

Economics 102
 Spring 1998
 Homework #5 **Answer Key**
 Due May 5(Tue) at the large lecture

Student Name:
 ID#:
 T.A. Name:
 Day/Time of Sec:

Question 1. (3 pts.)

- a. (1 pt.) The FED sells \$1,000 of T-bills from a bank in Chicago. What will be the total change in the money supply if the reserve ratio is 25%? **Money multiplier = $1/.25=4$ P DMs = - \$1000*4= - \$4,000.**
- b. (1 pt.) The FED buys \$2,000 of T-bills on the open market. What will be the total change in the money supply if the reserve ratio is 25%? **Money multiplier = $1/.25=4$ P DMs = \$2000*4= \$8,000.**
- c. (1 pt.) Suppose David deposits his paycheck of \$1,000 in a bank in Green Bay. What will be the total change in money supply if the reserve ratio is 25%? **The increase in reserves at a bank in Green Bay will be equal to the decrease in reserves at David's employer's bank, so that DMs =0.**

Question 2. (7 pts.) Consider an economy where the required reserve ratio is 40%. Suppose Mark sells \$2,000 worth of government securities to the FED and deposits the proceeds (\$2,000) in Bank 1. Note that this new deposit initially increases the quantity of money by \$2,000. Assume that all accounts were previously equal to 0 (or that we are only looking at changes), and there are no currency drains. After Mark has made his deposit, Bank 1's Balance Sheet is

Bank 1's Balance Sheet

Asset	Liabilities
Reserves: \$2,000	Demand Deposits: \$2,000

- a. (2 pts.) Suppose that Bank 1 lends out any excess reserves to Jill. Jill uses the entire loan to buy a sofa from Tim, who deposits her payment in Bank 2. Fill in the following table for Bank 1 and Bank 2 immediately after Tim has deposited her payment. Be sure to label all entries.

Bank 1's Balance Sheet

Asset	Liabilities
Reserves: \$800 Loans: \$1200	Demand Deposits: \$2000

Bank 2's Balance Sheet

Asset	Liabilities
Reserves: \$1200	Demand Deposits: \$1200

- b. (3 pts.) Suppose that Bank 2 lends out any excess reserves to Adam. Adam's entire loan ends up deposited in Bank 3, and so on. Fill in the following table.

Bank Number	New Deposit	New Loan	New Reserve	Increase in money	Cumulative increase in money
1	\$2000	\$1200	\$800	\$2000	\$2000
2	1200	720	480	1200	3200
3	720	432	288	720	3920
4	432	259.2	172.8	432	4352
:	:	:	:	:	:
31	0.000442	0.000265	0.000177	0.000442	4999.999

c. (1 pt.) What is the money multiplier? **Money multiplier = 1/required reserve ratio = 1/.4 = 2.5**

d. (1 pt.) After all rounds have been completed, what will the total increase in money be?

Money multiplier = 2.5 **DMs = \$2000 * 2.5 = \$5,000.**

Question 3. (10 pts.) Consider an economy with:

Money demand and supply are:

$$M_d = 5000 - 100r$$

$$M_s = 2500$$

Output market is:

$$C = 800 + .8(Y - T) - 10P$$

$$I = 2000 - 40r$$

$$G = 2000$$

$$T = 1000$$

where P is the aggregate price level and r is **percentage interest rate** (Not decimal term).

a. (1 pt.) Use the money market equations to find the equilibrium interest rate.

$$M_d = 5000 - 100r = 2500 = M_s \quad \mathbf{P} \quad \mathbf{The\ equilibrium\ interest\ rate = 25 = 25\%}$$

b. (1 pt.) Assume that $P = 200$. (Hint: This is a Keynesian model where the price level is fixed.) Using your answer to part(a), solve for the equilibrium GDP (Y_e).

$$Y_e = C + I + G = 800 + .8(Y_e - 1000) - 10(200) + 2000 - 40 * 25 + 2000$$

$$.2Y_e = 1000 \quad \mathbf{P} \quad \mathbf{The\ equilibrium\ Output = 5000}$$

Now suppose aggregate demand (AD) and aggregate supply (AS) are given by (Hint: we are now allowing price to vary):

$$AD: Y^D = C + I + G$$

$$AS: Y^S = 100P, \text{ or } P = 0.01Y^S.$$

c. (1 pt.) Using your answer to part(a), find AD equation. (Hints: solve for Y^D as a function of P , or P as a function of Y^D .)

$$Y^D = C + I + G = 800 + .8(Y_e - 1000) - 10P + 2000 - 40 * 25 + 2000$$

$$Y^D = 15000 - 50P, \text{ or } P = 300 - 0.02Y^D.$$

d. (2 pts.) Using your answer to part(a) and (c), solve for the equilibrium GDP (Y_e) and Price (P).

$$Y^D = 15000 - 50P = 100P = Y^S \quad \mathbf{P} \quad \mathbf{Y_e = 10000 \text{ and } P = 100.}$$

$$\mathbf{Or } P = 300 - 0.02Y^D = 0.01Y^S = P \quad \mathbf{P} \quad \mathbf{Y_e = 10000 \text{ and } P = 100.}$$

e. (1 pt.) Suppose that the full employment level of GDP is 12500. Does the current equilibrium GDP show an inflationary gap? **It shows a recessionary gap.**

f. (2 pts.) In order to reach the full employment level of GDP (i.e. $Y_{fe} = 12500$), government decides to change government spending. Then what will be new G ? Does the equilibrium price increase or decrease? Why?

(Hint: Don't use multipliers.)

$$Y^D = C + I + G = 800 + .8(Y_e - 1000) - 10P + 2000 - 40 * 25 + G$$

$$= 5000 + 5G - 50P \quad (\text{or } P = 100 + .1G - 0.02Y^D)$$

$$P = 100 + .1G - 0.02Y^D = 0.01Y^S = P$$

$$100 + .1G - 0.02(12500) = 0.01(12500) \quad \mathbf{P} \quad \mathbf{new\ G = 2750. \text{ Because AD shifts out, P goes up.}}$$

g. (2 pts.) Alternatively, suppose the money supply (M_s) is set by the FED at \$4375 (and $G = 2000$). Can we reach the full employment level of GDP (i.e. $Y_{fe} = 12500$)? What is the new equilibrium price?

$$M_d = 5000 - 100r = 4375 = M_s \quad \mathbf{P} \quad \mathbf{The\ equilibrium\ interest\ rate = 6.25 = 6.25\%}$$

$$Y^D = C + I + G = 800 + .8(Y_e - 1000) - 10P + 2000 - 40 * 6.25 + 2000 = 18750 - 50P$$

$$Y^D = 18750 - 50P = 100P = Y^S \quad \mathbf{P} \quad \mathbf{Y_e = 12500 \text{ and } P = 125}$$