10.1 Long-Run Economic Growth (pages 304–312)

Discuss the importance of long-run economic growth. The U.S. economy has experienced both long-run economic growth and the business cycle. The business cycle refers to alternating periods of economic expansion and economic recession. Long-run economic growth is the process by which rising productivity increases the standard of living of the typical person. Because of economic growth, the typical American today can buy almost eight times as much as the typical American of 1900. Long-run growth is measured by increases in real GDP per capita. Increases in real GDP per capita depend on increases in labor productivity. Labor productivity is the quantity of goods and services that can be produced by one worker or by one hour of work. Economists believe two key factors determine labor productivity—the quantity of capital per hour worked and the level of technology. Capital refers to manufactured goods that are used to produce other goods and services. Human capital is the accumulated knowledge and skills workers acquire from education, training, or their life experiences. Economic growth occurs if the quantity of capital per hour worked increases and if technological change occurs. Economists often discuss economic growth in terms of growth in potential GDP, which is the level of GDP attained when all firms are producing at capacity.

10.2 Saving, Investment, and the Financial System (pages 312–319)

Discuss the role of the financial system in facilitating long-run economic growth. Financial markets and financial intermediaries together comprise the financial system. A well-functioning financial system is an important determinant of economic growth. Firms acquire funds from households, either directly through financial markets—such as the stock and bond markets—or indirectly through financial intermediaries—such as banks. The funds available to firms come from saving. There are two categories of saving in the economy: private saving by households and public saving by the government. The value of total saving in the economy is always equal to the value of total investment spending. In the model of the market for loanable funds, the interaction of borrowers and lenders determines the market interest rate and the quantity of loanable funds exchanged.

10.3 The Business Cycle (pages 320–328)

Explain what happens during the business cycle. During the expansion phase of the business cycle, production, employment, and income are increasing. The period of expansion ends with a business cycle peak. Following a business cycle peak, production, employment, and income all decline during the recession phase of the cycle. The recession comes to an end with a business cycle trough, after which another period of expansion begins. The inflation rate usually rises near the end of a business cycle expansion and then falls during a recession. The unemployment rate declines during the later part of an expansion and increases during a recession. The unemployment rate often continues to increase even after an expansion has begun. Economists have not found a method to predict when recessions will begin and end. Recessions are difficult to predict because they are due to more than one cause. Until the severe recession of 2007–2009, recessions had been milder and the economy had been more stable in the period since 1950.
Chapter Review

Chapter Opener: Growth and the Business Cycle at Boeing (page 303)

Established in 1916, Boeing has grown into one of the world’s largest designers and manufacturers of commercial jetliners, military aircraft, satellites, missiles, and defense systems. Like many other companies, Boeing’s experiences have mirrored that of the U.S. economy. Because Boeing is a producer of durable goods, its sales have been vulnerable to the business cycle. When looking at output over longer periods of time, both real GDP and real GDP per capita rise. However, over shorter periods of time, real GDP and real GDP per capita do not grow smoothly and the economy will experience the periodic increases and decreases in production called business cycles. In 2007, Boeing received a record 1,413 orders for new commercial jets, as the United States and much of the world were experiencing a period of strong economic growth. In 2008, economies around the world entered a recession and Boeing’s orders declined by more than half. As global economic growth and the demand for air travel began to pick up by 2011, the demand for Boeing’s airplanes also increased. Boeing is just one of many examples of a company affected by the business cycle.

10.1 Long-Run Economic Growth (pages 304–312)

Learning Objective: Discuss the importance of long-run economic growth.

Long-run economic growth increases living standards. It is the reason why the standard of living for the average American today is so different from that of the 1900s. The best measure for the standard of living is real GDP per person or real GDP per capita. Real per capita GDP (in 2005 dollars) has grown from $5,600 in 1900 to $42,349 in 2010. Today, the average American can purchase about eight times as many goods and services compared to 1900. Economists use growth in real GDP per capita over time as a key measure of the long-term performance of the economy.

In the following formula for calculating the growth rate in real GDP (or real GDP per capita), \( t \) refers to the current year and \( t - 1 \) refers to the previous year:

\[
\text{Real GDP growth rate}_t = \frac{\text{Real GDP}_t - \text{Real GDP}_{t-1}}{\text{Real GDP}_{t-1}} \times 100
\]

Real GDP was $13,088 billion in 2010 and $12,703 billion in 2009. So the growth rate in real GDP for 2010 was:

\[
\text{Real GDP growth rate 2010} = \frac{\text{Real GDP 2010} - \text{Real GDP 2009}}{\text{Real GDP 2009}} \times 100
\]

\[
= \frac{$13,088 \text{ billion} - $12,703 \text{ billion}}{$12,703 \text{ billion}} \times 100 = 3.0\%
\]

To find real GDP growth rates over longer periods of time, such as ten years, we can average the growth rates for each year.

Increases in real GDP and real GDP per capita are caused by increases in labor productivity (output per hour worked). Economists believe that there are two key factors that determine labor productivity: the
quantity of the capital per hour worked and the level of technology. Recall that capital refers to manufactured goods that are used to produce other goods or services. As the capital stock per hour increases, so does worker productivity.

Technological change has similar effects on labor productivity. Technological change refers to an increase in the quantity of output that firms can produce using the same level of inputs. This means an economy can produce more output (real GDP) with the same quantities of workers and capital. However, it is important to point out that accumulating more workers and capital does not ensure that an economy will experience economic growth unless technological change also occurs. Most technological change is embodied in new machinery, equipment, or software.

The concept of potential GDP is very useful to economists when discussing long-run economic growth. Potential GDP refers to the level of output that could be produced if all firms are producing at capacity using normal working hours and their normal work force. Potential GDP grows over time as the labor force increases, as new machinery is installed, and as technological change takes place. In the United States, potential GDP increases about 3.3 percent per year.

