medium of exchange, *or* means of payment, *p. 190*
money multiplier, *p. 198*
moral suasion, *p. 205*
near monies, *p. 193*
Open Market Desk, *p. 200*
open market operations, *p. 205*
required reserve ratio, *p. 196*
reserves, *p. 195*
run on a bank, *p. 195*
store of value, *p. 190*
unit of account, *p. 190*

1. M1 ≡ currency held outside banks + demand deposits + traveler's checks + other checkable deposits
2. M2 ≡ M1 + savings accounts + money market accounts + other near monies
3. Assets ≡ Liabilities + Net Worth
4. Excess reserves ≡ actual reserves − required reserves
5. Money multiplier $\equiv \dfrac{1}{\text{required reserve ratio}}$

PROBLEMS

All problems are available on www.myeconlab.com

1. In the Republic of Ragu, the currency is the rag. During 2009, the Treasury of Ragu sold bonds to finance the Ragu budget deficit. In all, the Treasury sold 50,000 10-year bonds with a face value of 100 rags each. The total deficit was 5 million rags. Further, assume that the Ragu Central Bank reserve requirement was 20 percent and that in the same year, the bank bought 500,000 rags' worth of outstanding bonds on the open market. Finally, assume that all of the Ragu debt is held by either the private sector (the public) or the central bank.
   a. What is the combined effect of the Treasury sale and the central bank purchase on the total Ragu debt outstanding? on the debt held by the private sector?
   b. What is the effect of the Treasury sale on the money supply in Ragu?
   c. Assuming no leakage of reserves out of the banking system, what is the effect of the central bank purchase of bonds on the money supply?
2. In 2000, the federal debt was being paid down because the federal budget was in surplus. Recall that surplus means that tax collections (T) exceed government spending (G). The surplus ($T - G$) was used to buy back government bonds from the public, reducing the federal debt. As we discussed in this chapter, the main method by which the Fed increases the money supply is to buy government bonds by using open market operations. What is the impact on the money supply of using the fiscal surplus to buy back bonds? In terms of their impacts on the money supply, what is the difference between Fed open market purchases of bonds and Treasury purchases of bonds using tax revenues?
3. For each of the following, determine whether it is an asset or a liability on the accounting books of a bank. Explain why in each case.
   Cash in the vault
   Demand deposits
   Savings deposits
   Reserves
   Loans
   Deposits at the Federal Reserve
4. **[Related to the *Economics in Practice* on *p. 191*]** It is well known that cigarettes served as money for prisoners of war in World War II. Do a Google search using the keyword *cigarettes* and write a description of how this came to be and how it worked.
5. If the head of the Central Bank of Japan wanted to expand the supply of money in Japan in 2009, which of the following would do it? Explain your answer.
   Increase the required reserve ratio
   Decrease the required reserve ratio
   Increase the discount rate
   Decrease the discount rate
   Buy government securities in the open market
   Sell government securities in the open market
6. Suppose in the Republic of Madison that the regulation of banking rested with the Madison Congress, including the determination of the reserve ratio. The Central Bank of Madison is charged with regulating the money supply by using open market operations. In April 2011, the money supply was estimated to be 52 million hurls. At the same time, bank reserves were 6.24 million hurls and the reserve requirement was 12 percent. The banking industry, being "loaned up," lobbied the Congress to cut the reserve ratio. The Congress yielded and cut required reserves to 10 percent. What is the potential impact on the money supply? Suppose the central bank decided that the money supply should not be increased. What countermeasures could it take to prevent the Congress from expanding the money supply?
7. The U.S. money supply (M1) at the beginning of 2000 was $1,148 billion broken down as follows: $523 billion in currency, $8 billion in traveler's checks, and $616 billion in checking deposits. Suppose the Fed decided to reduce the money supply by increasing the reserve requirement from 10 percent to 11 percent. Assuming all banks were initially loaned up (had no excess reserves) and currency held outside of banks did not change, how large a change in the money supply would have resulted from the change in the reserve requirement?
8. As king of Medivalia, you are constantly strapped for funds to pay your army. Your chief economic wizard suggests the following plan: "When you collect your tax payments from your subjects, insist on being paid in gold coins. Take those gold coins, melt them down, and remint them with an extra 10 percent of brass thrown in. You will then have 10 percent more money than you started with." What do you think of the plan? Will it work?
9. Why is M2 sometimes a more stable measure of money than M1? Explain in your own words using the definitions of M1 and M2.
10. Do you agree or disagree with each of the following statements? Explain your answers.
    a. When the Treasury of the United States issues bonds and sells them to the public to finance the deficit, the money supply remains unchanged because every dollar of money taken in by the Treasury goes right back into circulation through government spending. This is not true when the Fed sells bonds to the public.
    b. The money multiplier depends on the marginal propensity to save.

*11. When the Fed adds new reserves to the system, some of these new reserves find their way out of the country into foreign banks or foreign investment funds. In addition, some portion of the new reserves ends up in people's pockets and mattresses instead of bank vaults. These "leakages" reduce the money multiplier and sometimes make it very difficult for the Fed to control the money supply precisely. Explain why this is true.

