Problem Set 2
14.02 Principles of Macroeconomics
Due 2/26/97

1.) Suppose the U.S. economy is represented by the following equations:

$Z = C + I + G$ $\qquad\qquad C = 300 + .9Y_D$ $\qquad\qquad Y_D = Y - T$

$T = 1,000$ $\qquad\qquad I = 200$ $\qquad\qquad G = 2,000$

a) Calculate the multiplier and the equilibrium level of output

b) Write out the private saving function for this economy. Then, calculate the level of private saving that occurs at the equilibrium level of output.

c) Now, suppose households decide to increase their autonomous saving by 100. Equivalently, households have decided to cut their autonomous consumption by 100. Calculate the new equilibrium level of output. Has this increased desire to save had a positive or negative effect on economic activity? Explain.

d) Show the effect of this increase in saving on the equilibrium output, using graphical presentation on ZZ-Y space. (i.e., Keynesian cross)

e) Calculate the level of private saving at this new equilibrium level of output. Compare the result with the answer in (b). Explain.

2.) For each of the following events, explain what effect each event has on:

(1) autonomous expenditures $\qquad\qquad$ (2) equilibrium output

(3) the slope of ZZ $\qquad\qquad$ (4) the multiplier

a) Increase in business confidence which results in an increase in nonresidential investment

b) An increase in the marginal propensity to save

c) Congress passes a budget which requires a reduction in welfare payment

d) Congress passes a budget which increases defense spending

3.) When real GDP is at its equilibrium value, the value of investment must be equal to the sum of private saving and government saving :$I = S + (T-G)$.

Holding taxes constant, a \$1 million increase in government spending would reduce government saving by \$1 million. Does this mean that investment would decrease by \$1 million? Explain, making specific reference to what you would expect to happen to private saving S under these circumstances.

4.) In the simplest model developed in the text, net taxes were taken to be independent of the level of real GDP. In fact, because income taxes increase with real GDP while many transfer payments decrease when real GDP rises, it is more accurate to allow total government net tax receipts T to be an increasing function of real GDP. This can be done by adding to our model an equation of the form: $T = t_0 + t_1 Y$ where t_0 represents the autonomous components of taxes, and $t_1 Y$ is the induced component. The parameter t_1 can be interpreted as the income tax rate. Using this revised model:

a) Derive the expression for equilibrium GDP as the product of a (new) autonomous expenditure multiplier and (new) autonomous expenditures.

b) Income taxes are often referred to as "automatic stabilizers." Show, by comparing the new autonomous expenditure multiplier to the old, why this might be so. (Hint: what happens to Y when autonomous consumption or investment change in the two cases?)

c) Some members of the Congress want to pass a balanced budget amendment to the US Constitution which requires the Federal budget to be continuously balanced (G=T for every single budget year). President Clinton's Council of Economic Advisors has claimed that such a balanced budget amendment would cause fiscal policy to destabilize the economy (i.e., move it even further away from its initial equilibrium) whenever autonomous expenditures change. Use the expanded model you have developed here to evaluate this argument. (Hint: write down an expression for the deficit, and see what would happen to it when autonomous expenditures change. How would fiscal policy have to respond to this endogenous movement in the Federal budget deficit under a balanced budget amendment?)

5.) For both of the following statements, answer "true" or "false" and explain briefly.

a) In a dynamic model of the goods market, the only way to calculate equilibrium GDP is to run a simulation and add up the change to GDP in each period.

b) In a dynamic model of the goods market, it is more likely that inventory investment will be negative during period of recession.

6.) The consumption equations in two alternative dynamic models are as follows:

Model A: $C_t = c_0 + .25Y_{Dt} + .15Y_{Dt-1}$

Model B: $C_t = c_0 + .20Y_{Dt} + .15Y_{Dt-1} + .05Y_{Dt-2}$

a) What is the marginal propensity to consume in model A? In model B?

b) What is the multiplier in model A? In model B?

c) Would a policy maker need to know which of these two models describes consumption spending in the economy when designing an economic policy? Why or why not?

7.) Suppose that in the simulation conducted in the last section of chapter 4 in the textbook, instead of increasing G by $1 billion, we had instead reduced taxes (T) by the same amount. Would the final effect on GDP have been the same? Would the speed of adjustment (the fraction of the final change in Y completed after a given period of time) have been the same? Why or why not?