Introductory Macroeconomics

Pre-Tutorial #6
Week Starting 19th April 2021

The Tutorial. This week's tutorial looks at aggregate demand and supply.

Note that your tutor is under no obligation to go through the answers to the pre-tutorial work in detail. The focus in the tutorial will be on the tutorial work itself – the questions here are preparatory.

Reading Guide. You should look carefully over lectures 11 and 12. You may also find Chapter 11 of BOFAH useful.

Key Concepts. Aggregate demand and supply. Monetary policy reaction function.

Problems.

1. What is the monetary policy reaction function? If a central bank was to become more aggressive in fighting inflation, how would you expect the policy reaction function to change? Explain.

2. Why is the AD curve downward sloping? Explain how the AD curve would shift if there was:

   (a) a sudden loss in consumer confidence

   (b) an unexpected increase in government spending

   (c) a recession abroad that decreases demand for our exports

3. If the natural real rate r^* increases, the AD curve shifts in. True or False?

4. If inflation is at target, $\pi = \pi^*$, then actual output must coincide with potential output, $Y = Y^*$. True or False?

5. Consider the AD-AS model

$$Y = Y^* - \alpha\gamma(\pi - \pi^*) + \varepsilon_D$$

$$\pi = \pi^e + \phi\beta(Y - Y^*) + \varepsilon_S$$

   Suppose the parameter values are $\alpha = 0.5$, $\gamma = 2$, $\phi = 0.5$, $\beta = 2$ with inflation target $\pi^* = 0.02$ and natural output normalized to $Y^* = 1$.

   (a) Suppose the economy begins in an initial long run equilibrium and there is then a temporary demand shock $\varepsilon_D = -0.05$. Compute the short run and long run effects of this shock on output and inflation.

   (b) Suppose the economy begins in an initial long run equilibrium and there is then a temporary supply shock $\varepsilon_S = 0.04$. Compute the short run and long run effects of this shock on output and inflation.

Solutions to Pre-Tutorial Work.

1. The monetary policy reaction function is a numerical description of how real interest rates vary in response to changes in inflation. An example is

$$r = r^* + \alpha(\pi - \pi^*)$$

   There are two possible interpretations of 'more aggressive in fighting inflation'. One interpretation is a lower inflation target π^*. The other is a larger repsonsiveness to increases in inflation above a given target, i.e., a high α.

2. The AD curve is downward sloping because an increase in inflation π induces the central bank to increase real interest rates r which reduces output Y by reducing consumption and investment demand. A negative shock to consumer confidence shifts in the AD curve, reducing output at each level of inflation. A positive shock to government spending shifts out the AD curve, increasing output at each level of inflation. We have not yet discussed open economies in class, but it's intuitive that a negative shock to net exports acts like any other negative shock to the exogenous expenditure components ($\bar{C}, \bar{I}, \bar{G}$ etc) and so shifts in the AD curve.

3. False. An increase in r^* shifts up the monetary policy reaction function but has no effect on the level of the AD curve.

4. False. There could be a combination of shocks $\varepsilon_D, \varepsilon_S$ that gives $Y < Y^*$ or $Y > Y^*$ while keeping $\pi = \pi^*$. In other words, $\pi = \pi^*$ is necessary but not sufficient for the economy to be in long run equilibrium.

5. Substituting in the given parameter values the AD and AS equations become

$$Y = Y^* - (0.5)(2)(\pi - \pi^*) + \varepsilon_D$$

$$\pi = \pi^e + (0.5)(2)(Y - Y^*) + \varepsilon_S$$

   (a) Since we begin in an initial long run equilibrium with $\pi^e = \pi^*$ and for this part the only shock is the demand shock we can write

$$Y = Y^* - (\pi - \pi^*) + \varepsilon_D$$

$$\pi = \pi^* + (Y - Y^*)$$

   Subsituting the AS curve into the AD curve then gives

$$Y = Y^* - (Y - Y^*) + \varepsilon_D$$

   or

$$2Y = 2Y^* + \varepsilon_D$$

   Hence

$$Y = Y^* + (0.5)\varepsilon_D$$

Since we have a negative demand shock $\varepsilon_D = -0.05$ and $Y^* = 1$ we get

$$Y = 1 + (0.5)(-0.05) = 0.975$$

We can then recover the associated value of inflation from the AS curve

$$\pi = \pi^* + (Y - Y^*) = 0.02 + (0.975 - 1) = -0.005$$

That is, in the short run, equilibrium output $Y = 0.975$ is 2.5% below potential $Y^* = 1$ and there is mild *deflation* $\pi = -0.005$ or -0.5%. Graphically, the negative demand shock shifts the AD curve in along the SRAS curve reducing output and reducing inflation. In the long run output returns to potential $Y^* = 1$ and inflation returns to target $\pi^* = 0.02$.

(b) Since we begin in an initial long run equilibrium with $\pi^e = \pi^*$ and for this part the only shock is the supply shock we can write

$$Y = Y^* - (\pi - \pi^*)$$

$$\pi = \pi^* + (Y - Y^*) + \varepsilon_S$$

Subsituting the AS curve into the AD curve then gives

$$Y = Y^* - ((Y - Y^*) + \varepsilon_S)$$

or

$$2Y = 2Y^* - \varepsilon_S$$

Hence

$$Y = Y^* - (0.5)\varepsilon_S$$

Since we have a positive supply shock $\varepsilon_S = 0.04$ and $Y^* = 1$ we get

$$Y = 1 - (0.5)(0.04) = 0.98$$

We can then recover the associated value of inflation from the AS curve

$$\pi = \pi^* + (Y - Y^*) + \varepsilon_S = 0.02 + (0.98 - 1) + 0.04 = 0.04$$

That is, in the short run, equilibrium output $Y = 0.98$ is 2% below potential $Y^* = 1$ and inflation rises to $\pi = 0.04$ or 4%. Graphically, the adverse supply shock shifts the SRAS curve up along the AD curve reducing output and increasing inflation. In the long run output returns to potential $Y^* = 1$ and inflation returns to target $\pi^* = 0.02$.