

Dr. Barry Haworth  
University of Louisville  
Department of Economics  
Economics 202

## Summary Sheet on Multipliers

### 1. What is a multiplier?

It is a way of seeing how sensitive the economy is to an expenditure injection/leakage. That is, within macroeconomics, multipliers tell us the effect of a change in aggregate expenditure on equilibrium GDP. In using multipliers within the context of our simple AE model, we also note the following:

- a. any given change in expenditure (i.e. any given  $\Delta G$ ,  $\Delta I$ ,  $\Delta T$ , etc.) will be less than the resulting change in equilibrium GDP (i.e.  $\Delta Y$ ) – although with  $\Delta T$ , we are assuming a larger MPC.
- b. changes in any expenditure represented as an injection (e.g.  $\Delta G$ ) are positively related to  $\Delta Y$ , while changes in any expenditure represented as a leakage (e.g.  $\Delta T$ ) is negatively related to  $\Delta Y$

### 2. How do I use a multiplier?

There are two types of multiplier, the expenditure multiplier and the tax multiplier. On the expenditure side, we will focus on the government expenditure multiplier.

$$(i) \text{ Government expenditure multiplier: } \Delta Y = \left( \frac{1}{1 - MPC} \right) \Delta G$$

$$(ii) \text{ Tax multiplier: } \Delta Y = \left( \frac{-MPC}{1 - MPC} \right) \Delta T$$

### Government expenditure multiplier

*Example 1:* The MPC is 0.8 and the government wants to know how much GDP is affected after increasing government spending by 1000 (i.e.  $\Delta G = 1000$ )

$$\Delta Y = \left( \frac{1}{1 - 0.8} \right) 1000$$

When we solve for  $\Delta Y$ , we get  $\Delta Y = 5000$ . I.e., an increase in G of 1000 leads to an increase in Y of 5000.

## Tax multiplier

*Example 2:* The MPC is 0.8 and the government wants to know how much GDP is affected after increasing taxes by 1000 (i.e.  $\Delta T = 1000$ )

$$\Delta Y = \left( \frac{-0.8}{1 - 0.8} \right) 1000$$

When we solve for  $\Delta Y$ , we get  $\Delta Y = -4000$ . I.e., an increase in  $T$  of 1000 leads to a decrease in  $Y$  of 4000.

Note what we said above. Increasing  $G$  leads to an increase in  $Y$ , but also that  $\Delta G < \Delta Y$ . Similarly, an increase in  $T$  leads to a decrease in  $Y$ . Given that the MPC is relatively large, we also observe  $|\Delta T| < |\Delta Y|$ .

Of course, if we began with a given  $\Delta Y$ , we could use that  $\Delta Y$  with the MPC to determine the amount of  $\Delta G$  or  $\Delta T$  that would get us this given  $\Delta Y$ .