12 Policy Effects and Cost Shocks in the AS/AD Model

Throughout the two Obama administrations and the early Trump administration, Republicans and Democrats argued vehemently about the overall government budget. Should taxes be raised or lowered? If tax rates are to be changed, should they be personal income tax rates or corporate profit tax rates? Should government spending be raised or lowered? Some of this debate was ideological, as U.S. political leaders differed in questions like how big the government should be. Other debate focused on more economic issues: Was the economy firmly on a growth path or still vulnerable to unemployment problems? Whatever the motivations for particular policies, decisions made in the political process about taxes and spending have important macroeconomic consequences. The *AS/AD* model developed in the last chapter is a key tool in allowing us to explore these consequences.

CHAPTER OUTLINE AND LEARNING OBJECTIVES

Fiscal Policy Effects

12.1 LEARNING OBJECTIVE

Use the *AS/AD* model to analyze the short-run and long-run effects of fiscal policy.

In Chapter 11, we discussed government spending on goods and services (*G*) as our fiscal policy variable. But the government also collects taxes and spends money on transfer payments, and these too are an important part of the fiscal policy story. We turn now to look at government spending and taxes using the lenses of the *AS/AD* model.

We will continue in this chapter to use *T* to denote net taxes, that is, taxes minus transfer payments. A decrease in *T* has the same *qualitative* effect as an increase in *G*. With lower taxes, households have more disposable income and that causes an increase in their consumption. We know from Chapter 9 that the tax multiplier is smaller in absolute value than is the government spending multiplier, but otherwise the economic effect of the two is similar. (You might want to review this material.) A decrease in net taxes, like an increase in *G*, shifts the *AD* curve to the right (just not as much because of the smaller multiplier).

What happens to the economy when government spending increases or net taxes decrease, thus shifting the *AD* curve to the right? Key to the answer to this question is knowing where on the *AS* curve the economy is when this fiscal stimulus is applied. In Figure 12.1, the economy is assumed to be on the nearly flat portion of the *AS* curve (point *A*) when we use fiscal policy to shift the *AD* curve. Here the economy is not producing close to capacity. As the figure shows, a shift of the *AD* curve in this region of the *AS* curve results in a small price increase relative to the output increase. The increase in equilibrium *Y* (from Y_0 to Y_1) is much greater than the increase in equilibrium *P* (from P_0 to P_1). Here an expansionary fiscal policy works well, increasing output with little increase in the price level. When the economy is on the nearly flat portion of the *AS* curve, firms are producing well below capacity, wages are less likely to increase even with an output increase, and firms will respond to an increase in demand by increasing output much more than they increase prices.

Figure 12.2 shows what happens when stimulus occurs when the economy is operating on the steep part of the *AS* curve (point *B*), at a high level relative to its resources. In this case, an expansionary fiscal policy results in a small change in equilibrium output (from Y_0 to Y_1) and a large change in the equilibrium price level (from P_0 to P_1). Here, an expansionary fiscal policy does not work well. The output multiplier is close to zero. Output is initially close to capacity, and attempts to increase it further mostly lead to a higher price level.

Make sure you understand what is happening behind the scenes in Figure 12.2 when we are on the steep part of the *AS* curve. The increase in government spending, *G*, increases the demand for firms' goods. Because firms are near capacity, raising output is difficult and firms respond by mostly raising their prices. The rise in the overall price level (*P*) induces action by the Fed because controlling prices is one of its main objectives; the price level is in the Fed rule. Thus, when *P* rises, the Fed increases the interest rate (*r*). The higher interest rate lowers planned investment. If total output cannot be increased very much because the economy is near capacity, the interest rate must rise enough to decrease planned investment enough to offset the increase in government spending in the new equilibrium. In this case there is almost complete crowding out of planned investment. Government spending has displaced private investment.

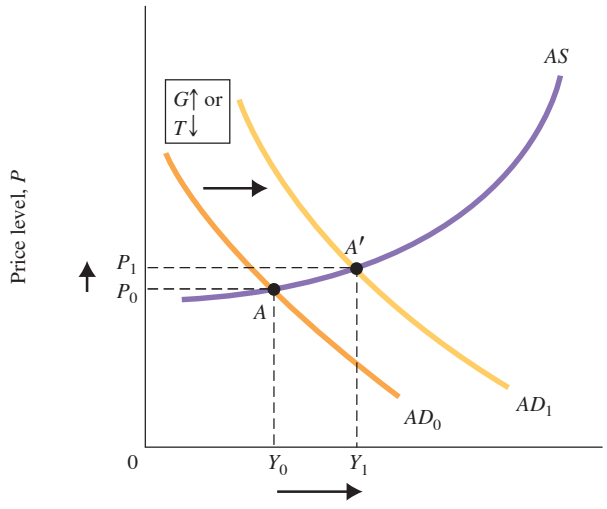

FIGURE 12.1 A Shift of the *AD* Curve When the Economy Is on the Nearly Flat Part of the *AS* Curve

