



Chapter Summary and Learning Objectives

13.1 Aggregate Demand (pages 420–427)

Identify the determinants of aggregate demand and distinguish between a movement along the aggregate demand curve and a shift of the curve. The **aggregate demand and aggregate supply model** enables us to explain short-run fluctuations in real GDP and price level. The **aggregate demand curve** shows the relationship between the price level and the level of planned aggregate expenditures by households, firms, and the government. The **short-run aggregate supply curve** shows the relationship in the short run between the price level and the quantity of real GDP supplied by firms. The **long-run aggregate supply curve** shows the relationship in the long run between the price level and the quantity of real GDP supplied. The four components of aggregate demand are consumption (*C*), investment (*I*), government purchases (*G*), and net exports (*NX*). The aggregate demand curve is downward sloping because a decline in the price level causes consumption, investment, and net exports to increase. If the price level changes but all else remains constant, then the economy will move up or down a stationary aggregate demand curve. If any variable other than the price level changes, then the aggregate demand curve will shift. The variables that cause the aggregate demand curve to shift are divided into three categories: changes in government policies, changes in the expectations of households and firms, and changes in foreign variables. For example, **monetary policy** involves the actions the Federal Reserve takes to manage the money supply and interest rates to pursue macroeconomic policy objectives. When the Federal Reserve takes actions to change interest rates, then consumption and investment spending will change, shifting the aggregate demand curve. **Fiscal policy** involves changes in federal taxes and purchases that are intended to achieve macroeconomic policy objectives. Changes in federal taxes and purchases shift the aggregate demand curve.

13.2 Aggregate Supply (pages 427–431)

Identify the determinants of aggregate supply and distinguish between a movement along the short-run aggregate supply curve and a shift of the curve. The **long-run aggregate supply curve** is a vertical line because in the long run, real GDP is always at its potential level and is unaffected by the price level. The short-run aggregate supply curve slopes upward because workers and firms fail to accurately predict the future price level. The three main explanations of why this failure results in an upward-sloping aggregate supply curve are that (1) contracts make wages and prices “sticky,” (2) businesses often adjust wages slowly, and (3) menu costs make some prices sticky. **Menu costs** are the costs to firms of changing prices on menus or catalogs. If the price level changes but all else remains constant, then the economy will move up or down a stationary aggregate supply curve. If any variable other than the price level changes, then the aggregate supply curve will shift. The aggregate supply curve shifts as a result of increases in the labor force and capital stock, technological change, expected increases or decreases in the future price level, adjustments of workers and firms to errors in past expectations about the price level, and unexpected increases or decreases in the price of an important raw material. A **supply shock** is an unexpected event that causes the short-run aggregate supply curve to shift.

13.3 Macroeconomic Equilibrium in the Long Run and the Short Run (pages 431–438)

Use the aggregate demand and aggregate supply model to illustrate the difference between short-run and long-run macroeconomic equilibrium. In long-run macroeconomic equilibrium, the aggregate demand and short-run aggregate supply curves intersect at a point on the long-run aggregate supply curve. In short-run macroeconomic equilibrium, the aggregate demand and short-run aggregate supply curves often intersect at a point off the long-run aggregate supply curve. An automatic mechanism drives the economy to long-run equilibrium. If short-run equilibrium occurs at a point below potential real GDP, then wages and prices will fall, and the short-run aggregate supply curve will shift to the right until potential GDP is restored. If short-run equilibrium occurs at a point beyond potential real GDP, then wages and prices will rise, and the short-run aggregate supply curve will shift to the left until potential GDP is restored. Real GDP can be temporarily above or below its potential level, either because of shifts in the aggregate demand curve or because supply shocks lead to shifts in the aggregate supply curve. **Stagflation** is a combination of inflation and recession, usually resulting from a supply shock.

13.4 A Dynamic Aggregate Demand and Aggregate Supply Model (pages 438–443)

Use the dynamic aggregate demand and aggregate supply model to analyze macroeconomic conditions. To make the aggregate demand and aggregate supply model more realistic, we need to make it dynamic by incorporating three facts that were left out of the basic model: (1) Potential real GDP increases continually, shifting the long-run aggregate supply curve to the right; (2) during most years, aggregate demand shifts to the right; and (3) except during periods when workers and firms expect high rates of inflation, the aggregate supply curve shifts to the right. The dynamic aggregate demand and aggregate supply model allows us to analyze macroeconomic conditions, including the beginning of the 2007–2009 recession.

Appendix: Macroeconomic Schools of Thought (pages 451–453)

Understand macroeconomic schools of thought. There are three major alternative models to the aggregate demand and aggregate supply model. **Monetarism** emphasizes that the quantity of money should be increased at a constant rate. **New classical macroeconomics** emphasizes that workers and firms have rational expectations. The **real business cycle model** focuses on real, rather than monetary, causes of the business cycle.

Chapter Review

Chapter Opener: The Fortunes of FedEx Follow the Business Cycle (page 419)

Many economists believe that changes in the quantity of packages shipped by FedEx are a good indicator of the overall state of the economy. FedEx was founded by Fred Smith, who in the 1960s proposed a new method of sending packages that moved away from using passenger airlines. FedEx's profits rise and fall with the quantity of packages they ship, and that quantity changes with the changing level of overall economic activity, referred to as the business cycle.

13.1 Aggregate Demand (pages 420–427)

Learning Objective: Identify the determinants of aggregate demand and distinguish between a movement along the aggregate demand curve and a shift of the curve.

This chapter uses the **aggregate demand and aggregate supply model** to explain fluctuations in real GDP and the price level. Real GDP and the price level are determined in the short run by the intersections of the aggregate demand curve and the aggregate supply curve. This is seen in textbook Figure 13.1. Changes in real GDP and changes in the price level are caused by shifts in these two curves.

The **aggregate demand curve (AD)** shows the relationship between the price level and the level of real GDP demanded by households, firms and the government. The four components of real GDP are:

- Consumption (C)
- Investment (I)
- Government purchases (G)
- Net exports (NX)

Using Y for real GDP, then we can write the following:

$$Y = C + I + G + NX.$$

The aggregate demand curve is downward sloping because a decrease in the price level increases the quantity of real GDP demanded. We assume that government purchases do not change as the price level changes. There are three reasons why the other components of real GDP change as the price level changes:

- **The wealth effect.** As the price level increases, the real value of household wealth falls, and so will consumption. In contrast, if the price level declines, real household wealth rises and so does consumption.
- **The interest rate effect.** A higher price level will tend to increase interest rates. Higher interest rates will reduce investment spending by firms as borrowing costs rise. Additionally, higher interest rates will also reduce consumption spending.
- **The international effect.** A higher price level will make U.S. goods relatively more expensive compared to other countries' goods. This will reduce exports, increase imports, and therefore, reduce net exports.

Price level changes cause movements along the AD curve. A change in any other variable that affects the willingness of households, firms, and the government to spend will cause a shift in the AD curve. The variables that cause AD to shift fall into three categories:

- **Changes in government policies.** **Monetary policy** refers to the actions the Federal Reserve takes to manage the money supply and interest rates to pursue macroeconomic policy objectives. **Fiscal policy** refers to changes in federal taxes and purchases that are intended to achieve macroeconomic policy objectives, such as high unemployment, price stability, and high rates of economic growth.
- **Changes in expectations of households and firms.** If consumers or firms are more optimistic about the future, they may purchase more goods and services, increasing consumption and investment expenditures.
- **Changes in foreign variables.** As income changes in other countries, consumers in those countries may buy more U.S. goods, causing exports to increase. Changes in exchange rates can also shift the AD curve; for example, if the U.S. dollar appreciates relative to other currencies, it makes imported goods less expensive and exports more expensive to foreign consumers, shifting the AD curve to the left.

The variables that shift the AD curve are summarized in Table 13.1.

