

TABLE 33.3 Monetary Policies for Recession and Inflation

(1) Expansionary Monetary Policy	(2) Restrictive Monetary Policy
Problem: unemployment and recession	Problem: inflation
↓	↓
Federal Reserve buys bonds, lowers reserve ratio, lowers the discount rate, or increases reserve auctions	Federal Reserve sells bonds, increases reserve ratio, raises the discount rate, or decreases reserve auctions
↓	↓
Excess reserves increase	Excess reserves decrease
↓	↓
Federal funds rate falls	Federal funds rate rises
↓	↓
Money supply rises	Money supply falls
↓	↓
Interest rate falls	Interest rate rises
↓	↓
Investment spending increases	Investment spending decreases
↓	↓
Aggregate demand increases	Aggregate demand decreases
↓	↓
Real GDP rises	Inflation declines

curve of Figure 33.5b that we have already been using with the aggregate demand and aggregate supply curves shown in Figure 33.5d. Figure 33.5d represents exactly the same economy as Figure 33.5c but adds some extra curves that relate only to our explanation of restrictive monetary policy.

To see how restrictive monetary policy works, let us first consider a situation in which the economy moves from a full-employment equilibrium to operating at more than full employment so that inflation is a problem and restrictive monetary policy would be appropriate. Assume that the economy begins at the full-employment equilibrium where AD_2 and AS intersect. At this equilibrium, $Q_f = \$900$ billion and the price level is P_2 .

Next, assume that the money supply grows to \$175 billion (S_{m3}) in Figure 33.5a. This results in an interest rate of 6 percent, investment spending of \$25 billion, and aggregate demand AD_3 . As the AD curve shifts to the right

from AD_2 to AD_3 in Figure 33.5d, the economy will move along the upwardsloping AS curve until it comes to an equilibrium at point a , where AD_3 intersects AS. At the new equilibrium, the price level has risen to P_3 and the equilibrium level of real GDP has risen to \$910 billion, indicating an inflationary GDP gap of \$10 billion (= \$910 billion – \$900 billion). Aggregate demand AD_3 is excessive relative to the economy’s full-employment level of real output $Q_f = \$900$ billion. To rein in spending, the Fed will institute a restrictive monetary policy.

The Federal Reserve Board will direct Federal Reserve Banks to undertake some combination of the following actions: (1) sell government securities to banks and the public in the open market, (2) increase the legal reserve ratio, (3) increase the discount rate, and (4) decrease the amount of reserves auctioned off under the term auction facility. Banks then will discover that their reserves are below those required and that the Federal funds rate has increased. So they will need to reduce their checkable deposits by refraining from issuing new loans as old loans are paid back. This will shrink the money supply and increase the interest rate. The higher interest rate will discourage investment, lowering aggregate demand and restraining demand-pull inflation.

But the Fed must be careful about just how much to decrease the money supply. The problem is that the inflation ratchet will take effect at the new equilibrium point a , such that prices will be inflexible at price level P_3 . As a result, aggregate supply to the left of point a will be the horizontal dashed line shown in Figure 33.5d. This means that the Fed cannot simply lower the money supply to S_{m2} in Figure 33.5a. If it were to do that, investment demand would fall to \$20 billion in Figure 33.5b and the AD curve would shift to the left from AD_3 back to AD_2 . But because of inflexible prices, the economy’s equilibrium would move to point c , where AD_2 intersects the horizontal dashed line that represents aggregate supply to the left of point a . This would put the economy into a recession, with equilibrium output below the full-employment output level of $Q_f = \$900$ billion.