12. You are given this account for a bank:

ASSETS		LIABILITIES	
Reserves	$ 500	$3,500	Deposits
Loans	3,000		

The required reserve ratio is 10 percent.

a. How much is the bank required to hold as reserves given its deposits of $3,500?
b. How much are its excess reserves?
c. By how much can the bank increase its loans?
d. Suppose a depositor comes to the bank and withdraws $200 in cash. Show the bank's new balance sheet, assuming the bank obtains the cash by drawing down its reserves. Does the bank now hold excess reserves? Is it meeting the required reserve ratio? If not, what can it do?

13. After suffering two years of staggering hyperinflation, the African nation of Zimbabwe officially abandoned its currency, the Zimbabwean dollar, in April 2009 and made the U.S. dollar its official currency. Why would anyone in Zimbabwe be willing to accept U.S. dollars in exchange for goods and services?

14. The following is from an article in *USA TODAY*.

> A small but growing number of cash-strapped communities are printing their own money. Borrowing from a Depression-era idea, they are aiming to help consumers make ends meet and support struggling local businesses. The systems generally work like this: Businesses and individuals form a network to print currency. Shoppers buy it at a discount—say, 95 cents for $1 value—and spend the full value at stores that accept the currency. . . .
>
> *Source:* From *USA TODAY*, a division of Gannett Co., Inc. Reprinted with Permission.

These local currencies are being issued in communities as diverse as small towns in North Carolina and Massachusetts to cities as large as Detroit, Michigan. Do these local currencies qualify as money based on the description of what money is in the chapter?

15. Suppose on your 21st birthday, your eccentric grandmother invites you to her house, takes you into her library, removes a black velvet painting of Elvis Presley from the wall, opens a hidden safe where she removes 50 crisp $100 bills, and hands them to you as a present, claiming you are her favorite grandchild. After thanking your grandmother profusely (and helping her rehang the picture of Elvis), you proceed to your bank and deposit half of your gift in your checking account and half in your savings account. How will these transactions affect M1 and M2? How will these transactions change M1 and M2 in the short run? What about the long run?"

16. Suppose Fred deposits $8,000 in cash into his checking account at the Bank of Bonzo. The Bank of Bonzo has no excess reserves and is subject to a 5 percent required reserve ratio.

a. Show this transaction in a T-account for the Bank of Bonzo.
b. Assume the Bank of Bonzo makes the maximum loan possible from Fred's deposit to Clarice and show this transaction in a new T-account.
c. Clarice decides to use the money she borrowed to take a trip to Tahiti. She writes a check for the entire loan amount to the Tropical Paradise Travel Agency, which deposits the check in its bank, the Iceberg Bank of Barrow, Alaska. When the check clears, the Bonzo Bank transfers the funds to the Iceberg Bank. Show these transactions in a new T-account for the Bonzo Bank and in a T-account for the Iceberg Bank.
d. What is the maximum amount of deposits that can be created from Fred's initial deposit?
e. What is the maximum amount of loans that can be created from Fred's initial deposit?

17. What are the three tools the Fed can use to change the money supply? Briefly describe how the Fed can use each of these tools to either increase or decrease the money supply.

* Note: Problems marked with an asterisk are more challenging.

5. The Fed can affect the equilibrium interest rate by changing the supply of money using one of its three tools—the required reserve ratio, the discount rate, or open market operations.
6. An increase in either *P* or *Y*, which shifts the money demand curve to the right, increases the equilibrium interest rate. A decrease in either *P* or *Y* decreases the equilibrium interest rate.
7. *Tight monetary policy* refers to Fed policies that contract the money supply and thus raise interest rates in an effort to restrain the economy. *Easy monetary policy* refers to Fed policies that expand the money supply and thus lower interest rates in an effort to stimulate the economy. The Fed chooses between these two types of policies for different reasons at different times.

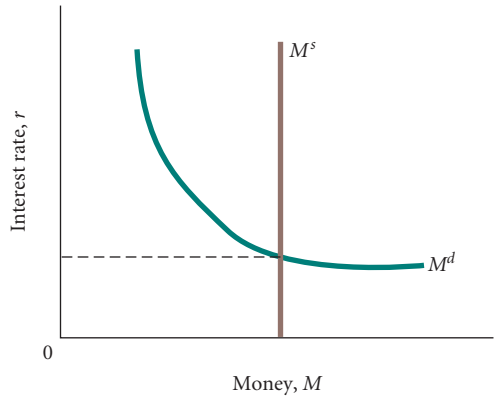
REVIEW TERMS AND CONCEPTS

easy monetary policy, *p. 223*
interest, *p. 213*
nonsynchronization of income and spending, *p. 215*
speculation motive, *p. 218*
tight monetary policy, *p. 223*
transaction motive, *p. 215*