 Study Hint

It is important to understand why the *AD* curve slopes downward. Read the feature ***Don't Let This Happen to You***. Remember in Chapter 12 that the aggregate demand curve is different from the demand curve for a single product (like a Bic[®] pen). Unlike the demand curve for an individual good where the prices of other goods are held constant, on the aggregate demand curve as the price level increases, all prices in the economy are increasing. Because of this distinction, the reason why the aggregate demand curve is downward sloping is not the same as the reason why the demand curve is downward sloping for a single product. The aggregate demand curve has a downward slope because of the wealth effect, the interest rate effect, and the international trade effect. Read ***Solved Problem 13.1*** to understand the distinction between movements along the aggregate demand curve and shifts of the aggregate demand curve. ***Making the Connection*** “Which Components of Aggregate Demand Changed the Most during the 2007–2009 Recession” describes how the components of aggregate demand changed during the most recent recession.

13.2 Aggregate Supply (pages 427–431)

Learning Objective: Identify the determinants of aggregate supply and distinguish between a movement along the short-run aggregate supply curve and a shift of the curve.

The aggregate supply curve shows the effects of price level changes on the quantity of goods and services firms are willing to supply. Because price level changes have different effects in the short run and in the long run, there is an aggregate supply curve for the long run and an aggregate supply curve for the short run.

The **long-run aggregate supply curve (*LRAS*)** is a curve showing the relationship in the long run between the price level and the level of real GDP supplied. As we saw in Chapter 11, in the long run the level of real GDP is determined by:

- the number of workers,
- the capital stock, and
- the available technology.

Because price level changes do not affect these factors, price level changes do not affect the level of real GDP in the long run. The long-run aggregate supply curve is therefore a vertical line. Increases in the number of workers, the capital stock, and the available technology will increase real GDP and shift the *LRAS* to the right. This is seen in textbook Figure 13.2.

Although the *LRAS* curve is vertical, the short-run aggregate supply curve (*SRAS*) is upward sloping. In the short run, as the price level increases, the quantity of goods and services that firms are willing to supply increases. This short-run relationship between the price level and the quantity of goods and services supplied occurs because as prices of final goods and services rise, the prices of inputs, such as wages and natural resource, rise more slowly, and may even remain constant. A consequence of this is that as the prices of final goods and services rise, profits increase and firms are willing to supply more goods and services in the short run. Additionally, as the overall price level rises, some firms are slower to adjust their prices. These firms may find their sales increasing and produce more output. Economists believe that some firms adjust prices more slowly than others and wages adjust more slowly than the price level because firms and workers fail to perfectly forecast changes in the price level. If firms and workers could accurately forecast prices, the short-run and long-run aggregate supply curves would both be vertical.

The three most common explanations for the upward-sloping short run supply curve are:

- Contracts make some wages and prices sticky. For example, the labor contract between General Motors and the United Automobile Workers fixes wages by contract.
- Firms are often slow to adjust wages. Firms tend to adjust wages once or twice a year, making wages slow to change. In addition, firms are often also reluctant to cut wages.
- Menu costs make some prices sticky. Some firms are slow to change prices because of expenses associated with the price changes. These are called **menu costs**.

The short-run aggregate supply curve will shift to the right when something happens that makes firms willing to supply more goods and services at the same prices. The short-run aggregate supply curve will shift with:

- Changes in the labor force or capital stock.
- Technological change.
- Expected changes in the future price level.
- Adjustment of workers and firms to errors in past expectations about the price level.
- Unexpected changes in the price of natural resources that are important inputs to many industries (this is often referred to as a **supply shock**).



Study Hint

Natural resource prices can rise or fall. An adverse supply shock usually refers to an increase in resource prices.

Oil is a natural resource. When hurricane Katrina hit New Orleans in 2005, it disrupted one-quarter of U.S. oil and natural gas output. This unexpected fall in oil production caused oil prices to soar. This made it more costly for firms to operate and produce and transport their goods.

The factors that shift the *SRAS* curve are summarized in textbook Table 13.2.

Extra Solved Problem 13.2

Shifts and Movements along the Short-Run Aggregate Supply Curve

Supports Learning Objective 13.2: Identify the determinants of aggregate supply and distinguish between a movement along the short-run aggregate supply curve and a shift of the curve.

Show how an increase in wages has a different effect on the *SRAS* curve than does an increase in prices.

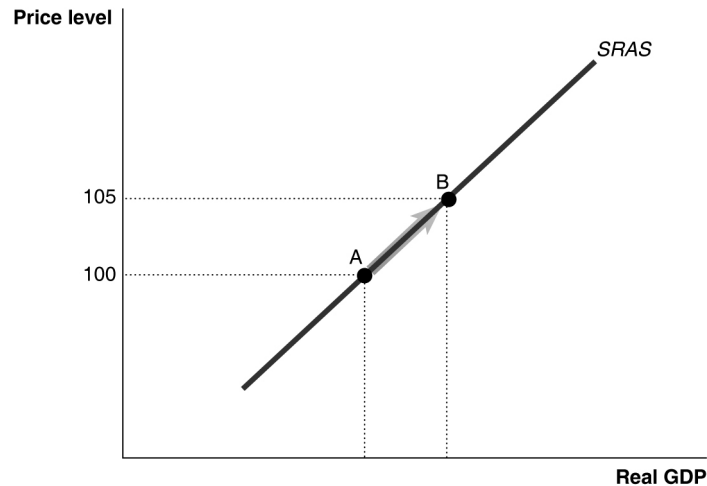
Solving the Problem

Step 1: Review the chapter material.

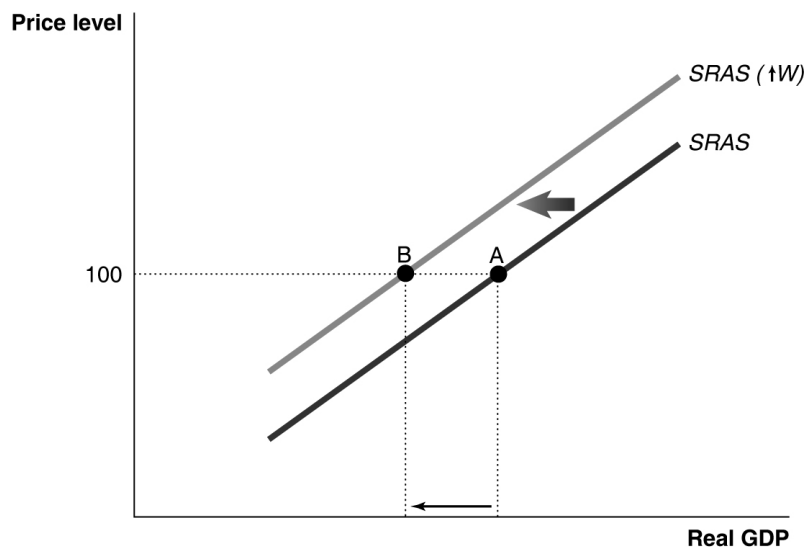
This question is about the difference in shifts and movements along the *SRAS* curve, so you may want to review the section “The Short-Run Aggregate Supply Curve,” which begins on page 428 of the textbook.

Step 2: Use a graph to show the effect on the SRAS curve of a change in the price level.

Changes in the price level cause movements along the *SRAS* curve. This is shown in the movement from point *A* to point *B* in the graph below. The higher price level leads firms to produce more goods and services, resulting in a higher level of real GDP in the short run.

**Step 3: Use a second graph to show the effect on the SRAS curve of a change in wages.**

Wages are one of the economic variables that are held constant along a given *SRAS* curve. An increase in the overall wage rate will shift the *SRAS* curve to the left. This is seen in the movement from point *A* to point *B* in the graph below. If wages rise, the production costs of firms increase, and in the short run, at any given price level firms are willing to supply a lower level of real GDP.



13.3

Macroeconomic Equilibrium in the Long Run and the Short Run
(pages 431–438)

Learning Objective: Use the aggregate demand and aggregate supply model to illustrate the difference between short-run and long-run macroeconomic equilibrium.

In long-run macroeconomic equilibrium, the AD curve and the $SRAS$ curve intersect at a point on the $LRAS$ curve. This is shown in textbook Figure 13.4.

