Multiple Choice Questions

1. Which of the following is not a primary cause of business cycle fluctuations, according to real business cycle theory?
   (a) A change in the production function
   (b) A change in the size of the labor force
   (c) A change in the money supply
   (d) A change in the real quantity of government purchases
   Answer: C
   Level of difficulty: 1
   Section: 10.1

2. The distinction between real and nominal shocks is that
   (a) real shocks directly affect only the IS curve, but not the FE line or LM curve.
   (b) real shocks directly affect only the FE line, but not the LM curve.
   (c) real shocks directly affect only the IS curve or the FE line, but not the LM curve.
   (d) real shocks have a large direct effect on the IS curve and the FE line, but only a small direct effect on the LM curve.
   Answer: C
   Level of difficulty: 2
   Section: 10.1

3. Real business cycle theorists think that most business cycle fluctuations are caused by shocks to
   (a) the production function.
   (b) the size of the labor force.
   (c) the real quantity of government purchases.
   (d) the spending and saving decisions of consumers.
   Answer: A
   Level of difficulty: 1
   Section: 10.1
4. Which of the following is an example of a productivity shock?
   (a) The introduction of new management techniques
   (b) A change in taxes on corporate profits
   (c) A change in the level of government transfer programs
   (d) An increase in the money supply
   Answer: A
   Level of difficulty: 1
   Section: 10.1

5. A temporary adverse productivity shock would
   (a) shift the labor supply curve upward.
   (b) decrease the level of employment.
   (c) decrease future income.
   (d) decrease the expected future marginal product of capital.
   Answer: B
   Level of difficulty: 2
   Section: 10.1

6. A beneficial productivity shock would _____ output, _____ the real interest rate, and _____ the price level.
   (a) increase; decrease; increase
   (b) increase; decrease; decrease
   (c) increase; increase; decrease
   (d) decrease; decrease; increase
   Answer: B
   Level of difficulty: 2
   Section: 10.1

7. An adverse supply shock would directly _____ labor productivity by changing the amount of output
   that can be produced with any given amount of capital and labor. It would also indirectly _____
   average labor productivity through changes in the level of employment.
   (a) increase; increase
   (b) increase; decrease
   (c) decrease; increase
   (d) decrease; decrease
   Answer: C
   Level of difficulty: 2
   Section: 10.1

8. When RBC economists work out a detailed numerical example of a more general theory, they are
   performing
   (a) econometrics.
   (b) number theory.
   (c) calibration.
   (d) topology.
   Answer: C
   Level of difficulty: 2
   Section: 10.1
9. When RBC economists compare the volatility in their models to the data, what are they looking at?
   (a) The degree to which variables lead output over the business cycle
   (b) The strength of procyclicality of different variables
   (c) The amount of random variation in economic variables
   (d) The degree to which different economic variables move together
   Answer: C
   Level of difficulty: 2
   Section: 10.1

10. When RBC economists compare the correlations in their models to the data, what are they looking at?
    (a) The degree to which variables lead output over the business cycle
    (b) The strength of procyclicality of different variables
    (c) The amount of random variation in economic variables
    (d) The degree to which different economic variables move together
    Answer: D
    Level of difficulty: 2
    Section: 10.1

11. The most common measure of productivity shocks is known as
    (a) the Solow residual.
    (b) the Lucas supply curve.
    (c) the Prescott productivity parameter.
    (d) the Kydland factor.
    Answer: A
    Level of difficulty: 1
    Section: 10.1

12. The Solow residual is
    (a) the waste from the production process.
    (b) the most common measure of productivity shocks.
    (c) a measure of the efficiency of the production process.
    (d) a measure of the proportion of involuntarily unemployed workers.
    Answer: B
    Level of difficulty: 1
    Section: 10.1