What the Fed needs to do to achieve full employment is to move the AD curve back only from AD_2 to AD_4 , so that the economy will come to equilibrium at point b . This will require a \$10 billion decrease in aggregate demand, so that equilibrium output falls from \$910 billion at point a to $Q_f = \$900$ billion at point b . The Fed can achieve this shift by setting the supply of money in Figure 33.5a at \$162.5 billion. To see how this works, draw in a vertical money supply curve in Figure 33.5a at \$162.5 billion and label it as S_{m4} . It will be exactly

halfway between money supply curves S_{m2} and S_{m3} . Notice that the intersection of S_{m4} with the money demand curve D_m will result in an interest rate of 7 percent. In Figure 33.5b, this interest rate of 7 percent will result in investment spending of \$22.5 billion (halfway between \$20 billion and \$25 billion). Thus, by setting the money supply at \$162.5 billion, the Fed can reduce investment spending by \$2.5 billion, lowering it from the \$25 billion associated with AD_3 down to only \$22.5 billion. This decline in investment spending will initially shift the AD curve only \$2.5 billion to the left of AD_3 . But then the multiplier process will work its magic. Since the multiplier is 4 in our model, the AD curve will end up moving by a full \$10 billion ($= 4 \times \2.5 billion) to the left, to AD_4 . This shift will move the economy to equilibrium b , returning output to the full employment level and eliminating the inflationary GDP gap.²

Column 2 in Table 33.3 summarizes the cause-effect chain of a tight money policy.

Monetary Policy: Evaluation and Issues

Monetary policy has become the dominant component of U.S. national stabilization policy. It has two key advantages over fiscal policy:

- Speed and flexibility.
- Isolation from political pressure.

Compared with fiscal policy, monetary policy can be quickly altered. Recall that congressional deliberations may delay the application of fiscal policy for months. In contrast, the Fed can buy or sell securities from day to day and thus affect the money supply and interest rates almost immediately.

Also, because members of the Fed's Board of Governors are appointed and serve 14-year terms, they are relatively isolated from lobbying and need not worry about retaining their popularity with voters. Thus, the Board, more readily than Congress, can engage in politically unpopular policies (higher interest rates) that may be necessary for the long-term health of the economy. Moreover, monetary policy is a subtler and more politically conservative measure than fiscal policy. Changes

in government spending directly affect the allocation of resources, and changes in taxes can have extensive political ramifications. Because monetary policy works more subtly, it is more politically palatable.

Recent U.S. Monetary Policy

In the early 1990s, the Fed's expansionary monetary policy helped the economy recover from the 1990–1991 recession. The expansion of GDP that began in 1992 continued through the rest of the decade. By 2000 the U.S. unemployment rate had declined to 4 percent—the lowest rate in 30 years. To counter potential inflation during that strong expansion, in 1994 and 1995, and then again in early 1997, the Fed reduced reserves in the banking system to raise the interest rate. In 1998 the Fed temporarily reversed its course and moved to a more expansionary monetary policy to make sure that the U.S. banking system had plenty of liquidity in the face of a severe financial crisis in southeast Asia. The economy continued to expand briskly, and in 1999 and 2000 the Fed, in a series of steps, boosted interest rates to make sure that inflation remained under control.

Significant inflation did not occur in the late 1990s. But in the last quarter of 2000 the economy abruptly slowed. The Fed responded by cutting interest rates by a full percentage point in two increments in January 2001. Despite these rate cuts, the economy entered a recession in March 2001. Between March 20, 2001, and August 21, 2001, the Fed cut the Federal funds rate from 5 percent to 3.5 percent in a series of steps. In the 3 months following the terrorist attacks of September 11, 2001, it lowered the Federal funds rate from 3.5 percent to 1.75 percent, and it left the rate there until it lowered it to 1.25 percent in November 2002. Partly because of the Fed's actions, the prime interest rate dropped from 9.5 percent at the end of 2000 to 4.25 percent in December 2002.

Economists generally credit the Fed's adroit use of monetary policy as one of a number of factors that helped the U.S. economy achieve and maintain the rare combination of full employment, price-level stability, and strong economic growth that occurred between 1996 and 2000. The Fed also deserves high marks for helping to keep the recession of 2001 relatively mild, particularly in view of the adverse economic impacts of the terrorist attacks of September 11, 2001, and the steep stock market drop in 2001–2002.

