

Extending the Analysis of Aggregate Supply

Chapter 16 adds to the aggregate demand-aggregate supply (AD-AS) model first introduced in Chapter 11. This addition will give you the analytical tools to improve your understanding of the short-run and long-run relationships between unemployment and inflation.

The major extension to the AD-AS model is the distinction between the **short-run aggregate supply curve** and the **long-run aggregate supply curve**. In the **short run**, nominal wages are fixed, so an increase in the price level increases business profits and real output. In the **long run**, nominal wages are flexible, so business profits and employment return to their original levels. Thus, the long-run aggregate supply curve is vertical at the full-employment level of output.

The distinction between the short-run and long-run aggregate supply curves requires a reinterpretation of demand-pull inflation and cost-push inflation. Although **demand-pull inflation** will increase the price level and real output in the short run, once nominal wages increase, the temporary increase in output is gone, but the price level will be higher at the full-employment level of output. **Cost-push inflation** will increase the price level and decrease real output in the short run, but again, once nominal wages fall, output and the price level will return to their original positions. If government policymakers try to counter cost-push inflation by increasing aggregate demand, they may make matters worse by increasing the price level and causing the short-run aggregate supply curve to decrease, thereby setting off an inflationary spiral.

The relationship between inflation and unemployment has been studied for many years. One influential observation, supported by data from the 1950s and 1960s, was embodied in the **Phillips Curve**, which suggested that there was a stable and predictable tradeoff between the rate of inflation and the unemployment rate. During the 1960s, it was thought that this tradeoff could be used for formulating sound monetary and fiscal policy to manage the economy.

The events of the 1970s and early 1980s, however, called into question the shape and stability of the Phillips Curve because the economy was experiencing both higher rates of inflation and unemployment—**stagflation**. The **aggregate supply shocks** of this period shifted the Phillips Curve rightward. When these shocks dissipated in the 1980s, the Phillips Curve began to shift back to its original position. By the end of the 1990s, points on the Phillips Curve were similar to those of the 1960s.

The conclusion to be drawn from studies of the Phillips Curve is that there is *no long-run tradeoff between inflation and unemployment*. In the long run, the downsloping

Phillips Curve is actually a vertical line at the natural rate of unemployment. In the short run, if aggregate demand increases and reduces the unemployment rate below its natural rate, the result is only temporary. Eventually, the unemployment rate will return to its natural rate, but at a higher rate of inflation.

Aggregate supply can also be affected by taxation. **Supply-side economics** contends that aggregate supply is important for determining levels of inflation, unemployment, and economic growth. Tax cuts are proposed by supply-siders as a way to create more incentives to work, save, and invest, thus increasing productivity and aggregate supply. The relationship between marginal tax rates and tax revenues is expressed in the **Laffer Curve**, which suggests that cuts in tax rates can increase tax revenues. Critics contend, however, that the incentive effects are small, potentially inflationary, and can have positive or negative effects on tax revenues.

■ CHECKLIST

When you have studied this chapter you should be able to

- ☐ Give a definition of the short run and long run in macroeconomics.
- ☐ Distinguish between a change in real wages and a change in nominal wages.
- ☐ Draw the short-run aggregate supply curve and describe its characteristics.
- ☐ Explain how the long-run aggregate supply curve is determined.
- ☐ Draw a graph that illustrates equilibrium in the extended AD-AS model.
- ☐ Explain demand-pull inflation using the extended AD-AS model and identify its short-run and long-run outcomes.
- ☐ Describe cost-push inflation using the extended AD-AS model.
- ☐ Give two generalizations about the policy dilemma for government in dealing with cost-push inflation.
- ☐ Explain recession and the process of adjustment using the extended AD-AS model.
- ☐ Draw a Phillips Curve and explain the basic tradeoff it presents.
- ☐ Define stagflation.
- ☐ Explain why adverse aggregate supply shocks shifted the Phillips Curve over time.
- ☐ List events that contributed to the demise of stagflation.

- ☐ State a generalization about the inflation-unemployment relationship in the long run.
- ☐ Use short-run and long-run Phillips Curves to explain inflation.
- ☐ Use short-run and long-run Phillips Curves to explain disinflation.
- ☐ Describe supply-siders' views of the effects of taxation on incentives to work and to save and invest.
- ☐ Use the Laffer Curve to explain the hypothesized relationship between marginal tax rates and tax revenues.
- ☐ State three criticisms of the Laffer Curve.