13. Given data on capital \( K \), labor \( N \), and output \( Y \), and estimates of capital’s share of output \( \alpha \),
    the Solow residual is measured as
    (a) \( Y K^{\alpha} N^{1-\alpha} \)
    (b) \( (Y K) / N^{1-\alpha} \)
    (c) \( Y / (K^{\alpha} N^{1-\alpha}) \)
    (d) \( 1/(Y K^{\alpha} N^{1-\alpha}) \)
    Answer: C
    Level of difficulty: 1
    Section: 10.1
14. The formula $Y / (K^a N^{1-a})$ provides a calculation of
   (a) x-efficiency.
   (b) dynamic efficiency.
   (c) economywide monopoly power.
   (d) the Solow residual.
   Answer: D
   Level of difficulty: 1
   Section: 10.1

15. Measures of the Solow residual show it to be
   (a) strongly procyclical.
   (b) mildly procyclical.
   (c) mildly countercyclical.
   (d) strongly countercyclical.
   Answer: A
   Level of difficulty: 1
   Section: 10.1

16. One important reason why the Solow residual may be strongly procyclical even if the actual technology used in production doesn’t change is that
   (a) employment is procyclical.
   (b) resource utilization is procyclical.
   (c) demand shocks are the dominant force determining the business cycle.
   (d) the coefficients ($a$ and $1 - a$) on capital and labor in the production function are procyclical.
   Answer: B
   Level of difficulty: 1
   Section: 10.1

17. If the utilization rates of capital ($u_K$) and labor ($u_N$) are procyclical, then the Solow residual, as conventionally measured, is
   (a) $Y[(u_K)^a (u_N)^{1-a}]$
   (b) $Y / [(u_K)^a (u_N)^{1-a}]$
   (c) $A u_K^a u_N^{1-a}$
   (d) $1 / Y[(u_K)^a (u_N)^{1-a}]$
   Answer: C
   Level of difficulty: 1
   Section: 10.1

18. Labor hoarding occurs when
   (a) firms keep good workers so other firms can’t hire them.
   (b) the unemployment rate exceeds the natural rate of unemployment.
   (c) involuntary unemployment exceeds voluntary unemployment.
   (d) because of hiring and firing costs, firms retain workers in a recession that they would otherwise lay off.
   Answer: D
   Level of difficulty: 1
   Section: 10.1
19. Braun and Evans found that
(a) the measured Solow residual varied sharply over the seasons.
(b) electricity use by producers rises sharply in economic upturns.
(c) professional forecasters have rational expectations of inflation.
(d) shocks to fiscal policy are the main source of business cycle fluctuations.
Answer: A
Level of difficulty: 1
Section: 10.1

20. Critics of the RBC approach argue that it’s hard to find productivity shocks large enough to cause business cycles. What is the RBC counterargument to this criticism?
(a) Business cycles are always and everywhere a monetary phenomenon.
(b) Wars and military buildups could be considered productivity shocks.
(c) Business cycles could be caused by the cumulation of small productivity shocks.
(d) Business cycles are often caused by unobservable productivity shocks, which aren’t apparent at the time they occur.
Answer: C
Level of difficulty: 2
Section: 10.1

21. A temporary increase in government purchases in the classical model would
(a) shift the production function to the right.
(b) shift the marginal product of labor curve to the left.
(c) shift the labor demand curve to the right.
(d) shift the labor supply curve to the right.
Answer: D
Level of difficulty: 1
Section: 10.1

22. In the classical model, a temporary increase in government purchases causes
(a) a decrease in output and the real interest rate.
(b) a decrease in output and an increase in the real interest rate.
(c) an increase in output and a decrease in the real interest rate.
(d) an increase in output and the real interest rate.
Answer: D
Level of difficulty: 2
Section: 10.1

23. In the classical model, a temporary decrease in government spending would cause a decrease in
(a) output, the real interest rate, real wages, and the price level.
(b) employment, the real interest rate, real wages, and the price level.
(c) output, employment, the real interest rate, and the price level.
(d) output, employment, real wages, and the price level.
Answer: C
Level of difficulty: 3
Section: 10.1
24. Classical economists oppose government intervention in the economy for all the reasons below EXCEPT that
   (a) policies to smooth out the business cycle are undesirable in principle.
   (b) increased government expenditures will lower the real wages of workers.
   (c) government policy is incapable of smoothing out the business cycle.
   (d) increases in government spending cannot increase the level of output and employment in the economy.
   Answer: D
   Level of difficulty: 2
   Section: 10.1