Study Hint
Note the distinction between long-run economic growth and the business cycle. Economic growth is a long-term phenomenon, whereas the business cycle is captured by short-run economic fluctuations. As shown in textbook Figure 10.2, economic growth is typically measured as a smooth trend in real GDP over a long period of time, and business cycles are periodic deviations from that smooth trend. Making the Connection “The Connection between Economic Prosperity and Health” discusses the impact of long-run economic growth on different measures of health, such as life expectancy. Making the Connection “What Explains Rapid Economic Growth in Botswana?” explains the importance of government policies, such as the protection of property rights and maintaining political stability, in promoting economic growth among African countries.

10.2 Saving, Investment, and the Financial System (pages 312–319)
Learning Objective: Discuss the role of the financial system in facilitating long-run economic growth.

Economic growth depends on firms purchasing capital goods. However, before a firm can acquire new buildings and machines, it must find financing. This requires access to the financial system. The U.S. financial system includes financial markets (like the stock and bond markets) and financial intermediaries (like banks, credit unions, pension funds, and insurance companies). The financial system channels funds from savers (lenders) to borrowers, who pay savers interest for use of the funds. Financial intermediaries pool the savings of many small savers and make large loans from the pooled funds.

A fundamental macroeconomic identity is that the total value of saving should equal the total value of investment. We can show why this identity holds: First, remember that the relationship between GDP (Y) and its components, consumption (C), investment (I), government purchases (G), and net exports (NX) can be expressed in terms of the following equation:

\[ Y = C + I + G + NX. \]

In a closed economy where exports and imports (and therefore, net exports) are zero, we know that:

\[ Y = C + I + G, \]
Private saving ($S_{private}$) is equal to what households retain of their income after purchasing goods and services ($C$) and paying taxes ($T$). In addition to receiving income for supplying factors of production to firms ($Y$), households also receive income from the government in the form of transfer payments ($TR$). Private saving can be expressed in the following equation:

$$S_{private} = Y + TR - C - T.$$ 

Public saving occurs when the government engages in saving ($S_{public}$). It is the difference between the government’s revenue and the government’s spending and can be expressed in the following equation:

$$S_{public} = T - G - TR.$$ 

Total saving in the economy ($S$) is $S_{private} + S_{public}$. It can also be expressed through the following equations:

$$S = S_{private} + S_{public} = (Y + TR - C - T) + (T - G - TR),$$ 

or

$$S = Y - C - G,$$ 

or

$$S = I.$$ 

The above equations have demonstrated that total saving must equal total investment. The financial system brings about the equality of total saving and total investment through the market for loanable funds. Borrowers and savers interact in the market for loanable funds, which determines the quantity of loanable funds and the interest rate on these funds. The demand for loanable funds is determined by the willingness of firms to borrow funds to finance new investment projects. These projects can range from building new factories to engaging in research and development. When determining whether to borrow funds, firms compare the return they expect to receive on an investment with the interest rate they must pay to borrow the necessary funds. The demand for loanable funds is downward sloping because the lower the interest rate, the larger the number of profitable investment projects there are, and the larger the quantity of loanable funds firms want to borrow. The supply of loanable funds is determined by the willingness of households to save, and by the extent of government saving or dissaving. The supply curve for loanable funds is upward sloping because the higher the interest rate, the greater the quantity of loanable funds supplied by savers. Because both borrowers and lenders are interested in the real interest rate they will receive or pay, equilibrium in the market for loanable funds determines the real interest rate, not the nominal interest rate.

Equilibrium in the market for loanable funds determines the quantity of loanable funds that will flow from lenders to borrowers each period and determines the real interest rate that lenders will receive and that borrowers must pay. The demand for loanable funds is determined by the willingness of firms to borrow money and engage in new investment projects, while the supply of loanable funds is determined by the willingness of households to save. Textbook Figure 10.3 shows equilibrium in the market for loanable funds.
Draw a loanable funds market graph and show what will happen to the equilibrium real interest rate and equilibrium quantity of loanable funds if demand increases. What will happen if supply increases?

An increase in demand will increase both the real interest rate and the quantity of loanable funds.

An increase in supply will reduce the real interest rate and increase the quantity of loanable funds.

Don’t forget the difference between a movement along a curve and a shift in the curve. A shift is caused by a change in a variable that is held constant when we draw a particular curve. For instance, a budget deficit causes a shift in the supply of loanable funds, and an increase in income causes an increase in demand for loanable funds. A change in the real interest rate will cause a movement along both the supply curve of loanable funds and the demand curve for loanable funds.

Making the Connection “Ebenezer Scrooge: Accidental Promoter of Economic Growth?” explains that in Charles Dickens’s *A Christmas Carol*, Scrooge the saver was in fact better for economic growth than Scrooge the spender because savings raise the supply of loanable funds.

When the government runs a budget deficit, it causes the supply curve for loanable funds to shift to the left. This is shown in textbook Figure 10.5. When the supply curve for loanable funds shifts to the left, the real interest rate will rise and private investment spending will fall because there will be fewer profitable private investment projects at the new, higher interest rate. This reduction in investment is referred to as **crowding out**. A budget surplus would have the opposite effects: increasing the total amount of saving in the economy, which would shift the supply of loanable funds to the right. As a result, a government budget surplus will lead to a lower real interest rate, a larger quantity of loanable funds, and higher saving and investment.

### 10.3 The Business Cycle (pages 320–328)

**Learning Objective:** Explain what happens during the business cycle.

The **business cycle** is a period of economic expansion followed by a period of economic recession. The expansion phase of a business cycle ends with a business cycle peak, followed by a period of contraction or recession. The recession phase of a business cycle ends with a business cycle trough, which is followed by another expansion. Textbook Figure 10.6 (a) shows the four phases of the business cycle.
Recessions tend to reduce inflation. On average, inflation is about 2.5 percentage points lower in the year after a recession than in the year before a recession. Recessions almost always increase unemployment. The unemployment rate tends to be about 1.2 percentage points higher in the year after a recession than in the year before a recession. Since the end of World War II, expansions have gotten progressively longer and recessions have become shorter. Until 2007, recessions had become milder.

