In Class Problem Set KEY

The equation of dynamic income generation can be written as,

$$Y_{t+1} = A + aY_t$$

(1)

where $A = I_{t+1} + G_{t+1} = I + G$ (investment and government spending are constant).

a. (1 point) In the figure at right plot equation (1).

b. (2 points) Assume that the sum of government spending and private investment is constant at 7 (billions of constant dollars) and that the tax adjusted marginal propensity to consume is 0.8. Solve for the stationary level of income and label this as $\bar{Y}$ in the figure at right.

$$\bar{Y} = 7 + 0.8\bar{Y} \Rightarrow 0.2\bar{Y} = 7 \Rightarrow \bar{Y} = 35$$

c. (2 points) Suppose that government spending increases by 3 (billions of constant dollars). The new values for government spending and investment will stay unchanged in the economy over time. Write down the basic dynamic income equation incorporating these changes in exogenous spending and solve for the new level of stationary income.

$$Y_{t+1} = 10 + 0.8Y_t$$

$$\bar{Y} = 10 + 0.8\bar{Y} \Rightarrow 0.2\bar{Y} = 10 \Rightarrow \bar{Y} = 50$$

In this case, spending increased by 3 but real GDP increased by 15 (from 30 to 50), for each 1 billion increase in spending real GDP increases by 5. Hence, the multiplier is 5, 15/3.

d. (3 points) Lastly, suppose that the marginal propensity to save increases by 0.3, while government spending, investment, and the tax rate are constant at the same level as in part c. Write down the basic dynamic income equation incorporating these changes in exogenous spending and solve for the new level of stationary income. Plot this new equation in the figure above and label the variable as $\hat{Y}$.

$$Y_{t+1} = 10 + 0.5Y_t$$

$$\hat{Y} = 10 + 0.5\hat{Y} \Rightarrow 0.5\hat{Y} = 10 \Rightarrow \hat{Y} = 20$$

e. (2 points) What is the effect of increase government spending or investment on economic growth? Explain briefly. An increase in government spending or an increase in investment increases $A$, causing $\bar{Y}$ to increase.