PROBLEMS

All problems are available on www.myeconlab.com

1. State whether you agree or disagree with the following statements and explain why.
   a. When the real economy expands (*Y* rises), the demand for money expands. As a result, households hold more cash and the supply of money expands.
   b. Inflation, a rise in the price level, causes the demand for money to decline. Because inflation causes money to be worth less, households want to hold less of it.
   c. If the Fed buys bonds in the open market and at the same time we experience a recession, interest rates will no doubt rise.
2. During 2003, we began to stop worrying that inflation was a problem. Instead, we began to worry about deflation, a decline in the price level. Assume that the Fed decided to hold the money supply constant. What impact would deflation have on interest rates?
3. **[Related to *Economics in Practice* on *p. 219*]** How many times a week do you use an ATM? If ATMs were not available, would you carry more cash? Would you keep more money in your checking account? How many times a day do you use cash?
4. What if, at a low level of interest rates, the money demand curve became nearly horizontal, as in the following graph. That is, with interest rates so low, the public would not find it attractive to hold bonds; thus, money demand would be very high. Many argue that this was the position of the U.S. economy in 2003. If the Fed decided to expand the money supply in the graph, what would be the impact on interest rates?



5. During the fourth quarter of 1993, real GDP in the United States grew at an annual rate of over 7 percent. During 1994, the economy continued to expand with modest inflation. (*Y* rose at a rate of 4 percent and *P* increased about 3 percent.) At the beginning of 1994, the prime interest rate (the interest rate that banks offer their best, least risky customers) stood at 6 percent, where it remained for over a year. By the beginning of 1995, the prime rate had increased to over 8.5 percent.
   a. By using money supply and money demand curves, show the effects of the increase in *Y* and *P* on interest rates, assuming *no change* in the money supply.
   b. On a separate graph, show that the interest rate can rise even if the Federal Reserve expands the money supply as long as it does so more slowly than money demand is increasing.
6. Illustrate the following situations using supply and demand curves for money:
   a. The Fed buys bonds in the open market during a recession.
   b. During a period of rapid inflation, the Fed increases the reserve requirement.
   c. The Fed acts to hold interest rates constant during a period of high inflation.
   d. During a period of no growth in GDP and zero inflation, the Fed lowers the discount rate.
   e. During a period of rapid real growth of GDP, the Fed acts to increase the reserve requirement.
7. During a recession, interest rates may fall even if the Fed takes no action to expand the money supply. Why? Use a graph to explain.
8. During the summer of 1997, Congress and the president agreed on a budget package to balance the federal budget. The "deal," signed into law by President Clinton in August as the Taxpayer Relief Act of 1997, contained substantial tax cuts and expenditure reductions. The tax reductions were scheduled to take effect immediately, however, while the expenditure cuts would come mostly in 1999 to 2002. Thus, in 1998, the package was seen by economists to be mildly expansionary. If the result is an increase in the growth of real

output/income, what would you expect to happen to interest rates if the Fed holds the money supply (or the rate of growth of the money supply) constant? What would the Fed do if it wanted to raise interest rates? What if it wanted to lower interest rates? Illustrate with graphs.

9. The demand for money in a country is given by

$$M^d = 10{,}000 - 10{,}000r + P \cdot Y$$

where M^d is money demand in dollars, r is the interest rate (a 10 percent interest rate means $r = 0.1$), and $P \cdot Y$ is national income. Assume that $P \cdot Y$ is initially 5,000.

   a. Graph the amount of money demanded (on the horizontal axis) against the interest rate (on the vertical axis).
   b. Suppose the money supply (M^s) is set by the central bank at $10,000. On the same graph you drew for part a., add the money supply curve. What is the equilibrium rate of interest? Explain how you arrived at your answer.
   c. Suppose income rises from $P \cdot Y = 5{,}000$ to $P \cdot Y = 7{,}500$. What happens to the money demand curve you drew in part a.? Draw the new curve if there is one. What happens to the equilibrium interest rate if the central bank does not change the supply of money?
   d. If the central bank wants to keep the equilibrium interest rate at the same value as it was in part b., by how much should it increase or decrease the supply of money given the new level of national income?
   e. Suppose the shift in part c. has occurred and the money supply remains at $10,000 but there is no observed change in the interest rate. What might have happened that could explain this?

10. The United States entered a deep recession at the end of 2007. The Fed under Ben Bernanke used aggressive monetary policy to prevent the recession from becoming another Great Depression. The Fed Funds target rate was 5.25 percent in the fall of 2007; by mid-2008, it stood at 2 percent; and in January 2009, it went to a range of 0-0.25 percent, where it still stood through mid-2010. Lower interest rates reduce the cost of borrowing and encourage firms to borrow and invest. They also have an effect on the value of the bonds (private and government) outstanding in the economy. Explain briefly but clearly why the value of bonds changes when interest rates change. Go to federalreserve.gov, click on "Economic Research & Data," and click on "Flow of Funds." Look at the most recent release and find balance sheet table B.100. How big is the value of Credit Market Instruments held by households?

11. Normally, people in the United States and from around the world think of highly rated corporate or government bonds as a safe place to put their savings relative to common stocks. Because the stock market had performed so poorly during the recession and because many foreigners turned to the United States as a safe place to invest, bond sales boomed.

