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.

1.1 $\frac{\Delta Y}{\Delta G}$ = govt multiplier

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

$\Delta Y = 25$

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

$\frac{-9}{x} = -3$

$\Delta T = 3$

$\frac{\Delta Y}{\Delta I}$ = Investment multiplier

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

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

   2.1 Equilibrium Output Y*

$Y = AE$

$Y = C_0 + C_1Y - C_1T + I + G$

$Y - C_1Y = C_0 - C_1T + I + G$

$Y(1 - C_1) = C_0 - C_1T + I + G$

$Y = \frac{C_0 - C_1T + I + G}{1 - C_1}$

   2.2 $\Delta Y/\Delta I$

$\frac{\Delta Y}{\Delta I} = \frac{1}{1-C}$

   2.3 $\Delta Y/\Delta G$

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

   2.4 $\Delta Y/\Delta T$

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

   2.5 Balanced-Budget Multiplier (BBM)

$\Delta G = \Delta T$

BBM = Govt. Mult. + TAX Mult.

$= \frac{1}{1-C_1} + \frac{(-C_1)}{1-C_1}$

2.6 Explain what the BBM is.

A situation in financial planning or budgeting process where planned spending. Govt. spending = tax.

BBM tells how Y^* change when both T&G increase by 1 units.

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.

$Y = AE$

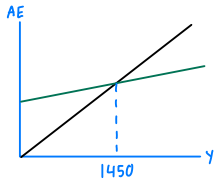
$AE = C + I + G$

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

$0.25Y = 362.5$

$Y = 1450$

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



$C = a + bY$

$C = 300 + 0.75(Yd)$

$\therefore$ intercept at 300

0.75 is slope

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)

$S + T = I + G$

$S + 50 = 50 + 50$

$S = 50$

$Y - T = C + S$

$Y - 50 = C_0 + C_1(Y - 50) + S$

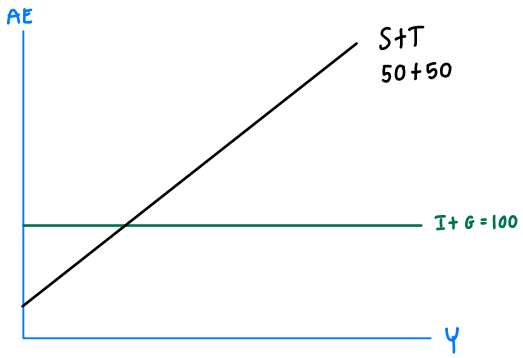
$Y - 50 = 300 + 0.75Y - 37.5 + 50$

$Y = 362.5 + 0.75Y$

$0.25Y = 362.5$

$Y = 1450$

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

$Y = AE = C + I + G + (X - M)$

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

$= 300 + 0.75Y + 75$

$0.25Y = 375$

$Y^* = 1500$

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

$\frac{\Delta Y}{\Delta GBT} = 1$

$\frac{\Delta Y}{50} = 1$

$\Delta Y = 50$

New $Y^* = 1450 + 50$

$= 1500$

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 ΔY/ΔI

4.3 ΔY/ΔG

4.4 ΔY/ΔT

4.5 Balanced-Budget Multiplier (BBM)

4.1) $Y = C_0 + C_1Y - C_1T + I + G + X - M_0 + M_1Y$

$Y - C_1Y - M_1Y = C_0 + C_1T + I + G + X - M_0$

$Y(1 - C_1 - M_1) = C_0 + C_1T + I + G + X - M_0$

$Y = \frac{C_0 + C_1T + I + G + X - M_0}{(1 - C_1 - M_1)}$

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

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

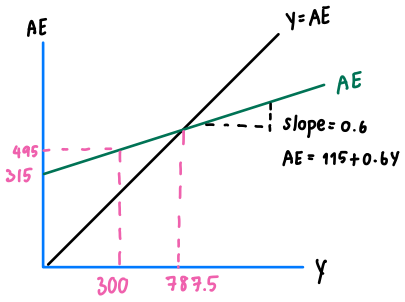
4.4) $\frac{\Delta Y}{\Delta T} = \frac{-C_1}{1 - C_1 + M_1}$