■ CHAPTER OUTLINE

1. The aggregate supply curve has short- and long-run characteristics. The short-run curve also shifts because of an increase in nominal wages. These factors make the analysis of aggregate supply and demand more complex.

a. The **short run** is a period in which nominal wages (and other input prices) remain fixed as the price level changes. The **long run** is a period in which nominal wages are fully responsive to changes in the price level.

b. The **short-run aggregate supply curve** is upward sloping: An increase in the price level increases business revenues and profits because nominal wages are fixed; in contrast, when the price level decreases, business revenue and profits decline, and so does real output.

c. The **long-run aggregate supply curve** is vertical at the potential level of output. Increases in the price level will increase nominal wages and cause a decrease (shift left) in the short-run aggregate supply curve, or declines in the price level will reduce nominal wages and cause an increase (shift right) in the short-run aggregate supply curve. In either case, although the price level changes, output returns to its potential level, and the long-run aggregate supply curve is vertical at the full-employment level of output.

d. **Equilibrium** in the extended AD-AS model occurs at the price level and output where the aggregate demand crosses the long-run aggregate supply curve and also crosses the short-run aggregate supply curve.

2. The extended AD-AS model can be applied to explain conditions of inflation and recession in an economy.

a. **Demand-pull inflation** will increase (shift right) the aggregate demand curve, which increases the price level and causes a temporary increase in real output. In the long run, workers will realize that their real wages have fallen and will demand an increase in their nominal wages. The short-run aggregate supply curve, which was based on fixed nominal wages, now decreases (shifts left), resulting in an even higher price level with real output returning to its initial level.

b. **Cost-push inflation** will decrease (shift left) the short-run aggregate supply curve. This situation will increase the price level and temporarily decrease real output, causing a recession. It creates a policy dilemma for government.

(1) If government takes actions to counter the cost-push inflation and recession by increasing aggregate demand, the price level will move to an even higher level, and the actions may set off an inflationary spiral.

(2) If government takes no action, the recession will eventually reduce nominal wages, and eventually the short-run aggregate supply curve will shift back to its original position.

c. If aggregate demand decreases, it will result in a **recession**. If prices and wages are flexible downward, the price level will fall and increase real wages. Eventually, nominal wages will fall to restore the original real wages. This change will increase short-run aggregate supply and end the recession, but not without a long period of high unemployment and lost output.

3. The short- and long-run relationship between inflation and unemployment is important.

a. If aggregate supply is constant and the economy is operating in the upsloping range of aggregate supply, then the greater the rate of increase in aggregate demand, the higher the rate of inflation (and output) and the lower the rate of unemployment. This inverse relationship between the rate of inflation and unemployment is known as the **Phillips Curve**. In the 1960s, economists thought there was a predictable tradeoff between unemployment and inflation. All society had to do was to choose the combination of inflation and unemployment on the Phillips Curve.

b. The **aggregate supply shocks** of the 1970s and early 1980s called into question the validity of the Phillips Curve. In that period, the economy experienced **stagflation**—both higher rates of inflation and unemployment. The aggregate supply shocks came from an increase in resource prices (oil), shortages in agricultural production, higher wage demands, and declining productivity. These shocks decreased the short-run aggregate supply curve, which increased the price level and decreased output (and unemployment). These shocks shifted the Phillips Curve to the right or showed there was no dependable tradeoff between inflation and unemployment.

c. The **demise of stagflation** came in the 1982–1989 period because of such factors as a severe recession in 1981–1982 that reduced wage demands, increased foreign competition that restrained price increases, and a decline in OPEC's monopoly power. The short-run aggregate supply curve increased, and the price level and unemployment rate fell. This meant that the Phillips Curve may have shifted back (left). Recent unemployment–inflation data are now similar to the Phillips Curve of the 1960s.

4. In the **long run**, there is no apparent tradeoff between inflation and unemployment. Any rate of inflation is consistent with the natural rate of unemployment at that time. In the **short run**, there can be a tradeoff between inflation and unemployment.

a. An increase in aggregate demand may temporarily reduce unemployment as the price level increases and profits expand but the actions also set other events into motion.

(1) The increase in the price level reduces the real wages of workers who demand and obtain higher nominal wages; these actions return unemployment to its original level.

(2) Back at the original level, there are now higher actual and expected rates of inflation for the economy, so the short-run Phillips Curve has shifted upward.

(3) The process is repeated if aggregate demand continues to increase. The price level rises as the short-run Phillips Curve shifts upward.

b. In the long run, the Phillips Curve is stable only as a vertical line at the natural rate of unemployment. After all adjustments in nominal wages to increases and decreases in the rate of inflation, the economy returns to its full-employment level of output and its natural rate of unemployment. There is no tradeoff between unemployment and inflation in the long run.

c. Disinflation—reductions in the inflation rate from year to year—is also explained by the distinction between the short-run and long-run Phillips Curves.