The federal government does not officially decide when a recession begins and when it ends. Economists turn to the Business Cycle Dating Committee of the National Bureau of Economics Research (NBER). The NBER defines a recession as “a significant decline in activity across the economy, lasting more than a few months, visible in industrial production, employment, real income, and wholesale retail trade.” The NBER is slow in announcing when the country is in a recession because its staff need time to gather and analyze economic statistics and normally are not able to do so until the recession has already begun.

Until 2007, the business cycle had become milder, and the economy had been more stable. Economists believe that there are three reasons behind the reduced severity of recessions and a generally more stable economy in the period of 1950–2007:

1. Services have been an increasing fraction of GDP over the last fifty years. Because goods are a smaller fraction of GDP, problems caused by uneven movements in business inventories have been reduced. A shift in the economy from producing durable goods, whose demand is more responsive to income changes, to services has had a damping effect on recessions in the United States. (Almost by definition, services cannot be held as inventories.)
2. Unemployment insurance provides some income for families to continue to buy goods and services during a recession.
3. Many economists believe that active government policies to combat recessions have had the effect of reducing the severity of recessions.
4. Many economists believe the increased stability of the financial system contributed to the stability of the overall economy in the period after the Great Depression and before the 2007–2009 economic recession.

Study Hint
Read the feature Don’t Let This Happen to You, which reinforces the difference between the price level and the inflation rate. Economic growth is measured by the growth rate in real GDP, not the level of real GDP. Notice that it is possible for the growth rate in real GDP to decline while the level of real GDP is still increasing. Likewise, the price level and inflation are different. Inflation is a rate of change. Inflation can be falling while prices are still rising.

Extra Solved Problem 10.3
Interest Rates and Recession
Supports Learning Objective 10.3: Explain what happens during the business cycle.

Using a graph of the market for loanable funds, predict what will happen to real interest rates as the economy enters a recession.

Solving the Problem
Step 1: Review the chapter material.
This problem is about using the market for loanable funds model, so you may want to review the section “The Market for Loanable Funds,” which begins on page 315 in the textbook.
Step 2: Draw a graph illustrating the effect of a reduction in saving.

The equilibrium real interest rate depends on the demand and supply of loanable funds. As the economy enters a recession, we would expect income to fall, reducing both consumption (and, therefore, investment) and saving. This reduction in saving should reduce the supply of loanable funds, shifting the supply curve to the left. The reduction in the supply of loanable funds is shown in the following graph:

As a result of this reduction in supply, we would expect the equilibrium real interest rate to increase from $i_1$ to $i_2$.

Step 3: Draw a graph illustrating the reduction in the demand for loanable funds.

At the same time that the supply of loanable funds is falling, we would expect the recession to reduce business investment opportunities. If firms do not expect output to grow, they may be unwilling to commit to new investment purchases. Firms will not need to expand their capital if they are laying off employees due to reduced demand. This should have the effect of reducing the demand for loanable funds, shifting the demand curve to the left. This is seen in the graph below:
Step 4: Predict what will happen to real interest rates.
As a result of this reduction in demand, we would expect the equilibrium real interest rate to decrease from $i_1$ to $i_2$. As the economy enters the recession, both the demand curve and the supply curve shift. Because both curves are shifting, the effect of the recession on the equilibrium real interest rate is uncertain. This is because the shift in the supply curve causes the real interest rate to increase at the same time the shift in the demand curve causes the real interest rate to decrease.

If the effect of the shift in demand is greater than the effect of the shift in supply, then we would expect to see the equilibrium real interest rate fall to $i_4$ as a result of the recession. This is seen in the graph below:

If the effect of the shift in supply is greater than the effect of the shift in demand, then we would expect to see the equilibrium real interest rate rise to $i_5$ as a result of the recession. This is seen in the graph below:

Our conclusion is that, based upon the market for loanable funds, we cannot predict what will happen to the equilibrium real interest rate as the economy enters a recession. The rate could either rise or fall. It is possible that the rate will not change. If this happens, the effect of the
shift in supply on the interest rate offsets the effect of the shift in demand and the real interest rate remains at $i_1$. The graph below shows this situation. In practice, we normally see the real interest rate fall during a recession, which means that the shift in the demand for loanable funds must typically be greater than the shift in supply.

**Key Terms**

**Business cycle** Alternating periods of economic expansion and economic recession.

**Capital** Manufactured goods that are used to produce other goods and services.

**Crowding out** A decline in private expenditures as a result of an increase in government purchases.

**Financial intermediaries** Firms, such as banks, mutual funds, pension funds, and insurance companies, that borrow funds from savers and lend them to borrowers.

**Financial markets** Markets where financial securities, such as stocks and bonds, are bought and sold.

**Financial system** The system of financial markets and financial intermediaries through which firms acquire funds from households.

**Labor productivity** The quantity of goods and services that can be produced by one worker or by one hour of work.

**Long-run economic growth** The process by which rising productivity increases the average standard of living.

**Market for loanable funds** The interaction of borrowers and lenders that determines the market interest rate and the quantity of loanable funds exchanged.

**Potential GDP** The level of real GDP attained when all firms are producing at capacity.
Self-Test

(Answers are provided at the end of the Self-Test.)

Multiple-Choice Questions

1. The only way that the standard of living of the average person in a country can increase is by
   a. increasing population growth so output can increase.
   b. increasing production faster than population growth.
   c. ensuring that the country’s economic growth is faster than economic growth in other countries.
   d. producing the amount of output necessary for subsistence.

2. A defining characteristic of the business cycle is
   a. periods of extremely slow growth followed by periods of very fast growth.
   b. frequent economic recessions followed by severe depressions.
   c. alternating periods of expansion and recession.
   d. periods of stable growth but with frequent downturns.

3. The defining characteristic of long-run economic growth is
   a. the business cycle.
   b. rising productivity.
   c. steady increases in living standards for everyone each year.
   d. high rates of inflation.