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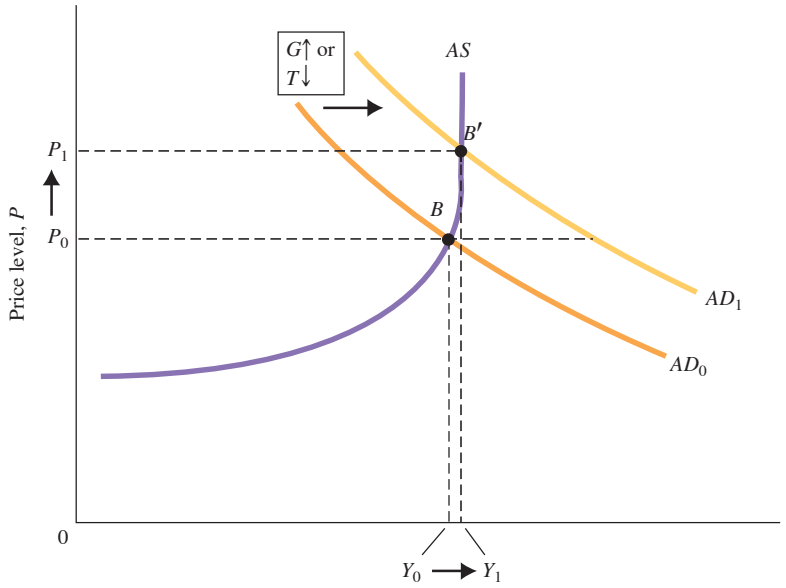
FIGURE 12.2 A Shift of the *AD* Curve When the Economy Is Operating at or Near Capacity



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What is behind the scenes if there is a decrease in net taxes (*T*) in Figure 12.2 on the steep part of the *AS* curve? In this case, consumption demand for firms' goods increases (because after tax income has increased). Firms again mostly raise their prices, so *P* increases, and so the Fed raises the interest rate, which lowers planned investment. If total output is little changed, the interest rate must rise such that the decrease in planned investment is roughly equal to the increase in consumption in the new equilibrium. In this case, consumption rather than government spending crowds out planned investment. Consumption is higher even though output is little changed because after-tax income is higher because of the decrease in *T* (disposable income, *Y*–*T*, is higher).

Note that in Figure 12.1, where the economy is on the flat part of the *AS* curve, there is very little crowding out of planned investment. Output expands to meet the increased demand. Because the price level increases very little, the Fed does not raise the interest rate much, and so there is little change in planned investment.

Fiscal Policy Effects in the Long Run MyLab Economics Concept Check

We can now turn to look at the long-run effects of fiscal policy. Most economists believe that in the long run wages adjust to some extent to match rising prices. Eventually, as prices rise, we would expect workers to demand and get higher wages. If wages adjust fully, then the long-run *AS* curve is vertical. In this case it is easy to see that fiscal policy will have no effect on output. If the government increases *G* or decreases *T*, thus shifting up the *AD* curve, the full effect is felt on the price level. Here, the long-run response to fiscal policy looks very much like that on the steep part of the short-run *AS* curve.

So we see that the key question, much debated in macroeconomics, is how fast wages adjust to changes in prices. If wages adjust to prices in a matter of a few months, the *AS* curve quickly becomes vertical and output benefits from fiscal policy will be short-lived. If wages are slower to adjust, the *AS* curve might retain some upward slope for a long period and one would be more confident about the usefulness of fiscal policy. Although most economists believe that wages are slow to adjust in the short run and therefore that fiscal policy has potential effects in the short run, there is less consensus about the shape of the long-run *AS* curve. In an interesting way, economists' views about how effective fiscal policy can be—whether the government can *ever* spend itself out of a low output state—is summarized in whether they believe the long-run *AS* curve is vertical or upward sloping.

Another source of disagreement among macroeconomists centers on whether equilibria below potential output, $\overline{Y}$ in Figure 11.8 in Chapter 11, are self-correcting (that is, without government intervention). If equilibria below potential output are self-correcting, the economy will

spend little time on the horizontal part of the *AS* curve. Recall that those who believe in a vertical long-run *AS* curve believe that slack in the economy will put downward pressure on wages, causing the short-run *AS* curve to shift to the right and pushing aggregate output back toward potential output. Other economists argue that wages do *not* fall much during slack periods and that the economy can get "stuck" at an equilibrium below potential output in the flat region of the *AS* curve. In this case, monetary and fiscal policy would be necessary to restore full employment. We will return to this debate in Chapter 13.

The "new classical" economics, which we will discuss in Chapter 17, assumes that prices and wages are fully flexible and adjust quickly to changing conditions. New classical economists believe, for example, that wage rate changes do not lag behind price changes. The new classical view is consistent with the existence of a vertical *AS* curve, even in the short run. At the other end of the spectrum is what is sometimes called the simple "Keynesian" view of aggregate supply. Those who hold this view believe there is a kink in the *AS* curve at capacity output, as we discussed in the *Economics in Practice*, "The Simple 'Keynesian' Aggregate Supply Curve," in Chapter 11. As we have seen, these differences in perceptions of the way the markets act have large effects on the advice economists give to the government.

