2.

a. Interest-bearing checking accounts make holding money more attractive. This increases the demand for money.

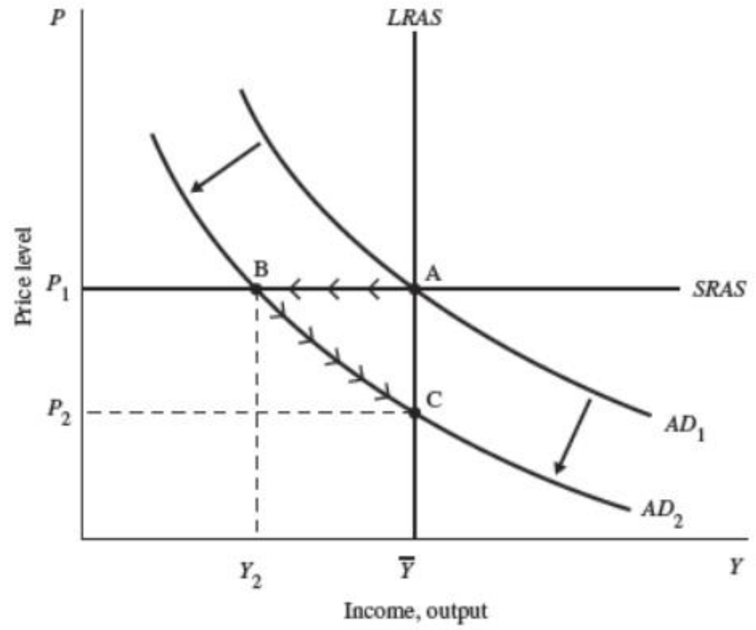
b. The increase in money demand is equivalent to a decrease in the velocity of money. Recall the quantity equation

$$M/P = kY,$$

where $k = 1/V$. For this equation to hold, an increase in real money balances for a given amount of output means that k must increase; that is, velocity falls. Because interest on checking accounts encourages people to hold money, dollars circulate less frequently.

c. If the Fed keeps the money supply the same, the decrease in velocity shifts the aggregate demand curve downward, as in Figure 9–6. In the short run when prices are sticky, the economy moves from the initial equilibrium, point A, to the short-run equilibrium, point B. The drop in aggregate demand reduces the output of the economy below the natural rate.

Figure 9–6



Over time, the low level of aggregate demand causes prices and wages to fall. As prices fall, output gradually rises until it reaches the natural-rate level of output at point C.

d. The decrease in velocity causes the aggregate demand curve to shift downward. The Fed could increase the money supply to offset this decrease and thereby return the economy to its original equilibrium at point A, as in Figure 9–7.

To the extent that the Fed can accurately measure changes in velocity, it has the ability to reduce or even eliminate the impact of such a demand shock on output. In particular, when a regulatory change causes money demand to change in a predictable way, the Fed should make the money supply respond to that change in order to prevent it from disrupting the economy.

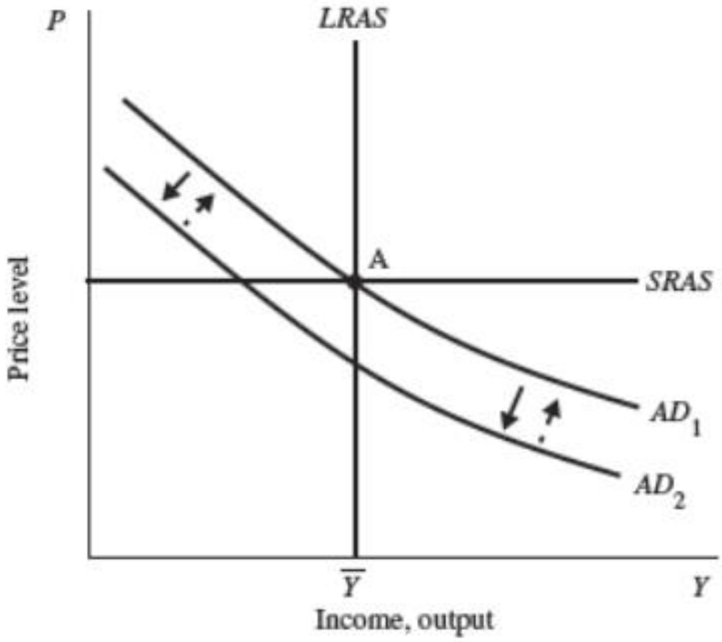


Figure 9–7

e. The decrease in velocity shifts the aggregate demand curve down and to the left. In the short run, the price level remains the same and the level of output falls below the natural rate. If the Fed wants to stabilize output and return it to the natural rate, they should increase the money supply. Note that increasing the money supply in this case will stabilize both output and the price level so that the answer here is the same as in part d.

3.

a. If the Fed reduces the money supply, then the aggregate demand curve shifts down, as in Figure 9–8. This result is based on the quantity equation $MV = PY$, which tells us that a decrease in money M leads to a proportionate decrease in nominal output PY (assuming that velocity V is fixed). For any given price level P, the level of output Y is lower, and for any given Y, P is lower.