4. Because the focus of long-run economic growth is on the standard of living of the average person, we measure the standard of living in terms of
   a. real GDP.
   b. nominal GDP.
   c. nominal GDP per capita.
   d. real GDP per capita.

5. In measuring changes in the standard of living in a country, economists rely heavily on comparisons over time of real GDP per capita because
   a. it is a very precise, almost perfect measure of well-being.
   b. it is an effective means of accounting for things like the level of pollution, the level of crime, spiritual well-being, and many factors that other measures can’t count.
   c. it includes the value of all production in the economy.
   d. despite its well-known flaws, it is the best means we have of comparing the performance of an economy over time.

6. The computation of the average annual growth rate of real GDP
   a. is the same for shorter periods of time as for longer periods of time.
   b. is computed by simply averaging the growth rate for each year, but only if we use a lot of years.
   c. is more complex when a long period of time is involved than when only a few years are included.
   d. involves computing the percentage change in real GDP between the first year and the last year for the period we are interested in.
7. What is the best use of the rule of 70 among those listed below?
   a. to forecast the duration of recessions
   b. to find the average annual growth rate of real GDP
   c. to judge how rapidly real GDP per capita is growing over long time periods
   d. to calculate the difference between the growth rate in real GDP and the growth rate in real GDP per capita

8. When it comes to raising the standard of living in a country, how important is the growth rate of real GDP?
   a. Growth rates in real GDP are very important. Small differences in growth rates can have large effects over long time periods.
   b. The difference in growth rates must be substantial before we notice any rise in living standards.
   c. The standard of living can increase in the long run without any growth in real GDP.
   d. When explaining changes in the standard of living, economists focus more on social factors than on growth rates of GDP.

9. Which of the following does not cause the quantity of goods and services that can be produced by one worker, or in one hour of work, to increase?
   a. an increase in the quantity of capital per hour worked
   b. technological change
   c. an increase in the number of workers
   d. an increase in the literacy rate

10. Which of the following terms refers to the accumulated knowledge and skills that workers acquire from education and training, or from their life experiences?
    a. capital
    b. financial capital
    c. human capital
    d. physical capital

11. Which of the following will ensure that an economy experiences sustained economic growth?
    a. increasing the amount of labor
    b. increasing the amount of capital
    c. increasing the amount of raw materials
    d. technological change

12. Which of the following government policies can help economic growth?
    a. ensuring relative political stability and relatively little corruption
    b. promoting the existence of an efficient financial system
    c. protecting private property rights, allowing for freedom of the press, and having a democratic form of government
    d. all of the above

13. Which of the following will not cause an economy to grow in the long run?
    a. a more productive labor force
    b. increases in capital per hour worked
    c. a low minimum-wage rate
    d. technological change
14. Potential GDP is
   a. always greater than actual real GDP.
   b. always less than actual real GDP.
   c. sometimes greater, sometimes less, and sometimes equal to actual real GDP.
   d. the level of GDP that would be produced when firms are operating at maximum capacity.

15. How do firms acquire funds by using indirect finance rather than direct finance?
   a. by issuing stocks or bonds
   b. by borrowing from households
   c. by borrowing from a bank
   d. by borrowing from other firms

16. Which of the following are financial securities that represent promises to repay a fixed amount of funds?
   a. stocks
   b. bonds
   c. both stocks and bonds
   d. neither stocks nor bonds

17. Which of the following is a financial intermediary?
   a. a bank
   b. the White House
   c. a company that develops an Internet search engine
   d. a real estate brokerage

18. Which of the following is not a service that the financial system provides for savers and borrowers?
   a. risk sharing among savers
   b. increased liquidity for savers
   c. matching savers with borrowers
   d. protecting information or facts about borrowers from savers.

19. A government that collects more in taxes than it spends experiences
   a. a budget surplus.
   b. a budget deficit.
   c. a budget balance.
   d. an increase in the national debt.

20. What happens when government spending is greater than government tax revenues?
   a. There is negative public saving.
   b. There is dissaving by government and the national debt rises.
   c. The government issues more new bonds than the old bonds it pays off.
   d. All of the above occur.

21. In determining whether or not to borrow funds, firms compare the rate of return they expect to make on an investment with
   a. the revenue expected from the investment.
   b. the interest rate they must pay to borrow the necessary funds.
   c. the initial cost of the investment.
   d. the total amount of profit they expect to make from the investment.
22. Fill in the blanks. The _________ the interest rate, the more investment projects firms can profitably undertake, and the _________ the quantity of loanable funds they will demand.
   a. lower; greater
   b. lower; smaller
   c. higher; greater
   d. higher; smaller

23. An increase in the real interest rate will
   a. shift the demand curve for loanable funds to the left.
   b. shift the supply curve of loanable funds to the right.
   c. cause a movement along the demand curve for loanable funds.
   d. result from the supply curve for loanable funds shifting to the right.

24. Which of the following determines the supply of loanable funds?
   a. the willingness of households and governments to save
   b. the number of financial intermediaries available
   c. changes in the interest rate, which cause business firms to undertake more or less profitable investment projects
   d. the quantity of stocks and bonds issued by business firms

25. If technological change increases the profitability of new investment to firms, which of the following will occur?
   a. The demand for loanable funds will increase.
   b. The supply of loanable funds will increase.
   c. The demand for loanable funds will decrease.
   d. The supply of loanable funds will decrease.

26. A federal government budget deficit will
   a. increase the demand for loanable funds and increase the equilibrium real interest rate.
   b. increase the supply of loanable funds and decrease the equilibrium real interest rate.
   c. decrease the supply of loanable funds and increase the equilibrium real interest rate.
   d. decrease the supply of loanable funds and decrease the equilibrium real interest rate.

27. If the government begins running a budget deficit, what impact will the deficit have on the loanable funds market?
   a. The demand for loanable funds will increase.
   b. The supply of loanable funds will increase.
   c. The demand for loanable funds will decrease.
   d. The supply of loanable funds will decrease.