25. Classical economists would cite all of the following as reasons why the government cannot smooth out the business cycle EXCEPT that
   (a) only productivity shocks can cause real fluctuations in the business cycle.
   (b) the government has imperfect knowledge of the economy.
   (c) political constraints on policy actions prevent the government from carrying out effective policies.
   (d) time lags between the onset of a recession and the implementation of effective countermeasures make anti-recessionary macroeconomic policies impractical.
   Answer: A
   Level of difficulty: 2
   Section: 10.1

26. According to classical economists, the government should increase government purchases when
   (a) the benefits of the spending exceed the costs.
   (b) the economy is in a recession.
   (c) the economy is likely to go into a recession in the next six months to a year.
   (d) inflation is lower than its targeted level.
   Answer: A
   Level of difficulty: 2
   Section: 10.1

27. According to classical economists, the increase in unemployment in recessions is caused by
   (a) slack aggregate demand.
   (b) the failure of wages to adjust to restore equilibrium in the labor market.
   (c) the power of labor unions, which prevent firms from cutting wages.
   (d) a mismatch of workers and jobs.
   Answer: D
   Level of difficulty: 2
   Section: 10.1
28. According to classical economists, unemployment rises in recessions due to an increase in _____ unemployment, not in _____ unemployment.
   (a) cyclical; frictional and structural
   (b) frictional and cyclical; structural
   (c) structural; frictional and cyclical
   (d) frictional and structural; cyclical
   Answer: D
   Level of difficulty: 2
   Section: 10.1

29. The term household production refers to
   (a) output produced by forcing children to work.
   (b) output produced by workers who are telecommuting.
   (c) services provided directly to households, such as lawn mowing by landscape companies.
   (d) output produced at home.
   Answer: D
   Level of difficulty: 1
   Section: 10.1

30. A household-production model more closely matches the U.S. data than a standard RBC model because it has a
   (a) higher standard deviation of market output.
   (b) lower standard deviation of market output.
   (c) higher rate of job destruction.
   (d) lower standard deviation of consumption.
   Answer: A
   Level of difficulty: 2
   Section: 10.1

31. Assuming that money is neutral, an increase in the nominal money supply would cause
   (a) an excess supply for goods.
   (b) an increase in the real money supply.
   (c) a fall in the price level.
   (d) a rise in nominal wages.
   Answer: D
   Level of difficulty: 1
   Section: 10.2

32. Assuming money neutrality in the classical model, a 10% increase in the nominal money supply would cause
   (a) a 10% increase in the real money supply.
   (b) a 10% decrease in the real money supply.
   (c) no change in the real money supply.
   (d) a less-than-10% change in the price level due to a shift in the aggregate supply curve.
   Answer: C
   Level of difficulty: 1
   Section: 10.2
33. The idea that expected future increases in output cause increases in the current money supply and that expected future decreases in output cause decreases in the current money supply, rather than the other way around, is known as
   (a) Granger causality.
   (b) money neutrality.
   (c) nominal adjustment.
   (d) reverse causation.
   Answer: D
   Level of difficulty: 2
   Section: 10.2

34. The basic classical model can account for the procyclical behavior of money if there
   (a) are real business cycles caused by productivity shocks.
   (b) is reverse causation from future output to money.
   (c) are rational expectations among the public.
   (d) are propagation mechanisms in the economy.
   Answer: B
   Level of difficulty: 1
   Section: 10.2

