

Similarly, landlords who receive lease payments of fixed dollar amounts will be hurt by inflation as they receive dollars of declining value over time. Likewise, public sector workers whose incomes are dictated by fixed pay schedules may suffer from inflation. The fixed “steps” (the upward yearly increases) in their pay schedules may not keep up with inflation. Minimum-wage workers and families living on fixed welfare incomes also will be hurt by inflation.

**Savers** Unanticipated inflation hurts savers. As prices rise, the real value, or purchasing power, of an accumulation of savings deteriorates. Paper assets such as savings accounts, insurance policies, and annuities that were once adequate to meet rainy-day contingencies or provide for a comfortable retirement decline in real value during inflation. The simplest case is the person who hoards money as a cash balance. A \$1000 cash balance would have lost one-half its real value between 1984 and 2007. Of course, most forms of savings earn interest. But the value of savings will still decline if the rate of inflation exceeds the rate of interest.

Example: A household may save \$1000 in a certificate of deposit (CD) in a commercial bank or savings and loan association at 6 percent annual interest. But if inflation is 13 percent (as it was in 1980), the real value or purchasing power of that \$1000 will be cut to about \$938 by the end of the year. Although the saver will receive \$1060 (equal to \$1000 plus \$60 of interest), deflating that \$1060 for 13 percent inflation means that its real value is only about \$938 ( $= \$1060 \div 1.13$ ).

**Creditors** Unanticipated inflation harms creditors (lenders). Suppose Chase Bank lends Bob \$1000, to be repaid in 2 years. If in that time the price level doubles, the \$1000 that Bob repays will have only half the purchasing power of the \$1000 he borrowed. True, if we ignore interest charges, the same number of dollars will be repaid as was borrowed. But because of inflation, each of those dollars will buy only half as much as it did when the loan was negotiated. As prices go up, the value of the dollar goes down. So the borrower pays back less valuable dollars than those received from the lender. The owners of Chase Bank suffer a loss of real income.

## Who Is Unaffected or Helped by Inflation?

Some people are unaffected by inflation and others are actually helped by it. For the second group, inflation redistributes real income toward them and away from others.

**Flexible-Income Receivers** People who have flexible incomes may escape inflation’s harm or even benefit from it. For example, individuals who derive their incomes solely from Social Security are largely unaffected by inflation because Social Security payments are *indexed* to the CPI. Benefits automatically increase when the CPI increases, preventing erosion of benefits from inflation. Some union workers also get automatic **cost-of-living adjustments (COLAs)** in their pay when the CPI rises, although such increases rarely equal the full percentage rise in inflation.

Some flexible-income receivers and all borrowers are helped by unanticipated inflation. The strong product demand and labor shortages implied by rapid demand-pull inflation may cause some nominal incomes to spurt ahead of the price level, thereby enhancing real incomes. For some, the 3 percent increase in nominal income that occurs when inflation is 2 percent may become a 7 percent increase when inflation is 5 percent. As an example, property owners faced with an inflation-induced real estate boom may be able to boost rents more rapidly than the rate of inflation. Also, some business owners may benefit from inflation. If product prices rise faster than resource prices, business revenues will increase more rapidly than costs. In those cases, the growth rate of profit incomes will outpace the rate of inflation.

**Debtors** Unanticipated inflation benefits debtors (borrowers). In our earlier example, Chase Bank’s loss of real income from inflation is Bob’s gain of real income. Debtor Bob borrows “dear” dollars but, because of inflation, pays back the principal and interest with “cheap” dollars whose purchasing power has been eroded by inflation. Real income is redistributed away from the owners of Chase Bank toward borrowers such as Bob.

The Federal government, which had amassed \$9.0 trillion of public debt through 2007 has also benefited from inflation. Historically, the Federal government regularly paid off its loans by taking out new ones. Inflation permitted the Treasury to pay off its loans with dollars of less purchasing power than the dollars originally borrowed. Nominal national income and therefore tax collections rise with inflation; the amount of public debt owed does not. Thus, inflation reduces the real burden of the public debt to the Federal government.