Monetary Policy Effects

12.2 LEARNING OBJECTIVE

Use the *AS/AD* model to analyze the short-run and long-run effects of monetary policy.

Monetary policy is controlled by the Fed, which we are assuming behaves according to the Fed rule described in Chapter 11. The interest rate value that the Fed chooses (*r*) depends on output (*Y*), the price level (*P*), and other factors (*Z*). The Fed achieves the interest rate value that it wants by setting the interest rate on bank reserves. But how effective is the Fed in moving the economy as it follows its rule? There are several features of the *AS*/*AD* model that we need to consider regarding the effectiveness of the Fed, which we turn to now.

The Fed's Response to the *Z* Factors MyLab Economics Concept Check

We noted in Chapter 11 that the Fed is not just a calculator, responding in a mechanical way to *Y* and *P*. The Fed is affected by things outside of our model. Looking at reports of consumer sentiment, the Fed may decide that the economy is more fragile than one might have thought looking at only output and the price level. Or perhaps the Fed is worried about something unfavorable in the international arena. If one of these "*Z*" factors, as we have called them, changes, the Fed may decide to set the interest rate above or below what the values of *Y* and *P* alone call for in the rule.

Because *Z* is outside of the *AS*/*AD* model (that is, exogenous to the model), we can ask what changes in *Z* do to the model. We have in fact already seen the answer to this question in Figure 11.7 in Chapter 11. An increase in *Z*, like an increase in consumer confidence, may prompt the Fed to increase the interest rate, thus shifting the *AD* curve to the left. Remember that an increase in *Z* induces the Fed to set the interest rate higher than what *Y* and *P* alone would call for. Similarly, a decrease in *Z* like a worry about the economy of China or Europe leads to an easing of monetary policy, shifting the *AD* curve to the right by encouraging more planned investment.

In the previous section, we used the fact that *G* and *T* shift the *AD* curve to analyze the effectiveness of fiscal policy in different situations (flat, normal, or steep part of the *AS* curve). This same analysis pertains to *Z*. Changes to the interest rate set by the Fed in response to changes in *Z* also have differential effects depending on where we are on the *AS* curve.

Shape of the *AD* Curve When the Fed Cares More About the Price Level than Output MyLab Economics Concept Check

In the equation representing the Fed rule, we used a weight of α for output and a weight of β for the price level. The relative size of these two coefficients can be thought of as a measure of how much the Fed cares about output versus the price level.[1] If α is small relative to β, this means that the Fed has a strong preference for stable prices relative to output. In this case, when the Fed sees a price increase, it responds with a large increase in the interest rate, thus driving down planned

[1]Remember that the Fed actually cares about inflation, the change in *P*, rather than the level of *P* itself. We are using *P* as an approximation. Also, the Fed cares about output because of its effect on employment.

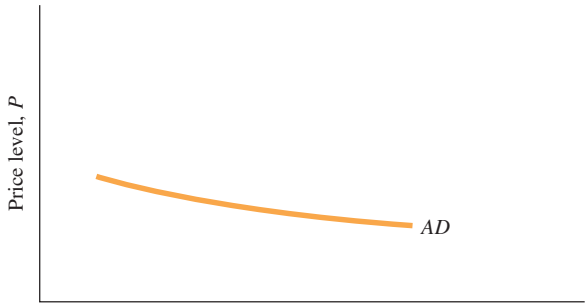

FIGURE 12.3 The Shape of the *AD* Curve When the Fed Has a Strong Preference for Price Stability Relative to Output

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investment and thus output. In this case, the *AD* curve is relatively flat, as depicted in Figure 12.3. The Fed is willing to accept large changes in *Y* to keep *P* stable. We will return to Figure 12.3 when we discuss cost shocks.

The issue of how much weight the Fed puts on the price level relative to output is related to the issue of inflation targeting, which is discussed at the end of this chapter. If a monetary authority is engaged in inflation targeting, then it behaves as if inflation is the only variable in its interest rate rule.

What Happens When There Is a Zero Interest Rate Bound? MyLab Economics Concept Check

Between 2008 and the end of 2015 short-term interest rates in the United States were close to zero. For all practical purposes, an interest rate cannot be negative. We don't charge people when they save money or pay them to borrow money. The fact that the interest rate is bounded by zero has implications for the shape of the *AD* curve, which we will now explore.

zero interest rate bound The interest rate cannot go below zero.

Let us begin with the Fed rule. Suppose the conditions of the economy in terms of output, the price level, and the *Z* factors are such that the Fed wants a *negative* interest rate. In this case, the best that the Fed can do is to choose zero for the value of *r*. This is called a **zero interest rate bound**. If *Y* or *P* or *Z* begin to increase, there is some point at which the rule will call for a positive value for *r* (the interest rate), at which time the Fed will move from zero to the positive value. The fact that the interest rate has remained at roughly zero for many years in the United States suggests that levels of *Y*, *P*, and *Z* may well have called for a negative interest rate for many years. In this case the values of *Y*, *P*, and *Z* are far below what they would have to be to induce the Fed to move to a positive interest rate in the Fed rule. We will call this case a **binding situation**.

binding situation State of the economy in which the Fed rule calls for a negative interest rate.