    If you were a holder of high-grade fixed rate bonds that you purchased a few years earlier when rates were much higher, you found yourself with big capital gains. That is, as rates went lower, the value of previously issued bonds increased. Many investment advisers in late 2010 were telling their clients to avoid bonds because inflation was going to come back.
   a. Suppose you bought a $10,000 ten-year fixed rate bond issued by the U.S. Treasury in July 2007 that paid 5% interest. In July 2010, new seven-year fixed rate bonds were being sold by the Treasury that paid 2.43%. Explain clearly what was likely to have happened to the value of your bond which still has 7 years to run paying 5%?
   b. Why would bond prices rise if people feared a recession was coming?
   c. Why would fear of inflation lead to losses for bondholders?
   d. Look back and see what happened in late 2010 into 2011? Did the Fed keep rates low? Did the recession end? Did we see the start of inflation? Explain.

12. Explain what will happen to holdings of bonds and money if there is an excess supply of money in the economy. What will happen if there is an excess demand for money in the economy? What will happen to interest rates in each of these cases?

13. The island nation of Macadamia recently experienced an 800 percent jump in tourism, increasing income throughout the island. Suppose the Macadamia money market was in equilibrium prior to the rise in tourism. What impact will the increase in income have on the equilibrium interest rate in Macadamia, assuming no change in the supply of money? What will the Macadamia Central Bank have to do to keep the increase in income from impacting the interest rate?

14. All else equal, what effect will an expansionary fiscal policy have on the money market, and how will this change impact the effectiveness of the fiscal policy? Draw a graph to illustrate your answer.

15. Explain the differences between the transaction motive for holding money and the speculation motive for holding money.

CHAPTER 11 APPENDIX A

The Various Interest Rates in the U.S. Economy

Although there are many different interest rates in the economy, they tend to move up or down with one another. Here we discuss some of their differences. We first look at the relationship between interest rates on securities with different *maturities*, or terms. We then briefly discuss some of the main interest rates in the U.S. economy.

The Term Structure of Interest Rates

The *term structure of interest rates* is the relationship among the interest rates offered on securities of different maturities. The key here is understanding issues such as these: How are these different rates related? Does a 2-year security (an IOU that promises to repay principal, plus interest, after 2 years) pay a lower annual rate than a 1-year security (an IOU to be repaid, with interest, after 1 year)? What happens to the rate of interest offered on 1-year securities if the rate of interest on 2-year securities increases?

THE AGGREGATE DEMAND (*AD*) CURVE *p. 237*

12. The *aggregate demand (AD) curve* graphs the negative relationship between aggregate output (income) and the price level. Each point on the *AD* curve is a point at which both the goods market and the money market are in equilibrium for a given value of the price level. The *AD* curve is *not* the sum of all the market demand curves in the economy.

13. An increase in the quantity of money supplied, an increase in government purchases, or a decrease in net taxes at a given price level shifts the aggregate demand curve to the right. A decrease in the quantity of money supplied, a decrease in government purchases, or an increase in net taxes shifts the aggregate demand curve to the left.

REVIEW TERMS AND CONCEPTS

aggregate demand (*AD*) curve, *p. 237*
contractionary fiscal policy, *p. 235*
contractionary monetary policy, *p. 236*
crowding-out effect, *p. 233*
expansionary fiscal policy, *p. 233*
expansionary monetary policy, *p. 233*
goods market, *p. 229*
interest sensitivity *or* insensitivity of planned investment, *p. 234*
money market, *p. 230*
policy mix, *p. 236*
real wealth, *or* real balance, effect, *p. 239*

PROBLEMS

All problems are available on www.myeconlab.com

1. On June 5, 2003, the European Central Bank acted to decrease the short-term interest rate in Europe by half a percentage point, to 2 percent. The bank's president at the time, Willem Duisenberg, suggested that, in the future, the bank could reduce rates further. The rate cut was made because European countries were growing very slowly or were in recession. What effect did the bank hope the action would have on the economy? Be specific. What was the hoped-for result on *C*, *I*, and *Y*?

2. **[Related to the *Economics in Practice* on *p. 231*]** In response to concerns of both the Treasury Department and the Congressional Oversight Panel regarding the value of loans being made to small businesses, the four largest U.S. banks (Bank of America, Citigroup, JP Morgan Chase, and Wells Fargo) all agreed to increase their small business lending practices in 2010. Search the Internet and describe any changes that have occurred in lending to small businesses since 2010. The text states that it is unclear whether the reduced lending is due more to a lack of lenders or a lack of borrowers. Go to www.sba.gov/advo/research and click on "Small Business Indicators." Select the most recent quarter from the quarterly indicator menu and describe what happened to demand for commercial and industrial loans as well as the level of optimism for small businesses. What correlation do you see between the changes in lending, the demand for loans, and the level of optimism for small businesses?

3. During the third quarter of 1997, Japanese GDP was falling at an annual rate of over 11 percent. Many blamed the big increase in Japan's taxes in the spring of 1997, which was designed to balance the budget. Explain how an increase in taxes with the economy growing slowly could precipitate a recession. Do not skip steps in your answer. If you were head of the Japanese central bank, how would you respond? What impact would your policy have on the level of investment?