Because that point—price level of 100 and real GDP of \$14.0 trillion—is on the $LRAS$ curve, firms will be operating at normal levels of capacity, and everyone that wants a job at the prevailing wage rate will have one (although there will still be frictional and structural unemployment).

**Study Hint**

Remember that although in long-run macroeconomic equilibrium there is no cyclical unemployment, there will still be frictional and structural unemployment. The $LRAS$ curve represents the level of real GDP that will be produced when firms are operating at their normal capacity; it does *not* represent the level of real GDP that could be produced if firms operated at their maximum capacity.

The aggregate demand and aggregate supply model can be used to examine events that move the economy away from long-run equilibrium. As a starting point, assume:

- The economy has not been experiencing inflation.
- The economy has not been experiencing long-run growth.

Recession

A decline in AD will cause a short-run decline in real GDP. As the AD curve shifts to the left, the economy will move to a new short-run equilibrium where AD intersects the $SRAS$ curve at a level of real GDP below potential GDP. The economy will be in a recession. Because firms need fewer workers to produce the lower level of output, wages will begin to fall. As wages fall, firms' costs will decline. Over time, as costs fall, the $SRAS$ curve will shift to the right and the economy will move back to long-run equilibrium at potential GDP. This is shown in textbook Figure 13.5.

This adjustment back to long-run equilibrium will occur automatically without any form of government intervention. But it may take several years to complete this adjustment. This is usually referred to as an *automatic mechanism*.

Expansion

An increase in AD will cause a short-run expansion in the economy. An increase in AD will shift the AD curve to the right as spending by households, firms, or government increases. This increased spending will cause a short-run expansion as firms meet increased demand by increasing production. In expanding production, firms may hire workers who would normally be structurally or frictionally unemployed. The lower level of unemployment will eventually result in higher wages, which will raise costs to firms. These higher costs will shift the $SRAS$ curve to the left and eventually return output to potential GDP. This is shown in textbook Figure 13.6.

As with a recession, the return to long-run equilibrium is an automatic adjustment in the long run. The inflation caused by an expansion beyond potential GDP usually occurs fairly quickly.

Supply Shock

An adverse supply shock (such as an oil price increase) is a shift to the left of the *SRAS* curve not caused by the automatic adjustment mechanism of the economy. In the short run, this adverse supply shock will reduce real GDP and increase the price level. The higher price level and recession is often referred to as **stagflation**. The recession caused by the supply shock will result in lower wages, which will shift the *SRAS* curve to the right, returning the economy to the initial long-run equilibrium. This is shown in textbook Figure 13.7.



Study Hint

It is important to understand what causes a change in aggregate demand or aggregate supply. Read *Making the Connection* “Does It Matter What Causes a Decline in Aggregate Demand?” to understand the importance of residential construction in determining the business cycle since 1955.

Making accurate macroeconomic forecasts is difficult because many factors can cause aggregate demand and aggregate supply to shift. This difficulty is illustrated by the diverse official forecasts in *Making the Connection* “How Long Does It Take to Return to Potential GDP? Economic Forecasts Following the Recession of 2007–2009.”

Extra Solved Problem 13.3

Determining Growth and Inflation Rates

Supports Learning Objective 13.3: Use the aggregate demand and aggregate supply model to illustrate the difference between short-run and long-run macroeconomic equilibrium.

Draw graphs showing how, as the *AD* and *LRAS* curves shift over time, real GDP and the price level are affected.

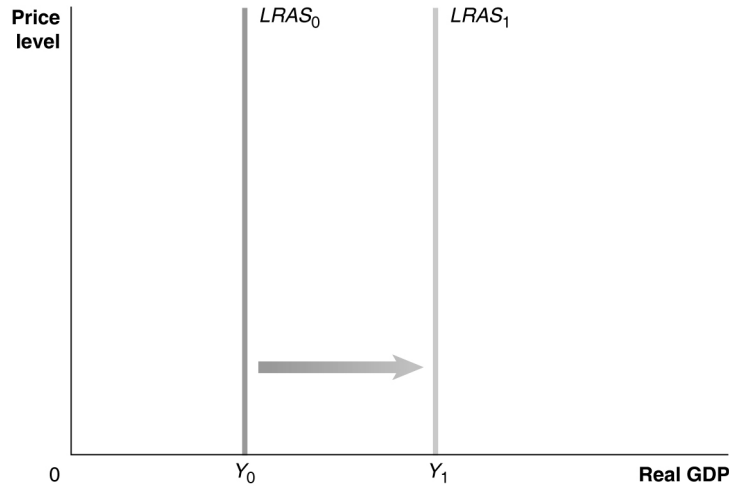
Solving the Problem

Step 1: Review the chapter material.

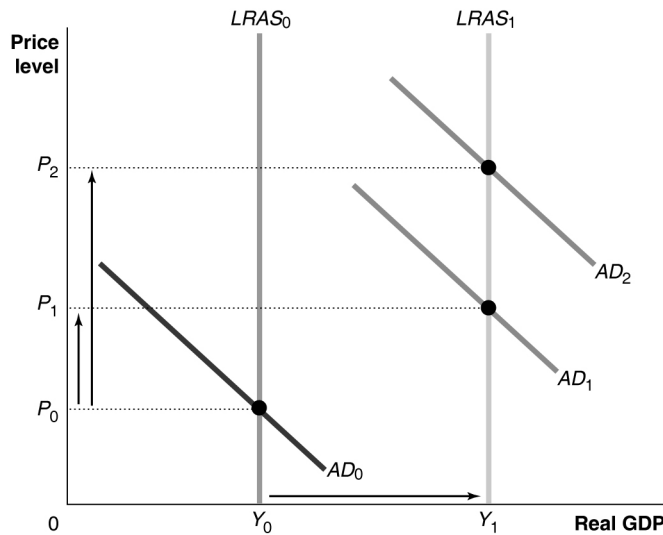
This problem is about analyzing the effects of shifts in aggregate demand and aggregate supply on the price level and real GDP, so you may want to review the section “Recessions, Expansions, and Supply Shocks,” which begins on page 433 of the textbook.

Step 2: Discuss how the price level and level of real GDP are determined in the long run.

The price level and the level of real GDP are determined in the long run by the levels of aggregate demand and *LRAS*. Over time, *LRAS* changes due to growth in the capital stock, growth in the number of workers, and technological change. These cause the *LRAS* curve to shift to the right from $LRAS_0$ to $LRAS_1$ in the graph:



At the same time, the *AD* curve will also shift to the right as consumption, investment, and government purchases all increase. Combining the shifts of the *LRAS* and *AD* curves on one graph gives the following:



Step 3: Determine the amount of real GDP growth.

The amount of real GDP growth depends on the change in *LRAS*. In the case above, real GDP will grow from Y_0 to Y_1 . The shift in *AD* will not affect that long-run result. How much the price level rises—in other words, how high the inflation rate is—will be affected by the shift in *AD*. The larger the change in *AD* is, the higher the inflation rate. In the long run, output growth is determined by shifts in the *LRAS* curve, and inflation is determined by shifts in the *AD* curve.

13.4 A Dynamic Aggregate Demand and Aggregate Supply Model (pages 438–443)

Learning Objective: Use the dynamic aggregate demand and aggregate supply model to analyze macroeconomic conditions.

The dynamic model of aggregate demand and aggregate supply builds on the basic aggregate demand and aggregate supply model to account for two key macroeconomic facts: the economy experiences long-term growth as potential real GDP increases every year, and the economy experiences at least some inflation every year. Three changes are made to the basic model:

- Potential real GDP increases continually, shifting the *LRAS* curve to the right.
- During most years, the *AD* curve will also shift to the right.
- Except during periods when workers expect very high rates of inflation, the *SRAS* curve will also shift to the right.



Study Hint

Spend time reviewing the acetate of Figure 13.8 on page 439 of the textbook. This acetate builds the dynamic aggregate demand and aggregate supply model step by step.

The dynamic aggregate demand and aggregate supply model assumes that the *LRAS* curve shifts to the right each year, which represents normal long-run growth in the economy. The *AD* curve also typically shifts to the right each year as the components of *AD* change.