In 2003 the Fed left the Federal funds rate at historic lows. But as the economy began to expand robustly in 2004, the Fed engineered a gradual series of rate hikes designed

²Again, we assume for simplicity that the decrease in nominal GDP does not feed back to reduce the demand for money and thus the interest rate. In reality, this would occur, slightly dampening the increase in the interest rate shown in Figure 33.5a.

to boost the prime interest rate and other interest rates to make sure that aggregate demand continued to grow at a pace consistent with low inflation. By the summer of 2006, the target for the Federal funds rate had risen to 5.25 percent and the prime rate was 8.25 percent. With the economy enjoying robust, noninflationary growth, the Fed left the Federal funds rate at 5.25 percent for over a year until the mortgage debt crisis threatened the economy during the late summer of 2007 (see this chapter's Last Word). In response to the crisis, the Fed took several actions. In August it lowered the discount rate by half a percentage point. Then, between September 2007 and April 2008, it lowered the target for the Federal funds rate from 5.25 percent to 2 percent. The Fed also initiated the term auction facility in December 2007 and took a series of extraordinary actions to prevent the failure of key financial firms. All these monetary actions and “lender-of-last resort” functions helped to stabilize the banking sector and stimulate the economy—thereby offsetting at least some of the damage done by the mortgage debt crisis. The Federal Reserve was lauded by many observers.

Problems and Complications

Despite its recent successes in the United States, monetary policy has certain limitations and faces real-world complications.

Lags Recall that fiscal policy is hindered by three delays, or lags—a recognition lag, an administrative lag, and an operational lag. Monetary policy also faces a recognition lag and an operational lag, but because the Fed can decide and implement policy changes within days, it avoids the long administrative lag that hinders fiscal policy.

A recognition lag affects monetary policy because normal monthly variations in economic activity and the price level mean that the Fed may not be able to quickly recognize when the economy is truly starting to recede or when inflation is really starting to rise. Once the Fed acts, an operation lag of 3 to 6 months affects monetary policy because that much time is typically required for interest-rate changes to have their full impacts on investment, aggregate demand, real GDP, and the price level. These two lags complicate the timing of monetary policy.

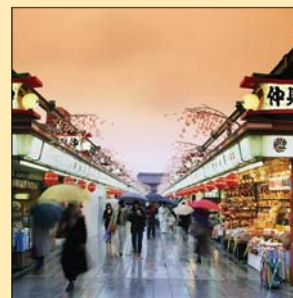
Cyclical Asymmetry Monetary policy may be highly effective in slowing expansions and controlling inflation but less reliable in pushing the economy from

a severe recession. Economists say that monetary policy may suffer from **cyclical asymmetry**.

If pursued vigorously, a restrictive monetary policy could deplete commercial banking reserves to the point where banks would be forced to reduce the volume of loans. That would mean a contraction of the money supply, higher interest rates, and reduced aggregate demand. The Fed can absorb reserves and eventually achieve its goal.

But it cannot be certain of achieving its goal when it adds reserves to the banking system. An expansionary

CONSIDER THIS . . .



Pushing on a String

In the late 1990s and early 2000s, the central bank of Japan used an expansionary monetary policy to reduce real interest rates to zero. Even with “interest-free” loans available, most consumers and businesses did not borrow and spend more. Japan’s econ-

omy continued to sputter in and out of recession.

The Japanese circumstance illustrates the possible *asymmetry* of monetary policy, which economists have likened to “pulling versus pushing on a string.” A string may be effective at pulling something back to a desirable spot, but it is ineffective at pushing it toward a desired location.

So it is with monetary policy, say some economists. Monetary policy can readily *pull* the aggregate demand curve to the left, reducing demand-pull inflation. There is no limit on how much a central bank can restrict a nation’s money supply and hike interest rates. Eventually, a sufficiently restrictive monetary policy will reduce aggregate demand and inflation.