5. Supply-side economics views aggregate supply as active rather than passive in explaining changes in the price level and unemployment.

a. It argues that higher marginal tax rates reduce incentives to work and high taxes also reduce incentives to save and invest. These policies lead to a misallocation of resources, less productivity, and a decrease in aggregate supply. To counter these effects, supply-side economists call for a cut in marginal tax rates.

b. The **Laffer Curve** suggests that it is possible to lower tax rates and increase tax revenues, thus avoiding a budget deficit because the policies will result in less tax evasion and avoidance.

c. Critics of supply-side economics and the Laffer Curve suggest that the policy of cutting tax rates will not work because

(1) It has only a small and uncertain effect on incentives to work (or on aggregate supply).

(2) It would increase aggregate demand relative to aggregate supply and thus reinforce inflation when there is full employment.

(3) The expected tax revenues from tax rate cuts depend on assumptions about the economy's position on the Laffer Curve. If tax cuts reduce tax revenues, it will create budget deficits.

■ HINTS AND TIPS

1. Chapter 16 is a more difficult chapter because the AD-AS model is extended to include both **short-run** and **long-run** effects. Spend extra time mastering this material, but do not try to read everything at once. Break the chapter into its logical sections, and practice drawing each graph.

2. Be sure you understand the distinction between the **short-run** and **long-run aggregate supply curves**. Then use these ideas to explain demand-pull inflation, cost-push inflation, and recession. Doing problem 2 will be especially helpful.

3. Be sure you understand how adverse **aggregate supply shocks** shift and create stability in the Phillips Curve.

4. Use Figure 16–9 in the text to help you understand why there is a difference in the short-run and long-run relationships between unemployment and inflation. Problem 4 will help your understanding of this complicated graph.

■ IMPORTANT TERMS

short run	stagflation
long run	aggregate supply shocks
short-run aggregate supply curve	disinflation
long-run aggregate supply curve	supply-side economics
Phillips Curve	Laffer Curve

SELF-TEST

■ FILL-IN QUESTIONS

1. In an AD-AS model with a stable aggregate supply curve, when the economy is producing in the upsloping portion of the aggregate supply curve, an increase in aggregate demand will (increase, decrease) _____ real output and employment, but a decrease in aggregate supply will _____ real output and employment.

2. In the short run, nominal wages are (fixed, variable) _____, but in the long run nominal wages are _____. In the short run, the aggregate supply curve is (upsloping, vertical) _____, but in the long run the curve is _____.

3. Demand-pull inflation occurs with a shift in the aggregate demand curve to the (right, left) _____, which will (decrease, increase) _____ the price level and temporarily _____ real output.

As a consequence, the (short-run, long-run) _____ aggregate supply curve will shift left because of a rise in (real, nominal) _____ wages, producing a (lower, higher) _____ price level at the original level of real output.

4. Cost-push inflation occurs with a shift in the short-run aggregate supply curve to the (right, left) _____; thus the price level will (increase, decrease) _____ and real output will temporarily _____.

5. If government takes no actions to counter the cost-push inflation, the resulting recession will (increase, decrease) _____ nominal wages and shift the

short-run aggregate supply curve back to its original position, yet if the government tries to counter the recession with a(n) _____ in aggregate demand, the price level will move even higher.

6. A recession will occur when there is (an increase, a decrease) _____ in aggregate demand. If the controversial assumption is made that prices and wages are flexible downward, then the price level (rises, falls) _____. Real wages will then (increase, decrease) _____, but eventually nominal wages will _____ and the aggregate supply curve will (increase, decrease) _____ and end the recession.

7. Along the upsloping portion of the short-run aggregate supply curve, the greater the increase in aggregate demand, the (greater, smaller) _____ the increase in the rate of inflation, the _____ the increase in real output, and the (greater, smaller) _____ the unemployment rate.

8. The original Phillips Curve indicates that there will be (a direct, an inverse) _____ relationship between the rate of inflation and the unemployment rate. This means that high rates of inflation will be associated with a (high, low) _____ unemployment rate, or that low rates of inflation will be associated with a _____ unemployment rate.

9. The policy tradeoff based on a stable Phillips Curve was that for the economy to reduce the unemployment rate, the rate of inflation must (increase, decrease) _____, and to reduce the rate of inflation, the unemployment rate must _____.

10. During the 1970s and early 1980s, aggregate (demand, supply) _____ shocks made the Phillips Curve (stable, unstable) _____. These shocks produced (demand-pull, cost-push) _____ inflation that resulted in a simultaneous increase in the inflation rate and the unemployment rate, called (disinflation, stagflation) _____.

11. Several factors contributed to stagflation's demise during the 1982–1989 period. They included

a. the 1981–1982 (inflation, recession) _____ largely caused by (a tight, an easy) _____ money policy. There was also (increased, decreased) _____ foreign competition and the _____ monopoly power of OPEC.

b. The effect of these factors (increased, decreased) _____ the short-run aggregate supply

curve; thus the inflation rate _____ and the unemployment rate _____.

