Exercise 4
Keynesian Cross and Fiscal Policy

1. Answer the following questions.
   - 1.1 Suppose Govt Multiplier is 5 and $\Delta G = 5$. Find ΔY.
   - 1.2 Suppose Tax Multiplier is -3 and $\Delta Y = -9$. Find ΔT.
   - 1.3 Suppose $\Delta Y = 10$ and $\Delta I = 2$. Find Investment Multiplier.

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.

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

   $C = 300 + 0.75(Yd)$ $\quad\quad$ $I = 50$

   $G = 50$ $\quad\quad$ $T = 50$ (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.

4. From $Y = C + I + G + (X - M)$
where $C = C_0 + C_1(Y - T)$ and $M = M_0 + M_1(Y)$, find

4.1 Equilibrium Output Y*

4.2 $\Delta Y/\Delta I$

4.3 $\Delta Y/\Delta G$

4.4 $\Delta Y/\Delta T$

4.5 Balanced-Budget Multiplier (BBM)

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

$C = 200 + 0.7(Yd)$ $I = 75$ $G = 75$

$T = 50$ $X = 50$ $M = 50 + 0.1Y$

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?

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.

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, increasing autonomous saving by 100.

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.

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

$\Delta G = 5$

$\therefore \Delta Y = 25$

1.2 find ΔT ; Tax multiplier $= -3$

$\therefore \Delta T = 3$

1.3 $\frac{\Delta Y}{\Delta I}$

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

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

2.1 $Y = AE$

$Y = C + I + G$

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

2.2 $\frac{\Delta Y}{\Delta I} = \frac{1}{1-C_1}$

2.3 $\frac{\Delta Y}{\Delta G} = \frac{1}{1-C_1}$

2.4 $\frac{\Delta Y}{\Delta T} = -\frac{C_1}{1-C_1}$

2.5 $\frac{\Delta Y}{\Delta T} + \frac{\Delta Y}{\Delta G} = -\frac{C_1}{1-C_1} + \frac{1}{1-C_1} = \frac{1-C_1}{1-C_1} = 1$

2.6 The sum of $\frac{\Delta Y}{\Delta G}$ and $\frac{\Delta Y}{\Delta T}$ will tell how Y will change when G and T change by the same amount

3.1 $AE = C + I + G$

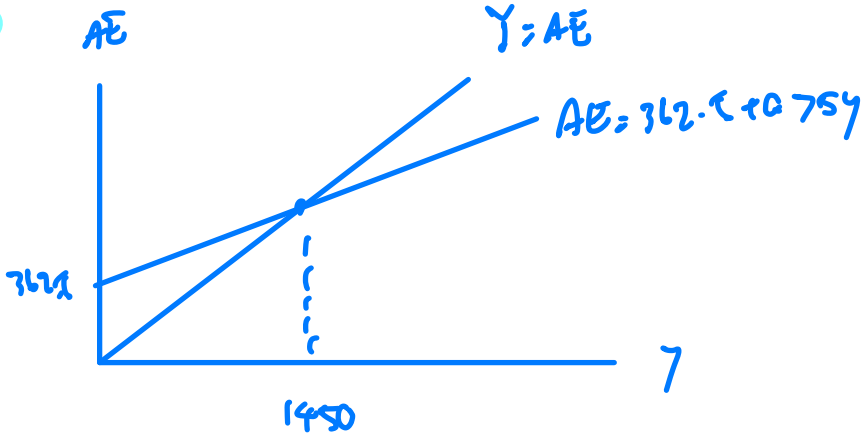
$Y = 300 + 0.75(Y - 50) + 50 + 50$

$0.25Y = 362.5$

$Y = 1450$

$AE = 362.5 + 0.75Y$

3.2



3.3 $S + T = I + G$

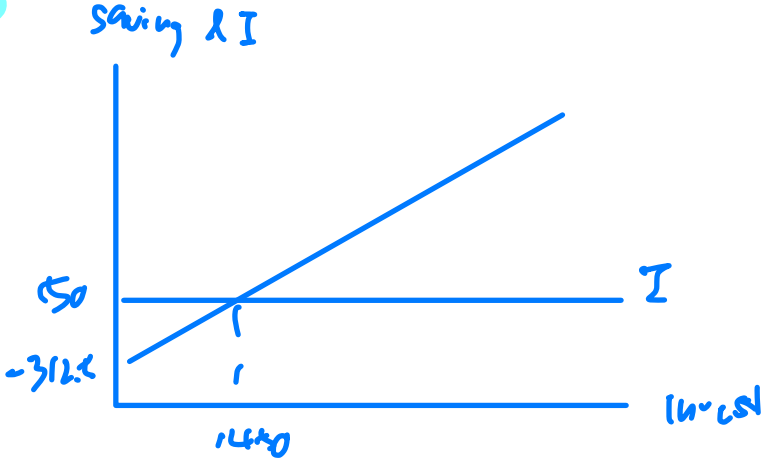
$S = -0.75(1 - mpc)Y$

$S = -362.5 + 0.25Y$

$0.25Y = 362.5$

$Y = 1450$

3.4



$Y_d = C + S$

$S = -300 - 0.75Y + 37.5 + Y - 50$

$S = -312.5 + 0.25Y$

3.5 $AE = C + I + G$

$Y = 30C + 0.75(Y - 100) + 100 + 50$

$0.25Y = 375$

$Y = 1500$

3.6 $\frac{\partial Y}{\partial G} + \frac{\partial Y}{\partial T} = \frac{\partial C}{50} + \frac{\partial C}{50} = 2$