What does Figure 11.6 in Chapter 11 look like in a binding situation? This is shown in Figure 12.4. In this situation the interest rate is always zero, and so equilibrium is just where the *IS* curve crosses zero. In this binding situation, changes in *P* and *Z* do not shift anything (as they did in Figure 11.6) because the interest rate is always zero. In a binding situation the *AD* curve is vertical, as shown in Figure 12.5. It is easy to see why. In the normal case, an increase in

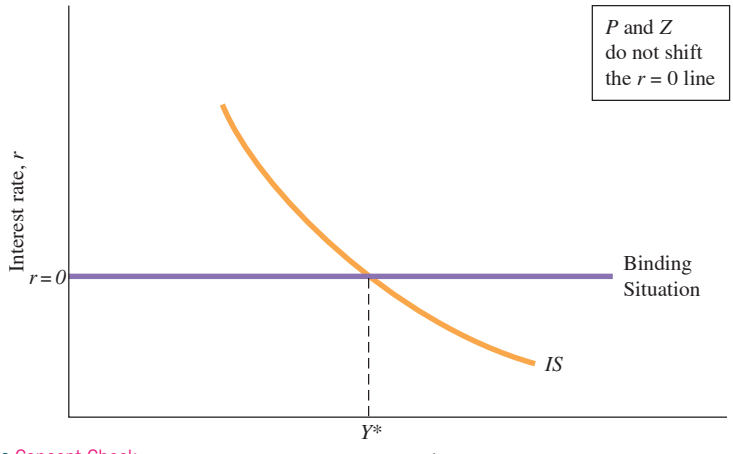

FIGURE 12.4 Equilibrium in the Goods Market When the Interest Rate Is Zero. In a binding situation changes in *P* and *Z* do not shift the *r* = 0 line.

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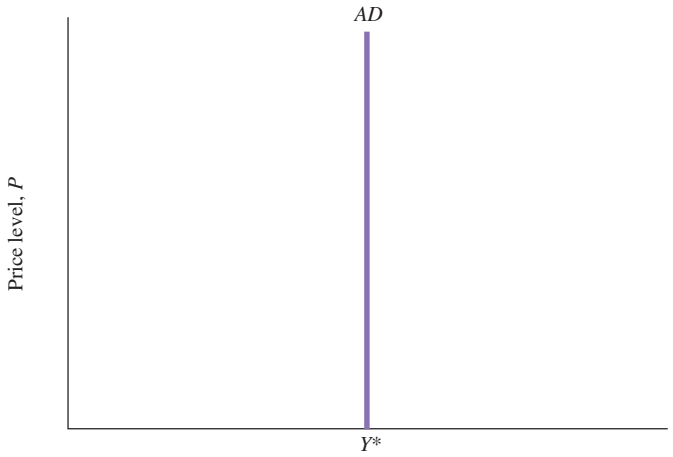

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FIGURE 12.5 The *AD* Curve in a Binding Situation. In a binding situation the interest rate is always zero.

P leads the Fed through the rule to increase the interest rate, which lowers planned investment and thus output. A decrease in *P* leads to the opposite. In the binding case, the interest rate does not change when *P* changes (it is always zero), and so planned investment and thus output do not change. For the *AD* curve to have a slope, the interest rate must change when the price level changes, which does not happen in the binding situation. Note also that changes in *Z* do not shift the *AD* curve in a binding situation (unlike the case in Figure 11.7 in Chapter 11). Again, the interest rate is always zero; it does not change when *Z* changes in a binding situation.

You should note that changes in government spending *(G)* and net taxes *(T)* still shift the *AD* curve even if it is vertical. In fact, because there is no crowding out of planned investment when *G* increases or *T* decreases because the interest rate does not increase, the shift is even greater. With a vertical *AD* curve, fiscal policy can be used to increase output, but monetary policy cannot. You might ask, what if the economy is on the nearly vertical part of the *AS* curve and a vertical *AD* curve is shifted to the right of the vertical part? Alas, there would be no intersection anymore. Here the model would break down, but fortunately this is not a realistic case. If the economy is on the nearly vertical part of the *AS* curve, output and possibly the price level would be high, and it is unlikely the Fed would want a negative interest rate in this case. The *AD* curve would thus not be vertical. Put another way, a binding situation is unlikely to exist at a high price level. Although for purposes of illustration the AD curve has been drawn as being vertical in Figure 12.5 for all values of P, it is unlikely to be so at high values of P.

Shocks to the System

12.3 LEARNING OBJECTIVE

Explain how economic shocks affect the *AS/AD* model.

