in its place.
 - b. The CPI does not allow for this substitution; it is calculated using a fixed basket of goods and services.
 - c. This implies that the CPI overstates the increase in the cost of living over time.
2. Introduction of New Goods
 - a. When a new good is introduced, consumers have a wider variety of goods and services to choose from.
 - b. This makes every dollar more valuable, which means that there is an increase in the purchasing power of the dollar.
 - c. Because the market basket is not revised often enough, these new goods are left out of the bundle of goods and services included in the basket.
3. Unmeasured Quality Change
 - a. If the quality of a good falls from one year to the next, the value of a dollar falls; if quality rises, the value of the dollar rises.
 - b. Attempts are made to correct prices for changes in quality, but it is often difficult to do so because quality is hard to measure.
4. The size of these problems is also difficult to measure.
5. The issue is important because many government transfer programs (such as Social Security) are tied to increases in the CPI.
6. Most studies indicate that the CPI overstates the rate of inflation by approximately 1 percentage point per year.

G. *In the News: A CPI for Senior Citizens*

1. Senior citizens generally do not spend their budgets in the same proportions as younger individuals.
 2. In fact, senior citizens spend a great deal on medical care, which has risen in price by a much larger amount than the prices of most other consumer products.
 3. This is an article from *The New York Times* discussing the debate over creating a separate price index for this group.
- H. The GDP Deflator Versus the Consumer Price Index
1. The GDP deflator reflects the prices of all goods produced domestically, while the CPI reflects the prices of all goods bought by consumers.
 2. The CPI compares the prices of a fixed basket of goods over time, while the GDP deflator compares the prices of the goods currently produced to the prices of the goods produced in the base year. This means that the group of goods and services used to compute the GDP deflator changes automatically over time as output changes.

Figure 23-2

3. Figure 23-2 shows the inflation rates calculated using the CPI and the GDP deflator.

II. Correcting Economic Variables for the Effects of Inflation

A. Dollar Figures from Different Times

1. To change dollar values from one year to the next, we can use this formula:

$$\text{Value in Year 2 dollars} = \text{Value in Year 1 dollars} \times \left(\frac{\text{Price level in Year 2}}{\text{Price level in Year 1}} \right)$$

2. Example: Babe Ruth's 1931 salary in 1999 dollars:

$$\text{Salary in 1999 dollars} = \text{Salary in 1931 dollars} \times \frac{\text{price level in 1999}}{\text{price level in 1931}}$$

$$\begin{aligned} \text{Salary in 1999 dollars} &= \$80,000 \times (166/15.2). \\ \text{Salary in 1999 dollars} &= \$873,684. \end{aligned}$$

3. *Case Study: Mr. Index Goes to Hollywood*
 - a. Reports of box office success are often made in terms of the dollar values of ticket sales.
 - b. These ticket sales are then compared with ticket sales of movies in the past.

- c. However, no correction for changes in the value of a dollar are made.

Table 23-2

- d. Table 23-2 shows a table of the top 20 films with the estimated box office gross in 1998 dollars. The winner: *Gone with the Wind*.

B. Indexation

1. Definition of **Indexation**: the automatic correction of a dollar amount for the effects of inflation by law or contract.
2. As mentioned above, many government transfer programs use indexation for the benefits. The government also indexes the tax brackets used for federal income tax.
3. There are uses of indexation in the private sector as well. Many labor contracts include Cost-of-Living-Allowances (COLAs).

C. Real and Nominal Interest Rates

1. Definition of **Nominal Interest Rate**: the interest rate as usually reported without a correction for the effects of inflation.
2. Definition of **Real Interest Rate**: the interest rate corrected for the effects of inflation.

$$\text{real interest rate} = \text{nominal interest rate} - \text{inflation rate}$$

Figure 23-3

3. Figure 23-3 shows real and nominal interest rates from 1965 to the present. Note that in the late 1970s, the real interest rate was negative because the inflation rate exceeded the nominal interest rate.