35. Friedman and Schwarz argue that money is not neutral because
   (a) theoretical models of the economy don’t show monetary neutrality.
   (b) money is a leading, procyclical variable.
   (c) they found several historical incidents in which changes in the money supply were not responses to macroeconomic conditions, and output moved in the same direction as money.
   (d) they found no evidence that productivity changes or changes in government spending contributed to business cycles; only monetary changes preceded every recession.
   Answer: C
   Level of difficulty: 1
   Section: 10.2

36. You and a friend are arguing over the issue of the nonneutrality of money. You believe that money is not neutral, and to prove your point you would cite all of the following EXCEPT
   (a) large gold discoveries that increased the money supply preceded an economic boom.
   (b) a change in monetary institutions preceded a boom or recession.
   (c) a change in the leadership of the Fed and its policy was followed by noticeable changes in the money supply and a recession or inflation.
   (d) the fact that every recession was preceded by a drop in the money supply.
   Answer: D
   Level of difficulty: 2
   Section: 10.2
37. If producers have imperfect information about the general price level and sometimes misinterpret changes in the general price level as changes in relative prices, then
   (a) the short-run aggregate supply curve is vertical.
   (b) the short-run aggregate supply curve slopes upward.
   (c) the aggregate demand curve is vertical.
   (d) the aggregate demand curve is horizontal.
   Answer: B
   Level of difficulty: 1
   Section: 10.3

38. The short-run aggregate supply curve can slope upward because
   (a) prices are fixed in the short run.
   (b) wages adjust immediately to changing economic circumstances.
   (c) producers have misperceptions about the aggregate price level.
   (d) prices adjust instantaneously.
   Answer: C
   Level of difficulty: 1
   Section: 10.3

39. According to the misperceptions theory, when the aggregate price level is higher than expected,
   (a) the aggregate quantity of output supplied rises above the full-employment level.
   (b) the aggregate quantity of output supplied falls below the full-employment level.
   (c) the aggregate quantity of output demanded falls below the full-employment level.
   (d) the aggregate quantity of output demanded rises above the full-employment level.
   Answer: A
   Level of difficulty: 2
   Section: 10.3

40. According to the misperceptions theory, when the price level falls below the expected price level,
   (a) the economy’s SRAS curve shifts up.
   (b) the economy moves along its AD curve.
   (c) the economy moves along its LRAS curve.
   (d) the economy moves along its SRAS curve.
   Answer: D
   Level of difficulty: 1
   Section: 10.3

41. If you expect a general price increase of 5% this year and the price of the hamburgers you sell increases by 10%, you would conclude that the relative price of your good has
   (a) declined, and you would increase your output.
   (b) declined, and you would decrease your output.
   (c) increased, and you would increase your output.
   (d) increased, and you would decrease your output.
   Answer: C
   Level of difficulty: 1
   Section: 10.3
42. You are likely to think that the relative price of your good has risen and you should increase your output if you expected
(a) the inflation rate to be 10% and the price of your good rose 7%.
(b) the inflation rate to be 10% and the price of your good rose 10%.
(c) the inflation rate to be 10% and the price of your good rose 13%.
(d) the inflation rate to be 0% and the price of your good fell 10%.
Answer: C
Level of difficulty: 1
Section: 10.3

43. Short-run aggregate supply is greater than long-run aggregate supply in the misperceptions theory if
(a) the actual price level is greater than the expected price level.
(b) the actual price level equals the expected price level.
(c) the actual price level is less than the expected price level.
(d) output is less than its full-employment level.
Answer: A
Level of difficulty: 1
Section: 10.3

44. Which of the following equations is most likely to represent short-run aggregate supply according to the misperceptions theory?
(a) \( Y = 6000 \)
(b) \( Y = 6000 + 50(P - P_e) \)
(c) \( P = 2 \)
(d) \( PY = 12,000 \)
Answer: B
Level of difficulty: 1
Section: 10.3

45. According to the misperceptions theory, when \( P < P_e \), output is _____ its full-employment level and the short-run aggregate supply curve must shift _____ to restore full employment.
(a) below; upward
(b) below; downward
(c) above; upward
(d) above; downward
Answer: B
Level of difficulty: 2
Section: 10.3