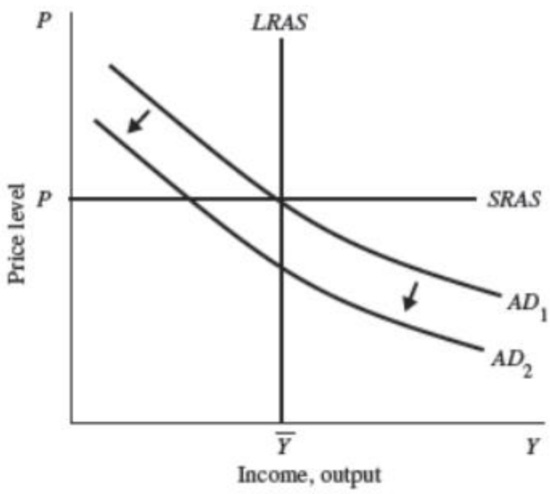


Figure 9–8

b. In the short run, we assume that the price level is fixed and that the aggregate supply curve is flat. As Figure 9–9 shows, in the short run, the leftward shift in the aggregate demand curve leads to a movement from point A to point B—output falls but the price level doesn't change. In the long run, prices are flexible. As prices fall, the economy returns to full employment at point C.

If we assume that velocity is constant, we can quantify the effect of the 5-percent reduction in the money supply. Recall from Chapter 4 that we can express the quantity equation in terms of percentage changes:

$$\%\Delta \text{ in } M + \%\Delta \text{ in } V = \%\Delta \text{ in } P + \%\Delta \text{ in } Y.$$

If we assume that velocity is constant, then the $\%\Delta$ in $V = 0$. Therefore,

$$\%\Delta \text{ in } M = \%\Delta \text{ in } P + \%\Delta \text{ in } Y.$$

We know that in the short run, the price level is fixed. This implies that the $\%\Delta$ in $P = 0$. Therefore,

$$\%\Delta \text{ in } M = \%\Delta \text{ in } Y.$$

Based on this equation, we conclude that in the short run a 5-percent reduction in the money supply leads to a 5-percent reduction in output. This is shown in Figure 9–9.

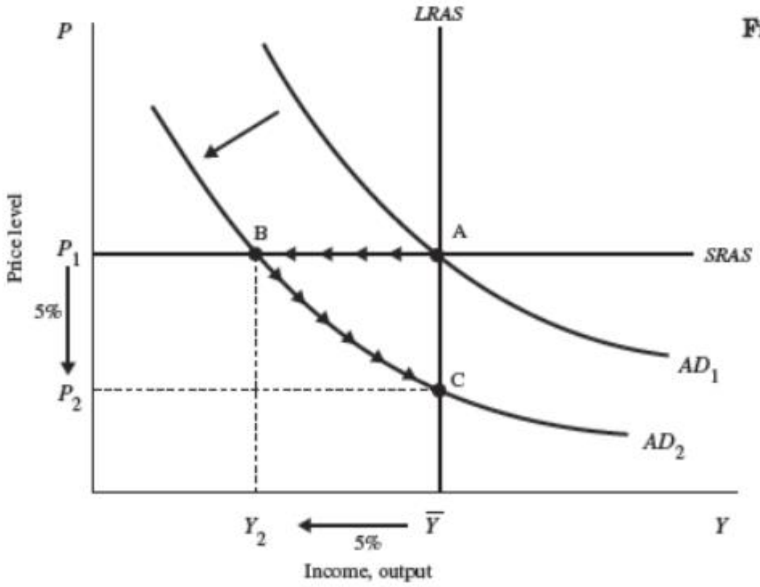


Figure 9–9

In the long run we know that prices are flexible and the economy returns to its natural rate of output. This implies that in the long run, the $\%\Delta$ in $Y = 0$. Therefore,

$$\%\Delta \text{ in } M = \%\Delta \text{ in } P.$$

Based on this equation, we conclude that in the long run a 5-percent reduction in the money supply leads to a 5-percent reduction in the price level, as shown in Figure 9–9.

c. Okun's law refers to the negative relationship that exists between unemployment and real GDP. Okun's law can be summarized by the equation:

$$\%\Delta \text{ in Real GDP} = 3\% - 2 \times [\Delta \text{ in Unemployment Rate}].$$

That is, output moves in the opposite direction from unemployment, with a ratio of 2 to 1. In the short run, when output falls, unemployment rises. Quantitatively, if velocity is constant, we found that output falls 5 percentage points relative to full employment in the short run. Okun's law states that output growth equals the full employment growth rate of 3 percent minus two times the change in the unemployment rate. Therefore, if output falls 5 percentage points relative to full-employment growth, then actual output growth is –2 percent. Using Okun's law, we find that the change in the unemployment rate equals 2.5 percentage points:

$$-2 = 3 - 2 \times [\Delta \text{ in Unemployment Rate}]$$

$$[-2 - 3]/[-2] = [\Delta \text{ in Unemployment Rate}]$$

$$2.5 = [\Delta \text{ in Unemployment Rate}]$$

In the long run, both output and unemployment return to their natural rate levels. Thus, there is no long-run change in unemployment.

d. The national income accounts identity tells us that saving $S = Y - C - G$. Thus, when Y falls, S falls (assuming the marginal propensity to consume is less than one). Figure 9–10 shows that this causes the real interest rate to rise. When Y returns to its original equilibrium level, so does the real interest rate.

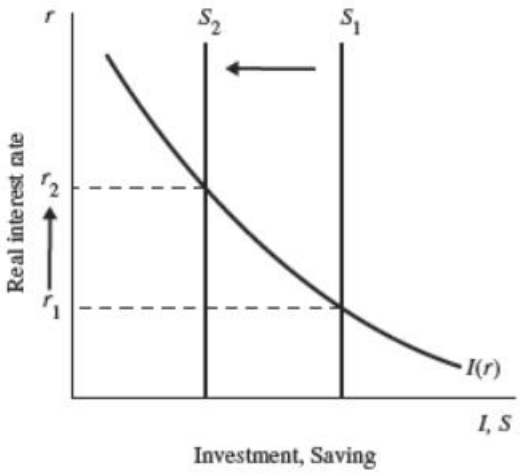


Figure 9–10