Cost Shocks MyLab Economics Concept Check

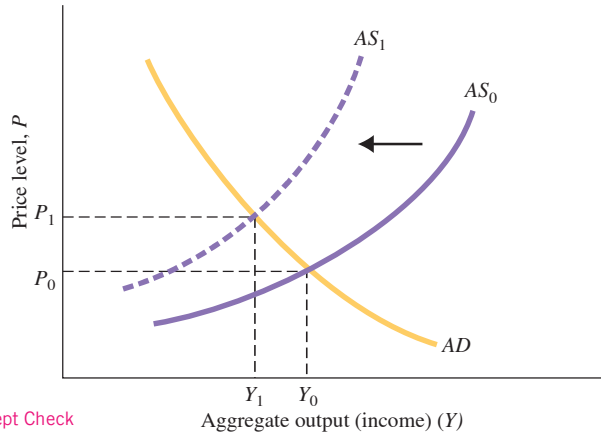
Suppose we have a sudden and severe cold spell that kills off a large fraction of the feeder-fish stock in the world. Or suppose that war breaks out in the Middle East and oil supplies from the region are cut off. How do events like these affect aggregate output and the price level in an economy? When things like this happen, what is the Fed likely to do? The *AS/AD* model can help guide us through to answers to these questions.

The cold spell and the Mideast war are examples of cost shocks, which were introduced in Chapter 11. We chose the examples carefully. In both cases the shock occurred in products that are used as inputs into a wide variety of other products. So a disaster in the fish or oil markets is likely to increase all at once the costs of many firms in many different markets. The *AS* curve shifts to the left as firms who experience these new costs raise their prices to cover their new higher costs.

Figure 12.6 shows what happens to the economy when the *AS* curve shifts to the left. This leads to **stagflation**, which is the simultaneous increase in unemployment and inflation. Stagflation is illustrated in Figure 12.6 where equilibrium output falls from Y_0 to Y_1 (and unemployment rises), and simultaneously the equilibrium price level rises from P_0 to P_1 (an increase in inflation). The

stagflation A situation of both high inflation and high unemployment.

FIGURE 12.6
An Adverse Cost Shock



MyLab Economics Concept Check

reason output falls is that the increase in P leads the Fed to raise the interest rate, which lowers planned investment and thus output. Remember that the Fed rule is a "leaning against the wind" rule, and when the price level rises the Fed leans against the wind by raising the interest rate.

We have seen in the previous two sections that when analyzing the effects of changing G, T, and Z, the shape of the AS curve matters. When analyzing the effects of cost shocks, on the other hand, it is the shape of the AD curve that matters. Consider, for example, the case where the AD curve is fairly flat, as in Figure 12.3. This is the case where the Fed puts a large weight on price stability relative to output because they are less concerned about the costs of unemployment. In this case, a leftward shift of the AS curve results in a large decrease in output relative to the increase in the price level. Behind the scenes the Fed is raising the interest rate a lot, lowering planned investment and thus output a lot, to offset much of the price effect of the cost shock. The price level rises less and output falls more than it would if the AD curve were shaped more like the one in Figure 12.6.

ECONOMICS IN PRACTICE

South African Prices Surge as Cape Town Goes Dry

In 2018, South Africa was reeling from a three-year-long drought, the worst in a century. As water levels in dams dropped dangerously to 30 percent, the government declared this drought a national disaster and imposed water restrictions in major cities, mainly Cape Town, leaving the Western Cape with 10 percent of dam reservoir water unsuitable for drinking.

The drought caused economic shocks across the country. While agriculture provides only 750,000 jobs and makes up slightly less than 5 percent of South Africa's GDP, it has indirect links to most other industries. The drought damaged most commercial and staple crops and forced breeders to slaughter cattle, causing a 6.4 percent increase in food prices. Over half of the farmers in the formal labor force lost their jobs. Agricultural growers' losses in 2018 were estimated at R10 billion (€0.7 billion). The combined effects of the decline in agricultural exports and the increase in wheat imports are estimated to reduce the trade balance by R20 billion (€1.4 billion). Since the Western Cape accounts for 13.3 percent of overall GDP, growth in 2018 could potentially drop to 0.8 percent from its initial estimate of 1.1 percent.

CRITICAL THINKING

1. Why was the South African economy harshly affected by the supply shock caused by the drought even though agriculture comprises a relatively small portion of GDP?

An interesting case is when the *AD* curve is vertical, as in Figure 12.5. Remember that this is the case of a binding situation with a zero interest rate. When the *AD* curve is vertical and the *AS* curve shifts to the left, there is no change in output. The only change is a higher price level. In a binding situation the increase in *P* does not change *r* (*r* is still zero), so planned investment is unaffected, and thus output is unaffected. Remember that this story holds only as long as the situation remains binding. At some point if there are large leftward shifts in the *AS* curve, *P* will be high enough that the binding situation no longer holds. When this happens, Figure 12.5 is not relevant, and we are back to Figure 12.6.

When the price level rises because the *AS* curve shifts to the left, this is called **cost-push, *or* supply-side, inflation**. As we have seen, this is accompanied by lower output. There is thus higher inflation and lower output, or *stagflation*.

cost-push, *or* supply-side, inflation Inflation caused by an increase in costs.

Demand-Side Shocks MyLab Economics Concept Check

We know from the previous two sections that an expansionary fiscal policy (an increase in *G* or a decrease in *T*) and an expansionary monetary policy (a decrease in *Z*) shifts the *AD* curve to the right and results in a higher price level. This is an increase in the price level caused by an increase in demand and is called **demand-pull inflation**. Contrary to cost-push inflation, demand-pull inflation corresponds to higher output rather than lower output.

demand-pull inflation Inflation that is initiated by an increase in aggregate demand.