4. Some economists argue that the "animal spirits" of investors are so important in determining the level of investment in the economy that interest rates do not matter at all. Suppose that this were true—that investment in no way depends on interest rates.
   a. How would Figure 12.1 be different?
   b. What would happen to the level of planned aggregate expenditures if the interest rate changed?
   c. What would be different about the relative effectiveness of monetary and fiscal policy?

5. For each of the following scenarios, tell a story and predict the effects on the equilibrium levels of aggregate output (Y) and the interest rate (r):
   a. During 2005, the Federal Reserve was tightening monetary policy in an attempt to slow the economy. Congress passed a substantial cut in the individual income tax at the same time.
   b. During the summer of 2003, Congress passed and President George W. Bush signed the third tax cut in 3 years. Many of the tax cuts took effect in 2005. Assume that the Fed holds M^s fixed.
   c. In 1993, the government raised taxes. At the same time, the Fed was pursuing an expansionary monetary policy.
   d. In 2005, conditions in Iraq led to a sharp drop in consumer confidence and a drop in consumption. Assume that the Fed holds the money supply constant.
   e. The Fed attempts to increase the money supply to stimulate the economy, but plants are operating at 65 percent of their capacities and businesses are pessimistic about the future.

6. Occasionally, the Federal Open Market Committee (FOMC) sets a policy designed to "track" the interest rate. This means that the FOMC is pursuing policies designed to keep the interest rate constant. If, in fact, the Fed were acting to counter any increases or decreases in the interest rate to keep it constant, what specific actions would you expect to see the Fed take if the following were to occur? (In answering, indicate the effects of each set of events on Y, C, S, I, M^s, M^d, and r.)
   a. An unexpected increase in investor confidence leads to a sharp increase in orders for new plants and equipment.
   b. A major New York bank fails, causing a number of worried people (not trusting even the FDIC) to withdraw a substantial amount of cash from other banks and put it in their cookie jars.

7. Paranoia, the largest country in central Antarctica, receives word of an imminent penguin attack. The news causes expectations about the future to be shaken. As a consequence, there is a sharp decline in investment spending plans.
   a. Explain in detail the effects of such an event on the economy of Paranoia assuming no response on the part of the central bank or the Treasury. (M^s, T, and G all remain constant.) Make sure you discuss the adjustments in the goods market and the money market.
   b. To counter the fall in investment, the king of Paranoia calls for a proposal to increase government spending. To finance the program, the chancellor of the exchequer has proposed three alternative options:
   (1) Finance the expenditures with an equal increase in taxes
   (2) Keep tax revenues constant and borrow the money from the public by issuing new government bonds
   (3) Keep taxes constant and finance the expenditures by printing new money

   Consider the three financing options and rank them from most expansionary to least expansionary. Explain your ranking.
8. Why might investment not respond positively to low interest rates during a recession? Why might investment not respond negatively to high interest rates during a boom?
9. The aggregate demand curve slopes downward because when the price level is lower, people can afford to buy more and aggregate demand rises. When prices rise, people can afford to buy less and aggregate demand falls. Is this a good explanation of the shape of the *AD* curve? Why or why not?
10. By late summer 2010, the target fed funds rate was between zero and 0.25 percent. At the same time, "animal spirits" were dormant and there was excess capacity in most industries. That is, businesses were in no mood to build new plant and equipment if they were not using their already existing capital. Interest rates were at or near zero, and yet investment demand remained quite low. The unemployment rate was 9.6 percent in August 2010. These conditions suggest that monetary policy is likely to be a more effective tool to promote expansion than fiscal policy. Do you agree or disagree? Explain your answer.
11. Describe the policy mix that would result in each of the following situations.
   a. The interest rate decreases, investment increases, and the change in aggregate output is indeterminate.
   b. Aggregate output increases, and the interest rate change is indeterminate.
   c. The interest rate increases, investment decreases, and the change in aggregate output is indeterminate.
   d. Aggregate output decreases, and the interest rate change is indeterminate.
12. In the first few chapters of this book, we introduced the notion of supply and demand. One of the first things we did was to derive the relationship between the price of a product and the quantity demanded per time period by an individual household. Now we have derived what is called the ***aggregate*** demand curve. The two look the same and both seem to have a negative slope, but the logic is completely different. Tell one story that explains the negative slope of a simple demand curve and another story that explains the more complex aggregate demand curve (*AD*).
13. Expansionary policies are designed to stimulate the economy by increasing aggregate output. Explain why expansionary fiscal policy and expansionary monetary policy have opposite effects on the interest rate despite having the same goal of increasing aggregate output. Illustrate your answer with graphs of the money market.
14. Explain the effect, if any, that each of the following occurrences should have on the aggregate demand curve.
   a. The Fed lowers the discount rate.
   b. The price level decreases.
   c. The federal government increases federal income tax rates in an effort to reduce the federal deficit.
   d. Pessimistic firms decrease investment spending.
   e. The inflation rate falls by 3 percent.
   f. The federal government increases purchases to stimulate the economy.