An example of including these changes is shown in textbook Figure 13.9. If we start at point *A*, the increase in *LRAS* and *SRAS* along with the shift in the *AD* curve will move the equilibrium to point *B* where the price level and the level of real GDP are both higher. If the *AD* curve shifts to the right more than the *LRAS* curve, the economy will experience both growth and inflation. If the *AD* and *LRAS* curves had shifted to the right by the same amount, the economy would have experienced growth without inflation. If the economy had suffered an adverse supply shock during the same period (with the *SRAS* curve shifting to the left), the price level would have increased more and real GDP would have increased less.

The dynamic aggregate demand and supply model suggests that inflation is caused by increases in total spending that are larger than increases in real GDP and by the *SRAS* curve shifting to the left due to higher costs. The model can shed light on the recession of 2007–2009. This recession, which began in December 2007, was due to the bursting of the housing bubble of 2002–2005. A housing bubble occurs when people become less concerned with the underlying value of a house and focus instead on expectations of the house price rising. Spending on residential construction dropped as a result of the deflating of the housing bubble, leading to a slow down in the growth of aggregate demand. Falling housing prices led to an increase in borrowers' defaults on their mortgage loans. These defaults caused banks and some major financial institutions to suffer heavy losses. The resulting financial crisis in turn led to a “credit crunch” that made it difficult for many households and firms to obtain loans they needed to finance their spending. Consumer spending and investment spending declined as a result. The severity of the recession of 2007–2009 was also attributable to the rapid increase in oil prices during 2008, which resulted in a supply shock that causes the short-run aggregate supply curve to shift to the left. These changes are shown in textbook Figure 13.10, which shows the beginning of the economic recession in late 2007.

Appendix

Macroeconomic Schools of Thought (pages 451–453)

Learning Objective: Understand macroeconomic schools of thought.

There are three major alternative models to the aggregate demand and aggregate supply model. **Monetarism** emphasizes that the quantity of money should be increased at a constant rate. **New classical macroeconomics** emphasizes that workers and firms have rational expectations. The **real business cycle model** focuses on real, rather than monetary, causes of the business cycle.

Key Terms

Aggregate demand and aggregate supply model A model that explains short-run fluctuations in real GDP and the price level.

Aggregate demand (AD) curve A curve that shows the relationship between the price level and the quantity of real GDP demanded by households, firms, and the government.

Fiscal policy Changes in federal taxes and purchases that are intended to achieve macroeconomic policy objectives.

Long-run aggregate supply (LRAS) curve A curve that shows the relationship in the long run between the price level and the quantity of real GDP supplied.

Menu costs The costs to firms of changing prices.

Monetary policy The actions the Federal Reserve takes to manage the money supply and interest rates to pursue macroeconomic policy objectives.

Short-run aggregate supply (SRAS) curve A curve that shows the relationship in the short run between the price level and the quantity of real GDP supplied by firms.

Stagflation A combination of inflation and recession, usually resulting from a supply shock.

Supply shock An unexpected event that causes the short-run aggregate supply curve to shift.

Key Terms—Appendix

Keynesian revolution The name given to the widespread acceptance during the 1930s and 1940s of John Maynard Keynes's macroeconomic model.

Monetarism The macroeconomic theories of Milton Friedman and his followers, particularly the idea that the quantity of money should be increased at a constant rate.

Monetary growth rule A plan for increasing the quantity of money at a fixed rate that does not respond to changes in economic conditions.

New classical macroeconomics The macroeconomic theories of Robert Lucas and others, particularly the idea that workers and firms have rational expectations.

Real business cycle model A macroeconomic model that focuses on real, rather than monetary, causes of the business cycle.

Self-Test

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

Multiple-Choice Questions

1. The aggregate demand and aggregate supply model explains
 - a. the effect of changes in the inflation rate on the nominal interest rate.
 - b. short-run fluctuations in real GDP and the price level.
 - c. the effect of long-run economic growth on the standard of living.
 - d. the effect of changes in the interest rate on investment spending.

2. The aggregate demand curve shows the relationship between
 - a. the interest rate and the quantity of real GDP demanded.
 - b. the interest rate and the quantity of real GDP supplied.
 - c. the price level and the interest rate.
 - d. the price level and the quantity of real GDP demanded.

3. The wealth effect refers to the fact that
 - a. when the price level falls, the real value of household wealth rises, and so will consumption.
 - b. when income rises, consumption rises.
 - c. when the price level falls, the nominal value of assets rises, while the real value of assets remains the same.
 - d. all of the above

4. The interest rate effect refers to the fact that a higher price level results in
 - a. higher interest rates and higher investment.
 - b. higher interest rates and lower investment.
 - c. lower interest rates and lower investment.
 - d. lower interest rates and higher investment.

5. The international-trade effect refers to the fact that an increase in the price level will result in
 - a. an increase in exports and a decrease in imports.
 - b. a decrease in exports and an increase in imports.
 - c. an increase in exports and an increase in imports.
 - d. a decrease in exports and a decrease in imports.

6. If the price level increases, then
 - a. the economy will move up and to the left along a stationary aggregate demand curve.
 - b. the aggregate demand curve will shift to the right.
 - c. the aggregate demand curve will shift to the left.
 - d. none of the above would occur.

7. Which of the following factors *does not* cause the aggregate demand curve to shift?
 - a. a change in the price level
 - b. a change in government policies
 - c. a change in the expectations of households and firms
 - d. a change in foreign variables

8. Which of the following shifts the aggregate demand curve to the right?
 - a. a fall in the price level
 - b. lower interest rates
 - c. households expecting lower future income
 - d. falling exports

9. Which of the following policies affects the economy through intended changes in the money supply and interest rates?
 - a. fiscal policy
 - b. monetary policy
 - c. both fiscal and monetary policies
 - d. neither fiscal nor monetary policies

10. How can government policies shift the aggregate demand curve to the right?
 - a. by increasing personal income taxes
 - b. by increasing business taxes
 - c. by increasing government purchases
 - d. all of the above

11. Which of the following statements is correct?
 - a. If households become more optimistic about their future incomes, the aggregate demand curve will shift to the right.
 - b. If firms become more optimistic about the future profitability of investment spending, the aggregate demand curve will shift to the right.
 - c. Both a. and b. are true.
 - d. Neither a. nor b. is true. Neither optimism nor pessimism have anything to do with shifts in the aggregate demand curve.

12. Fill in the blanks. If real GDP in the United States increases faster than real GDP in other countries, U.S. imports will _____ faster than U.S. exports, and net exports will _____.
 - a. increase; rise
 - b. increase; fall
 - c. decrease; rise
 - d. decrease; fall

13. If the exchange rate between the dollar and foreign currencies rises (the dollar rises in value versus foreign currencies), the price in foreign currency of U.S. products will _____ and the U.S. aggregate demand curve will shift to the _____.
 - a. rise; right
 - b. rise; left
 - c. fall; right
 - d. fall; left

14. If net exports increase as a result of a change in the price level in the United States, then
 - a. the aggregate demand curve will shift to the right.
 - b. the aggregate demand curve will shift to the left.
 - c. the aggregate demand curve will not shift.
 - d. there is an indeterminate effect on aggregate demand.

15. Which of the following statements is true?
 - a. In the long run, increases in the price level result in an increase in real GDP.
 - b. In the long run, increases in the price level result in a decrease in real GDP.
 - c. In the long run, changes in the price level do not affect the level of real GDP.
 - d. In the long run, changes in the price level may either increase or decrease real GDP.

16. The long-run aggregate supply curve
 - a. is positively sloped.
 - b. shifts to the right as technological change occurs.
 - c. is negatively sloped.
 - d. shifts to the left as the capital stock of the country grows.