12. The standard explanation for the Phillips Curve is that during the stagflation of the 1970s, the Phillips Curve shifted (right, left) _____, and during the demise of stagflation from 1982–1989, the Phillips Curve shifted _____. In this view, there is a trade-off between the unemployment rate and the rate of inflation, but changes in (short-run, long-run) _____ aggregate supply can shift the Phillips Curve.

13. In the long run, the tradeoff between the rate of inflation and the rate of unemployment (does, does not) _____ exist, and the economy is stable at its natural rate of (unemployment, inflation) _____.

14. The Phillips Curve may be downsloping in the (short run, long run) _____, but it is vertical in the _____ at the natural rate of unemployment. A shift in aggregate demand that reduces the unemployment rate in the short run, results in the long run in (an increase, a decrease) _____ in the rate of inflation and a return to the natural rate of unemployment.

15. When the actual rate of inflation is higher than the expected rate, profits temporarily (fall, rise) _____ and the unemployment rate temporarily (rises, falls) _____. This case would occur during a period of (inflation, disinflation) _____.

16. When the actual rate of inflation is lower than the expected rate, profits temporarily (fall, rise) _____ and the unemployment rate temporarily (rises, falls) _____. This case would occur during a period of (inflation, disinflation) _____.

17. It is the view of supply-side economists that high marginal tax rates (increase, decrease) _____ incentives to work, save, invest, and take risks. According to supply-side economists a stimulus for the economy would be a substantial (increase, decrease) _____ in marginal tax rates that would _____ economic growth through (an increase, a decrease) _____ in aggregate supply.

18. The Laffer Curve depicts the relationship between tax rates and (inflation, tax revenues) _____. It is useful for showing how a (cut, rise) _____ in marginal tax rates will increase aggregate supply.

19. In theory, the Laffer Curve shows that as the tax rates increase from 0%, tax revenues will (increase, decrease)

_____ to some maximum level, after which tax revenues will _____ as the tax rates increase; or as tax rates are reduced from 100%, tax revenues will (increase, decrease) _____ to some maximum level, after which tax revenues will _____ as tax rates decrease.

20. Criticisms of the Laffer Curve are that the effects of a cut in tax rates on incentives to work, save, and invest are (large, small) _____; that the tax cuts generate an increase in aggregate (demand, supply) _____ that outweigh any increase in aggregate _____ and may lead to inflation when at full employment; and that tax cuts can produce a (gain, loss) _____ in tax revenues that will only add to a budget deficit.

■ TRUE-FALSE QUESTIONS

Circle T if the statement is true, F if it is false.

1. The short run in macroeconomics is a period in which nominal wages are fully responsive to changes in the price level. T F

2. The short-run aggregate supply curve has a negative slope. T F

3. The long-run aggregate supply curve is vertical because nominal wages eventually change by the same amount as changes in the price level. T F

4. Demand-pull inflation will increase the price level and real output in the short run, but in the long run, only the price level will increase. T F

5. Cost-push inflation results in a simultaneous increase in the price level and real output. T F

6. When the economy is experiencing cost-push inflation, an inflationary spiral is likely to result when the government enacts policies to maintain full employment. T F

7. A recession is the result of an increase in the short-run aggregate supply curve. T F

8. If the economy is in a recession, prices and nominal wages will presumably fall, and the short-run aggregate supply curve will increase, so that real output returns to its full-employment level. T F

9. The Phillips Curve shows an inverse relationship between the rate of inflation and the unemployment rate. T F

10. Stagflation refers to a situation in which both the price level and the unemployment rate are rising. T F

11. Aggregate supply shocks can cause both higher rates of inflation and higher rates of unemployment. T F

12. The data from the 1970s and early 1980s indicated the aggregate supply curve increased. T F

13. One explanation of the stagflation of the 1970s and early 1980s was an increase in aggregate demand. T F

14. Among the factors that contributed to the demise of stagflation during the 1980s was a recession in 1981 to 1982. T F

15. There is no apparent long-run tradeoff between inflation and unemployment. T F

16. When the actual rate of inflation is higher than the expected rate, profits temporarily fall and the unemployment rate temporarily rises. T F

17. The long-run Phillips Curve is essentially a vertical line at the economy's natural rate of unemployment. T F

18. Disinflation is the same as mismeasurement of the inflation rate. T F

19. When the actual rate of inflation is lower than the expected rate of inflation, profits temporarily fall and the unemployment rate temporarily rises. T F

20. Most economists reject the idea of a short-run tradeoff between the unemployment and inflation rates but accept the long-run tradeoff. T F

21. Supply-side economists contend that aggregate demand is the only active factor in determining the price level and real output in an economy. T F

22. One proposition of supply-side economics is that the marginal tax rates on earned income should be reduced to increase the incentives to work. T F

23. Supply-side economists recommend a higher marginal tax rate on interest from saving because no productive work was performed to earn the interest. T F

24. The Laffer Curve suggests that lower tax rates will increase the rate of inflation. T F

25. A criticism of supply-side economics is that the incentive effects of tax cuts on working and saving are small and have little influence on aggregate supply. T F

■ MULTIPLE-CHOICE QUESTIONS

Circle the letter that corresponds to the best answer.

