

Some Answers

1) Suppose the Fed reduces the money supply by 5 percent.

a) What happens to the aggregate demand curve?

If the Fed reduces the money supply, the aggregate demand curve shifts down. 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 of course 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.

b) What happens to the level of output and the price level in the short run and in the long run?

In the short run, we assume that the price level is fixed and that the aggregate supply curve is flat. In the short run, output falls but the price level doesn't change. In the long-run, prices are flexible, and as prices fall over time, the economy returns to full employment.

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

$$\Delta M/M + \Delta V/V = \Delta P/P + \Delta Y/Y$$

We know that in the short run, the price level is fixed. This implies that the percentage change in prices is zero and thus $\Delta M/M = \Delta Y/Y$. Thus in the short run a 5 percent reduction in the money supply leads to a 5 percent reduction in output.

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 percentage change in output is zero and thus $\Delta M/M = \Delta P/P$. Thus in the long run a 5 percent reduction in the money supply leads to a 5 percent reduction in the price level.

c) According to Okun's law (this was referred to back in Chapter 2 – check it out), what happens to unemployment in the short run and in the long run?

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

$$\Delta Y/Y = 3.5\% - 2*(\Delta \text{ in unemployment})$$

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% (relative to full employment) in the short run, so unemployment increases 2.5%. In the long run, both output and unemployment return to their natural levels, so there is no long-term change in unemployment.

d) What happens to the real interest rate in the short run and in the long run?

The national income accounts identity tells us that saving $S = Y - C - G$. Thus, when Y falls, S falls (assuming that MPC is less than one). This will cause the real interest rate to rise (see Figure 3-9 for what this would look like). When Y returns to its original long-run level, so does the real interest rate.

2) Let's examine how the goals of the Fed influence its response to shocks. Suppose Fed A cares only about keeping the price level stable, and Fed B cares only about keeping output and employment at their natural levels. Explain how each Fed would respond to

a) An exogenous decrease in the velocity of money.

An exogenous decrease in the velocity of money causes the aggregate demand curve to shift downward. In the short run, prices are fixed, so output falls.

If the Fed wants to keep output and employment at their natural-rate levels, it must increase aggregate demand to offset the decrease in velocity. By increasing the money supply, the Fed can shift the aggregate demand curve upward, restoring the economy to its original equilibrium point. Both the price level and output would remain constant.

If the Fed wants to keep prices stable, then it wants to avoid the long-run adjustment to a lower price level. Therefore, it should do precisely what Fed B does, and increase the money supply to shift the aggregate demand curve upward, again restoring the original equilibrium point.

b) An exogenous increase in the price of oil.

An exogenous increase in the price of oil is an adverse supply shock that causes the short-run aggregate supply curve to shift upward.

If the Fed cares about keeping output and employment at their natural-rate levels, then it should increase aggregate demand by increasing the money supply. This policy response shifts the aggregate demand curve rightward. In this case, the economy immediately reaches a new equilibrium – the price level is permanently higher, but there is no loss in output associated with the adverse supply shock.

If the Fed cares about keeping prices stable, then there is no policy response it can implement. In the short run, the price level stays at the higher level. The Fed must simply wait, holding aggregate demand constant. Eventually, prices fall to restore full employment at the old price level. But the cost of this process is a prolonged recession.

- 3) Almost all economists agree that wages and prices are flexible in the long run and that real GDP moves toward its natural level. The speed with which this occurs, however, is a subject of considerable debate. Some economists believe that sticky wages and prices make the movement back to the natural level a long, protracted process, while others believe that wages and prices are sufficiently flexible to move the economy rapidly to its natural level.

What do you suppose economists who believe that the natural level is achieved very slowly think about the importance of stabilization policies? Why? What do you suppose economists who believe that the natural level is achieved rapidly think about stabilization policies? Why?

Those economists who believe that sticky wages and prices make the movement to the natural level a long drawn-out process generally believe that stabilization policies have an important role to play so that the economy need not languish for long periods of time below full employment. Those economists who believe that prices and wages are sufficiently flexible to move the economy to its natural level rapidly are less enthusiastic about the use of stabilization policy for several reasons: the policy effects and their timing are often unpredictable, policymakers may not act in the best interest of the economy, and the public's expectations of policy changes may mitigate their efficacy.

- 4) Suppose velocity is stable. What specific things would the Federal Reserve need to know in order to keep output at its natural level following a supply shock?

If velocity is stable, the Federal Reserve can easily ascertain the shape and position of the aggregate demand curve. Once the Fed located the position of the current short-run aggregate supply curve (by knowing what the current price level is), it could implement the appropriate policy change to shift the aggregate demand curve and keep output stable. Of course this also means that the Fed would also need to know where the long-run aggregate supply curve was (that is, the level of output that the economy can CONSISTENTLY produce without inflation or deflation).

Suppose instead that velocity is unstable and unpredictable. How would this complicate the Federal Reserve's ability to stabilize the economy following a supply shock?

If velocity is unstable and unpredictable, it will be difficult for the Federal Reserve to ascertain the exact shape and position of the aggregate demand curve. Consequently, it would be difficult to determine the required change in the money supply even if the short-run and long-run aggregate supply curves can be located precisely.