

an ever-shifting labour market. In general, **full employment** occurs if only workers who are between jobs and those whose skills are not needed in the economy are unemployed, or, in other words, the demand for jobs is equal to the supply of (useable) workers. In order to carry out appropriate policies to reduce unemployment, governments need to know when the economy has reached full employment. Economists estimate this moment by examining the **natural rate of unemployment**, which is the rate of unemployment that prevails when only frictional unemployment and structural unemployment exist, thereby excluding cyclical unemployment. But it is difficult to identify which type of unemployment is which when measuring unemployment. Economists can easily identify who is unemployed, but the ultimate cause may not be clear. The OECD estimates that the natural rate of unemployment in Canada fell from about 9 percent in the mid 1980s to about 6.6 percent in recent years. It is not surprising, then, that the actual rate of unemployment went well above 8 percent in 2009 during the recession.

Full employment Occurs if only workers who are between jobs and those whose skills are not needed in the economy are unemployed.

Natural rate of unemployment The rate of unemployment that prevails when only frictional unemployment and structural unemployment exist.

4.4 Inflation and Deflation

During World War II, you could buy bread for 10 to 15 cents a loaf and have milk delivered fresh to your door costing about 25 cents per half-gallon (2.25 litres). The average price of a new car was less than \$1000, and the average house cost less than \$5000. Today, bread, milk, cars, and houses all cost more—a lot more. Prices are now 13 times what they were in 1940. Clearly, this country has experienced quite a bit of *inflation* since then. We define **inflation** as an upward movement in the average level of prices. The opposite of inflation is **deflation**, defined as a downward movement in the average level of prices.

Note that these definitions depend on the *average* level of prices. This means that even during a period of inflation, some prices can be falling if other prices are rising at a faster rate. The prices of computers and computer-related equipment have dropped dramatically since the 1960s, even though there has been general inflation. Inflation is officially measured in Canada using the **Consumer Price Index (CPI)**, which is a weighted average of the prices of a specified set of goods and services purchased by wage earners in urban areas. Other measures of inflation include the GDP deflator and producer price indexes, which we discuss later in this chapter.

we want inflation to be between 1-3%

Inflation An upward movement in the average level of prices.

Deflation A downward movement in the average level of prices. *anything over that = unemployment.*

Consumer Price Index (CPI) A weighted average of the prices of a specified set of goods and services purchased by wage earners in urban areas.

Historical Changes in the CPI

The CPI has shown a fairly dramatic trend upward since about World War II. Figure 4-9 shows the annual rate of change in the CPI since 1870. Prior to World War II, there were numerous periods of deflation along with periods of inflation. Persistent year-in and year-out inflation seems to be a post-World War II phenomenon, at least in Canada. As far back as the time before Confederation, prices used to rise during war periods and then fall back to more normal levels afterward. This occurred during the War of 1812 and World War I. Consequently, the overall price level in 1940 was not much different from 150 years earlier. Historical data for inflation can be found at the end of this chapter.

Measuring the Rate of Inflation

How do we come up with a measure of the rate of inflation? This is, indeed, a thorny problem for government statisticians. It is easy to determine how much the price of an individual commodity has risen: if last year a light bulb cost 50 cents and this year it costs 75 cents, there has been a 50 percent rise in the price of that light bulb over a one-year period. We can express the change in the price of the individual light bulb in one of several ways: The price has gone up 25 cents; the price is one and a half (1.5) times as high; or the price has risen by 50 percent. An *index number* of this price rise is simply the second way (1.5) multiplied by 100, meaning that the index number would be 150. We multiply by 100 to eliminate decimals because it is easier to think in terms of percentage changes using integers (whole numbers). This is the standard convention adopted for convenience in dealing with index numbers or price levels.



