Exercise 4

Keynesian Cross and Fiscal Policy

1. Answer the following questions.

   1.1 Suppose Govt Multiplier is 5 and ΔG = 5. Find ΔY.

   1.2 Suppose Tax Multiplier is -3 and ΔY = -9. Find ΔT.

   1.3 Suppose ΔY = 10 and ΔI = 2. Find Investment Multiplier.

1.1 Government multiplier $= \frac{\Delta Y}{\Delta G} = 5$

$\cdot \Delta G = 5$

$\therefore \Delta Y = \frac{\Delta Y}{5} = 5$

$\Delta Y = 25$

1.2 tax multiplier $= \frac{\Delta Y}{\Delta T} = -3$

$= \frac{(-9)}{\Delta T} = -3$

$\Delta T = 3$

1.3 investment multiplier $= \frac{\Delta Y}{\Delta I}$

Given $\Delta Y = 10$ $\Delta I = 2$

$\frac{10}{2} = 5$

2. From $Y = C + I + G$ where $C = C_0 + C_1(Y - T)$, find

   2.1 Equilibrium Output Y*

   2.2 $\Delta Y/\Delta I$

   2.3 $\Delta Y/\Delta G$

   2.4 $\Delta Y/\Delta T$

   2.5 Balanced-Budget Multiplier (BBM)

   2.6 Explain what the BBM is.

2.1 $AE = C + I + G$

$Y = AE$

$y^* = C + I + G$

$y^* = C + C_0 + C_1(Y - T) + I + G$

$y^* = C + C_0 + C_1 Y - C_1 T + I + G$

$Y - C_1 Y = C + C_0 - C_1 T + I + G$

$Y(1 - C_1) = C + C_0 - C_1 T + I + G$

$$Y = \frac{1}{(1 - C_1)}(C + C_0 - C_1 T + I + G)$$

2.2 $AE = C + I + G$

$AE = C_0 + C_1(Y - T) + I + G$

$AE = C_0 + C_1 Y - C_1 T + I + G$

$AE = (C_0 - C_1 T + I + G) + C_1 Y$

as I is injection; $\frac{\Delta Y}{\Delta I} = \frac{1}{1 - \text{slopt AE}}$

2.3 $AE = C + I + G$

$AE = C_0 + C_1(Y - T) + I + G$

$AE = C_0 + C_1 Y - C_1 T + I + G$

$AE = (C_0 - C_1 T + I + G) + C_1 Y$

as I is injection; $\frac{\Delta Y}{\Delta G} = \frac{1}{1 - \text{slopl } AE}$

2.4 $AE = C + I + G$

$AE = C_0 + C_1(Y - T) + I + G$

$AE = C_0 + C_1 Y - C_1 T + I + G$

$AE = (C_0 - C_1 T + I + G) + C_1 Y$

as I is injection; $\frac{\Delta Y}{\Delta T} = \frac{1}{1 - \text{slopl } AE}$

2.5 BBM

$$\frac{\Delta Y^*}{\Delta G} + \frac{\Delta Y^*}{\Delta T_0} = \frac{1 - C_1}{1 - C_1}$$

2.6

BBM is change in aggregate output when both G and T increased by 1 unit.

3. Assume a closed economy with government. The country has the following components of aggregate expenditure.

C = 300 + 0.75(Yd)	I = 50
G = 50	T = 50 (lump-sum tax)

3.1 Use the Y = AE (standard) approach to find the equilibrium output.

3.2 Draw the Keynesian Cross, and find the intercept on the vertical axis and the slope of the AE schedule.

3.3 Use the Leakage = Injection (or saving/investment) approach to find the equilibrium level of output.

(Hint: the equilibrium condition is S + T = I + G, with Yd= Y – T = C + S)

3.4 Draw the saving/investment curve to show the equilibrium.

3.5 Suppose that the government decides to build more roads, raising government spending by 50 units, but this project is to be financed by the increase in net taxes of 50 units. Use the Y = AE (standard) approach to find the new equilibrium output.

