14.02 Principles of Macroeconomics

Problem Set #2
Posted: Wednesday, September 17, 2003
Due Date: Wednesday, September 24, 2003

Please remember to write your TA's name and section time on the front page of your problem set.

Part I. True/False: Decide whether each statement is true or false and justify your answer with a short argument.

1. When nominal income increases the demand for bonds also increases.

2. Expansionary monetary policy decreases the interest rate.

3. The money multiplier is always less than 1 since the reserve ratio (θ) is less than one.

4. Only federal employees can purchase stocks and bonds in the federal funds market.

5. If nominal income increases <u>and</u> the central bank decreases the money supply, the interest rate will fall.

Part II. Supply and Demand For Money

Assume an economy in which:
$L(i) = (.5-i)$
$\$Y=P*Y=\$10$ trillion
$M^s=\$3.5$ trillion

1. Graph M^s and M^d for this economy.

2. What is the equilibrium rate of interest?

3. Label the equilibrium of the money market at point A on the graph from number 1.

4. Now, the central bank sells $1 trillion worth of bonds via open market operations. Find the new equilibrium interest rate. Label this equilibrium point B on the graph.

5. At equilibrium A, what is the price of a bond that promises to pay $100 at the end of a year?

6. At equilibrium B, what is the price of a bond that promises to pay $100 at the end of a year?

7. Why did the price of bonds fall? How does this affect the rate of return on a bond that will pay $100 at the end of the year?

Part III. The Money Multiplier

Assume the following:
D^d = $800 billion
M^s (total supply of money) = $1200 billion
$\theta = 0.1$

1. In equilibrium, what are CU^d, R^d and H^d?

2. If the Fed purchases $300 million worth of T-bills, what is the change in the overall equilibrium money supply?

Part IV. IS-LM Practice Problems – Do Not Need to Be Turned In, But VERY IMPORTANT for Quiz 1

1. Assume the following IS-LM model:
$C = 80 + (4/5)Y_D$
$T = (1/4)Y$
$I = 300 - 2000i$
$G = 120$
$M^s = 700$
$P = 2$
$(M/P)^d = (1/3)Y + 200 - 1000i$

a. Derive the equilibrium values of consumption and money demand.

b. Calculate the equilibrium value of investment. How does investment change if the government increases its purchases by 160?

c. Keep the new level of government spending from part b (G=280). By how much will the equilibrium level of income and the interest rate change if nominal money supply is increased to 1100?

2. Suppose:
$C = c_0 + c_1(Y-T)$
$I = b_0 - b_1 i$
$(M/P)^d = m_1 Y - m_2 i$
G and T are constant

a. How should the parameters b_1, m_1, and m_2 be interpreted?

b. Use the IS-LM model to graphically determine the effectiveness of fiscal versus monetary policy when investment is very sensitive to changes in i, and money demand is very insensitive to changes in i.

c. Now suppose that the government imposes a tax, t_1, on income, so that the following is true:
$T = t_0 + t_1 Y, 0 < t_1 < 1$

If money demand is very insensitive to changes in the interest rate, is a decrease in the income tax rate an effective way to stimulate the economy?