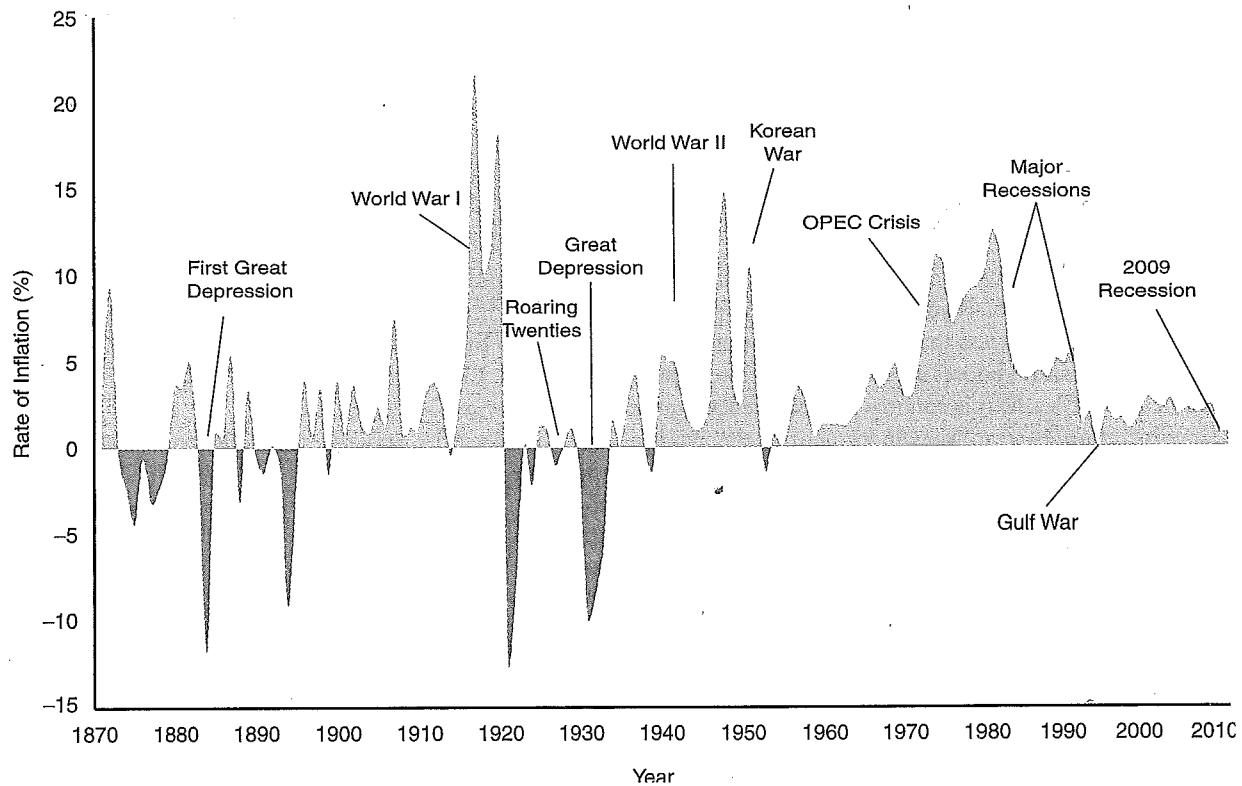
If the price of women's shoes falls, can there still be inflation?

FIGURE 4-9
Inflation in Canada

Inflation has often been associated with wars (see World War I, World War II, and the Korean War), and deflation is usually associated with a depression. However, during the

1970s, inflation was rising and sustained for many years, only falling back to about 2 percent in the mid-1990s, where it currently sits.

Source: Adapted from the Statistics Canada CANSIM database <http://cansim2.statcan.ca>, Table 326-0020; New Estimates of Output Growth in Canada, in *Perspectives on Canadian Economic History*, Ed. D. McCalla and M. Huberman, 2nd Ed., c. 1994.



Price index The cost of a market basket of goods and services in a given year expressed as a percentage of the cost of the same market basket during a base year.

Base year The year that is chosen as the point of reference for comparison of prices in other years.