3.6 Use the Balanced-Budget Multiplier (BBM) derived from Question 2.5 to find the new equilibrium output.

3.1 $Y = AE$

$AE = C + I + G$

$Y = C + I + G$

$Y = C_0 + C_1(Y - T) + I + G$

$Y = 300 + 0.75(Y - 50) + 50 + 50$

$Y = 300 + 0.75(Y) - 37.5 + 50 + 50$

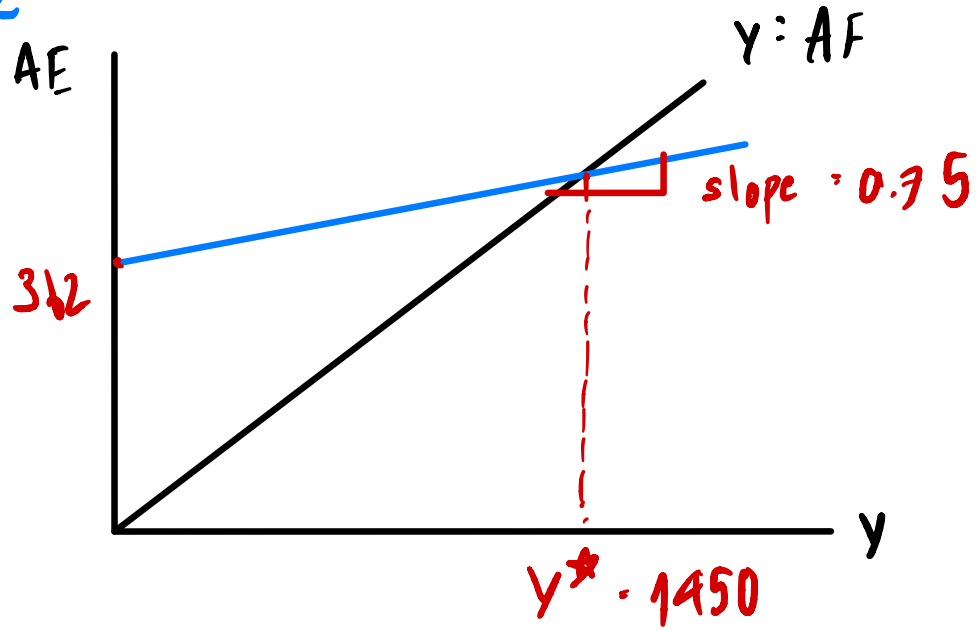
$Y - 0.75Y = 362.5$

$0.25Y = 362.5$

$Y^* = 1450$

$Y = 362 + 0.75Y$

3.2



3.3

$$S + T = I + G$$

$$Y - T = C + S$$

$$Y - C = S + T$$

$$Y - C = I + G$$

$$Y - C = 50 + 50$$

$$Y - C = 100$$

$$Y - (300 + 0.75Y_d) = 100$$

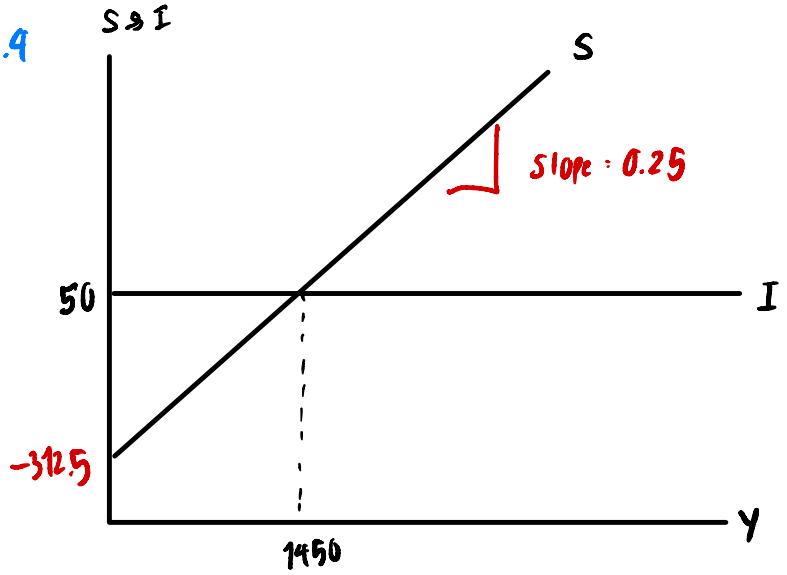
$$Y - (300 + 0.75(Y - 50)) = 100$$

$$Y - 300 - 0.75Y + 37.5 = 100$$

$$0.25Y = 362.5$$

$$Y^* = 1450$$

3.4



$$Y_d = C + S$$
$$Y - T = C + S$$
$$Y - 50 = 300 + 0.75(Y - 50) + S$$
$$S = -300 - 0.75Y + 37.5 + Y - 50$$
$$S = -312.5 + 0.25Y$$