## Anticipated Inflation

The redistribution effects of inflation are less severe or are eliminated altogether if people anticipate inflation and can adjust their nominal incomes to reflect the

expected price-level rises. The prolonged inflation that began in the late 1960s prompted many labor unions in the 1970s to insist on labor contracts with cost-of-living adjustment clauses.

Similarly, if inflation is anticipated, the redistribution of income from lender to borrower may be altered. Suppose a lender (perhaps a commercial bank or a savings and loan institution) and a borrower (a household) both agree that 5 percent is a fair rate of interest on a 1-year loan provided the price level is stable. But assume that inflation has been occurring and is expected to be 6 percent over the next year. If the bank lends the household \$100 at 5 percent interest, the bank will be paid back \$105 at the end of the year. But if 6 percent inflation does occur during that year, the purchasing power of the \$105 will have been reduced to about \$99. The lender will, in effect, have paid the borrower \$1 for the use of the lender's money for a year.

The lender can avoid this subsidy by charging an *inflation premium*—that is, by raising the interest rate by 6 percent, the amount of the anticipated inflation. By charging 11 percent, the lender will receive back \$111 at the end of the year. Adjusted for the 6 percent inflation, that amount will have roughly the purchasing power of \$105 worth of today's money. The result then will be a mutually agreeable transfer of purchasing power from borrower to lender of \$5, or 5 percent, for the use of \$100 for 1 year. Financial institutions have also developed variable-interest-rate mortgages to protect themselves from the adverse effects of inflation. (Incidentally, this example points out that, rather than being a *cause* of inflation, high nominal interest rates are a *consequence* of inflation.)

Our example reveals the difference between the real rate of interest and the nominal rate of interest. The **real interest rate** is the percentage increase in *purchasing power* that the borrower pays the lender. In our example the real interest rate is 5 percent.

### ORIGIN OF THE IDEA

#### 26.2

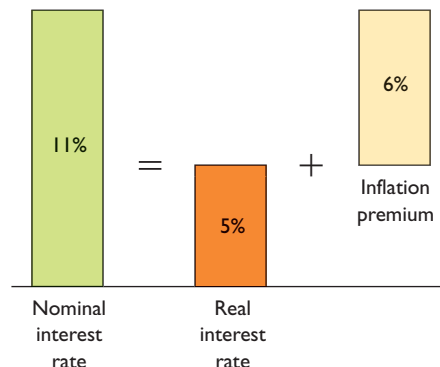
#### Real interest rates

The **nominal interest rate** is the percentage increase in *money* that the borrower pays the lender, including that resulting from the built-in expectation of inflation, if any. In equation form:

$$\text{Nominal interest rate} = \text{real interest rate} + \text{inflation premium (the expected rate of inflation)}$$

As illustrated in Figure 26.5, the nominal interest rate in our example is 11 percent.

**FIGURE 26.5 The inflation premium and nominal and real interest rates.** The inflation premium—the expected rate of inflation—gets built into the nominal interest rate. Here, the nominal interest rate of 11 percent comprises the real interest rate of 5 percent plus the inflation premium of 6 percent.



## Other Redistribution Issues

We end our discussion of the redistribution effects of inflation by making three final points:

- **Deflation** The effects of unanticipated **deflation**—declines in the price level—are the reverse of those of inflation. People with fixed nominal incomes will find their real incomes enhanced. Creditors will benefit at the expense of debtors. And savers will discover that the purchasing power of their savings has grown because of the falling prices.
- **Mixed effects** A person who is simultaneously an income earner, a holder of financial assets, and a debtor will probably find that the redistribution impact of unanticipated inflation is cushioned. If the person owns fixed-value monetary assets (savings accounts, bonds, and insurance policies), inflation will lessen their real value. But that same inflation may produce an increase in the person's nominal wage. Also, if the person holds a fixed-interest-rate mortgage, the real burden of that debt will decline. In short, many individuals are simultaneously hurt and helped by inflation. All these effects must be considered before we can conclude that any particular person's net position is better or worse because of inflation.
- **Arbitrariness** The redistribution effects of inflation occur regardless of society's goals and values. Inflation lacks a social conscience and takes from some and gives to others, whether they are rich, poor, young, old, healthy, or infirm.