46. According to the misperceptions theory, the amount by which producers increase their output when the general price level rises depends on
(a) the slope of the aggregate demand curve.
(b) the slope of the long-run aggregate supply curve.
(c) the size of the Solow residual.
(d) how much they think their relative prices have increased.
Answer: D
Level of difficulty: 1
Section: 10.3
47. If producers believe that the increase in their relative prices is small relative to the increase in the general price level, then the slope of the short-run aggregate supply curve will be
   (a) zero.
   (b) small.
   (c) large.
   (d) negative.
   Answer: C
   Level of difficulty: 1
   Section: 10.3

48. If producers believe that the increase in their relative prices is large relative to the increase in the general price level, then the slope of the short-run aggregate supply curve will be
   (a) infinite.
   (b) small.
   (c) large.
   (d) negative.
   Answer: B
   Level of difficulty: 1
   Section: 10.3

49. According to the misperceptions theory, an unanticipated decrease in the money supply shifts the AD curve _____, causing output to _____ in the short run.
   (a) up and to the right; rise
   (b) up and to the right; fall
   (c) down and to the left; rise
   (d) down and to the left; fall
   Answer: D
   Level of difficulty: 2
   Section: 10.3

50. According to the misperceptions theory, after an unanticipated increase in the money supply has occurred, the SRAS curve must shift _____ to restore general equilibrium; as it does so, the price level ______.
   (a) downward; rises
   (b) downward; falls
   (c) upward; rises
   (d) upward; falls
   Answer: C
   Level of difficulty: 2
   Section: 10.3
51. According to the misperceptions theory, an anticipated decline in the money supply leads to a shift of the $AD$ curve _____ and a shift of the $SRAS$ curve _____.
   (a) down and to the left; downward
   (b) down and to the left; upward
   (c) up and to the right; downward
   (d) up and to the right; upward
   Answer: A
   Level of difficulty: 2
   Section: 10.3

52. According to the misperceptions theory, an anticipated 10% decrease in the money supply leads to a short-run reduction in the price level of
   (a) 0%.
   (b) 5%.
   (c) some amount between 0% and 10%.
   (d) 10%.
   Answer: D
   Level of difficulty: 2
   Section: 10.3

53. Which of the following statements is true about the misperceptions theory?
   (a) Both anticipated and unanticipated changes in the nominal money supply have real effects on the economy.
   (b) Neither anticipated nor unanticipated changes in the nominal money supply has real effects on the economy.
   (c) Unanticipated changes in the nominal money supply have real effects, but anticipated changes are neutral.
   (d) Anticipated changes in the nominal money supply have real effects, but unanticipated changes are neutral.
   Answer: C
   Level of difficulty: 1
   Section: 10.3

54. If the money supply grows by 7% during the year, and people expected the money supply to grow by 5%, what happens to the short-run aggregate supply curve, according to the misperceptions theory?
   (a) It shifts down.
   (b) It shifts up.
   (c) It doesn’t shift.
   (d) It shifts down unless Ricardian equivalence holds, in which case it doesn’t shift.
   Answer: A
   Level of difficulty: 1
   Section: 10.3
55. According to the misperceptions theory, if the Fed wanted to use monetary policy to influence the real economy it would have to
(a) increase the money supply whenever the economy was in a recession.
(b) decrease the money supply whenever the economy was in an inflationary boom.
(c) surprise the public with unexpected changes in monetary policy.
(d) abide by the monetary targets it announced.
Answer: C
Level of difficulty: 1
Section: 10.3

56. The reason why some economists believe that attempts by the Fed to surprise the public in a systematic way cannot be successful is that
(a) information about the Fed’s plans will inevitably be leaked to the public.
(b) the Fed announces its goals before Congress and publishes its policy actions in the Federal Reserve Bulletin six weeks after they take place.
(c) the public would eventually figure out what the Fed’s policies were, negating the Fed’s surprise.
(d) competition in the money markets would neutralize the Fed’s intervention.
Answer: C
Level of difficulty: 1
Section: 10.3

