14.02 Principles of Macroeconomics
Problem Set 2
Fall 2005

Posted: Wednesday, September 21, 2005
Due: Wednesday, September 28, 2005

Please write your name AND your TA's name on your problem set. Thanks!

Exercise I. True/False/Uncertain? Explain

1. A decrease of the reserve ratio ϑ produces the same effect on the interest rate as an expansionary open market operation.
2. The safer and more efficient the banking sector is considered to be, the higher the money multiplier.
3. The bond that offers the highest interest rate has to be the most expensive one.
4. An increase in consumer confidence shifts the LM curve down and the IS curve to the right.
5. A monetary expansion is more effective in changing the interest rate when money demand is very sensitive to the interest rate.

Exercise II. The Money Market

Assume that the following is true about the economy:

Money Demand: $M^d = \$Y(0.4 - i)$
There is a one-year-bond that promises a payment of $12, where i is the interest rate on the bond.

Nominal Income: $\$Y = 1100$
The only bank is the central bank.
Money Supply: $M^s = 220$

1. What is the money demand when the interest rate is 4%? When i=20%? For which interest rate is the money demand lower? Explain why.
2. What is the price of the bond when $i = 4\%$? When $i = 20\%$? Explain.
3. Draw a graph for money supply and the demand and calculate the equilibrium i.
4. Suppose the central bank increases the money supply by 110. Graph and calculate the new equilibrium i.
5. Keep $M^s = 330$. To what amount would nominal GDP have to change to have a money market equilibrium level consistent with an interest rate i equal to 20%? Explain.

Exercise III. Money Multiplier

Keep the same money demand and the nominal income as initially given in Exercise II. Now imagine that there is a banking sector collecting deposits. The central bank requires a reserve ratio of $\vartheta = 50\%$.
People want to keep one third of their money demand as currency, and the rest as deposits.
The supply of central bank money is $H^s = 220$.
  1) Calculate the money multiplier, CU^d, D^d, R^d, H^d (the demand for central bank money). Compare the equilibrium i with the one obtained in the previous exercise in part 3. Explain.
  2) Suppose the central bank money supply is decreased by 22. Calculate the new equilibrium i.
  3) Keep $H^s = 198$. What happens to i if the nominal GDP decreases by 275? Explain.
  4) How can the central bank restore $\$Y = 1100$ keeping H^s and i at the same levels used in part 3) of this exercise?

Exercise IV. IS-LM Model

Assume
$$C = 360 + 0.3 * Y_D$$
$$I = 200 + 0.2 * Y - 400i$$
$$T = 200$$
$$G = 300$$
$$\left(\frac{H}{P}\right)^s = 200$$
$$\frac{CU^d}{M^d} = c = 0.4$$
$$\vartheta = 0.25$$
$$(M/P)^d = 2{,}5Y - 7000i$$
  1. Derive the IS relation.
  2. Derive the LM relation.
  3. Solve for equilibrium real output, interest rate, C and I and graph the IS-LM diagram.
  4. The government decides to increase its deficit: G increases by 90 to 390. Draw a graph and describe what happens in the economy. Find equilibrium Y, i, C, and I.
  5. What happens to our model if the investment is also a function of disposable income Y_D, instead of Y. Discuss this assumption and find the equilibrium i and Y before and after the fiscal expansion.
  6. What happens in the standard setting, with I=I(Y,i), not I=I(Y_D,i), if the fiscal expansion is driven through a decrease in taxes T from 200 to 110?
  7. Compare your answer to part 6 with that to part 4.