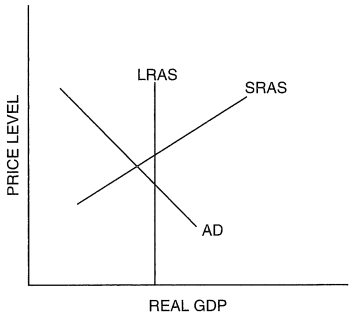
Monetary Policy

Monetary policy is the action of the Federal Reserve (the Fed) to prevent or address extreme economic fluctuations. The Fed uses its monetary policy tools to influence equilibrium interest rates in the money market through its control of bank reserves. The Fed lowers interest rates through expansionary monetary policy to prevent or address recessions, and it raises interest rates through contractionary monetary policy to prevent or address inflation. Monetary policy is transmitted to the economy through changes in aggregate demand. Monetary policy will have both short-run and long-run effects in the economy. In the following figures, long-run aggregate supply, short-run aggregate supply, and demand curves are represented by LRAS, SRAS, and AD.

Figure 4-7.1

Effects of Monetary Policy in the Economy (Recession)



1. Suppose that initially the economy is at the intersection of AD and SRAS in Figure 4-7.1.

   (A) What monetary policy can the Fed implement to move the economy to full-employment?

   (B) If the Fed is going to use open market operations, it should (*buy / sell*) Treasury securities.

   (C) The effect will *(increase / decrease)* Treasury security (bond) prices.

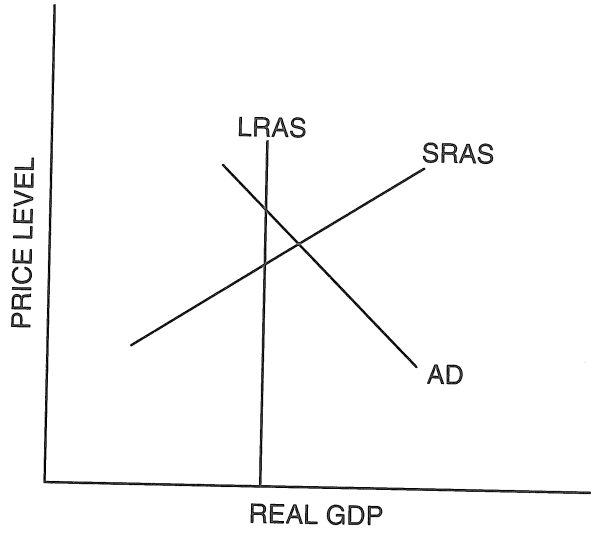
   (D) In the short run, what is the effect on nominal interest rates? Explain.

   (E) In the short run, what happens to real output? Shift the curve on the graph to show how the Fed's action results in a change in real output and explain why the shift occurs.

   (F) In the short run, what happens to the price level? Explain how the Fed's action results in a change to the price level.

Figure 4-7.2

Effects of Monetary Policy in the Economy (Inflation)



2. Suppose that initially the economy is at the intersection of AD and SRAS in Figure 4-7.2.

   (A) What monetary policy can the Fed implement to move the economy to full-employment?

   (B) If the Fed is going to use open market operations, it should (*buy / sell*) Treasury securities.

   (C) The effect will *(increase / decrease)* Treasury security (bond) prices.

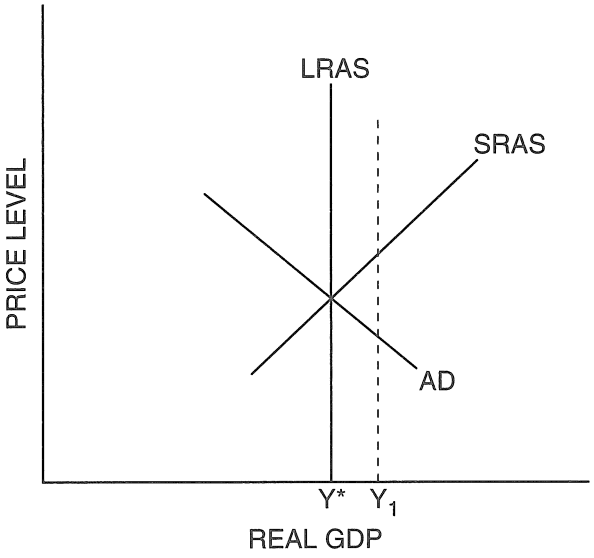
   (D) In the short run, what is the effect on nominal interest rates? Explain.

   (E) In the short run, what happens to real output? Shift the curve on the graph to show how the Fed's action results in a change in real output and explain why the shift occurs.

   (F) In the short run, what happens to the price level? Explain how the Fed's action results in a change to the price level.

3. In the situation shown in Figure 4-7.3, suppose that the monetary authorities decide to maintain the level of employment represented by the output level Y_1 by using expansionary monetary policy.

Figure 4-7.3
Monetary Policy in the Long Run



(A) Explain the effect of the expansionary monetary policy on the price level and output in the short run.

(B) Explain the effect on the price level and output in the long run.