1. For macroeconomics, the short run is a period in which nominal wages

- (a) remain fixed as the price level stays constant
- (b) change as the price level stays constant
- (c) remain fixed as the price level changes
- (d) change as the price level changes

2. Once sufficient time has elapsed for wage contracts to expire and nominal wage adjustments to occur, the economy enters

- (a) the short run
- (b) the long run

- (c) a period of inflation
 - (d) a period of unemployment
3. A graph of the short-run aggregate supply curve is
- (a) downsloping, and a graph of the long-run aggregate supply is upsloping
 - (b) upsloping, and a graph of the long-run aggregate supply is vertical
 - (c) upsloping, and a graph of the long-run aggregate supply is downsloping
 - (d) vertical, and a graph of the long-run aggregate supply is upsloping
4. Assume that initially your nominal wage was \$10 an hour and the price index was 100. If the price level increases to 110, then your
- (a) real wage has increased to \$11.00
 - (b) real wage has decreased to \$9.09
 - (c) nominal wage has increased to \$11.00
 - (d) nominal wage has decreased to \$9.09
5. In the extended AD-AS model, demand-pull inflation occurs because of an increase in aggregate demand that will eventually produce
- (a) an increase in real wages, thus a decrease in the short-run aggregate supply curve
 - (b) an increase in nominal wages, thus an increase in the short-run aggregate supply curve
 - (c) a decrease in nominal wages, thus a decrease in the short-run aggregate supply curve
 - (d) an increase in nominal wages, thus a decrease in the short-run aggregate supply curve
6. In the short run, demand-pull inflation increases real
- (a) output and decreases the price level
 - (b) wages and increases nominal wages
 - (c) output and increases the price level
 - (d) wages and decreases nominal wages
7. In the long run, demand-pull inflation
- (a) decreases real wages
 - (b) increases the price level
 - (c) increases the unemployment rate
 - (d) decreases real output
8. A likely result of the government trying to reduce the unemployment associated with cost-push inflation through stimulative fiscal policy or monetary policy is
- (a) an inflationary spiral
 - (b) stagflation
 - (c) a recession
 - (d) disinflation
9. What will occur in the short run if there is cost-push inflation and if the government adopts a hands-off approach to it?
- (a) an increase in real output
 - (b) a fall in unemployment
 - (c) demand-pull inflation
 - (d) a recession
10. If prices and wages are flexible, a recession will increase real wages as the price level falls. Eventually, nominal wages will
- (a) fall to the previous real wages, and the short-run aggregate supply will increase
 - (b) rise to the previous real wages, and the short-run aggregate supply will increase
 - (c) fall to the previous real wages, and the short-run aggregate supply will decrease
 - (d) rise to the previous real wages, and the short-run aggregate supply will decrease
11. The traditional Phillips Curve is based on the idea that with a constant short-run aggregate supply curve, the greater the increase in aggregate demand
- (a) the greater the unemployment rate
 - (b) the greater the rate of inflation
 - (c) the greater the increase in real output
 - (d) the smaller the increase in nominal wages
12. The traditional Phillips Curve shows the
- (a) inverse relationship between the rate of inflation and the unemployment rate
 - (b) inverse relationship between the nominal wage and the real wage
 - (c) direct relationship between unemployment and demand-pull inflation
 - (d) tradeoff between the short run and the long run
13. As the unemployment rate falls below its natural rate,
- (a) excessive spending produces demand-pull inflation
 - (b) productivity rises and creates cost-push inflation
 - (c) the expected rate of inflation equals the actual rate
 - (d) there is an aggregate supply shock
14. Which would be a factor contributing to stagflation in the 1970s?
- (a) a fivefold increase in productivity
 - (b) a doubling of stock prices
 - (c) a quadrupling of oil prices by OPEC
 - (d) a 10% decline in the rate of inflation
15. If there are adverse aggregate supply shocks, with aggregate demand remaining constant, then there will be
- (a) a decrease in the price level
 - (b) a decrease in the unemployment rate
 - (c) an increase in real output
 - (d) an increase in both the price level and the unemployment rate
16. A cause of both higher rates of inflation and higher rates of unemployment would be
- (a) an increase in aggregate demand
 - (b) an increase in aggregate supply
 - (c) a decrease in aggregate demand
 - (d) a decrease in aggregate supply
17. Which would be a factor contributing to the demise of stagflation during the 1982–1989 period?
- (a) a lessening of foreign competition
 - (b) a strengthening of the monopoly power of OPEC
 - (c) a recession brought on largely by a tight monetary policy
 - (d) an increase in regulation of airline and trucking industries
18. The economy is stable only in the
- (a) short run at a high rate of profit