**QUICK REVIEW 26.4**

- Inflation harms those who receive relatively fixed nominal incomes and either leaves unaffected or helps those who receive flexible nominal incomes.
- Unanticipated inflation hurts savers and creditors while benefiting debtors.
- The nominal interest rate equals the real interest rate plus the inflation premium (the expected rate of inflation).

## Does Inflation Affect Output?

Thus far, our discussion has focused on how inflation redistributes a given level of total real income. But inflation also may affect an economy's level of real output (and thus its level of real income). The direction and significance of this effect on output depend on the type of inflation and its severity.

### Cost-Push Inflation and Real Output

Recall that abrupt and unexpected rises in key resource prices such as oil can sufficiently drive up overall production costs to cause cost-push inflation. As prices rise, the quantity of goods and services demanded falls. So firms respond by producing less output, and unemployment goes up.

Economic events of the 1970s provide an example of how inflation can reduce real output. In late 1973 the Organization of Petroleum Exporting Countries (OPEC), by exerting its market power, managed to quadruple the price of oil. The cost-push inflationary effects generated rapid price-level increases in the 1973–1975 period. At the same time, the U.S. unemployment rate rose from slightly less than 5 percent in 1973 to 8.5 percent in 1975. Similar outcomes occurred in 1979–1980 in response to a second OPEC oil supply shock.

In short, cost-push inflation reduces real output. It redistributes a decreased level of real income.

### Demand-Pull Inflation and Real Output

Economists do not fully agree on the effects of mild inflation (less than 3 percent) on real output. One perspective is that even low levels of inflation reduce real output because inflation diverts time and effort toward activities designed to hedge against inflation. Examples:

- Businesses must incur the cost of changing thousands of prices on their shelves and in their computers simply to reflect inflation.

- Households and businesses must spend considerable time and effort obtaining the information they need to distinguish between real and nominal values such as prices, wages, and interest rates.
- To limit the loss of purchasing power from inflation, people try to limit the amount of money they hold in their billfolds and checking accounts at any one time and instead put more money into interest-bearing accounts and stock and bond funds. But cash and checks are needed in even greater amounts to buy the higher-priced goods and services. So more frequent trips, phone calls, or Internet visits to financial institutions are required to transfer funds to checking accounts and billfolds, when needed.

Without inflation, these uses of resources, time, and effort would not be needed, and they could be diverted toward producing more valuable goods and services. Proponents of “zero inflation” bolster their case by pointing to cross-country studies that indicate that lower rates of inflation are associated with higher rates of economic growth. Even mild inflation, say these economists, is detrimental to economic growth.

In contrast, other economists point out that full employment and economic growth depend on strong levels of total spending. Such spending creates high profits, strong demand for labor, and a powerful incentive for firms to expand their plants and equipment. In this view, the mild inflation that is a by-product of strong spending is a small price to pay for full employment and continued economic growth. Moreover, a little inflation may have positive effects because it makes it easier for firms to adjust real wages downward when the demands for their products fall. With mild inflation, firms can reduce real wages by holding nominal wages steady. With zero inflation firms would need to cut nominal wages to reduce real wages. Such cuts in nominal wages are highly visible and may cause considerable worker resistance and labor strife.

Finally, defenders of mild inflation say that it is much better for an economy to err on the side of strong spending, full employment, economic growth, and mild inflation than on the side of weak spending, unemployment, recession, and deflation.