3.5 $G\uparrow = 50 + 50 = 100$

$T\uparrow = 50 + 50 = 100$

$Y^* = ?$

$Y = AE$ equilibrium

$AE = C + I + G$

$Y = C + I + G$

$Y = 300 + 0.75(Y - 100) + 50 + 100$

$Y = 300 + 0.75Y - 75 + 150$

$Y = 375 + 0.75Y$

$0.25Y = 375$

$Y = 1500$

3.6 $\frac{\Delta y^*}{\Delta G} + \frac{\Delta y^*}{\Delta T_0} = \frac{1 - C_1}{1 - C_1} = 1$

$G\uparrow_1$ and $T\uparrow_1$ = $y^*\uparrow_1$

$\therefore$ G and T increased by 50 : output increased by 50

$\therefore$ $y + 50$

$y^* = 1450 + 50$

$= 1500$

5. Assume an open economy with government. The country has the following components of aggregate expenditure.

$C = 200 + 0.7(Yd)$	$I = 75$	$G = 75$
$T = 50$	$X = 50$	$M = 50 + 0.1Y$

MPC

MPM

5.1 Use the Y = AE approach to find the equilibrium. Is Y = 300 an equilibrium? If it is not, explain the adjustment process towards equilibrium.

5.2 Based on what you have derived in Question 4, calculate the investment, government spending, tax, and balanced-budget multipliers.

5.3 Interpret the value of each of the multipliers.

Suppose that the full-employment output (Y_F) is 600;

5.4 What type of output gap is the economy currently experiencing?

5.5 Draw the Keynesian Cross. Identify its slope and intercept. Also, illustrate the output gap.

Now, government wants to correct the output gap by moving the economy to the full-employment level, and is considering different policies.

(Hint: use the multipliers from Question 5.2 to answer the following questions)

5.6 If the government wants to adjust **only its spending (G)**, how much G should be changed?

5.7 If the government wants to adjust **only its net taxes (T)**, how much T should be changed?

5.8 If the government wants to boost **only investment (I)**, how much I should be changed?

5.9 If the government wants to implement a balanced-budget policy, what should the government do with G and T?

$Y = AE$

$AE = C + I + G + X - M$

$Y = 200 + 0.7(Y - 50) + 75 + 75 + (50 - 50 - 0.1Y)$

$Y = 200 + 0.7Y - 35 + 75 + 75 + 50 - 50 - 0.1Y$

$Y + 0.1Y - 0.7Y = 315$

$0.4Y = 315$

$Y^* = 787.5$

NO; $Y = 30$ is not equilibrius it need to increase the production to move to equilibrium at $Y = 787.5$

S.2 $MPC = 0.7$ $MPM = 0.1$

Slope of $AE = 0.6$

$$\frac{\Delta Y^*}{\Delta I} = \frac{1}{1 - \text{slope of } AE} = \frac{1}{1 - 0.6} = 2.5$$

$$\frac{\Delta Y^*}{\Delta G} = \frac{1}{1 - \text{slope of } AE} = \frac{1}{1 - 0.6} = 2.5$$

$$\frac{\Delta Y^*}{\Delta T} = \frac{-MPC}{1 - \text{slope of } AE} = \frac{-0.7}{1 - 0.6} = -1.75$$

$$BBM = \frac{\Delta Y^*}{\Delta G} + \frac{\Delta Y^*}{\Delta T}, \quad 2.5 - 1.75 = 0.75$$

5.3

investment multiplier : investment increased by 1 unit

= output (Y) increase by 2.5 units

government multiplier : government spending increased by 1 unit

= output (Y) increase by 2.5 units

tax multiplier = tax increased by 1 unit

= output (Y) decrease by 1.75 units

BBM = when government spending and tax increased by 1 unit = output (Y) will increased by 0.75 unit.

6. Explain the role of Import as an automatic stabilizer. If the government wants to further stabilize the economy, is there anything that the government can do with its tax system? Explain.