17. Which of the following factors will cause the long-run aggregate supply curve to shift to the right?
 - a. an increase in the number of workers in the economy
 - b. the accumulation of more machinery and equipment
 - c. technological change
 - d. all of the above

18. Which of the following factors will shift the short-run aggregate supply to the left?
 - a. a decrease in the price level
 - b. a decrease in the wage rate
 - c. a decrease in the cost of production
 - d. a decrease in the size of the labor force

19. Why does the short-run aggregate supply curve slope upward?
 - a. Profits rise when the prices of the goods and services firms sell rise more rapidly than the prices they pay for inputs.
 - b. An increase in market price results in an increase in quantity supplied, as stated by the law of supply.
 - c. As the number of workers, machinery, equipment, and technological changes increase, quantity supplied increases.
 - d. All of the above are reasons the short-run aggregate supply curve slopes upward.

20. If firms and workers could predict the future price level exactly, the short-run aggregate supply curve would be
 - a. downward sloping.
 - b. upward sloping.
 - c. horizontal.
 - d. the same as the long-run aggregate supply curve.

21. Why does the failure of workers and firms to accurately predict the price level result in an upward-sloping aggregate supply curve?
 - a. because contracts make some wages and prices “sticky”
 - b. because firms are often slow to adjust wages
 - c. because menu costs make some prices “sticky”
 - d. all of the above

22. Assume that cotton is the only good produced in the economy. Which of the following would explain why the short-run aggregate supply curve for cotton would be upward sloping?
- Cotton demand and cotton prices begin to rise rapidly, and the wages of cotton workers rise as the demand for cotton workers increases.
 - Cotton demand and cotton prices begin to rise rapidly, but the price of fertilizer—an input into the production of cotton—remains fixed by contract.
 - Cotton demand and cotton prices begin to rise rapidly, but foreign cotton producers increase production faster than domestic cotton producers increase production.
 - All of the above explain why the short-run aggregate supply curve for cotton would be upward sloping.
23. What are menu costs?
- the costs of searching for profitable opportunities
 - the costs associated with guarding against the effects of inflation
 - the costs to firms of changing prices
 - the costs of a fixed list of inputs
24. What is the impact of an increase in the price level on the short-run aggregate supply curve?
- a shift of the curve to the right
 - a shift of the curve to the left
 - a movement up and to the right along a stationary curve
 - a combination of a movement along the curve and a shift of the curve
25. Which of the following causes the short-run aggregate supply curve to shift to the right?
- a higher expected future price level
 - an increase in the actual (or current) price level
 - a technological change
 - all of the above
26. If all workers and firms adjust to the fact that the price level is higher than they had expected it to be,
- there will be a movement up and to the right along a stationary aggregate supply curve.
 - there will be a movement down and to the left along a stationary aggregate supply curve.
 - the short-run aggregate supply curve will shift to the left.
 - the short-run aggregate supply curve will shift to the right.
27. If oil prices rise unexpectedly,
- there will be a movement up and to the right along a stationary aggregate supply curve.
 - there will be a movement down and to the left along a stationary aggregate supply curve.
 - the short-run aggregate supply curve will shift to the left.
 - the short-run aggregate supply curve will shift to the right.
28. An unexpected change in the price of oil would be called _____ by economists.
- a demand shock
 - a supply shock
 - disinflation
 - stagflation

29. In the short run, a supply shock as a result of an unexpected decrease in oil prices will
- increase the price level but decrease real GDP.
 - decrease the price level but increase real GDP.
 - increase both the price level and real GDP.
 - decrease both the price level and real GDP.
30. The economy is in long-run equilibrium when
- the short-run aggregate supply curve and the aggregate demand curve intersect at a point to the right of the long-run aggregate supply curve.
 - the short-run aggregate supply curve and the aggregate demand curve intersect at a point to the left of the long-run aggregate supply curve.
 - the short-run aggregate supply curve and the aggregate demand curve intersect at a point on the long-run aggregate supply curve.
 - None of the above are true of an economy in long-run equilibrium.
31. If firms reduce investment spending and the economy enters a recession, which of the following contributes to the adjustment that causes the economy to return to its long-run equilibrium?
- the eventual agreement by workers to accept lower wages
 - the decision by firms to charge higher prices
 - both of the above
 - none of the above
32. If the economy adjusts through the automatic mechanism, then a decline in aggregate demand causes
- a recession in the short run and an increase in the price level in the long run.
 - a recession in the short run and a decline in the price level in the long run.
 - an expansion in the short run and a decline in the price level in the long run.
 - an expansion in the short run and an increase in the price level in the long run.
33. Fill in the blanks. If the economy is initially at full-employment equilibrium, then a increase in aggregate demand causes _____ in real GDP in the short run and _____ in the price level in the long run.
- an increase; an increase
 - a decrease; a decrease
 - an increase; a decrease
 - a decrease; an increase
34. Stagflation is
- a combination of inflation and recession.
 - a combination of recession and deflation.
 - a situation of low inflation and low unemployment.
 - stagnant employment during periods of expansion.
35. Which of the following is usually the cause of stagflation?
- a reduction in government purchases
 - an increase in investment as a result of a reduction in interest rates
 - a decline in net exports as a result of a change in the exchange rate
 - a supply shock as a result of an unexpected increase in the price of a natural resource

36. After a supply shock that shifts the short-run aggregate supply (*SRAS*) curve to the left, what causes the *SRAS* to shift to the right until the long-run level of equilibrium output is reached once again?
- an increase in the wages that workers earn and the prices that firms charge
 - workers' willingness to accept lower wages and firms' willingness to accept lower prices
 - an increase in government spending
 - a decrease in government spending
37. Which of the following is true about the basic or static aggregate demand and aggregate supply model?
- The economy experiences continuing inflation.
 - The economy does not experience long-run growth.
 - The price level is constant and so the short-run aggregate supply is horizontal.
 - All of the above are true.
38. To turn the basic model of aggregate demand and aggregate supply into a dynamic model, which of the following assumptions must be made?
- Potential real GDP increases continually, shifting the long-run aggregate supply (*LRAS*) curve to the right.
 - During most years, the aggregate demand (*AD*) curve will be shifting to the right.
 - Except during periods when workers and firms expect high rates of inflation, the short-run aggregate supply (*SRAS*) curve will be shifting to the right.
 - All of the above assumption must be made.
39. If no other factors that affect the *SRAS* curve have changed, what impact will increases in the labor force, increases in the capital stock, and technological change have on both the short-run and the long-run aggregate supply?
- Over time, both the long-run aggregate supply and the short-run aggregate supply will shift to the right by the same amount.
 - Over time, the long-run aggregate supply will shift to the right, and the short-run aggregate supply will remain stationary.
 - Over time, the long-run aggregate supply will remain stationary, and the short-run aggregate supply will shift to the right.
 - Both the long-run aggregate supply and the short-run aggregate supply will shift to the left by the same amount.
40. How does the dynamic model of aggregate supply and aggregate demand explain inflation?
- by showing that if total production in the economy grows faster than total spending, prices will rise
 - by showing that increases in labor productivity usually lead to increases in prices
 - by showing that if total spending in the economy grows faster than total production, prices will rise
 - none of the above
41. In the dynamic aggregate demand and supply model, which of the following is correct?
- If aggregate demand increases more than aggregate supply increases, the price level will rise.
 - If aggregate demand and aggregate supply both increase the same amount, the price level will rise.
 - If aggregate supply increases more than aggregate demand increases, the price level will rise.
 - If aggregate supply increases more than aggregate demand increases, the price level will not change.

42. The recession of 2007–2009 was caused by a decline in aggregate demand. Which factors contributed to this decline?
- a. unexpected increases in oil prices
 - b. a “credit crunch” as a result of the collapse of major banks and other financial institutions
 - c. the corporate accounting scandals
 - d. all of the above
43. The increases of oil prices in 2008 are best described as
- a. shifts of the short-run aggregate supply curve to the right.
 - b. shifts of the short-run aggregate supply curve to the left.
 - c. shifts of the aggregate demand curve to the right.
 - d. shifts of the aggregate demand curve to the left .
44. The 2007–2009 recession was a clear example of
- a. the impact that a decrease in aggregate demand can have on the economy.
 - b. the impact of a shift to the left in the long-run aggregate supply on the economy.
 - c. the impact of a positive supply shock on the economy.
 - d. all of the above.
45. The 1974–1975 recession was a result of
- a. a supply shock that caused a leftward shift of the short-run aggregate supply curve.
 - b. a supply shock that caused a leftward shift of the long-run aggregate supply curve.
 - c. a housing bubble collapse that caused a leftward shift of the aggregate demand curve.
 - d. a financial crisis that caused a leftward shift of both the short-run aggregate supply curve and the aggregate demand curve.