But during severe recession, participants in the economy may be highly pessimistic about the future. If so, an expansionary monetary policy may not be able to push the aggregate demand curve to the right, increasing real GDP. The central bank can produce excess reserves in the banking system by reducing the reserve ratio, lowering the discount rate, purchasing government securities, and increasing reserve auctions. But commercial banks may not be able to find willing borrowers for those excess reserves, no matter how low interest rates fall. Instead of borrowing and spending, consumers and businesses may be more intent on reducing debt and increasing saving in preparation for expected worse times ahead. If so, monetary policy will be ineffective. Using it under those circumstances will be much like pushing on a string.

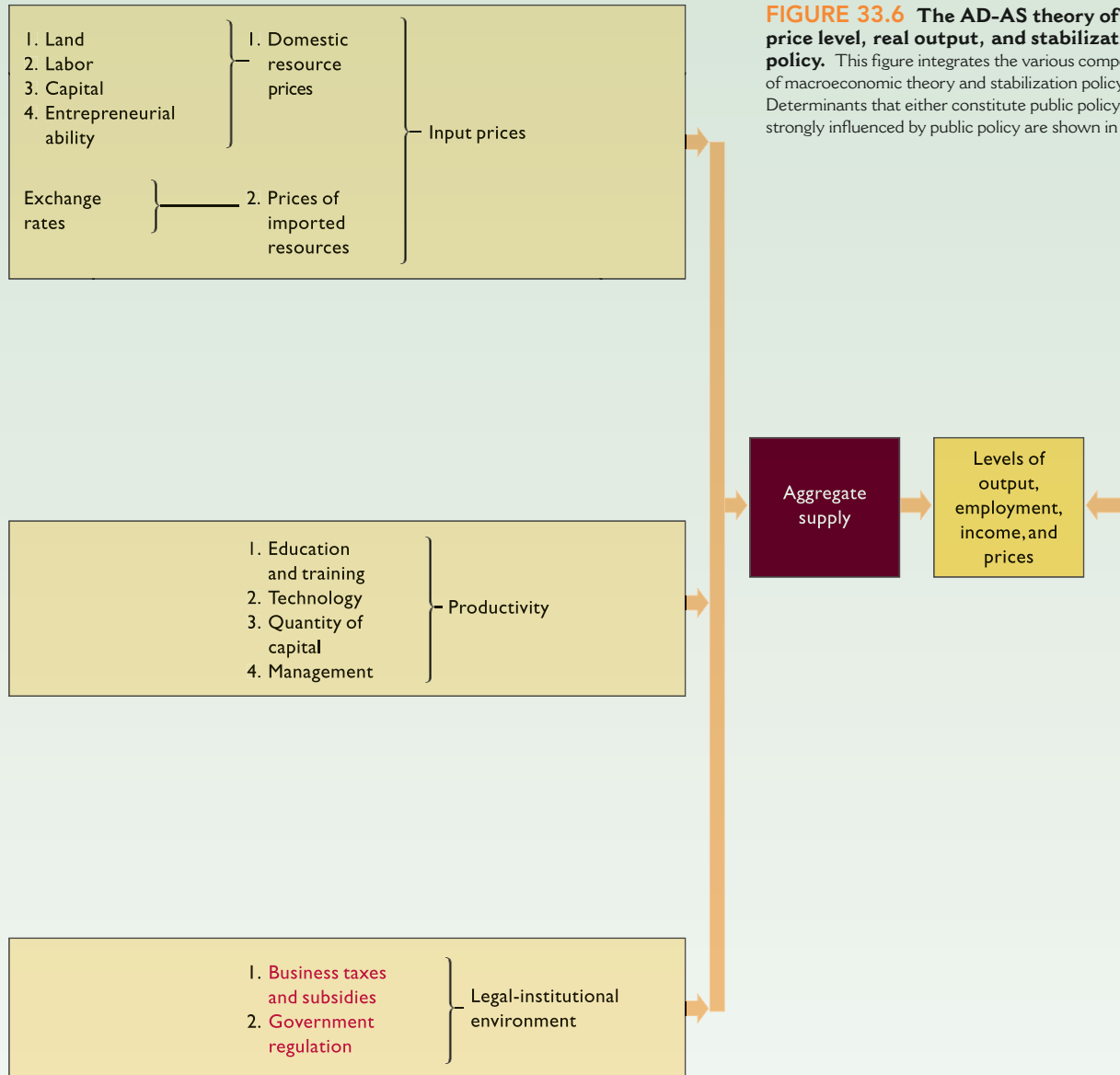
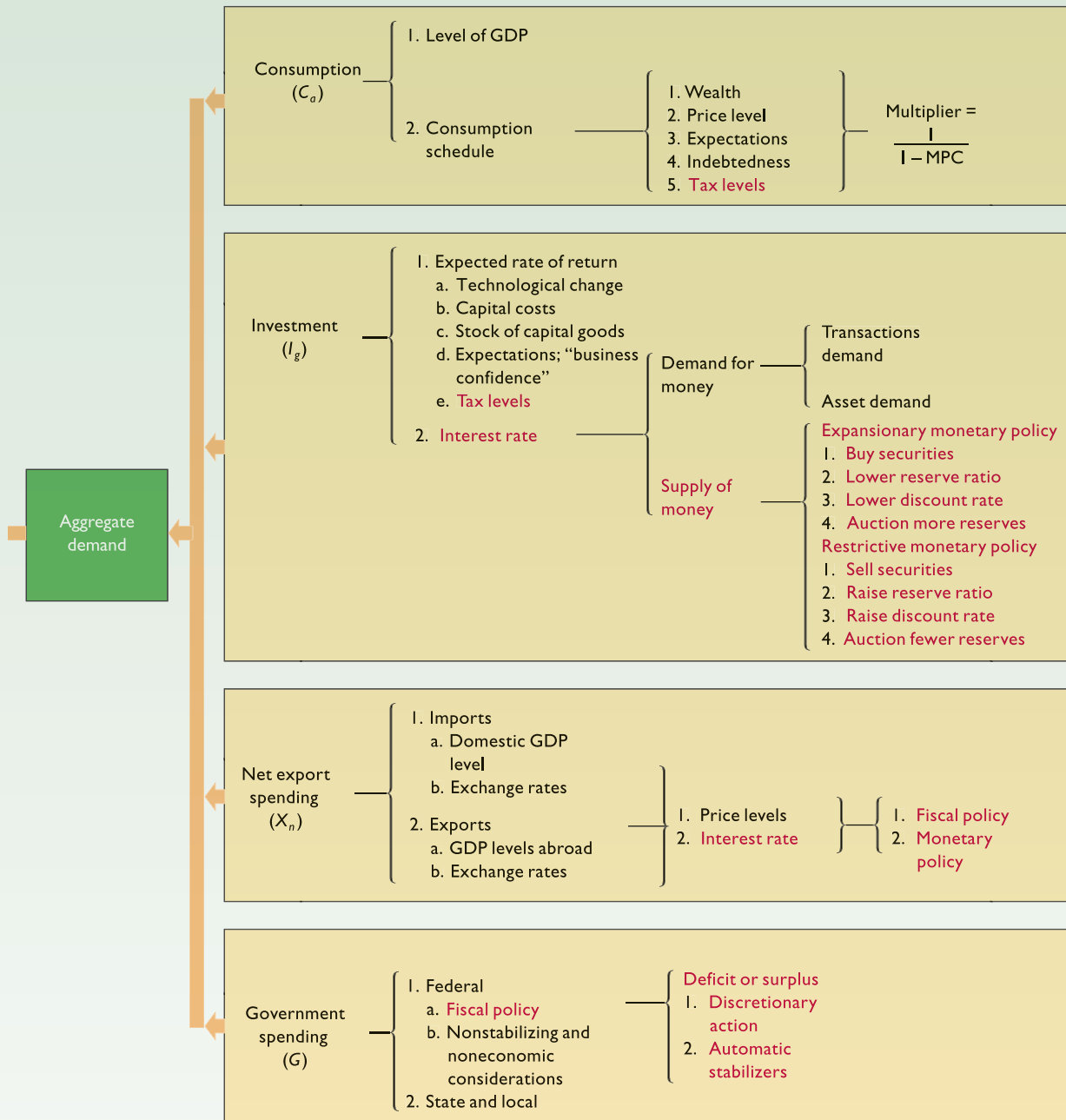


FIGURE 33.6 The AD-AS theory of the price level, real output, and stabilization policy. This figure integrates the various components of macroeconomic theory and stabilization policy. Determinants that either constitute public policy or are strongly influenced by public policy are shown in red.