28. Which of the following equals the amount of public saving?
   a. the government’s tax revenue minus the sum of government purchases and transfer payments to households
   b. the sum of the government’s tax revenue, government purchases, and government transfer payments to households
   c. the sum of government purchases and transfer payments to households, minus transfer payments to households
   d. the government’s transfer payments to household minus the sum of the government’s tax revenue and government purchases.
29. How would a consumption tax affect the loanable funds market?
   a. The demand for loanable funds would increase.
   b. The supply of loanable funds would increase.
   c. The demand for loanable funds would decrease.
   d. The supply of loanable funds would decrease.

30. From a trough to a peak, the economy goes through
   a. the recessionary phase of the business cycle.
   b. the expansionary phase of the business cycle.
   c. falling real GDP.
   d. rising real GDP, but falling real GDP per capita.

31. Typically, when will the National Bureau of Economic Research (NBER) announce that the economy is in a recession?
   a. about six months prior to the recession
   b. on the precise date that the recession starts
   c. only well after the recession has begun
   d. exactly one year after the recession starts

32. As the economy nears the end of an expansion, which of the following occurs?
   a. Interest rates are usually rising.
   b. Wages are usually rising faster than prices.
   c. The profits of firms will be falling.
   d. All of the above occur.

33. When do households and firms typically increase their debts substantially?
   a. toward the end of a recession
   b. toward the end of an expansion
   c. at the beginning of both recessions and expansions
   d. in the middle of a recession

34. In business cycles,
   a. expansions are usually the same length as recessions.
   b. the peak is the end of the expansion.
   c. the trough is always six months after the previous peak.
   d. the dates of the peak and trough are determined by Congress.

35. Which types of goods are most likely to be affected by the business cycle?
   a. durable goods
   b. nondurable goods
   c. services
   d. goods purchased by the government

36. How does the inflation rate behave during the business cycle?
   a. During expansions, the inflation rate usually increases.
   b. During recessions, the inflation rate usually increases.
   c. The inflation rate is unpredictable; it may increase or decrease during recessions or expansions.
   d. The inflation rate usually decreases during both recessions and expansions.
37. Fill in the blanks. Recessions cause the inflation rate to ________, and they cause the unemployment rate to ________.
   a. increase; increase
   b. increase; decrease
   c. decrease; decrease
   d. decrease; increase

38. During the early stages of a recovery,
   a. firms usually rush to hire new employees before other firms employ them.
   b. firms are usually reluctant to hire new employees.
   c. the rate of unemployment increases dramatically.
   d. the rate of unemployment decreases dramatically.

39. Comparing the 1950–2007 period with other periods, how would you describe the business cycle?
   a. Recessions were milder, and the economy was more stable.
   b. Recessions were deeper and longer lasting, and the economy was more unstable.
   c. There were no periods of recession in the 1950–2007 period, and the economy was very stable.
   d. There were expansions and recessions in the 1950–2007 period, but the recessions were longer than the expansions.

40. Which of the following is not a reason that the economy is considered to be more stable in the 1950–2007 period than in other periods?
   a. the increasing importance of services and the declining importance of goods
   b. the establishment of unemployment insurance programs
   c. the use of active government policies to stabilize the economy
   d. the introduction of a minimum-wage rate

41. During the last half of the twentieth century, the U.S. economy experienced
   a. long expansions, interrupted by relatively short recessions.
   b. long recessions, interrupted by relatively short expansions.
   c. much more severe swings in real GDP than in the first half of the twentieth century.
   d. an inflation rate that increased during both recessions and expansions.

42. Changes in the stability of the economy during the 1950–2007 period were attributed to
   a. the steady rise of manufacturing production as a percentage of GDP.
   b. the fact that the production of services fluctuates more than the production of durable goods such as automobiles.
   c. the increasing importance of services and the declining importance of goods.
   d. the increased instability in financial markets that partially offset the instability in other markets.

43. How have the establishment of unemployment insurance and the creation of other transfer programs that provide funds to the unemployed contributed to business cycle stability?
   a. They have not contributed; in fact, they have worsened the stability of the economy.
   b. They have made it possible for workers who lose their jobs to have higher incomes and, therefore, to spend more than they would otherwise.
   c. They have limited the ability of the government to spend on other, more effective programs to bring about stability.
   d. It is difficult to establish the impact of these programs on economic stability.
44. The period between the mid-1980s and the recession that began in late 2007 is commonly known as
   a. the Great Depression.
   b. the Great Recession.
   c. the Great Moderation.
   d. the Great Divide.

45. Which of the following statements best characterizes the views of economists with respect to
government stabilization policies?
   a. All economists are in favor of government policies intended to stabilize the economy.
   b. Hardly any economists are in favor of government policies intended to stabilize the economy.
   c. Some economists believe that government policies have played a key role in stabilizing the
economy, but other economists disagree.
   d. Most economists agree that government policies intended to stabilize the economy policies have
been very effective, while only a few disagree.

Short Answer Questions

1. If real GDP grows more slowly than the rate at which population is growing, what will happen to
   real GDP per capita? What will happen to the standard of living?
   _______________________________________________________________________________
   _______________________________________________________________________________

2. Growth in the capital stock is an important factor in economic growth. What is the link between
growth in the capital stock and investment spending?
   _______________________________________________________________________________
   _______________________________________________________________________________
   _______________________________________________________________________________

3. Suppose that households decide to save a greater fraction of their income even though the current
   interest rate has not changed. Use the loanable funds model to predict how the equilibrium real
   interest rate will change.
   _______________________________________________________________________________
   _______________________________________________________________________________
   _______________________________________________________________________________

4. What effect does the business cycle typically have on the unemployment rate and the inflation
   rate? On average, how much difference is there between each rate in the year before a recession
   begins and the year after a recession ends?
   _______________________________________________________________________________
   _______________________________________________________________________________
5. Explain how unemployment insurance may cause a recession to be shorter and milder, while at the same time keeping unemployment higher for a longer time.