CHAPTER 12 APPENDIX

The *IS-LM* Model

There is a useful way of depicting graphically the determination of aggregate output (income) and the interest rate in the goods and money markets. Two curves are involved in this diagram, the *IS* curve and the *LM* curve. In this Appendix, we will derive these two curves and use them to see how changes in government purchases (G) and the money supply (M^s) affect the equilibrium values of aggregate output (income) and the interest rate. The effects we describe here are the same as the effects we described in the main text; here we illustrate the effects graphically.

The *IS* Curve

We know that in the goods market there is an equilibrium level of aggregate output (income) (Y) for each value of the interest rate (r). For a given value of r, we can determine the equilibrium value of Y. The equilibrium value of Y falls when r rises and rises when r falls. There is thus a *negative* relationship between the equilibrium value of Y and r. The reason for this negative relationship is the negative relationship between planned investment and the interest rate. When the interest rate rises, planned investment (I) falls, and this decrease in I leads to a decrease in the equilibrium value of Y. The negative relationship between the equilibrium value of Y and r is shown in Figure 12A.1. This curve is called the ***IS* curve**.[1] Each point on the *IS* curve represents the equilibrium point in the goods market for the given interest rate.

[1] The letter *I* stands for investment, and the letter *S* stands for saving. *IS* refers to the fact that in equilibrium in the goods market, planned investment equals saving.

fairly flat and that at high levels of aggregate output, the *AS* curve is vertical or nearly vertical. Thus, the *AS* curve slopes upward and becomes vertical when the economy reaches its capacity, or maximum, output.

3. Anything that affects an individual firm's marginal cost curve can shift the *AS* curve. The two main factors are wage rates and energy prices.

THE EQUILIBRIUM PRICE LEVEL *p. 250*

4. The *equilibrium price level* in the economy occurs at the point at which the *AS* and *AD* curves intersect. The intersection of the *AS* and *AD* curves corresponds to equilibrium in the goods and money markets *and* to a set of price/output decisions on the part of all the firms in the economy.

THE LONG-RUN AGGREGATE SUPPLY CURVE *p. 251*

5. If wages fully adjust to prices in the long run, then the long-run *AS* curve will be vertical.
6. The level of aggregate output that can be sustained in the long run without inflation is called *potential output* or *potential GDP*.

MONETARY AND FISCAL POLICY EFFECTS *p. 253*

7. If the economy is initially producing on the flat portion of the *AS* curve, an expansionary policy—which shifts the *AD* curve to the right—will result in a small increase in the equilibrium price level relative to the increase in equilibrium output. If the economy is initially producing on the steep portion of the *AS* curve, an expansionary policy results in a small increase in equilibrium output and a large increase in the equilibrium price level.
8. If the *AS* curve is vertical in the long run, neither monetary nor fiscal policy has any effect on aggregate output in the long run. For this reason, the exact length of the long run is one of the most pressing questions in macroeconomics.

CAUSES OF INFLATION *p. 255*

9. *Demand-pull inflation* is inflation initiated by an increase in aggregate demand. *Cost-push*, or *supply-side, inflation* is inflation initiated by an increase in costs like energy prices. An increase in costs may also lead to *stagflation*—the situation in which the economy is experiencing a contraction and inflation simultaneously.
10. Inflation can become "built into the system" as a result of expectations. If prices have been rising and people form their expectations on the basis of past pricing behavior, firms may continue raising prices even if demand is slowing or contracting.
11. When the price level increases, so too does the demand for money. If the economy is operating on the steep part of the *AS* curve and the Fed tries to keep the interest rate constant by increasing the supply of money, the result could be a *hyperinflation*—a period of very rapid increases in the price level.

THE BEHAVIOR OF THE FED *p. 259*

12. In practice, the Fed controls the interest rate rather than the money supply. The interest rate value that the Fed chooses depends on the state of the economy. The Fed wants high output and low inflation. The Fed is likely to decrease the interest rate during times of low output and low inflation, and it is likely to increase the interest rate during times of high output and high inflation.
13. The Fed generally had high interest rates in the 1970s and early 1980s as it fought inflation. Since 1983, inflation has been low by historical standards and the Fed focused in this period on trying to smooth fluctuations in output.
14. Inflation targeting is the case where the monetary authority weights only inflation. It chooses its interest rate values with the aim of keeping the inflation rate within some specified band over some specified horizon.

REVIEW TERMS AND CONCEPTS

aggregate supply, *p. 248*
aggregate supply (*AS*) curve, *p. 248*
cost-push, *or* supply-side, inflation, *p. 256*
cost shock, *or* supply shock, *p. 250*
demand-pull inflation, *p. 255*
equilibrium price level, *p. 250*
inflation targeting, *p. 264*
potential output, *or* potential GDP, *p. 253*
stagflation, *p. 256*