COMPUTING A PRICE INDEX. The measurement problem becomes more complicated when it involves a large number of goods, some whose prices have risen faster than others and some with prices that have fallen. We have to pick a representative bundle, a so-called “market basket,” of goods and services and compare the cost of that market basket of goods over time. When we do this, we obtain a **price index**, which is defined as the cost of a market basket of goods in a given year, expressed as a percentage of the cost of that identical market basket of goods in some starting year, known as the **base year**—the year that is chosen as the point of reference for comparison of prices in other years.

$$\text{Price index} = \frac{\text{Cost of market basket in a given year}}{\text{Cost of market basket in base year}} \times 100$$

In the base year, the price index will always be 100 because the year is the same in the numerator and in the denominator; therefore, the fraction equals 1, and when we multiply it by 100, we get 100.

A simple numerical example is given in Table 4-1. In the table, there are only two goods in the market basket—corn and microcomputers. The *quantities* in the basket remain the same between the base year, 1997, and 2011; only the *prices* change. Such a *fixed-quantity* price index is the easiest to compute because the statisticians need only look at prices of goods and services sold every year, rather than actually observing how much of these goods and services consumers actually purchase each year.

(1) Commodity	(2) Market Basket Quantity Unit	(3) Price per Unit in 1997	(4) Cost of Market Basket Unit	(5) Price per Unit in 2011	(6) Cost of Market Basket at 2011 Prices
Corn	100 bushels	\$ 4	\$ 400	\$ 8	\$ 800
Microcomputers	2	500	1000	450	900
Totals			\$1400		\$1700
Price index = $\frac{\text{Cost of market basket in 2011}}{\text{Cost of market basket in base year 1997}} \times 100 = \frac{\$1700}{\$1400} \times 100 = 121.43$					

TABLE 4-1

Calculating a Price Index for a Two-Good Market Basket

In this simplified example, there are only two goods: corn and microcomputers. The quantities and base-year prices are given in columns 2 and 3. The cost of the 1997 market basket, calculated in column 4, comes to \$1400. The 2011 prices are given in column 5. The cost of the market basket in 2011, calculated in column 6, is \$1700. The price index for 2011 compared with 1997 is 121.43.

You can use a price index to calculate the annual rate of inflation. If the price index rose from 100 to 103 between 2010 and 2011, you could say that the annual rate of inflation was 3 percent. And you would be correct. Putting this into a formula, we have

$$\text{Annual rate of inflation} = \frac{\text{Current price index} - \text{Previous year's price index}}{\text{Previous year's price index}} \times 100$$

Using our example from above, we could calculate the rate of inflation to be

$$\text{Rate of inflation} = \frac{103 - 100}{100} \times 100 = 3\%$$

THE CONSUMER PRICE INDEX. Statistics Canada has the task of identifying a market basket of goods and services of the typical consumer. Every so often (usually every five to ten years), the prices of almost 500 goods and services are recorded and used to formulate the base year price level. The current base year is 2002.

Economists have known for years that the way Statistics Canada measures changes in the CPI is flawed. Specifically, Statistics Canada has been unable to account for the way consumers substitute less expensive items for higher-priced items. The reason is that the CPI is a fixed-quantity price index (like the index in Table 4-1), meaning that each month Statistics Canada samples only prices, rather than relative quantities purchased by consumers. In addition, Statistics Canada has been unable to take account of quality changes as they occur. Even if it captures the dramatically falling prices of personal computers, it has been unable to reflect the dramatic improvement in quality. Finally, the CPI ignores the introduction of new products.

KNOW

Inflation and the Purchasing Power of Money

The value of a dollar does not stay constant when there is inflation. The value of money is usually talked about in terms of the *purchasing power* of money. A dollar's **purchasing power** is the amount of goods and services that it can buy. Consequently, another way of defining inflation is as a decline in the purchasing power of money. The higher the rate of inflation, the greater is the drop in the purchasing power of money.

Purchasing power The amount of goods and services a given amount of money can buy.