$G \& T \uparrow 1 \quad Y^{\Delta} \uparrow 2$

$G \& T \uparrow 50 \quad Y^{\Delta} \uparrow 100$

4.1 $Y = C_0 + C_1(Y - T) + I + G + X - (M_0 + M_1 Y)$

$Y = C_0 + C_1 Y - C_1 T + I + G + X - M_0 - M_1 Y$

$Y(1 - C_1 + M_1) = C_0 - C_1 T + I + G + X - M_0$

$Y^{\Delta} = \frac{C_0 - C_1 T + I + G + X - M_0}{1 - C_1 + M_1}$

4.2 $\frac{\partial Y}{\partial I} = \frac{1}{1 - C_1 + M_1}$

4.3 $\frac{\partial Y}{\partial G} = \frac{1}{1 - C_1 + M_1}$

4.4 $\frac{\partial Y}{\partial T} = -\frac{C_1}{1 - C_1 + M_1}$

4.5 $\frac{\partial Y}{\partial G} + \frac{\partial Y}{\partial T} = \frac{1 - C}{1 - C_1 + M_1}$

5.1 $Y = 200 + 0.7(Y - 50) + 75 + 75 + 50 - (50 + 0.1Y)$

$0.9Y = 315$

$Y = 787.5$

300 is not at equilibrium, because $Y < AE$ firms is now facing shortage

5.2 $\frac{\Delta Y}{\Delta F} = \frac{\Delta Y}{\Delta I} = \frac{1}{(1-0.7)+0.1} = \frac{1}{0.4} = 2.5$

$\frac{\Delta Y}{\Delta T} = \frac{-0.7}{(1-0.7)+0.1} = \frac{-0.7}{0.4} = -1.75$

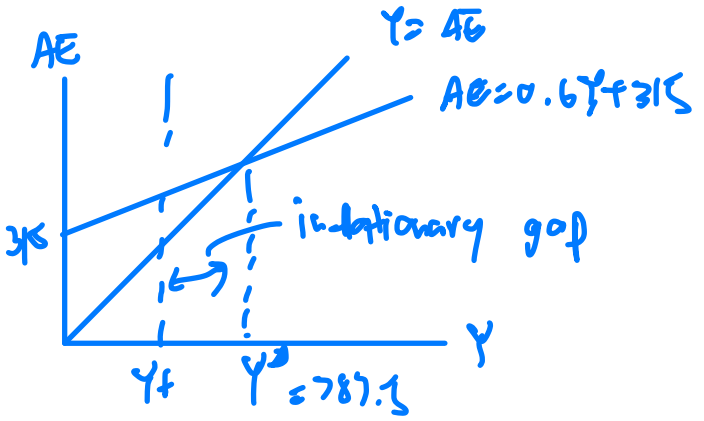
$\frac{\Delta Y}{\Delta F} + \frac{\Delta Y}{\Delta T} = \frac{1-0.7}{1-0.7+0.1} = \frac{0.3}{0.4} = 0.75$

5.3 $Y^* > Y_F \quad [787.5 > 600]$

The unemployment is below the natural rate of unemployment

5.4 Inflationary gap

5.5



Since this is an inflationary gap, the solution is to shift the AE down by decreasing in tax or spending etc.

5.6 $\frac{\Delta Y}{\Delta G} = 2.5$

$\Delta Y = 600 - 787.5 = -187.5$

$\Delta G = -75$

∴ Government should decrease its spending by 75.

5.7 $\frac{\Delta Y}{\Delta T} = 1.75$

$\frac{-187.5}{\Delta T} = -1.75$, $\Delta T = 107.1$

∴ Net taxes should raised by 107.1

5.8 $\frac{-137.5}{\Delta I} = 2.5$, $\Delta I = -75$

∴ It should decrease in investment by 75

5.9 $BPM = 0.75$

$\frac{-187.5}{\Delta G + \Delta T} = 0.75$

$\Delta G + \Delta T = -250$

∴ decrease ΔG, ΔT by 250

6 When economic is good, Y is high, T and M are large which make people has less income to spend domestically If gov. want to slow down the economy they have to increase tax.

If govt. want to boost, they have to reduce tax.

7.1 $S = I$

$-200 + 0.5Y = 50$

$Y^* = 500$

7.2 $S = -200 + 0.5(500)$

$= 50$

7.3 $S = -100 + 0.5Y$

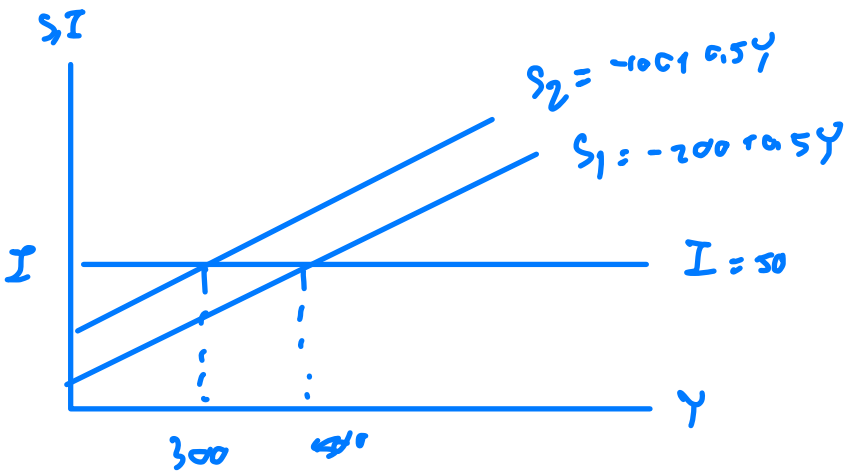
$-100 + 0.5Y = 50$

$Y^* = 300$

7.4 $S = -100 + 0.5(300)$

$S^* = 300$

7.5



Increasing autonomous saving doesn't mean you will be richer as from the new equilibrium saving still be the same at 50.