6. The table below gives real GDP for Canada for the period 2005–2010:

<table>
<thead>
<tr>
<th>Year</th>
<th>Real GDP (millions of 2010 Canadian dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>$1,529,968</td>
</tr>
<tr>
<td>2006</td>
<td>1,573,159</td>
</tr>
<tr>
<td>2007</td>
<td>1,607,768</td>
</tr>
<tr>
<td>2008</td>
<td>1,618,846</td>
</tr>
<tr>
<td>2009</td>
<td>1,574,004</td>
</tr>
<tr>
<td>2010</td>
<td>1,624,608</td>
</tr>
</tbody>
</table>

Using this data, calculate the growth rate in real GDP for each year from 2005 to 2010, and the average growth rate in real GDP for this period. If Canadian real GDP grew at this average rate, how many years would it take for real GDP to double?

True/False Questions

T  F  1. Adjusted for inflation, GDP per capita in the United States in 2010 was about the same as it was in 1900.
T  F  2. If real GDP grows at a rate of 5 percent per year, it will take more than fifteen years for real GDP to double.
T  F  3. Labor productivity is the quantity of goods and services that can be produced by one hour of work.
T  F  4. Labor productivity is now about the same as it was in 1900.
T  F  5. Actual real GDP can never be higher than potential GDP because potential GDP is the upper limit of real GDP.
T  F  6. In an economy with no imports or exports, total savings equal investment.
T  F  7. Private saving in the economy equals total savings plus public saving.
T  F  8. An increase in the real interest rate caused by a decrease in the supply of loanable funds will reduce the demand for loanable funds and shift the loanable funds demand curve to the left.
T  F  9. In the market for loanable funds, savers demand loanable funds.
T F 10. An increase in the equilibrium quantity of loanable funds will result in an increase in both saving and investment.

T F 11. The dates for business cycle peaks and troughs are determined by the Business Cycle Committee of Congress (BCCC).

T F 12. A business cycle is (in this order) an expansion, a peak, a recession, a trough, and then another expansion.

T F 13. Recessions in the period between 1950 and 2011 typically lasted more than two years.

T F 14. Inflation is usually lower and unemployment is usually higher after a recession than before a recession.

T F 15. Unemployment insurance is one of the reasons that recessions have become shorter and less severe.

**Answers to the Self-Test**

**Multiple-Choice Questions**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>b</td>
<td>Increasing production faster than population growth is the only way that the standard of living of the average person in a country can increase.</td>
</tr>
<tr>
<td>2.</td>
<td>c</td>
<td>Dating back to at least the early nineteenth century, the U.S. economy has experienced periods of expanding production and employment followed by periods of recession, during which production and employment decline. These alternating periods of expansion and recession are called the business cycle.</td>
</tr>
<tr>
<td>3.</td>
<td>b</td>
<td>Long-run economic growth is the process by which rising productivity increases the standard of living of the typical person.</td>
</tr>
<tr>
<td>4.</td>
<td>d</td>
<td>Because the focus of long-run economic growth is on the standard of living of the average person, we measure it by real GDP per capita. We use real GDP rather than nominal GDP to eliminate the effect of price changes.</td>
</tr>
<tr>
<td>5.</td>
<td>d</td>
<td>The quantity of goods and services that a person can buy, as measured by real GDP, is not a perfect measure of how happy or contented that person may be. The level of pollution, the level of crime, spiritual well-being, and many other factors are ignored in calculating GDP but contribute to a person’s happiness. Nevertheless, economists rely heavily on comparisons of real GDP per capita because—flawed though the measure is—it is the best means we have of comparing the performance of an economy over time or the performance of different economies at any particular time. (Economists who have studied the issue of happiness have found a high correlation between per capita real GDP and per capita happiness.)</td>
</tr>
<tr>
<td>6.</td>
<td>c</td>
<td>For example, real GDP in the United States was $2,004 billion in 1950 and $13,088,652 billion in 2010. To find the average annual growth rate during this sixty-year period, we need to compute the growth rate that would result in $2,004 billion growing to $13,088 billion over sixty years. In this case, the growth rate is 3.2 percent. That is, if $2,004 billion grows at an average rate of 3.2 percent per year, then after sixty years it will have grown to $13,088 billion. For shorter periods of time, we get approximately the same answer by averaging the growth rate for each year.</td>
</tr>
</tbody>
</table>
Question 7. c  One way to judge how rapidly real GDP per capita is growing is to calculate the number of years it would take to double. If real GDP per capita in a country doubles, say every twenty years, then most people in the country will experience significant increases in their standard of living over the course of their lives. If real GDP per capita doubles only every 100 years, then increases in the standard of living will be too slow to notice.

Question 8. a  Small differences in growth rates can have large effects on how rapidly the standard of living in a country increases. For example, in fifty years a $1 trillion economy would grow to a $4.4 trillion economy at a 3 percent growth rate. The same economy would grow to $7.1 trillion at a growth rate of 4 percent.

Question 9. c  Increasing the number of hours of work is not sufficient to increase productivity. Economists believe two key factors determine labor productivity: the quantity of capital per hour worked and the level of technology.

Question 10. c  Human capital is defined as the accumulated knowledge and skills that workers acquire from education and training, or from their life experiences.

Question 11. d  A very important point is that just accumulating more inputs—such as labor, capital, and raw materials—will allow growth for a period of time. To sustain the growth, however, technological change must also occur.

Question 12. d  Protecting private property, avoiding political instability and corruption, and allowing press freedom and democracy are a straightforward recipe for providing an environment in which economic growth can occur.

Question 13. c  A low minimum wage may increase teenage employment but would not influence economic growth.

Question 14. c  Potential real GDP increases every year as the labor force and the capital stock grow and technological change occurs. Actual real GDP has sometimes been greater than potential real GDP and sometimes less, because of the effects of the business cycle. Note that potential real GDP results from firms producing at normal capacity, rather than at maximum capacity.

Question 15. c  Firms acquire funds from households, either directly through financial markets—such as the stock and bond markets—or indirectly through financial intermediaries, such as banks. In financial markets, firms raise funds by selling financial securities directly to savers.