QUICK QUIZ FOR FIGURE 33.6

- All else equal, an increase in domestic resource availability will:
 - increase input prices, reduce aggregate supply, and increase real output.
 - raise labor productivity, reduce interest rates, and lower the international value of the dollar.
 - increase net exports, increase investment, and reduce aggregate demand.
 - reduce input prices, increase aggregate supply, and increase real output.
- All else equal, an expansionary monetary policy during a recession will:
 - lower the interest rate, increase investment, and reduce net exports.
 - lower the interest rate, increase investment, and increase aggregate demand.
 - increase the interest rate, increase investment, and reduce net exports.
 - reduce productivity, aggregate supply, and real output.



3. A personal income tax cut, combined with a reduction in corporate income and excise taxes, would:
- increase consumption, investment, aggregate demand, and aggregate supply.
 - reduce productivity, raise input prices, and reduce aggregate supply.
 - increase government spending, reduce net exports, and increase aggregate demand.
 - increase the supply of money, reduce interest rates, increase investment, and expand real output.

4. An appreciation of the dollar would:
- reduce the price of imported resources, lower input prices, and increase aggregate supply.
 - increase net exports and aggregate demand.
 - increase aggregate supply and aggregate demand.
 - reduce consumption, investment, net export spending, and government spending.

Answers: 1. d; 2. b; 3. a; 4. a

In 2007, Massive Defaults on Home Mortgages Threatened to Bring the Credit Markets to a Halt. The Fed Acted Quickly to Restore Confidence and Keep Loans Flowing.

In 2007, a major wave of defaults on home mortgages threatened the health of any financial institution that had invested in home mortgages either directly or indirectly. A majority of these mortgage defaults were on *subprime mortgage loans*—high-interest rate loans to home buyers with higher-than-average credit risk. Crucially, several of the biggest indirect investors in these subprime loans had been banks. The banks had lent money to investment companies that had invested in mortgages. When the mortgages started to go bad, many investment funds “blew up” and couldn’t repay the loans they had taken out from the banks. The banks had to “write off” (declare unrecoverable) the loans they had made to the investment funds. Doing so meant reducing the banks’ reserves, which in turn limited their ability to generate new loans. This was a major threat to the economy since both consumers and businesses rely on loans to finance consumption and investment expenditures.

In the second half of 2007 and into early 2008, the Federal Reserve took several important steps to increase bank reserves and avert a financial crisis. In August 2007, it fulfilled its important (but thankfully rarely needed) role as a “lender of last resort” by lowering the discount rate and encouraging banks to borrow reserves directly from the Fed. When many banks proved reluctant to borrow reserves at the discount rate (because they thought

that doing so might make them appear to be in bad financial condition and in need of a quick loan from the Fed), the Fed introduced the anonymous term auction facility in December as an innovative new way of encouraging banks to borrow reserves and thereby preserve their ability to keep extending loans. Most importantly, the FOMC lowered the target for the Federal funds rate first from 5.25 percent to 4.75 percent in September, then to 4.50 percent in October, down to 4.25 percent in December, and then down to 2 percent in April 2008. To accomplish these rate cuts, it bought bonds in the open market and auctioned off reserves. The greater reserves expanded bank lending.

The lower Federal funds rate also resulted in lower interest rates in general, thereby bolstering aggregate demand. Many observers had been worried that the **mortgage debt crisis** might lead nervous consumers and businesses to cut back on spending out of fear that the crisis might increase the likelihood of a recession. By increasing aggregate demand, the Fed decreased this possibility and reassured both consumers and businesses about the economy’s prospects going forward.