4.5) $BBM = \frac{1 - C_1}{1 - C_1 + M_1}$

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

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



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

$0.4Y = 315 \quad Y = 787.5$

$Y = 300$ is not at Equilibrium

Income has to adj. towards Equilibrium by ↑ production, Gov. spending ↑, ↓ tax

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

Investment multiplier $= \frac{\Delta Y}{\Delta I} = \frac{787.5}{75} = 10.5$

Govt. multiplier $= \frac{\Delta Y}{\Delta G} = \frac{787.5}{75} = 10.5$

Tax. multiplier $= \frac{\Delta Y}{\Delta T} = \frac{787.5}{50} = 15.75$

$\frac{1}{1 - C_1 + M_1} = \frac{1}{1 - 0.6} = 2.5$ ($-0.7 + 0.1$)

$= \frac{-C_1}{1 - C_1 + M_1} = \frac{-0.7}{0.4} = 1.75$

BBM $= 10.5 + 15.75 = 21.25$

$= 2.5 + (-1.75) = 0.75$

5.3 Interpret the value of each of the multipliers.

Invest mult. = if investment increase 1 unit, Y increase 2.5 units.

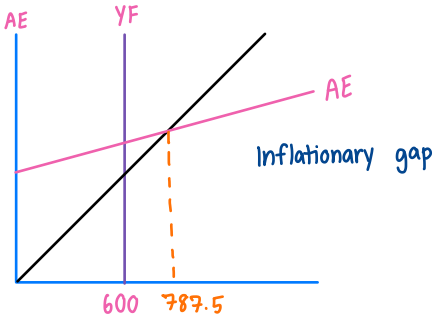
Govt. mult. = if Govt. spending increase 1 unit, Y increase 2.5 units

Tax. mult. = if tax increase 1 units, Y decrease 1.75 units

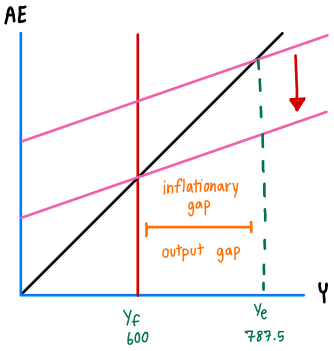
BBM. mult. = if Govt. spending & tax both increase 1 unit, Y increase 0.75 unit.

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.



$C = a + bY$

$= 200 + 0.7(Yd)$

$\therefore$ intercept = 200

slope = 0.7

$AE = 315 + 0.6Y$

$\therefore$ intercept = 315

slope = 0.7

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?

$\frac{\Delta Y}{\Delta G} = 10.5$

$\frac{189.5}{\Delta G} = 10.5$

$\Delta G = 0.056$ units

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

$\Delta Y = -189.5$

$\frac{-189.5}{\Delta G} = 2.5$

$\Delta G = -75$

(Govt should decrease G by 75)

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

$\frac{\Delta Y}{\Delta T} = 15.75$

$\frac{787.5}{\Delta T} = 15.75$

$\Delta T = 0.02$ units

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

$\Delta Y = -187.5$

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

$\Delta T = 107.14$

(Govt. should raise T)

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

$\frac{\Delta Y}{\Delta I} = 10.5$

$\frac{7875}{\Delta I} = 10.5$

$\Delta I = 0.056$ unit

$\Delta I = -7.5$

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

$\frac{\Delta Y}{BBM} = 21.25$

$\frac{787.5}{BBM} = 21.25$

$BBM = 0.027$ units

$\frac{\Delta Y}{BBM} = 0.75$

$\frac{187.5}{BBM} = 0.75$

$BBM = 250$

→ Govt. will reduce gov. spending 250 units

reduce tax 250 units.

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.

Boom economy
↳ govt. increase tax + imports.
↳ people then have less income
↳ consumption will then decrease

Recession
↳ decrease import + tax
↳ more income to spend domestically
↳ boost the economy

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.

7.1) $S = I$

$-200 + 0.5Y = 50$

$0.5Y = 250$

$Y^* = 500$

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

$S^* = -200 + 0.5(500)$

$S^* = 50$

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.

$S = -200 + 0.5Y + 100$

$S' = -100 + 0.5Y$

$S' = I \rightarrow -100 + 0.5Y = 50$

$Y^* = 300$

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

$S^* = -100 + 0.5(300)$

$S^* = 50$

7.5 Comment on your result.