- (b) short run at the natural rate of inflation
- (c) long run at the natural rate of unemployment
- (d) long run at the natural rate of inflation

19. When the actual inflation rate is higher than expected, profits temporarily

- (a) fall and the unemployment rate temporarily falls
- (b) rise and the unemployment rate temporarily falls
- (c) rise and the unemployment rate temporarily rises
- (d) fall and the unemployment rate temporarily rises

20. When the actual rate of inflation is lower than the expected rate, profits temporarily

- (a) fall and the unemployment rate temporarily rises
- (b) rise and the unemployment rate temporarily falls
- (c) rise and the unemployment rate temporarily rises
- (d) fall and the unemployment rate temporarily falls

21. In a disinflation situation, the

- (a) actual rate of inflation is lower than the expected rate, so the unemployment rate will rise to bring the expected and actual rates into balance
- (b) expected rate of inflation is lower than the actual rate, so the unemployment rate will rise to bring the expected and actual rates into balance
- (c) actual rate of inflation is higher than the expected rate, so the unemployment rate will fall to bring the expected and actual rates into balance
- (d) expected rate of inflation is higher than the actual rate, so the unemployment rate will fall to bring the expected and actual rates into balance

22. The long-run Phillips Curve is essentially

- (a) horizontal at the natural rate of unemployment
- (b) vertical at the natural rate of unemployment
- (c) vertical at the natural rate of inflation
- (d) horizontal at the natural rate of inflation

23. Supply-side economists contend that the U.S. system of taxation reduces

- (a) unemployment but causes inflation
- (b) incentives to work, save, and invest
- (c) transfer payments to the poor
- (d) the effects of cost-push inflation

24. Based on the Laffer Curve, a cut in the tax rate from 100% to a point before the maximum level of tax revenue will

- (a) increase the price level
- (b) increase tax revenues
- (c) decrease real output
- (d) decrease the real wages

25. A criticism of tax cuts and supply-side economics made by many economists is that

- (a) the demand-side effects exceed the supply-side effects
- (b) the supply-side effects exceed the demand-side effects
- (c) the demand-side and supply-side effects offset each other
- (d) there are only supply-side effects

■ PROBLEMS

1. In columns 1 and 2 of the table below is a portion of a short-run aggregate supply schedule. Column 3 shows the number of full-time workers (in millions) that would have to be employed to produce each of the seven real domestic outputs (in billions) in the short-run aggregate supply schedule. The labor force is 80 million workers and the full-employment output of the economy is

\$_____.

a. If the aggregate demand schedule were that shown in columns 1 and 4,

(1) the price level would be _____ and the real output would be \$_____.

(2) the number of workers employed would be _____, the number of workers unemployed would be _____ million, and the unemployment rate would be _____%.

b. If aggregate demand were to increase to that shown in columns 1 and 5 and short-run aggregate supply remained constant,

(1) the price level would rise to _____ and the real output would rise to \$_____.

(2) employment would increase by _____ million workers and the unemployment rate would fall to _____%.

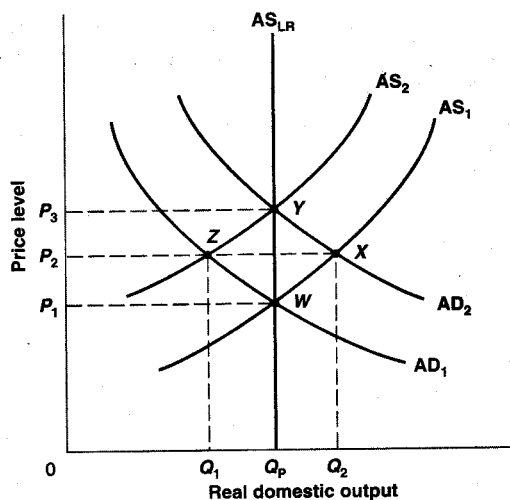
(3) the price level would increase by _____ and the rate of inflation would be _____%.

c. If aggregate demand were to decrease to that shown in columns 1 and 6 and short-run aggregate supply remained constant,

(1) Price level	(2) Real output supplied	(3) Employment (in millions)	(4) Real output demanded	(5) Real output demanded	(6) Real output demanded
130	\$ 800	69	\$2300	\$2600	\$1900
140	1300	70	2200	2500	1800
150	1700	72	2100	2400	1700
160	2000	75	2000	2300	1600
170	2200	78	1900	2200	1500
180	2300	80	1800	2100	1400
190	2300	80	1700	2000	1300

- (1) the price level would fall to _____ and the real output would fall to \$ _____.
- (2) employment would decrease by _____ compared with situation **a**, and workers and the unemployment rate would rise to _____%.
- (3) the price level would decrease and the rate of inflation would be (positive, negative) _____.