A strange thing about the crisis was that before it happened, banks had mistakenly believed that an innovation known as the “mortgage-backed security” had eliminated their exposure to mortgage defaults. Mortgage-backed securities are a type of bond backed by mortgage payments. To create them, banks and other mortgage lenders would first make mortgage loans. But then instead of holding those loans as assets on their balance sheets and collecting the monthly mortgage payments, the banks and other mortgage lenders would bundle hundreds or thousands of them together and sell them off as a bond—in

monetary policy suffers from a “You can lead a horse to water, but you can’t make it drink” problem. The Fed can create excess reserves, but it cannot guarantee that the banks will actually make additional loans and thus increase the supply of money. If commercial banks seek liquidity and are unwilling to lend, the efforts of the Fed will be of little avail. Similarly, businesses can frustrate the intentions of the Fed by not borrowing excess reserves. And the public may use money paid to them through Fed sales of U.S. securities to pay off existing bank loans, rather than on increased spending on goods and services.

Furthermore, a severe recession may so undermine business confidence that the investment demand curve

shifts to the left and frustrates an expansionary monetary policy. That is what happened in Japan in the 1990s and early 2000s. Although its central bank drove the real interest rate to 0 percent, investment spending remained low and the Japanese economy stayed mired in recession. In fact, deflation—a fall in the price level—occurred. The Japanese experience reminds us that monetary policy is not a certain cure for the business cycle.

In March 2003 some members of the Fed’s Open Market Committee expressed concern about potential deflation in the United States if the economy remained weak. But the economy soon began to vigorously expand, and deflation did not occur. (**Key Question 8**)

essence selling the right to collect all of the future mortgage payments. The banks would get a cash payment for the bond and the bond buyer would start to collect the mortgage payments.

From the banks' perspective, this seemed like a smart business decision because it transferred any future default risk on those mortgages to the buyer of the bond. The banks thought that they were off the hook. Unfortunately for them, however, they lent a substantial portion of the money they got selling the bonds to investment funds that invested in mortgage-backed bonds. So while the banks were no longer directly exposed to mortgage default risk, they were still indirectly exposed to it. And so when many homebuyers started to default on their mortgages, the banks still lost money.

But what had caused the skyrocketing mortgage default rates in the first place? There were many causes, including declining real-estate values. But an important factor was the bad incentives provided by the bonds. Since the banks and other mortgage lenders thought that they were no longer exposed to mortgage default risk, they became very sloppy in their lending

practices—so much so that people were granted subprime mortgage loans that they were very unlikely to be able to repay. Some mortgage companies were so eager to sign up new homebuyers (in order to bundle their loans together to sell bonds) that they stopped running credit checks and even allowed applicants to claim higher incomes than they were actually earning

in order to qualify for big loans. The natural result was that many of these people took on “too much mortgage” and were soon failing to make their monthly payments.

Politicians and financial regulators are now examining whether tighter lending rules would help to offset the “pass the buck” incentives created by mortgage-backed securities and prevent loans from being issued to people

who are very unlikely to be able to make the required monthly payments. They also are considering ways to help homeowners who took on too much debt to remain in their homes since defaults on these loans would increase the supply of homes for sale in the real estate market and reduce house prices, which in turn could produce further defaults and reduce confidence in the overall economy.



QUICK REVIEW 33.4

- The Fed is engaging in an expansionary monetary policy when it increases the money supply to reduce interest rates and increase investment spending and real GDP; it is engaging in a restrictive monetary policy when it reduces the money supply to increase interest rates and reduce investment spending and inflation.
- The Fed managed low inflation and strong growth during the 1990s. The crises of 9/11 and the 2001 recession caused the Fed to lower rates aggressively, which it did again during the mortgage debt crisis that started in 2007.
- The main strengths of monetary policy are (a) speed and flexibility and (b) political acceptability; its main weaknesses are (a) time lags and (b) potential ineffectiveness during severe recession.

