

Problem Set #4

Due Wednesday 4/6/11 by 6 p.m. in the Econ 110-1 slot in the Economics Alcove

Use a stapler! Write legibly and use full and grammatically correct sentences in your answers. Draw graphs neatly and label axes and points clearly. Show your work on calculations. Each part below is weighted equally in grading, as are subparts within a part.

A. Present value calculations:

(For each of these problems, assume any payment today is at time zero, while all other payments are at time one, two, etc.)

- 1) A bond offers a payment of \$200 per year in perpetuity.
 - a. The interest rate is 5%. What is the most that you should be willing to pay for the bond today?
 - b. The bond costs \$2000. What is its yield?
- 2) An investment offers \$200 per year for four years.
 - a. If the interest rate is 4%, what is the PV of this investment?
 - b. If the interest rate is 3%, what is the PV of this investment?
- 3) An investment offers \$200 per year for four years. You have to pay \$600 today for the investment.
 - a. The interest rate is 4%. What is the PV of this investment?
 - b. You tell the investment company that you don't have \$600 today, so instead they tell you you can pay \$200 down today and pay them the other \$400 at the rate of \$100 a year. Now what is the PV of this investment?
- 4) An investment offers \$200 per year for two years. You have to pay \$150 today for the investment.
 - a. The interest rate is 4%. What is the PV of this investment?
 - b. What is the internal rate of return on this investment?

B. Assume the Muhtarian National banking system's balance sheet looks like this:

| <u>Assets</u> | | <u>Liabilities</u> | |
|---------------|------------------|--------------------|------------------|
| Reserves | \$20,000 | Deposits | \$80,000 |
| Loans | \$80,000 | Capital | \$20,000 |
| | <u>\$100,000</u> | | <u>\$100,000</u> |

1) What is the reserve ratio of this system? What is the money multiplier?

Show how the banking system balance sheet would look, starting from the one given above, after each of the following occurrences. Also state by how much the money supply has changed, and whether or not the money multiplier has changed.

- 2) An immigrant deposits \$4000.
- 3) The reserve ratio is changed to 20%.
- 4) The central banking authority holds an open market sale of \$2000 worth of securities.

C. Assume the economy can be characterized by the following ten equations:

$$C = 100 + .75Y_d$$

$$Y_d = Y - T$$

$$I = 60 - 5r + .1Y$$

$$T = 100 + .2Y$$

$$G = 100$$

$$M_D = M_S$$

$$M_D = 100 - 10r + .1Y$$

$$Y = C + I + G$$

$$M_S = 80/P$$

$$P = 1$$

- 1) Solve for the equilibrium values of r and Y .
- 2) a. Verify that $Y = C + I + G$ by solving for C and I and showing the two sides are equal.
b. Verify also that $M_D = M_S$.
- 3) What is the value of the multiplier?
- 4) Is the government running a surplus or a deficit? How much?

D. Assume the economy can be characterized by the following twelve equations:

$$C = 100 + .75Y_d$$

$$Y_d = Y - T$$

$$I = 60 - 5r + .1Y$$

$$T = 100 + .2Y$$

$$G = 100$$

$$M_D = M_S$$

$$M_D = 100 - 10r + .1Y$$

$$Y = C + I + G$$

$$M_S = 80/P$$

$$Y = \bar{Y} + 100(P - P^e)$$

$$\bar{Y} = 600$$

$$P^e = 2 \text{ (at time 0 for part 4 below)}$$

- 1) Solve for the equilibrium values of r , Y , and P .
- 2) Is the economy above, below, or at long-run (full-employment) output? If above or below, by how much?
- 3) Explain in words what will happen in the economy if the government increases G . Sketch the AD - (SR)AS situation for the economy before and after the increase in G . Show the LRAS (\bar{Y}) on your diagram as well.

Now assume the economy can be characterized by the same twelve equations in the short-run, but that in the long run output must equal \bar{Y} .

- 4) a. What are the short-run equilibrium values of r , Y , and P ?
- b. Explain in words what has to happen for the economy to move to long-run equilibrium.
- c. What happens to prices during the adjustment period (as in is there inflation or deflation)?
- d. Draw a graph showing AD, SRAS₀, SRAS₁, and LRAS and mark the two equilibria on your graph.