PROBLEMS

All problems are available on www.myeconlab.com

1. In Japan during the first half of 2000, the Bank of Japan kept interest rates at a near zero level in an attempt to stimulate demand. In addition, the government passed a substantial increase in government expenditure and cut taxes. Slowly, Japanese GDP began to grow with absolutely no sign of an increase in the price level. Illustrate the position of the Japanese economy with aggregate supply and demand curves. Where on the short-run *AS* curve was Japan in 2000?
2. In 2008, the price of oil rose sharply on world markets. What impact would you expect there to be on the aggregate price level and on real GDP? Illustrate your answer with aggregate demand and supply curves. What would you expect to be the effect on interest rates if the Fed held the money supply constant? Tell a complete story.
3. By using aggregate supply and demand curves to illustrate your points, discuss the impacts of the following events on the price level and on equilibrium GDP (*Y*) in the *short run*:
   a. A tax cut holding government purchases constant with the economy operating at near full capacity
   b. An increase in the money supply during a period of high unemployment and excess industrial capacity

c. An increase in the price of oil caused by a war in the Middle East, assuming that the Fed attempts to keep interest rates constant by accommodating inflation

d. An increase in taxes and a cut in government spending supported by a cooperative Fed acting to keep output from falling

4. During 1999 and 2000, a debate raged over whether the United States was at or above potential GDP. Some economists feared the economy was operating at a level of output above potential GDP and inflationary pressures were building. They urged the Fed to tighten monetary policy and increase interest rates to slow the economy. Others argued that a worldwide glut of cheap products was causing input prices to be lower, keeping prices from rising.

   By using aggregate supply and demand curves and other useful graphs, illustrate the following:

   a. Those pushing the Fed to act were right, and prices start to rise more rapidly in 2000. The Fed acts belatedly to slow money growth (contract the money supply), driving up interest rates and pushing the economy back to potential GDP.

   b. The worldwide glut gets worse, and the result is a *falling* price level (deflation) in the United States despite expanding aggregate demand.

5. **[Related to the *Economics in Practice* on *p. 252*]** The *Economics in Practice* describes the simple Keynesian aggregate supply curve as one in which there is a maximum level of output given the constraints of a fixed capital stock and a fixed supply of labor. The presumption is that increases in demand when firms are operating below capacity will result in output increases and no input price or output price changes but that at levels of output above full capacity, firms have no choice but to raise prices of demand increases. In reality, however, the short-run aggregate supply curve isn't flat and then vertical. Rather, it becomes steeper as we move from left to right on the diagram. Explain why. What circumstances might lead to an equilibrium at a very flat portion of the *AS* curve? at a very steep portion?

6. Using aggregate supply and aggregate demand curves to illustrate, describe the effects of the following events on the price level and on equilibrium GDP in the *long run* assuming that input prices fully adjust to output prices after some lag:

   a. An increase occurs in the money supply above potential GDP

   b. A decrease in government spending and in the money supply with GDP above potential GDP occurs

   c. Starting with the economy at potential GDP, a war in the Middle East pushes up energy prices temporarily. The Fed expands the money supply to accommodate the inflation.

7. Two separate capacity constraints are discussed in this chapter: (1) the actual physical capacity of existing plants and equipment, shown as the vertical portion of the short-run *AS* curve, and (2) potential GDP, leading to a vertical long-run *AS* curve. Explain the difference between the two. Which is greater, full-capacity GDP or potential GDP? Why?

8. In country A, all wage contracts are indexed to inflation. That is, each month wages are adjusted to reflect increases in the cost of living as reflected in changes in the price level. In country B, there are no cost-of-living adjustments to wages, but the workforce is completely unionized. Unions negotiate 3-year contracts. In which country is an expansionary monetary policy likely to have a larger effect on aggregate output? Explain your answer using aggregate supply and aggregate demand curves.

9. During 2001, the U.S. economy slipped into a recession. For the next several years, the Fed and Congress used monetary and fiscal policies in an attempt to stimulate the economy. Obtain data on interest rates (such as the prime rate or the federal funds rate). Do you see evidence of the Fed's action? When did the Fed begin its expansionary policy? Obtain data on total federal expenditures, tax receipts, and the deficit. (Try www.commerce.gov). When did fiscal policy become "expansionary"? Which policy seems to have suffered more from policy lags?

10. Describe the Fed's tendency to "lean against the wind." Do the Fed's policies tend to stabilize or destabilize the economy?

