

## Tutorial Note 2: Consumption and Goods Market

Solution to Exercises

Teaching Assistant: Harlly Zhou

1.
  - a.  $Y = 480 + (0.5)(Y - 70) + 110 + 250 = 1610$  billion.
  - b.  $Y_D = 1610 - 70 = 1540$  billion.
  - c.  $C = 480 + 0.5(1540) = 1250$  billion.
2.
  - Q5(c): Because of the automatic effect of taxes on the economy, the economy responds less to changes in autonomous spending than in the case where taxes are independent of income. Since output tends to vary less (to be more stable), fiscal policy is called an automatic stabilizer.
  - Q6(c): Both  $Y$  and  $T$  decrease.
  - Q6(d): If  $G$  is cut,  $Y$  decreases even more. A balanced budget requirement amplifies the effect of the decline in  $c_0$ . Therefore, such a requirement is destabilizing.
3. A. Simple by definition.
4. (1) Transfers will increase during recessions when output  $Y$  decreases. For example, in recessions, the unemployment rate will increase. The government pays parts of workers' original earnings for a specified amount of time. This would help the unemployed workers and reduce the negative effects of recession on consumption.  
(2) a.  $Y = \frac{1}{1-c_1(1-r_2)}[(c_0 + c_1r_1) - c_1T + I + G]$ .  
b. We have

$$Z = (c_0 + c_1r_1) + c_1(1 - r_2)Y - c_1\bar{T} + \bar{I} + \bar{G}.$$

Increasing both  $\bar{G}$  and  $\bar{T}$  by 1 unit will cause  $Z$  to increase by  $1 - c_1$  unit. Then  $Y$  increases by  $1 - c_1$  unit. Since

$$C = c_0 + c_1(Y - T + R) = [c_0 + c_1(r_1 - \bar{T})] + c_1(1 - r_2)Y,$$

$C$  increases by  $(1 - c_1)(1 - r_2)$  unit. Then  $Z$  increases by  $(1 - c_1)c_1(1 - r_2)$  unit,  $Y$  increases by  $(1 - c_1)c_1(1 - r_2)$  unit, and  $C$  increases by  $(1 - c_1)c_1^2(1 - r_2)^2$  unit. In the end, the multiplier is

$$\sum_{i=0}^{+\infty} (1 - c_1)[c_1(1 - r_2)]^i = \frac{1 - c_1}{1 - c_1(1 - r_2)}.$$

(3) a. With constant  $\bar{T}$ , the disposable income is

$$Y_D = Y - \bar{T} + (r_1 - r_2 Y) = (1 - r_2)Y - (\bar{T} - r_1).$$

In the alternative system, the disposable income is

$$Y_D = Y - (t_0 + t_1 Y) = (1 - t_1)Y - t_0.$$

Equating the coefficients yields the correspondence:

$$t_1 = r_2, \quad t_0 = \bar{T} - r_1.$$

b.  $r_2 > 0$  and  $t_1 > 0$  are both automatic stabilizers that flattens the slope of  $Y_D$  w.r.t.  $Y$ . Increasing  $t_0$  is the same as either increasing the fixed tax  $\bar{T}$  or lower the transfer  $r_1$ .