The “Big Picture”

Figure 33.6 (Key Graph) on pages 680 and 681 brings together the analytical and policy aspects of macroeconomics discussed in this and the eight preceding chapters. This “big picture” shows how the many concepts and principles discussed relate to one another and how they constitute a coherent theory of the price level and real output in a market economy.

Study this diagram and you will see that the levels of output, employment, income, and prices all result from the interaction of aggregate supply and aggregate demand. The items shown in red relate to public policy.

Summary

1. The goal of monetary policy is to help the economy achieve price stability, full employment, and economic growth.
2. The total demand for money consists of the transactions demand and asset demand for money. The amount of money demanded for transactions varies directly with the nominal GDP; the amount of money demanded as an asset varies directly with the interest rate. The market for money combines the total demand for money with the money supply to determine equilibrium interest rates.
3. Interest rates and bond prices are inversely related.
4. The four available instruments of monetary policy are (a) open-market operations, (b) the reserve ratio, (c) the discount rate, and (d) the term auction facility.
5. The Federal funds rate is the interest rate that banks charge one another for overnight loans of reserves. The prime interest rate is the benchmark rate that banks use as a reference rate for a wide range of interest rates on short-term loans to businesses and individuals.
6. The Fed adjusts the Federal funds rate to a level appropriate for economic conditions. In an expansionary monetary policy, it purchases securities from commercial banks and the general public to inject reserves into the banking system. This lowers the Federal funds rate to the targeted level and also reduces other interest rates (such as the prime rate). In a restrictive monetary policy, the Fed sells securities to commercial banks and the general public via open-market operations. Consequently, reserves are removed from the banking system, and the Federal funds rate and other interest rates rise.
7. Monetary policy affects the economy through a complex cause-effect chain: (a) Policy decisions affect commercial bank reserves; (b) changes in reserves affect the money supply; (c) changes in the money supply alter the interest rate; (d) changes in the interest rate affect investment; (e) changes in investment affect aggregate demand; (f) changes in aggregate demand affect the equilibrium real GDP and the price level. Table 33.3 draws together all the basic ideas relevant to the use of monetary policy.
8. The advantages of monetary policy include its flexibility and political acceptability. In recent years, the Fed has used monetary policy to keep inflation low while helping limit the depth of the recession of 2001, to boost the economy as it recovered from that recession, and to help stabilize the banking sector in the wake of the mortgage debt crisis. Today, nearly all economists view monetary policy as a significant stabilization tool.
9. Monetary policy has two major limitations and potential problems: (a) Recognition and operation lags complicate the timing of monetary policy. (b) In a severe recession, the reluctance of firms to borrow and spend on capital goods may limit the effectiveness of an expansionary monetary policy.

Terms and Concepts

monetary policy

interest

transactions demand

asset demand

total demand for money

open-market operations

reserve ratio

discount rate

term auction facility

Federal funds rate

expansionary monetary policy

prime interest rate

restrictive monetary policy

Taylor rule

cyclical asymmetry

mortgage debt crisis

Study Questions

1. **KEY QUESTION** What is the basic determinant of (a) the transactions demand and (b) the asset demand for money? Explain how these two demands can be combined graphically to determine total money demand. How is the equilibrium interest rate in the money market determined? Use a graph to show the impact of an increase in the total demand for money on the equilibrium interest rate (no change in money supply). Use your general knowledge of equilibrium prices to explain why the previous interest rate is no longer sustainable. **LO1**
2. **KEY QUESTION** Assume that the following data characterize a hypothetical economy: money supply = \$200 billion; quantity of money demanded for transactions = \$150 billion; quantity of money demanded as an asset = \$10 billion at 12 percent interest, increasing by \$10 billion for each 2-percentage-point fall in the interest rate. **LO1**
 - a. What is the equilibrium interest rate? Explain.
 - b. At the equilibrium interest rate, what are the quantity of money supplied, the total quantity of money demanded, the amount of money demanded for transactions, and the amount of money demanded as an asset?
3. **KEY QUESTION** Suppose a bond with no expiration date has a face value of \$10,000 and annually pays a fixed amount