Automatic stabilizer is component in AE to stabilize the GDP it main role is the make the economy less fluctuated as they can

During good time (Inflation) ⇒ high Y and AE

T ↑ M ↑ G ↓ → AE ↓ Y^* ↓

During bad time (decession) → low Y and AE

T ↓ M ↓ G ↑ → AE ↑ Y^* ↑

7. Let S = -200 + 0.5Y and I = 50, be the saving function and investment.

7.1 Use the saving/investment approach to find the equilibrium output.

7.2 Find the equilibrium saving. (Hint: substitute Y* into S)

Suppose people decide to save more, <u>increasing autonomous saving by 100</u>.

7.3 Use the saving/investment approach to find the new equilibrium output.

7.4 Find the new equilibrium saving. (Hint: substitute new Y* into S)

7.5 Comment on your result.

7.1 $-200 + 0.5y = 50$

$\frac{1}{2}y = 250$

$y^* = 500$

7.2 $S = -200 + 0.5y^*$

$= -200 + 0.5(500)$

$= -200 + 250$

$S^* = 50$

7.3

$$y = -200 + 0.5y + 100$$

$$y = -100 + 0.5y$$

$$-100 + 0.5y = 50$$

$$\frac{1}{2}y = 150$$

$$y^* = 300$$

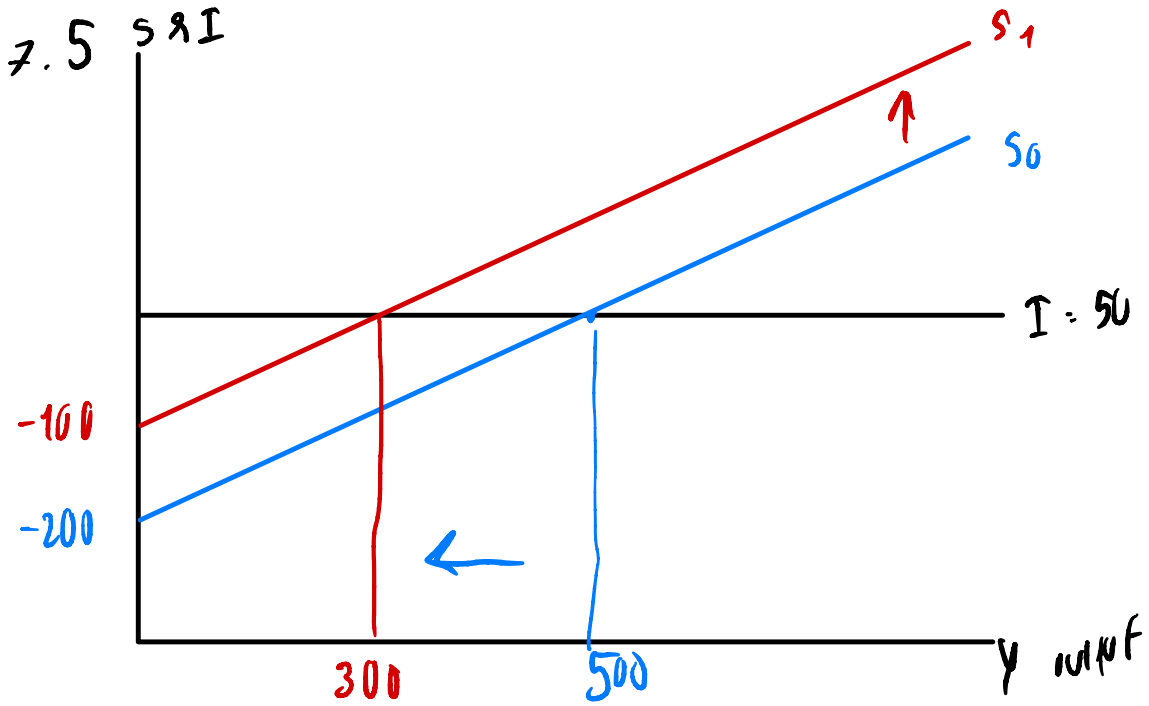
7.4 $S = -100 + 0.5y^*$

$$= -100 + 0.5(300)$$

$$= -100 + 150$$

$$S^* = 50$$

7.5



Paradox of thrift

↓

People save more

↓

Economy slow down

↳ Due to less money change hand in economy

↓

less income to people

People save more by 100

($S_0 \rightarrow S_1$)

Output decrease by 200

(500 → 300)