

## Aggregate Demand Shock

Suppose for some reason the confidence of the consumers declines.

- (a) How does this shock affect the economy if the policymakers follow the monetary policy rule of  $R - r = \bar{m}(\pi - \bar{\pi})$  if this shock is sustained for five years? (Assuming that the economy will finish adjusting and go back to zero output gap exactly in the end of the fifth year and the shock will disappear in the end of the fifth year)

Answer:

We assume that policymakers follow the monetary policy rule:  $R - r = \bar{m}(\pi - \bar{\pi})$ . The response of the economy is then shown in Figure 1. The initial effect of a decrease in  $\bar{a}$  is to shift the Aggregate Demand curve in: at any given level of inflation, the output gap associated with the higher value of  $\bar{a}$  has decreased. In particular, this means the economy jumps from point *A* to point *B*. Upon seeing the increase in demand for their goods, firms decrease prices, so inflation picks down to some extent. Following the aggregate demand shock, some of the shock appears in the form of a lower output gap and some is taken in the form of lower inflation.

The economy evolves over time after the initial impact of the shock as follows. Firstly, consider the equation for the AS curve:

$$\pi_t = \pi_{t-1} + \bar{v}RGap_t + \bar{o}.$$

The level of inflation associated with a zero output gap (and no inflation shocks) is given by  $\pi_{t-1}$ . Since inflation is below  $\bar{\pi}$  in period one, this leads firms to expect lower inflation in the future, so the AS curve shifts downward over time. Firms expect lower inflation, so the inflation rate associated with a zero output gap decreases. This means that transition dynamics push the economy toward a lower level of inflation and reduce the output gap toward zero. These dynamics are also shown graphically in Figure 1. The economy moves gradually over time from point *B* to point *C*. In the graph, we labeled this as occurring after five years of time.

What is the level of inflation at point *C*? Notice that the output gap is zero at this point, so from the Aggregate Supply curve, the inflation rate is stable:  $\pi_t = \pi_{t-1} + 0 + 0$ . As long as nothing else changes, the economy will remain at point *C*. Next, using the Aggregate Demand curve, we see that  $0 = Gap_t = \bar{a} + \bar{b}\bar{m}(\pi - \bar{\pi})$ . Solving this equation for the level of inflation, we see that  $\pi^C = \bar{\pi} + \bar{a} / \bar{b}\bar{m}$ . Notice that  $\bar{a}$  is a negative number here, therefore the inflation rate would be lower than its steady-state rate by an amount that depends on the aggregate demand shock.

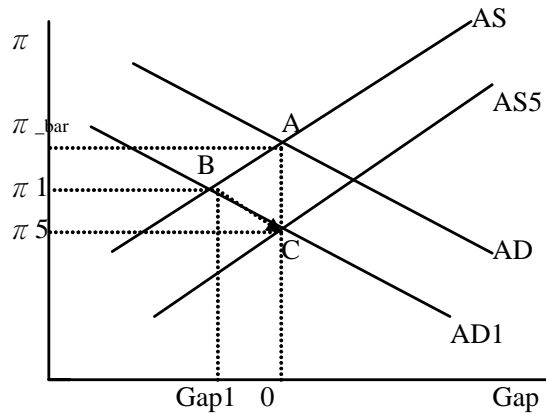


Figure 1

**(b) How does your prediction of inflation in (a) depend on  $\bar{m}$  ?**

Answer:

When  $\bar{m}$  is higher, the AD curve is flatter. That means the inflation rate will fall less. In other words, if the central bank is very aggressive in fighting the inflation, then the change of inflation rate will be smaller.

On the other hand, when  $\bar{m}$  is lower, the AD curve is steeper. That means the inflation rate will fall less. In other words, if the central bank is less aggressive in fighting the inflation, then the change of inflation rate will be larger.

**(c) How will this economy evolve in the future once the shock disappears five years later?**

Answer:

After the fifth year, the economy will continue to evolve. Why? In part (a) point C features an inflation rate that is lower than the central bank's target rate of  $\bar{\pi}$ . Thus the economy is not in its steady state at point C, so this definitely cannot be the end of the story. But how can this economy go back to its steady state at point A?

Recall again that aggregate demand shocks by their very nature are temporary. The longrun value of  $\bar{a}$  has to be zero. When this shock disappears in the end of the fifth year, the Aggregate Demand curve shifts back to its original position, and the economy jumps from point C to point D, as shown in Figure 2. Notice that since the output gap was already zero, this is like a positive shock, and it causes the output gap to jump above zero. This change in turn puts upward pressure on inflation. The standard transition dynamics then take the economy back to steady state as higher inflation raises expected inflation and causes the AS curve to shift gradually back to its original position. Over time, the economy moves back to point A, slowly sliding up the original Aggregate Demand curve.

The evolution of the economy after the fifth year is shown in Figure 2.

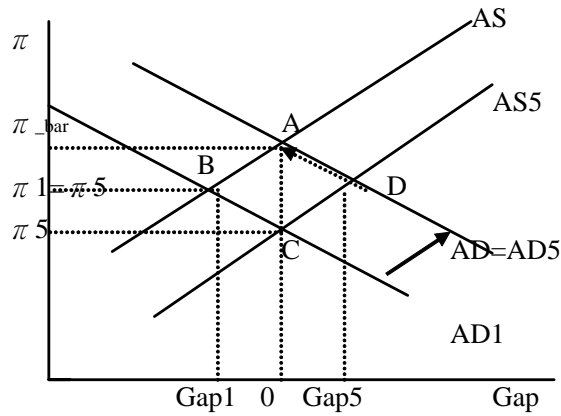


Figure 2

(d) Draw the time path diagrams of output gap and inflation for (a) and (c).

Answer:

The overall time path of the output gap and inflation in response to the aggregate demand shock is shown below.