Question 16. b  Stocks are financial securities that represent partial ownership of a firm. If you buy one share of stock in General Electric, then you become one of millions of owners of that firm who are entitled to a share of the firm’s profits. Bonds are financial securities that represent promises to repay a fixed amount of funds.

Question 17. a  Financial intermediaries, such as banks, mutual funds and insurance companies, channel funds from savers to borrowers.

Question 18. d  The financial system provides savers with information or facts about borrowers and expectations about returns on financial securities.

Question 19. a  A government that collects more in taxes than it spends experiences a budget surplus. A government that spends more than it collects in taxes experiences a budget deficit.
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.</td>
<td>d</td>
<td>When government spending is greater than government tax revenues, there is negative public saving. Negative saving is also referred to as <strong>dissaving</strong>. Only when the government runs a budget surplus does it provide funds to financial markets by paying off more old bonds than it issues new bonds.</td>
</tr>
<tr>
<td>21.</td>
<td>b</td>
<td>In determining whether or not to borrow funds, firms compare the return they expect to make on an investment with the interest rate they must pay to borrow the necessary funds.</td>
</tr>
<tr>
<td>22.</td>
<td>a</td>
<td>The demand for loanable funds is downward sloping because the lower the interest rate is, the more investment projects firms can profitably undertake, and the greater the quantity of loanable funds they will demand.</td>
</tr>
<tr>
<td>23.</td>
<td>c</td>
<td>Because the real interest rate is plotted on the vertical axis, a change in that rate will cause a movement along the graph, not a shift.</td>
</tr>
<tr>
<td>24.</td>
<td>a</td>
<td>The supply of loanable funds is determined by the willingness of households to save, and by the extent of government saving or dissaving. Financial intermediaries are not a source of funds, merely a conduit for channeling funds from savers to borrowers. Changes in the interest rate are caused by a change in the supply of loanable funds, not the other way around. Stocks and bonds are a source of acquiring funds (borrowing) and represent demand for funds, not supply of loanable funds.</td>
</tr>
<tr>
<td>25.</td>
<td>a</td>
<td>The demand for loanable funds is determined by the willingness of firms to borrow money to engage in new investment projects. A technological change that increases profitability will increase that willingness for every level of the real interest rate.</td>
</tr>
<tr>
<td>26.</td>
<td>c</td>
<td>A federal budget deficit takes funds out of the economy, which will shift the supply of loanable funds to the left, resulting in a higher equilibrium real interest rate.</td>
</tr>
<tr>
<td>27.</td>
<td>d</td>
<td>When the government runs a budget surplus it provides funds to financial markets by paying off more old bonds than it issues new bonds—there is positive public saving. When government spending is greater than government tax revenues, there is negative public saving. Negative saving is also referred to as dissaving. Therefore, the deficit reduces the total amount of savings in the economy.</td>
</tr>
<tr>
<td>28.</td>
<td>a</td>
<td>Public saving equals tax revenue minus the sum of government purchases and transfer payments to households.</td>
</tr>
<tr>
<td>29.</td>
<td>b</td>
<td>For example, consider someone who puts her savings in a certificate of deposit at an interest rate of 4 percent and whose tax rate is 25 percent. Under an income tax, this person’s after-tax return to saving is 3 percent [4 \times (1 - 0.25)]. Under a consumption tax where savings are not taxed, the return rises to 4 percent. We can conclude that moving from an income tax to a consumption tax would increase the return to saving, causing the supply of loanable funds to increase.</td>
</tr>
<tr>
<td>30.</td>
<td>b</td>
<td>The period of contraction ends with a business cycle trough. Following the business cycle trough, production, employment, and income rise as the economy enters the expansion phase of the cycle.</td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
<td>Comment</td>
</tr>
<tr>
<td>----------</td>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td>31.</td>
<td>c</td>
<td>The NBER is fairly slow in announcing business cycle dates because it takes time to gather and analyze economic statistics. Typically, the NBER will announce that the economy is in a recession only well after the recession has begun. (Sometimes the NBER Business Cycles Committee continues to debate the exact dates on which a recession began and ended for several years after the recession is over. For example, the debate about when the 2001 recession ended continued well into 2004. The starting period (December 2007) of the 2007–2009 recession was not announced until late 2008.</td>
</tr>
<tr>
<td>32.</td>
<td>d</td>
<td>As the economy nears the end of an expansion, interest rates are usually rising, and the wages of workers are usually rising faster than prices. As a result of rising interest rates and rising wages, the profits of firms will be falling. Typically, toward the end of an expansion, both households and firms will have substantially increased their debts.</td>
</tr>
<tr>
<td>33.</td>
<td>b</td>
<td>Typically, toward the end of an expansion, both households and firms will have substantially increased their debts.</td>
</tr>
<tr>
<td>34.</td>
<td>b</td>
<td>The phases of the business cycle are the trough, followed by the expansion, the peak, and then the contraction followed by a trough and another cycle.</td>
</tr>
<tr>
<td>35.</td>
<td>a</td>
<td>Consumer durables are affected more by the business cycle than are nondurables—such as food and clothing—or services—such as haircuts or medical care. Because people can often continue to use their existing furniture, appliances, or automobiles, they are more likely to postpone spending on durables than on other goods.</td>
</tr>
<tr>
<td>36.</td>
<td>a</td>
<td>During economic expansions, the inflation rate usually increases, particularly near the end of the expansion, and during recessions, the inflation rate usually decreases. In every recession since 1950, the inflation rate has been lower during the twelve months after the recession ended than it was during the twelve months before the recession began.</td>
</tr>
<tr>
<td>37.</td>
<td>d</td>
<td>Recessions cause the inflation rate to fall, but they cause the unemployment rate to increase.</td>
</tr>
<tr>
<td>38.</td>
<td>b</td>
<td>The reluctance of firms to hire new employees during the early stages of a recovery means that the unemployment rate usually continues to rise even after the recession has ended.</td>
</tr>
<tr>
<td>39.</td>
<td>a</td>
<td>Before 1950 and after 2007, real GDP went through much greater year-to-year fluctuations than other periods. During the time period from 1950–2007, the American economy did not experience anything similar to the sharp fluctuations in real GDP that occurred during the early 1930s or after 2007.</td>
</tr>
<tr>
<td>40.</td>
<td>d</td>
<td>The minimum wage has nothing to do with the stability of the economy.</td>
</tr>
<tr>
<td>41.</td>
<td>a</td>
<td>During the last half of the twentieth century, the U.S. economy experienced long expansions, interrupted by relatively short recessions.</td>
</tr>
<tr>
<td>42.</td>
<td>c</td>
<td>As services, such as medical care or investment advice, have become a much larger fraction of GDP, there has been a corresponding decline in the production of goods.</td>
</tr>
<tr>
<td>43.</td>
<td>b</td>
<td>These and other government programs make it possible for workers who lose their jobs during recessions to have higher incomes and, therefore, to spend more than they would otherwise. This additional spending may have helped to make recessions shorter and shallower.</td>
</tr>
</tbody>
</table>
Question  Answer  Comment
44.  c  Because the mild economic fluctuations during the period between the mid-1980s and the recession that began in late 2007, that period is commonly known as the “Great Moderation.”
45.  c  Many economists believe that these government policies have played a key role in stabilizing the economy in the years during the 1950–2007 period, but other economists disagree. These economists argue that far from helping to stabilize the economy, active policy has kept the economy from becoming even more stable.