### Hyperinflation

All economists agree that **hyperinflation**, which is extraordinarily rapid inflation, can have a devastating impact on real output and employment.

### How, If at All, Do Changes in Stock Prices Relate to Macroeconomic Instability?

Every day, the individual stocks (ownership shares) of thousands of corporations are bought and sold in the stock market. The owners of the individual stocks receive dividends—a portion of the firm's profit. Supply and demand in the stock market determine the price of each firm's stock, with individual stock prices generally rising and falling in concert with the collective expectations for each firm's profits. Greater profits normally result in higher dividends to the stock owners, and, in anticipation of higher dividends, people are willing to pay a higher price for the stock.

The media closely monitor and report stock market averages such as the Dow Jones Industrial Average (DJIA)—the weighted-average price of the stocks of 30 major U.S. industrial firms. It is common for these price averages to change over time or even to rise or fall sharply during a single day. On “Black Monday,” October 19, 1987, the DJIA fell by 20 percent. A sharp drop in stock prices also occurred in October 1997, mainly in response to rapid declines in stock prices in Hong Kong and other southeast Asia stock markets. In contrast, the stock market averages rose spectacularly in 1998 and 1999, with the DJIA rising 16 and 25 percent in those two years. In 2002, the DJIA fell 17 percent. In 2003, it rose by 25 percent.

The volatility of the stock market raises this question: Do changes in stock price averages and thus stock market wealth cause macroeconomic instability? Linkages between the stock market and the economy might lead us to answer “yes.” Consider a sharp increase in stock prices. Feeling wealthier, stock owners respond by increasing their spending (the *wealth effect*). Firms react by increasing their purchases of new capital goods because they can finance such purchases through issuing new shares of high-valued stock (the *investment effect*). Of course, sharp declines in stock prices would produce the opposite results.

Studies find that changes in stock prices do affect consumption and investment but that these consumption and investment

impacts are relatively weak. For example, a 10 percent sustained increase in stock market values in 1 year is associated with a 4 percent increase in consumption spending over the next 3 years. The investment response is even weaker. So typical day-to-day and year-to-year changes in stock market values have little impact on the macroeconomy.



In contrast, *stock market bubbles* can be detrimental to an economy. Such bubbles are huge run-ups of overall stock prices, caused by excessive optimism and frenzied buying. The rising stock values are unsupported by realistic prospects of the future strength of the economy and the firms operating in it. Rather than slowly decompress, such bubbles may burst and cause harm to the economy. The free fall of stock values, if long-lasting, causes reverse wealth effects. The stock market crash also may create

an overall pessimism about the economy that undermines consumption and investment spending even further. Indeed, many economists believe that the stock market crash of 1929 helped to contribute to the onset of the Great Depression during the 1930s by creating a tremendous amount of pessimism regarding the future.

A related question: Even though typical changes in stock prices do not cause recession or inflation, might they predict such maladies? That is, since stock market values are based on expected profits, wouldn't we expect rapid changes in stock price averages to forecast changes in future business conditions? Indeed, stock prices often do fall prior to recessions and rise prior to expansions. For this reason stock prices are among a group of 10 variables that constitute an index of leading indicators (Last Word, Chapter 30). Such an index may provide a useful clue to the future direction of the economy. But taken alone, stock market prices are not a reliable predictor of changes in GDP. Stock prices have fallen rapidly in some instances with no recession following. Black Monday itself did not produce a recession during the following 2 years. In other instances, recessions have occurred with no prior decline in stock market prices.

As prices shoot up sharply and unevenly during hyperinflation, people begin to anticipate even more rapid inflation and normal economic relationships are disrupted. Business owners do not know what to charge for their products. Consumers do not know what to pay. Resource suppliers want to be paid with actual output, rather than with rapidly depreciating money. Money eventually becomes almost worthless and ceases to do its job as a medium of exchange. Businesses, anticipating further price increases, may find that hoarding both materials and finished products is profitable. Individual savers may decide to buy non-productive wealth—jewels, gold, and other precious metals, real estate, and so forth—rather than providing funds that can be borrowed to purchase capital equipment. The economy may be thrown into a state of barter, and production and exchange drop further. The net result is economic collapse and, often, political chaos.