57. The primary reason why the Fed cannot systematically surprise the public with its monetary policy is
(a) the nonneutrality of money.
(b) the presence of productivity shocks that generate real business cycles independent of the monetary side of the economy.
(c) the presence of rational expectations among the public.
(d) the presence of propagation mechanisms within the economy.
Answer: C
Level of difficulty: 1
Section: 10.3

58. The theory of rational expectations suggests that
(a) people never make forecast errors.
(b) people make intelligent use of available information.
(c) people make systematic forecast errors.
(d) people are slow to incorporate new information into their forecasts.
Answer: B
Level of difficulty: 2
Section: 10.3
59. According to the misperceptions theory, short-lived shocks may have long-term effects on the economy because of
(a) multiplier effects.
(b) propagation mechanisms.
(c) accelerator effects.
(d) automatic stabilizers.
Answer: B
Level of difficulty: 1
Section: 10.3

60. The primary reason that short-lived shocks can have long-run effects is
(a) the nonneutrality of money.
(b) misperceptions by the public over the actual price level and the expected price level.
(c) the presence of rational expectations among the public.
(d) the presence of propagation mechanisms.
Answer: D
Level of difficulty: 1
Section: 10.3

**Essay Questions**

1. Use the classical (RBC) IS-LM-FE model to show the effects on the economy of a temporary beneficial supply shock—for example, a decrease in the price of oil. You should show the impact on the real wage, employment, output, the real interest rate, consumption, investment, and the price level.

**Answers:** The marginal productivity of labor is increased, shifting the labor demand curve to the right. As a result, the real wage rises and employment increases. Both the higher productivity and increased employment increase output. The FE line shifts right, with the IS curve unchanged, so the LM curve must shift down (the price level declines) to restore equilibrium. As a result, the real interest rate declines, increasing consumption and investment.

Level of difficulty: 2
Section: 10.1

2. How is the Solow residual measured? What problems arise in its measurement when resource utilization varies over the business cycle? What implications do these measurement issues have for evidence supporting the RBC model?

**Answers:** The Solow residual is measured as $Y / (K^a N^{1-a})$. But when resource utilization varies over the business cycle, this isn’t the correct measure of productivity. As a result, productivity appears to be procyclical, but in fact productivity might be constant. Thus the fact that the measured Solow residual is strongly procyclical, which has been taken as evidence in support of RBC models, may not be proof that productivity shocks drive the business cycle.

Level of difficulty: 1
Section: 10.1
3. Suppose the economy’s production function is \( Y = A(300N - N^2) \). The marginal product of labor is \( MPN = A(300 - 2N) \). Suppose that \( A = 10 \). The supply of labor is \( NS = 0.05w + 0.005G \).

(a) If \( G \) is 26,000, what are the real wage, employment, and output?
(b) If \( G \) rises to 26,400, what are the real wage, employment, and output?
(c) If \( G \) falls to 25,600, what are the real wage, employment, and output?
(d) In cases (b) and (c), what is the government purchases multiplier; that is, what is the change in output divided by the change in government purchases?

**Answers:**

(a) Setting labor supply equal to labor demand gives \( N = 0.05 \times 10 \times (300 - 2N) + 0.005G \), which can be simplified to get \( N = 75 + 0.0025G \). With \( G = 26,000 \), \( N = 140 \). Then \( w = 10 \times [300 - (2 \times 140)] = 200 \) and \( Y = 10 \times [(300 \times 140) - 140^2] = 224,000 \).

(b) Following the same procedure gives \( N = 141 \), \( w = 180 \), and \( Y = 224,190 \).

(c) \( N = 139 \), \( w = 220 \), and \( Y = 223,790 \).