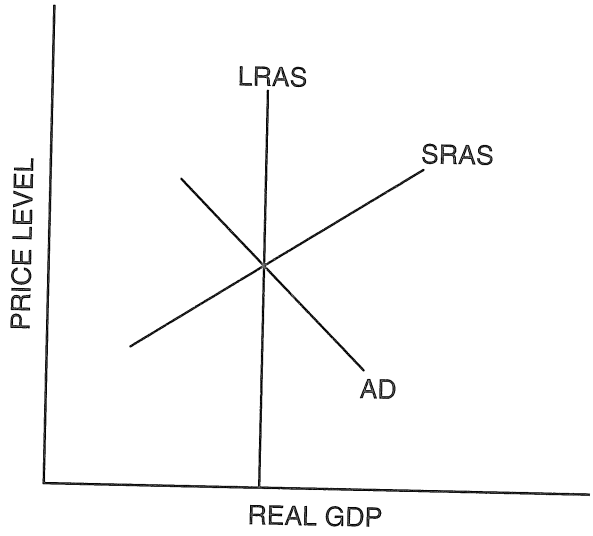
(C) Explain what you think will happen to the nominal rate of interest and the real rate of interest in the short run as the Fed continues to increase the money supply. Explain why.

(D) Explain what you think will happen to the nominal rate of interest and the real rate of interest in the long run. Explain why.

4. Many economists think that moving from short-run equilibrium to long-run equilibrium may take several years. List three reasons why the economy might not immediately move to long-run equilibrium.

5. Briefly summarize the long-run impact of an expansionary monetary policy on the economy.

Figure 4-7.4
Expansionary Monetary Policy



6. Suppose that initially the economy is at the intersection of AD and SRAS as shown in Figure 4-7.4. Now, the Fed decides to implement expansionary monetary policy to increase the level of employment.

   (A) In the short run, what happens to real output? Explain why.

   (B) In the short run, what happens to the price level? Explain why.

(C) In the short run, what happens to employment and nominal wages? Explain why.

(D) In the short run, what happens to nominal interest rates and real interest rates?

(E) In the long run, what happens to real output? Explain why.

(F) In the long run, what happens to the price level? Explain why.

(G) In the long run, what happens to employment and nominal wages? Explain why.

(H) In the long run, what happens to the nominal interest rate and the real interest rate?

The Quantity Theory of Money

The relationship among money, price, and real output can be represented by the *equation of exchange*, which typically takes the following form:

$$MV = PQ$$

where

M = the money supply
V = the velocity of money (the number of times an average dollar bill is spent)
P = the average price level
Q = real value of all final goods and services (real gross domestic product [GDP])

This equation shows the balance between "money," represented on the left side of the equation, and goods and services, represented on the right side of the equation. The equation shows that, for a given level of V, if M increases more than Q there must be an increase in P (inflation) to keep the two sides of the equation equal. This means that an increase in the money supply not offset by an increase in real output will lead to inflation. Classical economists assumed that the velocity of money was stable (constant) over time because institutional factors—such as how frequently people are paid—largely determine velocity. Therefore, changes in the money supply will lead to inflation if the economy is at full employment.

1. Define (in your own words and in one or two sentences each) the four variables in the equation of exchange.

2. The product of V and M equals PQ. What is PQ?

3. Suppose velocity remains constant, while the money supply increases. Explain how this would affect nominal GDP.

4. Changes in technology have led to increases in electronic transactions. Explain how these changes affect velocity.

Real versus Nominal Interest Rates

If you bought a one-year bond for $1,000 and the bond paid an interest rate of 10 percent, at the end of the year would you be 10 percent wealthier? You will certainly have 10 percent more money than you did a year earlier, but can you buy 10 percent more? If the price level has risen, the answer is that you cannot buy 10 percent more. If the inflation rate were 8 percent, then you could buy only 2 percent more; if the inflation rate were 12 percent, you would be able to buy 2 percent less! The *nominal interest rate* is the rate the bank pays you on your savings or the rate that appears on your bond or car loan. The *real interest rate* represents the change in your purchasing power. The *expected real interest rate* represents the amount you need to receive in real terms to forgo consumption now for consumption in the future.

The *Fisher Equation* shows the relationship between the nominal interest rate, the real interest rate, and the inflation rate as shown below:

$$r = i - \pi$$

where

r = the real interest rate

i = the nominal interest rate

π = the inflation rate.

In the previous example with the 10 percent bond, if the inflation rate were 6 percent, then your real interest rate (the increase in your purchasing power) would be 4 percent (6 = 10 – 4).

Obviously banks and customers do not know what inflation is going to be, so the interest rates on loans, bonds, and so forth are set based on expected inflation. The expected real interest rate is

$$re = i - \pi e$$

where

πe = the expected inflation rate.

The equation can be rewritten as $i = re + \pi e$.

A bank sets the nominal interest rate equal to its expected real interest rate plus the expected inflation rate. However, the real interest rate it actually receives may be different if inflation is not equal to the bank's expected inflation rate.

According to the Fisher Equation, if the Federal Reserve increases the money supply, the price level will increase. The resulting inflation will increase the nominal interest rate, decrease the real interest rate, or some combination of the two. This is known as the *Fisher Effect.* In the short run, increases in the money supply decrease the nominal interest rate and real interest rate. In the long run, an increase in the money supply will result in an increase in the price level and the nominal interest rate.

Table 4-9.1
Real and Nominal Interest Rates

Year	Nominal interest rate (%)	Inflation rate (%)	Real interest rate (%)
1	5.02	1.87	
2	5.07	1.85	
3	4.78	1.14	
4	4.64	1.56	
5	5.82	2.29	
6	3.39	1.95	

1. Table 4-9.1 provides the nominal interest rates and inflation rates for the Years 1–6. Compute the real interest rates and then graph the nominal and real interest rates on Figure 4-9.1.

Figure 4-9.1
Real and Nominal Interest Rates