Short Answer Questions

1. Explain the difference between the aggregate demand curve and the demand curve for an individual product.

2. Explain the difference between a shift of the *AD* curve and a movement along the *AD* curve.

3. Over time, as the capital stock increases, the number of workers increases, and technology change occurs, what happens to the *LRAS* and *SRAS* curves?

4. Suppose the *AD* and *SRAS* curves intersect at a level of real GDP to the right of the *LRAS* curve. Show this graphically. Explain how real GDP will adjust toward potential real GDP. Show the resulting long-run equilibrium graphically.

5. Over time, the *AD* and *LRAS* curves both shift to the right. Show that this can have three results: inflation, no price change, or deflation. Because we generally observe inflation in the U.S. economy, what does this tell us about the shifts in the *AD* and *LRAS* curves over time?

6. Starting at potential real GDP, explain why the short-run impact of an increase in aggregate demand on output is different from the long-run impact of a change in aggregate demand on output.

True/False Questions

- T F 1. The wealth effect suggests that a fall in the price level will increase consumption spending by households.
- T F 2. As the price level in the United States increases, exports from the United States will also increase.
- T F 3. An increase in taxes will reduce consumption and shift the *AD* curve to the right.
- T F 4. Because prices do not influence the level of the capital stock, the number of workers, or the level of technology in the long run, changes in the price level will not change the level of real GDP in the long run.

- T F 5. Better technology that raises labor productivity will shift the *LRAS* curve to the right.
- T F 6. When real GDP is equal to potential real GDP, there is no unemployment.
- T F 7. The *LRAS* curve is upward sloping because wages of workers rise as prices of final goods and service rise.
- T F 8. If workers expect prices to rise, the *SRAS* curve will shift to the left.
- T F 9. An unexpected increase in the price of an important natural resource causes a movement up a stationary *SRAS* curve.
- T F 10. Long-run macroeconomic equilibrium occurs where the *AD* and *SRAS* curves intersect at a point on the *LRAS* curve.
- T F 11. A decrease in *AD* will reduce real GDP in the short run and in the long run.
- T F 12. If real GDP is to the left of the *LRAS* curve, there will be no cyclical unemployment.
- T F 13. The adjustment from short-run to long-run equilibrium is due to government policy actions.
- T F 14. When real GDP is at the potential GDP level, then a supply shock will affect the level of real GDP in both the short run and the long run.
- T F 15. If *AD* grows faster than *LRAS*, prices will decrease.

Answers to the Self-Test

Multiple-Choice Questions

Question	Answer	Comment
1.	b	The aggregate demand and aggregate supply model explains short-run fluctuations in real GDP and the price level. As textbook Figure 13.1 shows, in this model real GDP and the price level are determined in the short run by the intersection of the aggregate demand curve and the aggregate supply curve. Fluctuations in real GDP and the price level are caused by shifts in the aggregate demand curve or in the aggregate supply curve.
2.	d	The aggregate demand curve shows the relationship between the price level and the quantity of GDP demanded by households, firms and the government. This is shown in textbook Figure 13.1.
3.	a	When the price level falls, the real value of household wealth rises, and so will consumption. Economists refer to this impact of the price level on consumption as the wealth effect.
4.	b	When prices rise, businesses and households need more money to finance buying and selling. A higher interest rate raises the cost of borrowing to business firms and households. As a result, firms will borrow less to build new factories or to install new machinery and equipment, and households will borrow less to buy new houses. A lower price level will have the reverse effect, leading to an increase in investment.

Question	Answer	Comment
5.	b	If the price level in the United States rises relative to the price levels in other countries, U.S. exports will become relatively more expensive and foreign imports will become relatively less expensive. Some consumers in foreign countries will shift from buying U.S. products to buying domestic products, and some U.S. consumers will also shift from buying U.S. products to buying imported products. U.S. exports will fall and U.S. imports will rise, causing net exports to fall. A lower price level in the United States has the reverse effect, causing net exports to rise.
6.	a	If the price level rises but other factors that affect the willingness of households, firms, and the government to spend are unchanged, then the economy will move up a stationary aggregate demand curve.
7.	a	The factors that cause the aggregate demand curve to shift fall into three categories: changes in government policies, changes in the expectations of households and firms, and changes in foreign factors. Changes in the price level causes a movement along the aggregate demand curve, not a shift.
8.	b	Lower interest rates reduce the cost of borrowing so that consumption and investment spending increase, resulting in a shift of the <i>AD</i> curve to the right. A price level change causes a movement along the <i>AD</i> curve rather than a shift in the curve.
9.	b	The federal government uses monetary policy and fiscal policy to shift the aggregate demand curve. Monetary policy involves changes in interest rates, and fiscal policy involves changes in government purchases and taxes.
10.	c	Because government purchases are one component of aggregate demand, an increase in government purchases shifts the aggregate demand curve to the right. An increase in personal income taxes reduces disposable income available to households. This reduces consumption spending and shifts the aggregate demand curve to the left. Lower personal income taxes shift the aggregate demand curve to the right. Increases in business taxes reduce the profitability of investment spending and shift the aggregate demand curve to the left. Decreases in business taxes shift the aggregate demand curve to the right.
11.	c	If households become more optimistic about their future incomes, they are likely to increase their current consumption. This will shift the aggregate demand curve to the right. Similarly, if firms become more optimistic about the future profitability of investment spending, the aggregate demand curve will shift to the right.
12.	b	When real GDP increases, so does the income available for consumers and businesses to spend. If real GDP in the United States increases faster than real GDP in other countries, U.S. imports will increase faster than U.S. exports, and net exports will fall. This happened in the late 1990s and early 2000s.
13.	b	Net exports will fall if the exchange rate between the dollar and foreign currencies rises, because the price in foreign currency of U.S. products sold in other countries will rise, thereby lowering exports, and the dollar price of foreign products sold in the United States will fall, which increases U.S. imports. Consequently, net exports will fall. A decrease in net exports at every price level will shift the <i>AD</i> curve to the left.

Question	Answer	Comment
14.	c	A change in the U.S. domestic price level causes a movement along the U.S. aggregate demand curve, not a shift. Therefore, a change in net exports caused by a change in the price level in the United States will <i>not</i> cause the aggregate demand curve to shift.
15.	c	In the long run, changes in the price level do not affect the level of real GDP. Textbook Figure 13.2 illustrates the fact that in the long run, changes in the price level do not affect real GDP by showing the long-run aggregate supply curve (<i>LRAS</i>) as a vertical line.
16.	b	The long-run aggregate supply curve is vertical and shifts to the right with increases in capital, labor, and technology.
17.	d	The long-run aggregate supply curve and potential real GDP increase each year as the number of workers in the economy increases, the economy accumulates more machinery and equipment, and technological improvement occurs.
18.	d	A price level change will cause a movement along the short-run aggregate supply curve, while decreasing costs of production and lower wages will cause the curve to shift to the right. A decrease in the size of the labor force will cause the curve to shift to the left.
19.	a	The short-run aggregate supply curve (<i>SRAS</i>) slopes upward because, as prices of final goods and services rise, prices of inputs—such as the wages of workers—rise more slowly. Profits rise when the prices of the goods and services firms sell rise more rapidly than the prices they pay for inputs. Therefore, a higher price level leads firms to supply more goods and services. A secondary reason the <i>SRAS</i> curve slopes upward is that as the price level rises or falls, some firms are slow to adjust their prices. A firm that is slow to raise its prices when the price level is increasing may find its sales increasing and will increase production.
20.	d	It is impossible for each firm and every individual to correctly predict the future price level. If they could, the short-run aggregate supply curve would be the same as the long-run aggregate supply curve. Most economists agree that the short-run aggregate supply curve slopes upward because workers and firms cannot accurately predict the future price level.
21.	d	Most economists agree that the short-run aggregate supply curve slopes upward because workers and firms fail to accurately predict the future price level. Economists are not in complete agreement on why this is true, but the three most common explanations are: contracts make some wages and prices “sticky,” businesses are often slow to adjust wages, and menu costs make some prices sticky.