2. The following is an aggregate demand and aggregate supply model. Assume that the economy is initially in equilibrium at **AD₁** and **AS₁**. The price level will be _____ and the real domestic output will be _____.



a. If there is demand-pull inflation, then

- (1) in the short run, the new equilibrium is at point _____, with the price level at _____ and real output at _____;
- (2) in the long run, nominal wages will rise so the aggregate supply curve will shift from _____ to _____. The equilibrium will be at point _____ with the price level at _____ and real output at _____, so the increase in aggregate demand has only moved the economy along its _____ curve.

b. Now assume that the economy is initially in equilibrium at point **W**, where **AD₁** and **AS₁** intersect. If there is cost-push inflation, then

- (1) in the short run, the new equilibrium is at point _____, with the price level at _____ and real output at _____.
- (2) if the government tries to counter the cost-push inflation with expansionary monetary and fiscal policy, then aggregate demand will shift from _____ to _____, with the price level becoming _____.

_____ and real output _____, but this policy has a trap because the price level has shifted from _____ to _____ and the new level of inflation might shift _____ leftward.

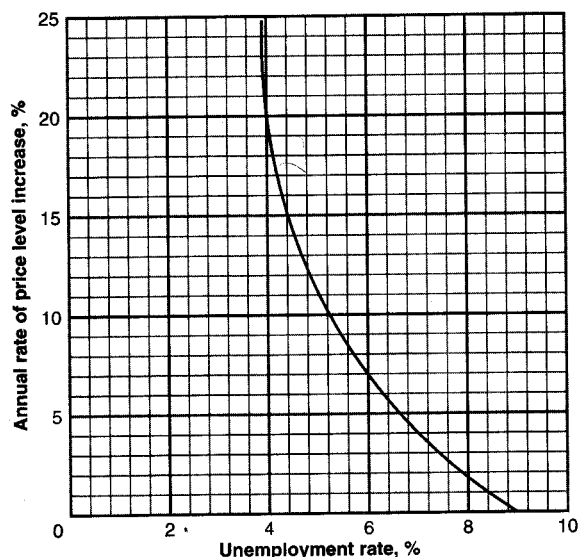
(3) if government does not counter the cost-push inflation, the price level will eventually move to _____ and real output to _____ as the recession reduces nominal wages and shifts the aggregate supply curve from _____ to _____.

c. Now assume that the economy is initially in equilibrium at point **Y**, where **AD₂** and **AS₂** intersect. If there is a recession that reduces investment spending, then

(1) aggregate demand decreases and real output shifts from _____ to _____, and, assuming that prices and wages are flexible downward, the price level shifts from _____ to _____.

- (2) these events cause real wages to (rise, fall) _____, and eventually nominal wages _____ to restore the previous real wages.
- (3) when this happens, the short-run aggregate supply curve shifts from _____ to _____ to its new equilibrium at point _____. The equilibrium price level is _____ and the equilibrium level of output is _____ at the long-run aggregate supply curve _____.

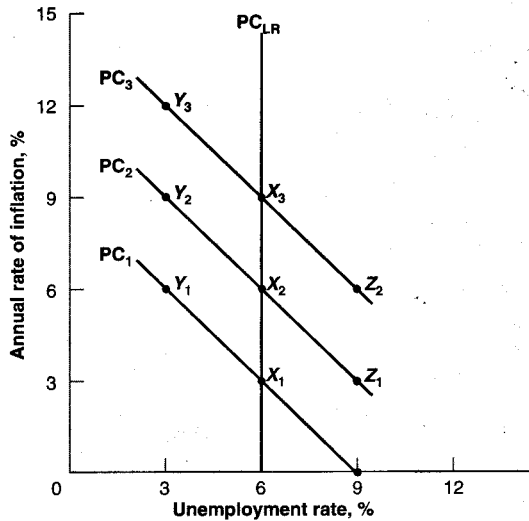
3. The following is a traditional Phillips Curve.



- a.** At full employment (a 4% unemployment rate) the price level would rise by _____% each year.
- b.** If the price level were stable (increasing by 0% a year), the unemployment rate would be _____%.

- c. Which of the combinations along the Phillips Curve would you choose for the economy? _____
 Why would you select this combination? _____

4. Following is a model of short- and long-run Phillips Curves.



a. Suppose you begin at point X_1 and an assumption is made that nominal wages are set on the original expectation that a 3% rate of inflation will continue in the economy.

(1) If an increase in aggregate demand reduces the unemployment rate from 6% to 3%, then the actual rate of inflation will move to _____. The higher product prices will lift profits of firms and they will hire more workers; thus in the short run the economy will temporarily move to point _____.