There are other sources of demand shifts, exogenous to the model, that are interesting to consider. These we can put under the general heading of demand-side shocks. As mentioned in Chapter 5, in the 1930s when macroeconomics was just beginning, John Maynard Keynes introduced the idea of "animal spirits" of investors. Keynes' animal spirits were his way of describing a kind of optimism or pessimism about the economy which could bolster or hinder the economy. Animal spirits, although maybe important to the economy, are not explained by our model. Within the present context, an improvement in animal spirits—for example, a rise in consumer confidence—can be thought of as a "demand-side shock."

What happens when, say, there is a positive demand-side shock? The *AD* curve shifts to the right. This will lead to some increase in output and some increase in the price level, how much of each depends on where the economy is on the *AS* curve. There is nothing new to our story about aggregate demand increases except that instead of being triggered by a fiscal or monetary policy change, the demand increase is triggered by something outside of the model. Any price increase that results from a demand-side shock is also considered demand-pull inflation.

Expectations MyLab Economics Concept Check

Animal spirits can be considered expectations of the future. Expectations in general likely have important effects on the economy, but they are hard to predict or to quantify. However formed, firms' expectations of future prices may affect their current price decisions. If a firm expects that its competitors will raise their prices, it may raise its own price in anticipation of this. An increase in future price expectations may thus shift the *AS* curve to the left and thus act like a cost shock. How might this work?

Consider a firm that manufactures toasters in an imperfectly competitive market. The toaster maker must decide what price to charge retail stores for its toaster. If it overestimates price and charges much more than other toaster manufacturers are charging, it will lose many customers. If it underestimates price and charges much less than other toaster makers are charging, it will gain customers but at a considerable loss in revenue per sale. The firm's *optimum price*—the price that maximizes the firm's profits—is presumably not too far from the average of its competitors' prices. If it does not know its competitors' projected prices before it sets its own price, as is often the case, it must base its price on what it expects its competitors' prices to be.

Suppose inflation has been running at about 10 percent per year. Our firm probably expects its competitors will raise their prices about 10 percent this year, so it is likely to raise the price of its own toaster by about 10 percent. This response is how expectations can get "built into the system." If every firm expects every other firm to raise prices by 10 percent, every firm will raise prices by about 10 percent. Every firm ends up with the price increase it expected.

The fact that expectations can affect the price level is vexing. Expectations can lead to an inertia that makes it difficult to stop an inflationary spiral. If prices have been rising and if

people's expectations are *adaptive*—that is, if they form their expectations on the basis of past pricing behavior—firms may continue raising prices even if demand is slowing or contracting. In terms of the *AS*/*AD* diagram, an increase in inflationary expectations that causes firms to increase their prices shifts the *AS* curve to the left. Remember that the *AS* curve represents the price/output responses of firms. If firms increase their prices because of a change in inflationary expectations, the result is a leftward shift of the *AS* curve.

Given the importance of expectations in inflation, the central banks of many countries survey consumers about their expectations. In Great Britain, for example, a March 2018 survey by the Bank of England found that consumers expected inflation of 3.4 percent for the period 2018–2023. Inflation expectations in England have been in this same range for some years. A similar survey by the Bank of India found consumer expectations of inflation in this period to be in the 8-9 percent range, slightly down from a few years earlier. One of the aims of central banks is to try to keep these expectations low so that expectations of higher prices do not get built in to actual price levels.

12.4 LEARNING OBJECTIVE

Discuss monetary policy since 1970.

