14.02 Problem Set 2 Solutions

I. True/False

1. False. The multiplier is $\frac{1}{1-c_1(1-t)}$. The effect is dampened because taxes also respond to the increase in output.

2. True. Bonds plus Money are wealth. All are stocks.

3. False. Interest rates do increase because the M^d shifts up and to restore equilibrium for a given M^s interest rates on bonds increase to increase (not reduce) the demand for bonds.

4. False. Currency plus reserves are high-powered money (H), so when Fed does an OMO and sells bonds (on its assets side), then H goes down (on its liabilities side). The sale of bonds leads their price to fall and thus the interest rate on them to rise.

II. Short Questions

1. b. Remember that an increase in H will have a greater effect on M the larger the money multiplier. The money multiplier is larger (for a given required reserve ratio) the smaller the amount of currency people hold to the proportion of their money demand. Answers a,c, and d go in the other direction. Answer e has no effect, the interest rate does not figure in the transmission of H to M.

2.

a.

Central Bank

A	L
bonds:200	currency:100
	reserves:100

Banks

A	L
bonds/loans: 400	deposits:500
reserves:100	

The reserve ratio, θ, is 100/500 = 0.2

b. H = CU + R = 200

c. M = CU + D = 600

d. money multiplier = M/H = 3

e. can write money multiplier as $\frac{1}{c+\theta(1-c)}$, so as $c \uparrow, multiplier \downarrow$ since $\theta < 1$. So to acheive a increase in M need to buy more bonds when c increases to 0.2 from 1/6.

III. Goods Market.

a. Investment depends positively on output. So compared to case in class, when for example consumption increased, investment did not respond, but here because there is a feedback from the increase in production to firms to increase their investment. This is a pretty realistic assumption that output and investment move together.

b. Equilibrium $Y_{eq} = \frac{1}{1-c_1-d_1}(c_0 + d_0 + G - c_1 T)$. Now the multiplier is $\frac{1}{1-c_1-d_1}$. If $c_1 + d_1 > 1$ then the geometric series associated with it will explode (go to ∞, and so the model will make no sense.

c. The effect is the multiplier in the case of an increase of G by $1 billion. Compared to in class when $d_1 = 0$, the effect now is even larger.

d. $S + (T - G) = d_0 + d_1 Y$. So before for a fixed I on the right-hand side, when G increased by 1, S had to increase by 1. But now S increases even more due to I increase because Y increases.

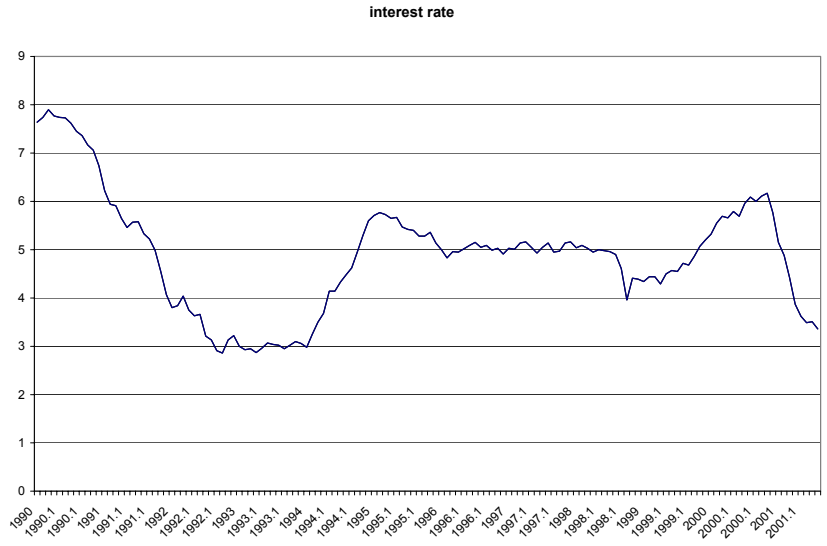
e. $S_{eq} = Y_{eq} - T - C$, and plugging for C and Y_{eq} gives,

$S_{eq} = \frac{1-c_1}{1-c_1-d_1}(c_0 + d_0 + G - c_1 T) - c_0 - (1 - c_1)T$

So for $G \uparrow$ by 1, then $S_{eq} \uparrow$ by $\frac{1-c_1}{1-c_1-d_1}$.

V. Empirical Excercise.

At the beginning of the 1990s, there was a recession so the Fed decreased interest rates. Then in 1998, there was turmoil in the global economy with East Asian financial crisis and followed by Russian crisis and the collapse of long-term capital management (a hedge fund) so the Fed pumped liquidity into the system by decreasing interest rates. Finally, there is fear of a recession in the past months and so Greenspan has been cutting rates again.


interest rate
9
8
7
6
5
4
3
2
1
0
1990
1990.1
1990.1
1991
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1992
1992.1
1992.1
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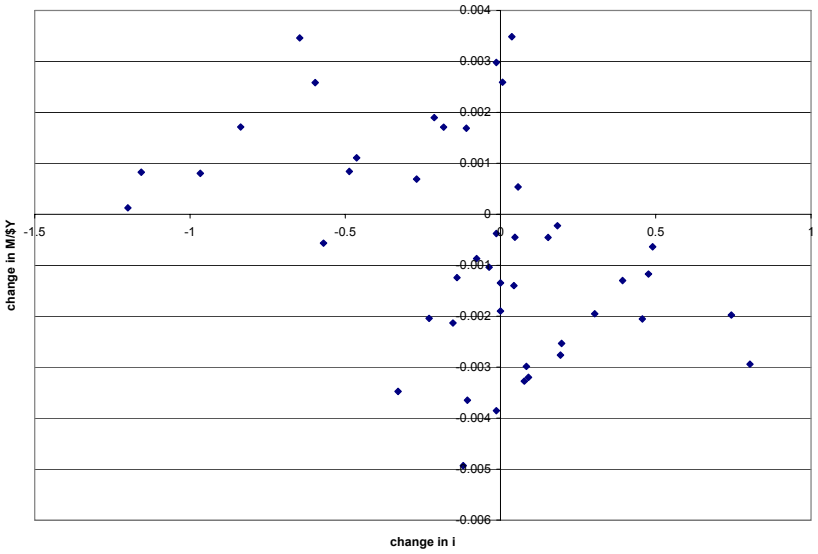
change in M/$Y
change in i
0.004
0.003
0.002
0.001
0
-0.001
-0.002
-0.003
-0.004
-0.005
-0.006
-1.5
-1
-0.5
0
0.5
1