Question	Answer	Comment
22.	b	If steel demand and steel prices begin to rise rapidly, producing additional steel will be profitable, because coal prices will remain fixed by contract. In both of these cases, rising prices lead to higher output. If these examples are representative of enough firms in the economy, then a rising price level should lead to a greater quantity of goods and services supplied. In other words, the short-run aggregate supply curve will be upward sloping. If the workers of the coal companies had accurately predicted what would happen to prices, this would have been reflected in the contracts, and the steel mill would not have earned greater profits when prices rose. In that case, rising prices would not have led to higher output.
23.	c	If demand for their products is higher or lower than they had expected, firms may want to charge prices different from the ones printed in their menus or catalogs. Changing prices would be costly, however, because it would involve printing new menus or catalogs. The costs to firms of changing prices are called menu costs.
24.	c	If the price level changes, but other factors are unchanged, then the economy will move up or down a stationary aggregate supply curve. If any factor other than the price level changes, the aggregate supply curve will shift.
25.	c	As technology improves, the productivity of workers and machinery increases, which means that firms can produce more goods and services with the same quantities of labor and capital. This reduces their costs of production and allows them to produce more output at every price level. As a result, the short-run aggregate supply curve shifts to the right.
26.	c	If workers and firms across the economy are adjusting to the price level being higher than expected, they will require higher wages for the same work. This puts upward pressure on prices and the short-run aggregate supply curve will shift to the left. If they are adjusting to the price level being lower than expected, the short-run aggregate supply curve will shift to the right.
27.	c	If oil prices rise unexpectedly, the costs of production will rise for many firms. Some utilities also burn oil to generate electricity, so electricity prices will rise. Rising oil prices lead to rising gasoline prices, which raises transportation costs for many firms. Oil is a key input to manufacturing plastics and artificial fibers, so costs will rise for many other products. Because many firms face rising marginal production costs, they will supply the same level of output only at higher prices, and the short-run aggregate supply curve will shift to the left.
28.	b	Economists refer to an unexpected increase or decrease in the price of an important raw material as a supply shock.
29.	b	An unexpected decrease in oil prices shifts the short-run aggregate supply curve to the right, resulting in a lower price level and higher real GDP.
30.	c	When the short-run aggregate supply curve and the aggregate demand curve intersect at a level of real GDP that is above or below the level of potential GDP represented by the long-run aggregate supply curve (<i>LRAS</i>), the economy will adjust back toward the <i>LRAS</i> . Only when the short-run aggregate supply curve intersects the aggregate demand curve at a point on the <i>LRAS</i> is the economy in long-run equilibrium. Long-run equilibrium is shown in textbook Figure 13.4.

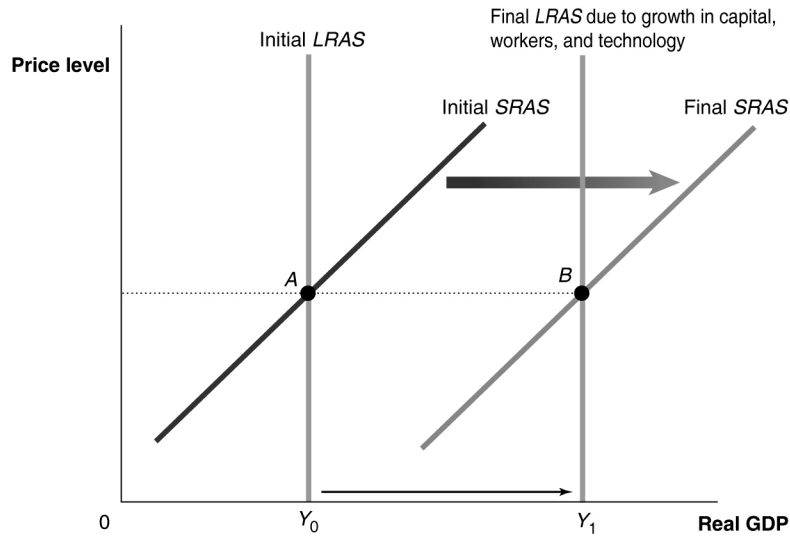
Question	Answer	Comment
31.	a	The decrease in aggregate demand initially leads to a short-run equilibrium with a lower price level and GDP below potential. Workers and firms will begin to adjust to the price level being lower than they had expected it to be. Workers will be willing to accept lower wages—because each dollar of wages is able to buy more goods and services—and firms will be willing to accept lower prices. In addition, the unemployment resulting from the recession will make workers more willing to accept lower wages, and the decline in demand will make firms more willing to accept lower prices. This causes the short-run aggregate supply curve to shift to the right.
32.	b	An important point to notice is that a decline in aggregate demand causes a recession in the short run, but in the long run it causes only a decline in the price level. Economists refer to the process of adjustment back to full employment just described as an automatic mechanism because it occurs without any actions by the government.
33.	a	In the short run, an increase in aggregate demand causes an increase in real GDP as a result of a rightward shift of the <i>AD</i> curve. In the long run, it causes only an increase in the price level as the <i>SRAS</i> curve shifts to the left.
34.	a	Stagflation is defined as a combination of inflation and recession.
35.	d	Stagflation, a combination of inflation (higher prices) and recession, occurs when the short-run aggregate supply curve shifts left. This type of shift usually results from an adverse supply shock.
36.	b	The recession caused by the supply shock increases unemployment and reduces output. This eventually results in workers being forced to accept lower wages and firms being forced to accept lower prices. Lower wages cause the short-run aggregate supply curve to shift back to the long-run equilibrium output at full employment.
37.	b	The basic aggregate demand and aggregate supply model gives us important insights into how short-run macroeconomic equilibrium is determined. Unfortunately, the model relies on two assumptions: (1) The economy does not experience continuing inflation, and (2) the economy does not experience long-run growth.
38.	d	The economy is not static, with an unchanging level of full-employment real GDP and no continuing inflation. Real economies are dynamic, with growing potential GDP and ongoing inflation. We can create a dynamic aggregate demand and aggregate supply model by making three changes to the basic model: 1) The full-employment level of real GDP increases continually, shifting the long-run aggregate supply (<i>LRAS</i>) curve to the right; 2) during most years the aggregate demand (<i>AD</i>) curve will be shifting to the right, and 3) except during periods when workers and firms expect high rates of inflation, the short-run aggregate supply (<i>SRAS</i>) curve will be shifting to the right.
39.	a	Increases in the labor force and the capital stock and technological change cause both the long-run aggregate supply curve and the short-run aggregate supply curve to shift. If no other factors that affect the <i>SRAS</i> curve have changed, the <i>LRAS</i> and <i>SRAS</i> curves will shift to the right by the same amount.

Question	Answer	Comment
40.	c	The dynamic aggregate demand and aggregate supply model provides a more accurate explanation than the basic model of the source of most inflation. Figure 13.9 shows that if total spending in the economy grows faster than total production, prices rise. If the <i>AD</i> curve shifts to the right by more than the <i>LRAS</i> curve, inflation will result because equilibrium will occur at a higher price level.
41.	a	In a growing economy, prices rise when aggregate demand grows more than aggregate supply.
42.	b	A “credit crunch” among major banks and other financial institutions made it difficult for consumers to finance their spending, leading to declines in consumption and investment spending. Other factors that led to a decline in aggregate demand include the ending of the housing bubble of 2002–2005, leading to a decline in spending on residential construction, which is part of investment spending.
43.	b	Increases in oil prices, such as those in 2008, are considered as adverse supply shocks. An adverse supply shock causes a shift of the short-run aggregate supply curve to the left. This contributed to the severity of the 2007–2009 recession.
44.	a	The 2007–2009 recession provides a clear example of the impact of a decline in aggregate demand on the economy. Following the end of the housing bubble, spending on residential construction declined sharply. The collapse of the housing market also caused a crisis in the financial sector, which in turn led to a “credit crunch” that led to declines in consumption and investment spending.
45.	a	The 1974–1975 recession was a result of an oil shock that shifted the short-run supply curve to the left. See Solved Problem 13.4 in the textbook.