(2) If workers demand and receive higher wages to compensate for the loss of purchasing power from higher than expected inflation, then business profits will fall from previous levels and firms will reduce employment; therefore, the unemployment rate will move from point _____ to point _____ on the graph.

The short-run Phillips Curve has shifted from _____ to _____ on the graph.

(3) If aggregate demand continues to increase so that the unemployment rate drops from 6% to 3%, then prices will rise before nominal wages, and output and employment will increase, so that there will be a move from point _____ to point _____ on the graph.

(4) But when workers get nominal wage increases, profits fall, and the unemployment rate moves from point _____ at _____% to point _____ at _____%. The short-run

Phillips Curve has now shifted from _____ to _____ on the graph.

(5) The long-run Phillips Curve is the line _____.
 b. Suppose you begin at point X_3 , where the expected and actual rate of inflation is 9% and the unemployment rate is 6%.

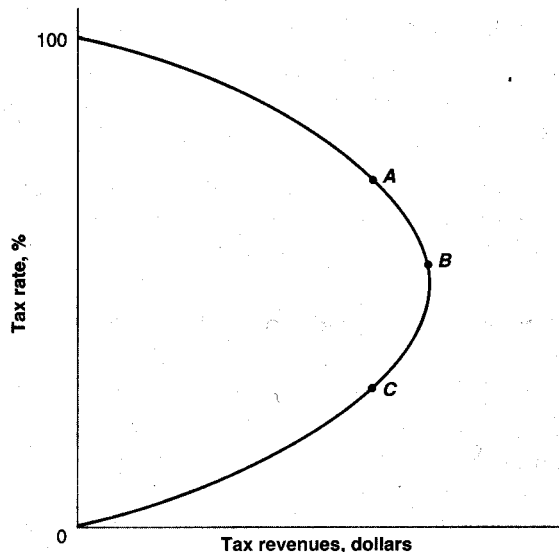
(1) If there should be a decline in aggregate demand because of a recession and if the actual rate of inflation should fall to 6%, well below the expected rate of 9%, then business profits will fall and the unemployment rate will decrease to 9% as shown by the move-

ment from point X_3 to point _____.

(2) If firms and workers adjust their expectation to the 6% rate of inflation, the nominal wages will fall, profits will rise, and the economy will move from point _____ to point _____. The short-run Phillips Curve has shifted from _____ to _____.

(3) If this process is repeated, the long-run Phillips Curve will be traced as line _____.

5. The following is a Laffer Curve.



a. The point of maximum tax revenue is _____. As tax rates decrease from 100% to point B , tax revenues will (increase, decrease) _____. As tax rates increase from 0% to point B , tax revenues will _____.

b. Supply-side economists would contend that it would be beneficial for government to cut tax rates if they are (below, above) _____ point B , whereas critics of supply-side economics contend that it would be harmful for government to cut tax rates if they are _____ point B .

■ SHORT ANSWER AND ESSAY QUESTIONS

1. What distinguishes the short run from the long run in macroeconomics?
2. Identify the basic difference between a short-run and a long-run aggregate supply curve.
3. Explain what happens to aggregate supply when an increase in the price level results in an increase in nominal wages.
4. Explain how to find equilibrium in the extended AD-AS model.
5. Describe the process of demand-pull inflation in the short run and in the long run.
6. How does demand-pull inflation influence the aggregate supply curve?
7. Describe cost-push inflation in the extended AD-AS model.
8. What two generalizations emerge from the analysis of cost-push inflation? Describe the two scenarios that provide the basis for the generalizations.
9. Describe recession in the extended AD-AS model.
10. What is a Phillips Curve? What two rates are related?
11. Explain how a Phillips Curve with a negative slope may be derived by holding aggregate supply constant and mentally increasing aggregate demand.
12. Were the rates of inflation and of unemployment consistent with the Phillips Curve in the 1960s? What do data on these two rates suggest about the curve since then?
13. What were the aggregate supply shocks to the U.S. economy during the 1970s and early 1980s? How did these shocks affect interpretation of the Phillips Curve?
14. Describe the factors that contributed to stagflation's demise during the 1982–1989 period. What do many economists contend happened to the aggregate supply curve, unemployment, and inflation during this period?
15. How can there be a short-run tradeoff between inflation and unemployment, but no long-run tradeoff? Explain.
16. How can the Phillips Curve be used to explain both inflation and disinflation in the economy.
17. What are the characteristics of the long-run Phillips Curve? How is it related to the natural rate of unemployment?
18. Discuss why supply-side economists contend there are tax disincentives in the economy.
19. Draw and explain a Laffer Curve showing the relationship between tax rates and tax revenues.
20. Outline the three criticisms of the ideas expressed in the depiction of the Laffer Curve.