(d) In part (b), the multiplier is \( 190/400 = 0.475 \). In part (c), the multiplier is \( 210/400 = 0.525 \).
Level of difficulty: 2
Section: 10.1

4. Suppose the money demand of individuals and firms depends on what they perceive to be the probabilities that the economy will expand or contract over the following six months. Suppose their money demand is given by the equation \( L = 0.5Y - 100i + 20z \), where \( z \) is the probability that the economy is expanding six months in the future. If \( z = 1 \), the economy will certainly be in recovery; if \( z = 0 \), the economy will certainly be in recession; and for \( z \) between 0 and 1, there is some uncertainty about the future state of the economy. Use a classical (RBC) model of the economy. If the Fed moves the money supply to target the price level, how does the money supply relate to the expected future state of the economy? Is this an example of reverse causation?

**Answer:** For a given level of real output and the nominal interest rate, to target the price level means that the nominal money supply moves directly with \( z \) (so that \( \Delta M = 20\Delta z \)). This a version of reverse causation because the probability of higher future output affects the money supply today.

Level of difficulty: 2
Section: 10.1

5. Why do many economists believe that money affects output? What is the empirical evidence in support of that belief?

**Answer:** Except for the classical (RBC) model of the economy, other models provide theoretical reasons for the effect of money on output. These include the misperceptions theory, which finds that unanticipated changes in money growth influence output, and the Keynesian theory, which shows that the failure of prices to adjust to return the economy to equilibrium leads money to affect output. Friedman and Schwartz looked at historical episodes in which independent changes in the money supply led to changes in output. This is supported by the work of Romer and Romer, who reviewed and updated the Friedman and Schwartz analysis, and the Volcker episode in the early 1980s.

Level of difficulty: 1
Section: 10.2
6. A classical economy is described by the following equations.

\[ C^d = 500 + 0.5(Y - T) - 100r. \]
\[ I^d = 350 - 100r. \]
\[ L = 0.5Y - 200i. \]
\[ Y = 1850. \]
\[ \pi = 0.05. \]

Government spending and taxes are equal where \( T = G = 200. \) The nominal money supply \( M = 3560. \)

(a) What are the equilibrium values of the real interest rate, the price level, consumption, and investment?

(b) Suppose an economic shock increases desired investment by 10, so it is now \( I^d = 360 - 100r. \) How does this affect the equilibrium values of the real interest rate, the price level, consumption, and investment?

(c) Returning to the initial situation in part (a), suppose an economic shock increases desired consumption by 10, so it is now \( C^d = 510 + 0.5(Y - T) - 100r. \) How does this affect the equilibrium values of the real interest rate, the price level, consumption, and investment?

Answers:

(a) \[ S^d = Y - C^d - G = 0.5Y - 400 + 100r - 200. \] Set \( S^d = I^d: \) \[ 0.5Y - 600 + 100r = 350 - 100r; \] so \( 200r = 950 - 0.5Y (IS). \) With \( Y = 1850, \) \( r = 0.125. \) Then \( C = 1312.5 \) and \( I = 337.5. \) From the money demand equation, \( 3560/P = (0.5 \times 1850) - (200 \times 0.175) = 925 - 35 = 890, \) so \( P = 4. \)

(b) Set \( S^d = I^d: \) \[ 0.5Y - 600 + 100r = 360 - 100r; \] so \( 200r = 960 - 0.5Y (IS). \) With \( Y = 1850, \) \( r = 0.175. \) Then \( C = 1307.5 \) and \( I = 342.5. \) From the money demand equation, \( 3560/P = (0.5 \times 1850) - (200 \times 0.225) = 925 - 45 = 890, \) so \( P = 4.045. \)

(c) Set \( S^d = I^d: \) \[ 0.5Y - 610 + 100r = 350 - 100r; \] so \( 200r = 960 - 0.5Y (IS). \) With \( Y = 1850, \) \( r = 0.175. \) Then \( C = 1317.5, \) \( I = 332.5, \) and \( P = 4.045. \)

Level of difficulty: 2
Section: 10.2

7. Suppose the economy is characterized by the following equations.

\[ IS \text{ curve: } r = 20.20 - 0.002Y \]
\[ LM \text{ curve: } M/P = Y - 250(r + \pi) \]
\[ SRAS \text{ curve: } Y = \bar{Y} + 100(P - P^e) \]

The nominal money supply is \( M = 19,800, \) expected inflation is \( \pi = 0.20, \) and full-employment output is \( \bar{Y} = 10,000. \)

(a) If the economy begins in general equilibrium, what are the equilibrium values of the price level, output, and the real interest rate?