One of the most important uses for inflation measures is to be able to distinguish between nominal and real values. A **nominal value** refers to the value of something in today's dollars or its "money face value." **Real values** are those that have been corrected for the changes in prices. Real values involve our command over goods and services—purchasing power—and therefore depend on a set of prices. In many instances where we want to make meaningful comparisons, we must first adjust the nominal values to their real value equivalents. Consider this example: Nominal income per person in 1960 was only about \$2250 per year. In 2003, nominal income was \$37 400. Were people really that badly off in 1961? No, for nominal income in 1961 is expressed in 1961 dollars, not in the prices of today and so cannot be directly compared. In today's dollars, the per-person income of 1961 would be closer to \$14 950, or about 40 percent of today's income per person. (The uncorrected 1961 data show per-person income to be only about 6 percent of today's income.)

Nominal value The value of something in today's dollars.

Real values Values that have been corrected for the changes in prices.



What happens to purchasing power and behaviour when there is hyperinflation?

How Are People Hurt by Inflation?

You can tell if you have been hurt by inflation by calculating the change in your *real income*. Your **real income** measures how much you can purchase with a given amount of income. If you could purchase two loaves of bread with the money earned during one hour of work last year, and you can still purchase that bread with the earnings from the same number of hours of work this year, then your purchasing power, or your real income, has not changed. If you cannot purchase two loaves of bread with the earnings from one hour of work but can only afford one and a half loaves, then your real income has declined. Conversely, if you can purchase more than two loaves of bread, your real income has increased. To determine the effect of inflation on your real income, calculate the percentage increase (or decrease) in your income in dollars and subtract the annual rate of inflation. Let us assume, for example, that your income increases 4 percent and inflation is 3 percent. What has happened to your real income?

$$\% \text{ change in real income} = 4\% - 3\% = 1\%$$

Real income Measures how much you can purchase with a given amount of income.

In other words, inflation has not hurt you because your income has risen faster than the rate of inflation. Inflation may also affect the value of some assets, and in particular, those with a fixed face value, such as cash, in a similar way. Example 4-3 shows how real income changed for industrial wage earners for the years 1994-2003.

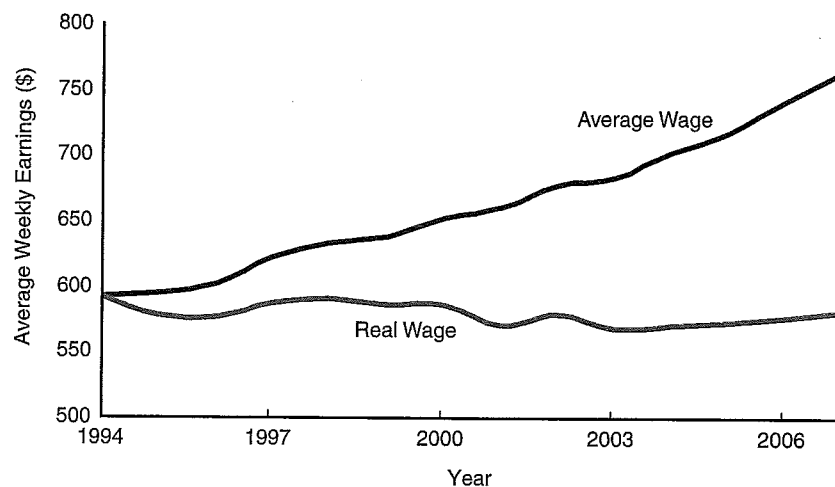
EXAMPLE 4-3 Do Rising Nominal Wages Mean Rising Real Wages, Too?

The decade from 1994 to 2007 was good for Canada. Unemployment was generally low, and wages were rising. Or were they?

Figure 4-10 shows the course of average nominal and real industrial wages over the decade. Average nominal weekly wages rose from \$592.67 to \$765.35 in the year 2007, an increase of about 29 percent. But over the same period, the Consumer Price Index (2002 = 100) had risen from 85.2 to about 112.1, an increase of about 32 percent. On average, then, workers experienced a *decrease* in their real wages of about 2.5 percent, the opposite of what the increase in nominal wages would suggest.

FIGURE 4-10
Average Nominal and Real Earnings

Average nominal industrial wages were on the rise from 1994-2007, but the rise in the price level actually reduced real wages.



For critical analysis: Who benefits from lower wages?

Source: Adapted from the Statistics Canada CANSIM database, table 281-0028 and table 176-003 July 2007.