

Finance 30220
Macroeconomic Analysis
Problem Set 7b

1) Consider the following IS/LM/FE model:

$$\text{FE: } Y^* = 10,000$$

$$\text{IS: } Y = 14,000 - 500r$$

$$\text{LM: } r = 2 + .05Y - .823\left(\frac{M}{P}\right)$$

Where Y is real GDP in billions, r is the real interest rate as a percentage, P is the price level and M is the money supply in billions.

a) Assuming that the money supply is currently 600 billion, solve for the equilibrium interest rate and price level.

To get the interest rate, plug in 10,000 for real GDP into the IS curve and solve for the interest rate.

$$10,000 = 14,000 - 500r$$

$$500r = 4,000$$

$$r = 8$$

Now, to get the price level, plug in 8 for the interest rate and 10,000 for real GDP and 600 for money supply into the LM curve.

$$8 = 2 + .05(10,000) - .823\left(\frac{600}{P}\right)$$

$$6 = 500 - \frac{494}{P}$$

$$\frac{494}{P} = 494$$

$$P = 1$$

b) Suppose that the Federal Reserve increases the money supply by 10% to 660 billion. Solve for the short run impact on the interest rate and real GDP

IN the short run, we are looking for the intersection of IS and LM. Plug in 660 for money supply and 1 for price and we have the following two conditions:

$$Y = 14,000 - 500r$$

$$r = 2 + .05Y - .823(660)$$

If we plug the IS curve into the LM curve, we have:

$$r = 2 + .05(14,000 - 500r) - .823(660)$$

$$r = 2 + 700 - 25r - 543$$

$$26r = 159$$

$$r = 6.1$$

$$Y = 14,000 - 500(6.1) = 10,950$$

c) Calculate the long run impact on price:

Plug in the original 8 percent for the interest rate, 10,000 for GDP and 660 for money and solve for P

$$8 = 2 + .05(10,000) - .823\left(\frac{660}{P}\right)$$

$$6 = 500 - \frac{494}{P}$$

$$\frac{543}{P} = 494$$

$$P = 1.10$$

2) Continuing with the same model, suppose that the government provides an incentive that raises corporate investment. As a result, at the initial interest rate, expenditures rise by 10%.

a) Calculate the short term effect on output and interest rates.

The new IS curve will be $Y = 15,000 - 500r$ (at an interest rate of 8%, demand is 11,000 – a 10% increase)

Repeat the process from 1b. We know the following:

$$Y = 15,000 - 500r$$

$$r = 2 + .05Y - .823(600)$$

If we plug the IS curve into the LM curve, we have:

$$r = 2 + .05(15,000 - 500r) - .823(600)$$

$$r = 2 + 750 - 25r - 494$$

$$26r = 258$$

$$r = 9.9$$

$$Y = 15,000 - 500(9.9) = 10,050$$

b) Calculate the long term effect on prices:

First, we need to find the interest rate where demand is back to 10,000

$$10,000 = 15,000 - 500r$$

$$r = 10$$

Now, plug in 10,000 for Y, 10 for r and 600 for M to find the new price:

$$10 = 2 + .05(10,000) - .823\left(\frac{600}{P}\right)$$

$$10 = 2 + 500 - \frac{494}{P}$$

$$\frac{494}{P} = 492$$

$$P = 1.004$$