Monetary Policy since 1970

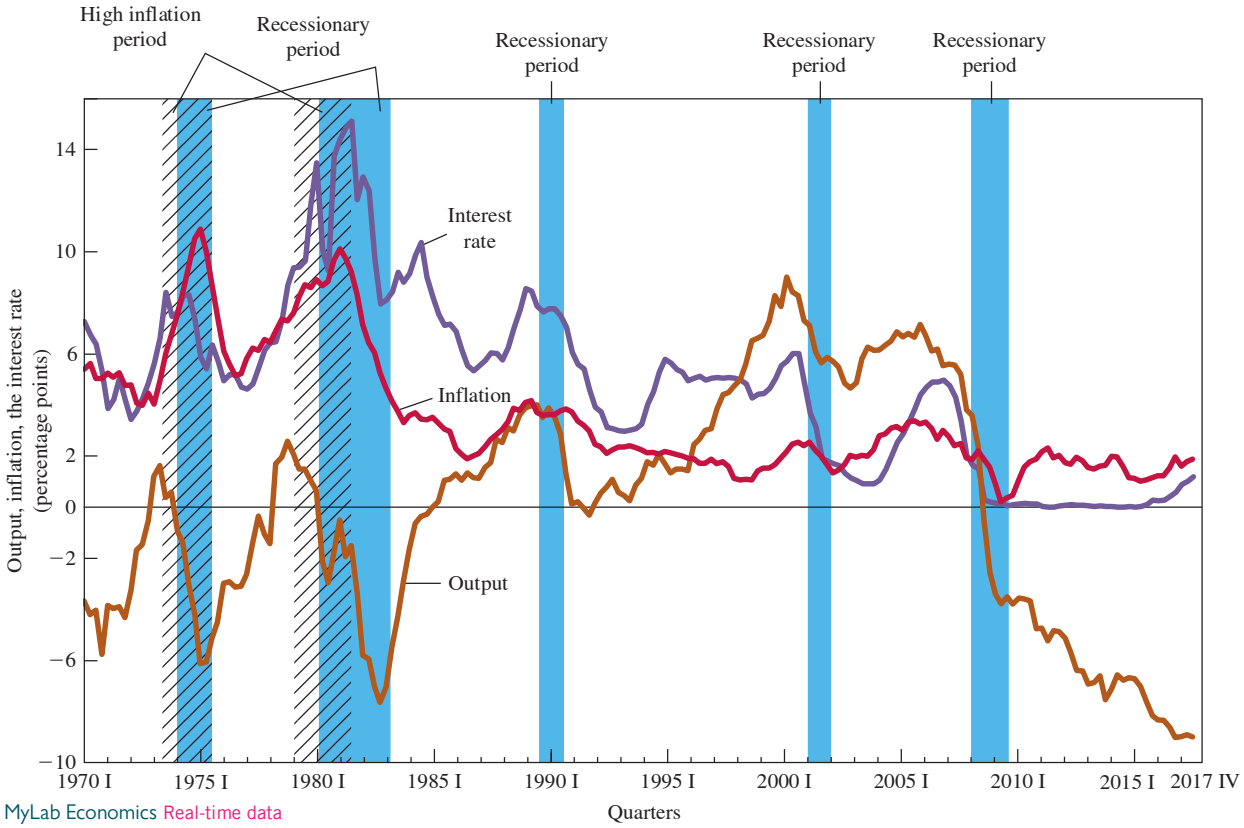
At the end of Chapter 9, we compared the fiscal policies of the Clinton, Bush, Obama, and early Trump administrations. In this section, we will review what monetary policy has been like since 1970. Remember by monetary policy we mean the interest rate behavior of the Fed. How has the Fed changed the interest rate in response to economic conditions?

Figure 12.7 plots three variables that can be used to describe Fed behavior. The interest rate is the 3-month Treasury bill rate, which moves closely with the interest rate that the Fed actually controls, which is the federal funds rate. For simplicity, we will take the 3-month Treasury bill rate to be the rate that the Fed controls and we will just call it "the interest rate." Inflation is the percentage change in the GDP deflator over the previous four quarters. This variable is also plotted in Figure 5.6 on p. 128. Output is the percentage deviation of real GDP from its trend. (Real GDP itself is plotted in Figure 5.4 on p. 127.) It is easier to see fluctuations in real GDP by looking at percentage deviations from its trend.

Recall from Chapter 5 that we have called five periods since 1970 "recessionary periods" and two periods "high inflation periods." These periods are highlighted in Figure 12.7. The recessionary and high inflation periods have considerable overlap in the last half of the 1970s and early 1980s. After 1981, there are no more high inflation periods and three more recessionary periods. There is thus some stagflation in the early part of the period but not in the later part.

We know from earlier in this chapter that stagflation is bad news for policy makers. No matter what the Fed does, it will result in a worsening of either output or inflation. Should the Fed raise the interest rate to lessen inflation at a cost of making the output situation (and therefore unemployment) worse, or should it lower the interest rate to help output growth (which will lower unemployment) at a cost of making inflation worse? What did the Fed actually do? You can see from Figure 12.7 that the Fed generally raised the interest rate when inflation was high—even when output was low and unemployment was high. So, the Fed seems to have worried more in this period about inflation than unemployment. The interest rate was very high in the 1979–1983 period even though output was low. Had the Fed not had such high interest rates in this period, the recession would likely have been less severe, but inflation would have been even worse. Paul Volcker, Fed chair at that time, was both hailed as an inflation-fighting hero and pilloried for what was labeled the "Volcker recession."

After inflation got back down to about 4 percent in 1983, the Fed began lowering the interest rate, which helped to increase output. The Fed increased the interest rate in 1988 as inflation began to pick up a little and output was strong. The Fed acted aggressively in lowering the interest rate during the 1990–1991 recession and again in the 2001 recession. The Treasury bill rate got below 1 percent in 2003. The Fed then reversed course, and the interest rate rose to nearly 5 percent in 2006. The Fed then reversed course again near the end of 2007 and began lowering the interest rate in an effort to fight a recession that it expected was coming. The recession did come, and the Fed lowered the interest rate to near zero beginning in 2008 IV. The interest rate remained at essentially zero until the end of 2015 when the Fed began raising it gradually. The period between 2008 IV and 2015 IV is the period of the zero interest rate bound discussed



▲ **FIGURE 12.7 Output, Inflation, and the Interest Rate 1970 I–2017 IV**
The Fed generally had high interest rates in the two inflationary periods and low interest rates from the mid-1980s on. It aggressively lowered interest rates in the 1990 III–1991 I, 2001 I–2001 III, and 2008 I–2009 II recessions. Between 2008 and 2015 there was a zero lower bound. Output is the percentage deviation of real GDP from its trend. Inflation is the four-quarter average of the percentage change in the GDP deflator. The interest rate is the 3-month Treasury bill rate.

previously in this chapter. This period was a "binding situation" period. There was some controversy when the Fed began raising the interest rate at the end of 2015. Output was still considerably below its trend, as can be seen in the figure, and inflation had not picked up much. Some felt that the Fed should have waited until it saw more signs of increased inflation.