(b) If the expected price level is the price level you found in part (a), what happens to the price level, output, and the real interest rate in the short run if there’s an unanticipated decrease in the nominal money supply to 14,737.5? {Hint: guess some price levels that differ from the one you found in part (a) by increments of 0.25.}

(c) If the expected price level is the price level you found in part (a), what happens to the price level, output, and the real interest rate in the short run if there’s an unanticipated increase in the nominal money supply to 24,937.5?
Answers:
(a) From the IS curve with $Y = 10,000$:

$$r = 20.20 - (0.002 \times 10,000) = 0.20.$$  

Combining the IS curve with the LM curve gives the AD curve, with values for output set at full-employment output ($Y = 10,000$), and with the price level equal to the expected price level:

$$M/P = Y - 250(r + \pi')$$  

$$19,800/P = 10,000 - 250(0.2 + 0.2) = 9,900,$$
so $P = 2.$

(b) Now $P$ may differ from $P'$ in the short run, so things are a bit more complicated. Combining the IS curve with the LM curve gives the AD curve, with the values for output and the price level to be determined in combination with the SRAS curve:

$$AD: \quad M/P = Y - 250(r + \pi')$$

$$= Y - 250[(20.20 - 0.002Y) + 0.2]$$

$$= 1.5Y - 5100.$$  

$$SRAS: \quad Y = 10,000 + 100(P - 2)$$

Plug SRAS into AD to get:

$$M/P = 1.5Y - 5100$$

$$= 1.5[10,000 + 100(P - 2)] - 5100$$

$$= 9600 + 150P$$

This is a quadratic equation in $P$ for a given $M$, as you can see by multiplying through by $P$ and rearranging:

$$150P^2 + 9600P - M = 0$$

Note that in part (a), with $M = 19,800$, the solution to the equation is $P = 2$.

With $M = 14,737.5$, we need to solve the equation $150P^2 + 9600P - 14,737.5 = 0$. You can use the quadratic formula, or guess the solution by checking increments of $P$ of 0.25, to find $P = 1.5$. Output is $Y = 10,000 + 100(P - 2) = 9950$. The real interest rate is $r = 20.20 - 0.002Y = 0.30$.

(c) With $M = 24,937.5$, we need to solve the equation $150P^2 + 9600P - 24,937.5 = 0$, which has the solution $P = 2.5$. Output is $Y = 10,000 + 100(P - 2) = 10,050$. The real interest rate is $r = 20.20 - 0.002Y = 0.10$.

Level of difficulty: 2  
Section: 10.3

8. Analyze the short-run and long-run effects of an unanticipated decrease in the money supply in the misperceptions model. Tell what happens to output, the price level, and the expected price level in both the short run and long run.

Answers: The reduction in money supply shifts the AD curve left, reducing output and the price level, while the expected price level is unchanged, since the decrease in money supply was unanticipated. In the long run, the SRAS curve shifts down as people reduce their expected price level. The economy returns to full-employment output, but at a lower price level.

Level of difficulty: 2  
Section: 10.3
9. Why doesn’t stabilization policy work, according to economists using the misperceptions theory?

**Answer:** Stabilization policy requires taking systematic action to combat recessions (using stimulative policy) or to fight inflation (using restrictive policy). But policy works only if it is unanticipated, according to the misperceptions theory. So the use of stimulative policy in a recession would be anticipated and have no effect. Only unanticipated policy would work, but such a policy would have to be random, and could not be used to smooth the business cycle.

Level of difficulty: 2
Section: 10.3