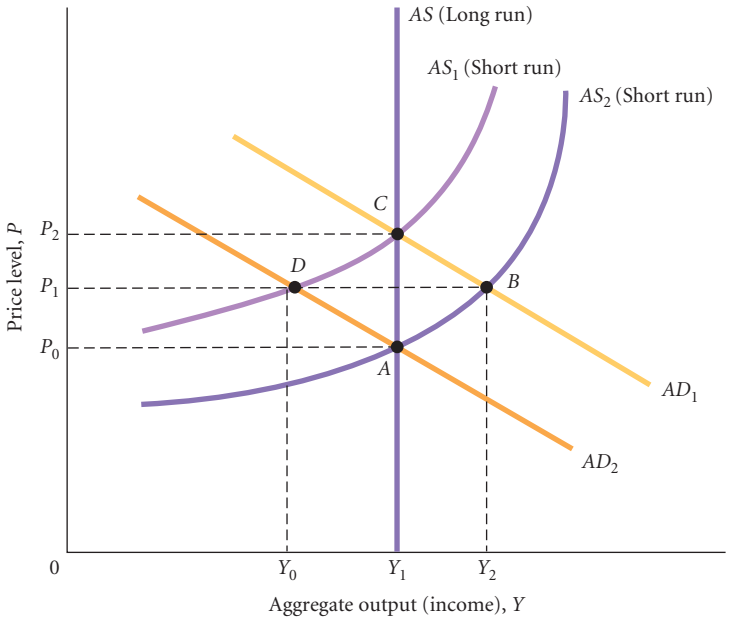
11. **[Related to the *Economics in Practice* on *p. 261*]** In August 2010, the Fed's discount rate was 0.75 percent and the federal funds rate was 0.25 percent, with a Fed target of 0–0.25 percent. The *Economics in Practice* states that all of the major investment banks employ economists to help them forecast what the Fed will do, and in mid-2010, many of these economists pushed back their expectations of when the Fed would raise interest rates, citing lower-than-anticipated inflation expectations, slow job growth, and an overall weak economy as reasons for the delay in rate increases. Go to www.frb.gov, www.bea.gov, and www.bls.gov to see what has happened to interest rates, the inflation rate, the unemployment rate, and GDP since August 2010. Were the economists' forecasts of the Fed delaying interest rate increases until 2011 correct? Describe any apparent correlation between the changes in interest rates and changes in the inflation rate, the unemployment rate, and GDP since August 2010.

12. From the following graph, identify the initial equilibrium, the short-run equilibrium, and the long-run equilibrium based on the scenarios below. Explain your answers and identify what happens to the price level and aggregate output.

    Scenario 1. The economy is initially in long-run equilibrium at point *A*, and a cost shock causes cost-push inflation. The government reacts by implementing an expansionary fiscal policy.

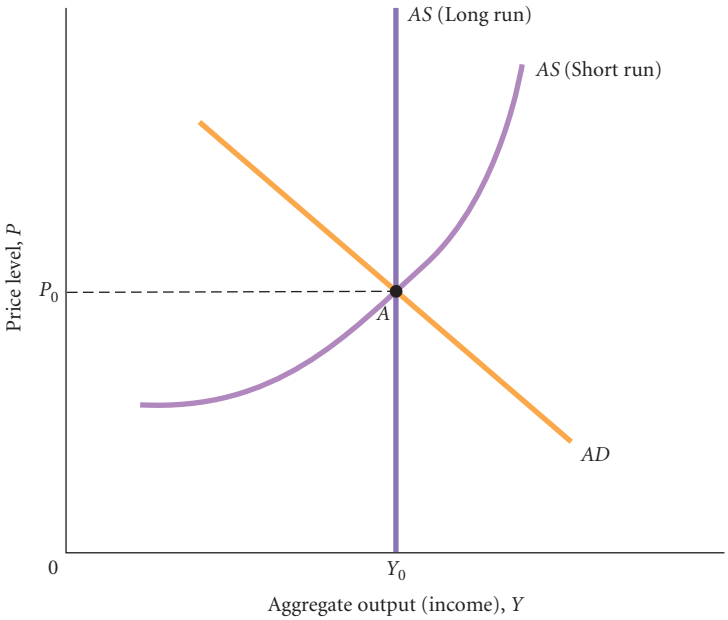
    Scenario 2. The economy is initially in long-run equilibrium at point *A*, and an increase in government purchases causes demand-pull inflation. In the long run, wages respond to the inflation.

    Scenario 3. The economy is initially in long-run equilibrium at point *C*, and the federal government implements an increase in corporate taxes and personal income taxes. In the long run, firms and workers adjust to the new price level and costs adjust accordingly.



Scenario 4. The economy is initially in equilibrium at point *C*, and energy prices decrease significantly. The government reacts by implementing a contractionary fiscal policy.

13. The economy of Mayberry is currently in equilibrium at point *A* on the graph below. Prince Barney of Mayberry has decided that he wants the economy to grow and has ordered the Royal Central Bank of Mayberry to print more currency so banks can expand their loans to stimulate growth. Explain what will most likely happen to the economy of Mayberry as a result of Prince Barney's actions and show the result on the graph.



14. Evaluate the following statement: In the short run, if an economy experiences inflation of 10 percent, the cause of the inflation is unimportant. Whatever the cause, the only important issue the government needs to be concerned with is the 10 percent increase in the price level.

15. **[Related to the *Economics in Practice* on *p. 258*]** A monthly survey conducted by Torcuato Di Tella University in Buenos Aires showed that in August 2010, people in Argentina expected inflation to increase 25 percent over the next 12 months, a similar response to the previous month's survey. This shows a large discrepancy between inflation expectations and the Argentine Central Bank's monthly index of consumer prices which showed prices rising at an annual rate of 11.2 percent, the highest level in 4 years. Use aggregate supply and demand curves to show the effect of these expectations of inflation on the Argentine economy, assuming firms increase prices in response to the expectations. What can the Argentine Central Bank do to try to lower the expectations to their projected inflation level of 11.2 percent? What impact would this have on the aggregate supply and demand curves?

Source: "Twelve months inflation expectations in Argentina steady at 25%," *MercoPress*, August 20, 2010.