Fed behavior in the period since 1970 is thus fairly easy to summarize. 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 between 1983 and 2008 on trying to smooth fluctuations in output. Between 2008 and 2015 there was a zero lower bound as the Fed focused on trying to increase output.

Inflation Targeting MyLab Economics Concept Check

Some monetary authorities in the world engage in what is called **inflation targeting**. If a monetary authority behaves this way, it announces a *target* value of the inflation rate, usually for a horizon of a year or more, and then it chooses its interest rate values with the aim of keeping the actual inflation rate within some specified band around the target value. For example, the target value might be 2 percent with a band of 1 to 3 percent. Then the monetary authority would try to keep the actual inflation rate between 1 and 3 percent. With a horizon of a year or more, the monetary authority would not expect to keep the inflation rate between 1 and 3 percent each month because there are a number of temporary factors that move the inflation rate around each month (such as weather) over which the monetary authority has no control. But over a year or more, the expectation would be that the inflation rate would be between 1 and 3 percent. India, which had continuing struggles with inflation in recent years, has set an inflation target of 6 percent for 2015–2016, falling to 4 percent by 2017–2018.

inflation targeting When a monetary authority chooses its interest rate values with the aim of keeping the inflation rate within some specified band over some specified horizon.

There has been much debate about whether inflation targeting is a good idea. It can lower fluctuations in inflation, but possibly at a cost of larger fluctuations in output.

When Ben Bernanke was appointed chair of the Fed in 2006, some wondered whether the Fed would move in the direction of inflation targeting. Bernanke had argued in the past in favor of it. There is, however, no evidence that the Fed did this during Bernanke's tenure as the Fed chair. You can see in Figure 12.7 that the Fed began lowering the interest rate in 2007 in anticipation of a recession, which doesn't look like inflation targeting.

Looking Ahead

We have so far said little about employment, unemployment, and the functioning of the labor market in the macroeconomy except to note the central role of sticky wages in the construction of the *AS* curve. The next chapter will link everything we have done so far to this third major market arena—the labor market—and to the problem of unemployment.

SUMMARY

12.1 FISCAL POLICY EFFECTS *p. 261*

1. Increases in government spending (G) and decreases in net taxes (T) shift the *AD* curve to the right and increase output and the price level. How much each increases depends on where the economy is on the *AS* curve before the change.
2. If the *AS* curve is vertical in the long run, then changes in G and T have no effect on output in the long run.

12.2 MONETARY POLICY EFFECTS *p. 263*

3. Monetary policy is determined by the Fed rule, which includes output, the price level, and the factors in Z. Changes in Z shift the *AD* curve.
4. The *AD* curve is flatter the more the Fed weights price stability relative to output stability.
5. A binding situation is a state of the economy in which the Fed rule calls for a negative interest rate. In this case the best the Fed can do is have a zero interest rate.
6. The *AD* curve is vertical in a binding situation.

12.3 SHOCKS TO THE SYSTEM *p. 265*

7. Positive cost shocks shift the *AS* curve to the left, creating *cost-push inflation*.
8. Positive demand-side shocks shift the *AD* curve to the right, creating *demand-pull inflation*.

12.4 MONETARY POLICY SINCE 1970 *p. 268*

9. 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 between 1983 and 2008 on trying to smooth fluctuations in output. Between 2008 and 2016 there was a zero interest rate bound.
10. Inflation targeting is the case where the monetary authority weights only inflation. It chooses its interest rate value with the aim of keeping the inflation rate within some specified band over some specified horizon.

REVIEW TERMS AND CONCEPTS

binding situation, *p. 264*
cost-push, *or* supply-side inflation, *p. 267*
demand-pull inflation, *p. 267*
inflation targeting, *p. 269*
stagflation, *p. 265*
zero interest rate bound, *p. 264*

PROBLEMS

All problems are available on MyLab Economics.

12.1 FISCAL POLICY EFFECTS

LEARNING OBJECTIVE: Use the *AS/AD* model to analyze the short-run and long-run effects of fiscal policy.

1.1 In February 2010, the Greek government adopted several austerity packages as part of its bailout by the International Monetary Fund. Since then, it has had to reduce tax evasion, impose limits on thirteenth and fourteenth month salaries, increase value-added tax (VAT), and cut pensions. Explain how such measures could precipitate a recession. If you had the power, would you have accepted the austerity measures?

MyLab Economics Visit **www.pearson.com/mylab/economics** to complete these exercises online and get instant feedback. Exercises that update with real-time data are marked with  .