Short Answer Responses

1. If the rate of growth of population is greater than the rate of growth of real GDP, then real GDP per capita will decrease and the standard of living is likely to decline.

2. Investment spending includes (1) the purchase of capital goods by firms, including new factories, office buildings, and machinery used to produce other goods, (2) changes in business inventories, and (3) new residential construction. If the purchase of new capital goods exceeds the level of depreciation (the amount of capital worn out by current production), then the capital stock will increase.

3. The increased desire to save by the public will shift the supply of loanable funds to the right, from $S_0$ to $S_1$. This will cause the real interest rate to fall from $i_0$ to $i_1$. The equilibrium quantity of loanable funds will increase from $L_0$ to $L_1$. 

4. During expansion, the unemployment rate usually falls and the inflation rate usually rises. During recession, the unemployment rate usually rises and the inflation rate usually falls. On average, inflation is about 2.5 percentage points lower in the year after a recession than for the year before the recession. Also, on average, unemployment is about 1.2 percentage points higher the year after a recession than the year before a recession.

5. Unemployment insurance is an economic cushion. When the economy slips into a recession, some individuals will lose jobs. Unemployment insurance replaces some of the lost income and allows families to continue to buy goods and services. This makes the recession milder because spending does not fall as much as it would have if these families had no funds to spend. At the same time, unemployment insurance payments may reduce the incentive for those unemployed to take a new job quickly.

6. Based on the given information, the growth rates for the years are as given in the table (for example, the growth rate in 2006 is calculated as 100 × [(1,573,159 − 1,529,968)/1,529,968] = 2.8 percent). Note that because data for 2004 are not given, we cannot calculate the 2005 growth rate.

<table>
<thead>
<tr>
<th>Year</th>
<th>Real GDP (millions of 2010 Canadian dollars)</th>
<th>Growth Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>$1,529,968</td>
<td>–</td>
</tr>
<tr>
<td>2006</td>
<td>1,573,159</td>
<td>2.8%</td>
</tr>
<tr>
<td>2007</td>
<td>1,607,768</td>
<td>2.2%</td>
</tr>
<tr>
<td>2008</td>
<td>1,618,846</td>
<td>0.7%</td>
</tr>
<tr>
<td>2009</td>
<td>1,574,004</td>
<td>-2.8%</td>
</tr>
<tr>
<td>2010</td>
<td>1,624,608</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

The average growth rate for this period was 1.2% (=2.8 + 2.2 + 0.7 − 2.8 + 3.2)/5). According to the Rule of 70, the number of years for the economy to double is 58.3 (=70/1.2).

True/False Answers

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. F</td>
<td>Textbook Figure 10.1 shows that real GDP per capita in the United States was about eight times in 2011 as it was in 1900.</td>
<td></td>
</tr>
<tr>
<td>2. F</td>
<td>According to the rule of 70, if real GDP growth is 5 percent, then it will take fourteen years (70/5=14 years) to double real GDP.</td>
<td></td>
</tr>
<tr>
<td>3. T</td>
<td>See page 308 in the textbook.</td>
<td></td>
</tr>
<tr>
<td>4. F</td>
<td>Growing labor productivity is the major source of economic growth.</td>
<td></td>
</tr>
<tr>
<td>5. F</td>
<td>Potential GDP is the level of real GDP when all firms are producing at capacity, but actual real GDP can still be higher than potential GDP. See textbook Figure 10.2.</td>
<td></td>
</tr>
<tr>
<td>6. T</td>
<td>See page 315 in the textbook.</td>
<td></td>
</tr>
<tr>
<td>7. F</td>
<td>Total savings equal private saving plus public saving.</td>
<td></td>
</tr>
<tr>
<td>8. F</td>
<td>An increase in the real interest rate caused by a decrease in the supply of loanable funds will cause a movement along the demand curve and reduce quantity demanded.</td>
<td></td>
</tr>
<tr>
<td>9. F</td>
<td>In the market for loanable funds, borrowers demand loanable funds and savers...</td>
<td></td>
</tr>
</tbody>
</table>

supply loanable funds.

10. T  See textbook Figure 10.4.

11. F  The dates are determined by the National Bureau of Economic Research (which is not a government agency).

12. T  See page 320 in the textbook.

13. F  Recessions have gotten shorter after 1950. Until 2011, a typical recession lasted less than a year.

14. T  See pages 324 to 326 in the textbook.

15. T  See pages 327 and 328 in the textbook.