Short Answer Responses

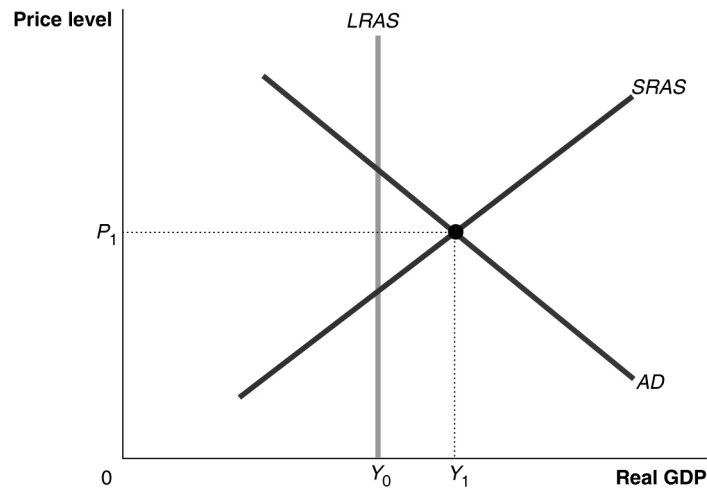
1. Though the demand curve for an individual product and the *AD* curve look alike, they are very different. On the individual product demand curve, as the price changes, all other prices are held constant. On the *AD* curve, all prices are changing together.
2. A change in the price level (the GDP deflator) will cause a movement along the *AD* curve. As the price level increases, the quantity demand of real GDP falls because of the wealth effect, the interest-rate effect, and the international-trade effect. The *AD* curve shifts when something happens that changes demand for real GDP at each price level, such as a change in government purchases, investment spending, or net exports.

- Over time as the capital stock increases, the number of workers increases, and technology changes, firms can produce more output. This is seen as a shift in the *LRAS* curve to the right. As this happens the *SRAS* curve also shifts out, reflecting the notion that firms can produce more with fewer resources. This is shown in the graph below.

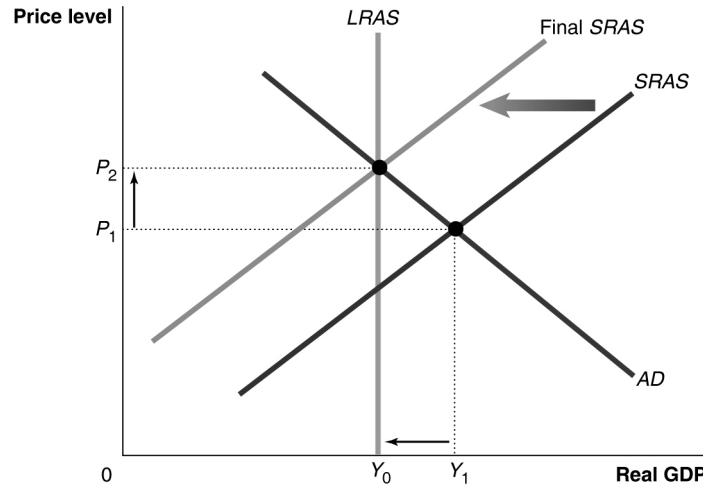


As this growth occurs, other economic variables may also change, so the shift in the *SRAS* curve could be larger or smaller than that shown above. For example, if a supply shock occurred, the new *SRAS* curve would not shift as far to the right as shown above.

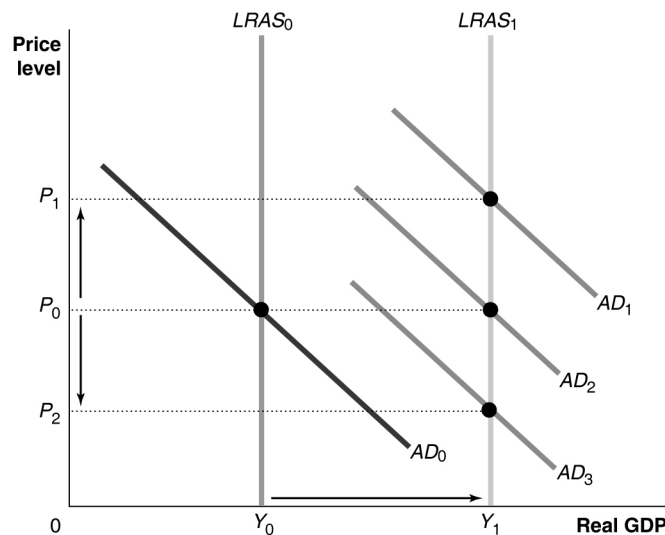
- The initial equilibrium, with the *AD* and *SRAS* curves together at an output level to the right of the *LRAS* curve, would look like:



With the *SRAS* and *AD* curves above, the short-run equilibrium would be at P_1 and Y_1 . Because this level of real GDP is above potential real GDP, eventually wages will start to rise. This increase in wages will shift the *SRAS* curve to the left. The *SRAS* curve will continue to shift to the left until real GDP returns to the level of potential real GDP, Y_0 . This is the automatic adjustments mechanism. The final equilibrium is shown in the graph below.



- Over time, both the *AD* curve and the *LRAS* curve will shift to the right. What happens to the price level depends on the increase in demand relative to the increase in supply. Shown below are three possibilities. If the *AD* curve shifts to the right more than the *LRAS* curve ($AD_0 \rightarrow AD_1$), the price level will rise from P_0 to P_1 , so there will be inflation. If the *AD* curve shifts the same as the *LRAS* curve ($AD_0 \rightarrow AD_2$), prices will not change. If the *AD* curve shifts to the right less than the *LRAS* curve ($AD_0 \rightarrow AD_3$), then the price level will fall from P_0 to P_2 , so there will be deflation.



Because we observe over time that both the price level and real GDP generally increase, we can conclude that *AD* usually increases more than *LRAS*.

6. In the short run, the increase in AD will result in a higher price level and a higher level of output. This extra production pushes the economy above potential real GDP. At this higher level of production above potential, costs of producing will begin to rise. These higher costs will in the long run cause the $SRAS$ curve to shift to the left, eventually returning the economy to potential real GDP. In the short run, with costs fixed, output can rise from an increase in aggregate demand. In the long run, as costs adjust upward, the level of real GDP returns to potential GDP.

True/False Answers

Question	Answer	Comment
1.	T	See page 421 in the textbook for the definition of the wealth effect.
2.	F	As U.S. prices rise, all other things (prices in other countries) equal, U.S. goods get more expensive, causing exports to fall.
3.	F	Higher taxes will reduce consumption, but shift AD to the left.
4.	T	See page 428 in the textbook for the concept of the short-run aggregate supply ($SRAS$) curve.
5.	T	Better technology that raises labor productivity will increase potential real GDP, and so the $LRAS$ curve shifts to the right.
6.	F	At potential real GDP there is both structural and frictional unemployment.
7.	F	The $LRAS$ curve is vertical because changes in the price level do not affect the level of real GDP in the long run.
8.	T	If workers expect prices to rise, they will bargain for higher wages, which will push costs upward.
9.	F	A supply shock causes the $SRAS$ curve to shift.
10.	T	See textbook Figure 13.4.
11.	F	A change in AD will only change real GDP in the short run.
12.	F	At output to the left of the $LRAS$ curve, there will be cyclical unemployment.
13.	F	The automatic adjustment from short-run to long-run equilibrium is due to the adjustment of input prices.
14.	F	A supply shock affects real GDP only in the short run. In the long run, the economy returns to potential GDP.
15.	F	If AD grows faster than $LRAS$, prices will rise.