Examples of hyperinflation are Germany after the First World War and Japan after the Second World War. In Germany, “prices increased so rapidly that waiters changed the prices on the menu several times during the course of a lunch. Sometimes customers had to pay double the price

listed on the menu when they ordered.”<sup>2</sup> In postwar Japan, in 1947 “fisherman and farmers . . . used scales to weigh currency and change, rather than bothering to count it.”<sup>3</sup>

There are also more recent examples: Between June 1986 and March 1991 the cumulative inflation in Nicaragua was 11,895,866,143 percent. From November 1993 to December 1994 the cumulative inflation rate in the Democratic Republic of Congo was 69,502 percent. From February 1993 to January 1994 the cumulative inflation rate in Serbia was 156,312,790 percent.<sup>4</sup>

Such dramatic hyperinflations are always the consequence of highly imprudent expansions of the money supply by government. The rocketing money supply produces frenzied total spending and severe demand-pull inflation. Zimbabwe’s 26,000 percent inflation in 2007 is just the latest example.

<sup>2</sup>Theodore Morgan, *Income and Employment*, 2nd ed. (Englewood Cliffs, N.J.: Prentice Hall, 1952), p. 361.

<sup>3</sup>Raburn M. Williams, *Inflation! Money, Jobs, and Politicians* (Arlington Heights, Ill.: AHM Publishing, 1980), p. 2.

<sup>4</sup>Stanley Fischer, Ratna Sahay, and Carlos Végh, “Modern Hyper- and High Inflation,” *Journal of Economic Literature*, September 2002, p. 840.

## Summary

1. The United States and other industrial economies have gone through periods of fluctuations in real GDP, employment, and the price level. Although they have certain phases in common—peak, recession, trough, expansion—business cycles vary greatly in duration and intensity.
2. Although economists explain the business cycle in terms of underlying causal factors such as major innovations, productivity shocks, money creation, and financial crises, they generally agree that changes in the level of total spending are the immediate causes of fluctuating real output and employment.
3. The business cycle affects all sectors of the economy, though in varying ways and degrees. The cycle has greater effects on output and employment in the capital goods and durable consumer goods industries than in the services and nondurable goods industries.
4. Economists distinguish between frictional, structural, and cyclical unemployment. The full-employment or natural rate of unemployment, which is made up of frictional and structural unemployment, is currently between 4 and 5 percent. The presence of part-time and discouraged workers makes it difficult to measure unemployment accurately.
5. The GDP gap, which can be either a positive or a negative value, is found by subtracting potential GDP from actual GDP. The economic cost of unemployment, as measured by the GDP gap, consists of the goods and services forgone by society when its resources are involuntarily idle. Okun’s law suggests that every 1-percentage-point increase in unemployment above the natural rate causes an additional 2 percent negative GDP gap.
6. Inflation is a rise in the general price level and is measured in the United States by the Consumer Price Index (CPI). When inflation occurs, each dollar of income will buy fewer goods and services than before. That is, inflation reduces the purchasing power of money.
7. Unemployment rates and inflation rates vary widely globally. Unemployment rates differ because nations have different natural rates of unemployment and often are in different phases of their business cycles. Inflation and unemployment rates in the United States recently have been in the middle to low range compared with rates in other industrial nations.
8. Economists discern both demand-pull and cost-push (supply-side) inflation. Demand-pull inflation results from an excess of total spending relative to the economy’s capacity to produce. The main source of cost-push inflation is abrupt and rapid increases in the prices of key resources. These supply shocks push up per-unit production costs and ultimately raise the prices of consumer goods.
9. Unanticipated inflation arbitrarily redistributes real income at the expense of fixed-income receivers, creditors, and