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Exercise 3
Keynesian Cross and the Multiplier

1. The Keynesian consumption function assumes that $0 < MPC < 1$; what is the basis for such assumption?
2. Assume a CLOSED economy with NO government. Let the autonomous consumption be 200 and MPS be 0.3. Draw and write equations for both saving and consumption functions.
3. Let the saving function be $S = -150 + 0.35Y$. Find and draw the consumption function.
4. How do the followings affect the AE graph (i.e. explain how the graph changes) and the equilibrium output?

- All firm managers decide to buy fewer machines.
- The government decides to build more roads.
- The citizens decide to save more at all income levels.
- The citizens decide to save larger proportion of income.
- The government decides to raise tax.

5. In the Keynesian Cross Model, suppose that aggregate output is greater than aggregate expenditure. Explain the adjustment process towards the equilibrium.
6. Let $C = 60 + 0.6Y$ and $I = 20$. Find the equilibrium output with the saving/investment approach.
7. Let $S = -60 + 0.4Y$ and $I = 20$. Find the equilibrium output with the standard approach. Now, suppose I increases by 20. Find the new equilibrium and the investment multiplier.
8. With the multiplier effect, an injection of money (for example, investment) can lead to a greater proportional increase in output. Explain how this can happen.
9. How is the investment multiplier related to MPC? Explain the intuition behind such relationship. (Hint: Question 9)
10. What is the Paradox of Thrift? Explain it with diagram.

Answers:

① In consumption equation $C = C_0 + MPC\,Y$, there exists an assumption that $0 < MPC < 1$ because Y signifies income and it is impossible to consume more than the income.

② + Consumption equation:

$C = C_0 + MPC\,Y$; $MPC + MPS = 1 \Rightarrow MPC = 1 - 0.3 = 0.7$

$C = 200 + 0.7Y$

+ Saving equation:

$Y = S + C \Rightarrow S = Y - C$

$S = Y - 200 - 0.7Y$

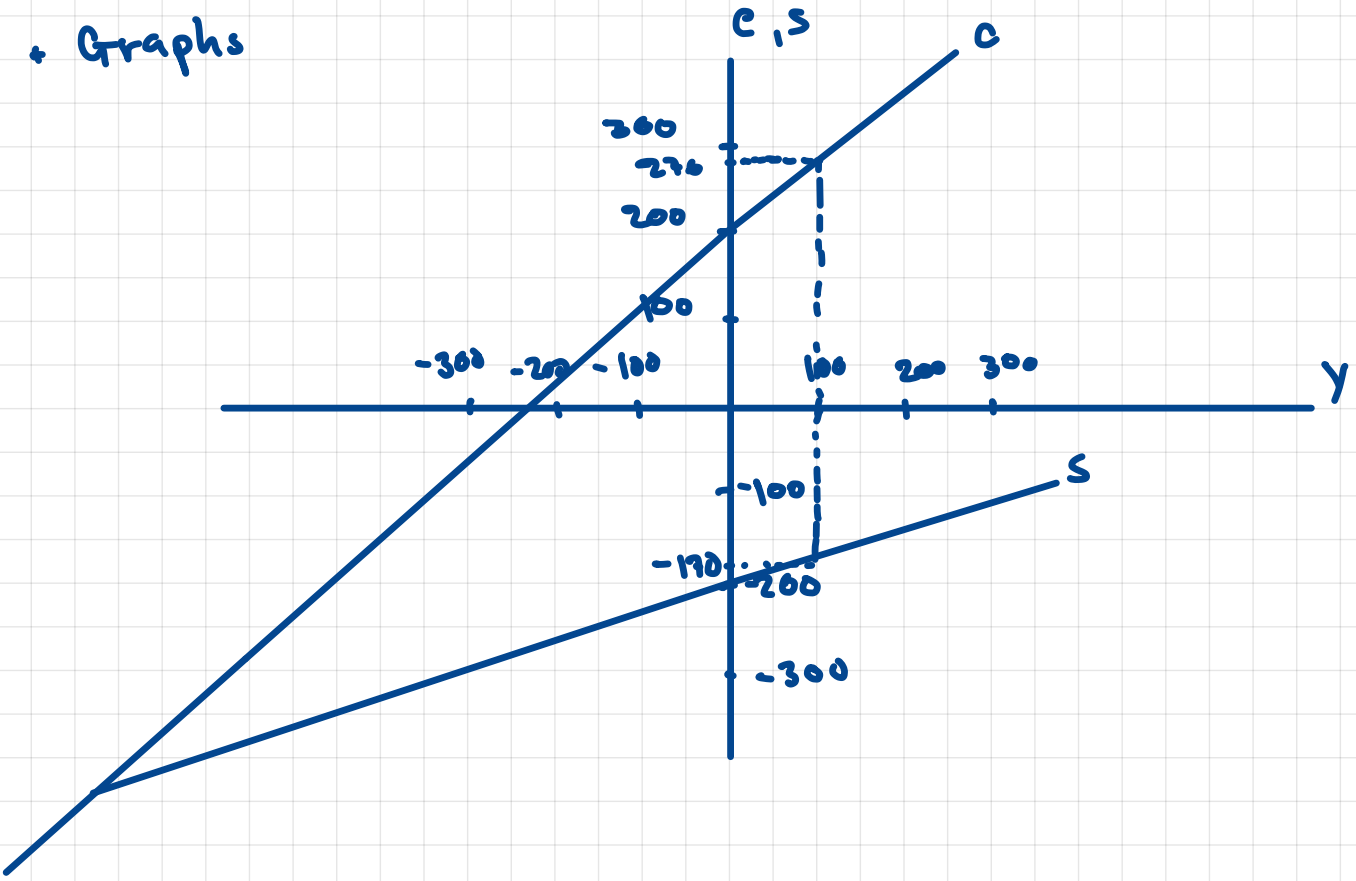
$S = -200 + 0.3Y$

+ Graph:

if $Y = 0 \Rightarrow C = 200$; $S = -200$

if $Y = 100 \Rightarrow C = 270$; $S = -170$

+ Graphs



⑤. Find and draw consumption function

$Y = S + C \Rightarrow C = Y - S$

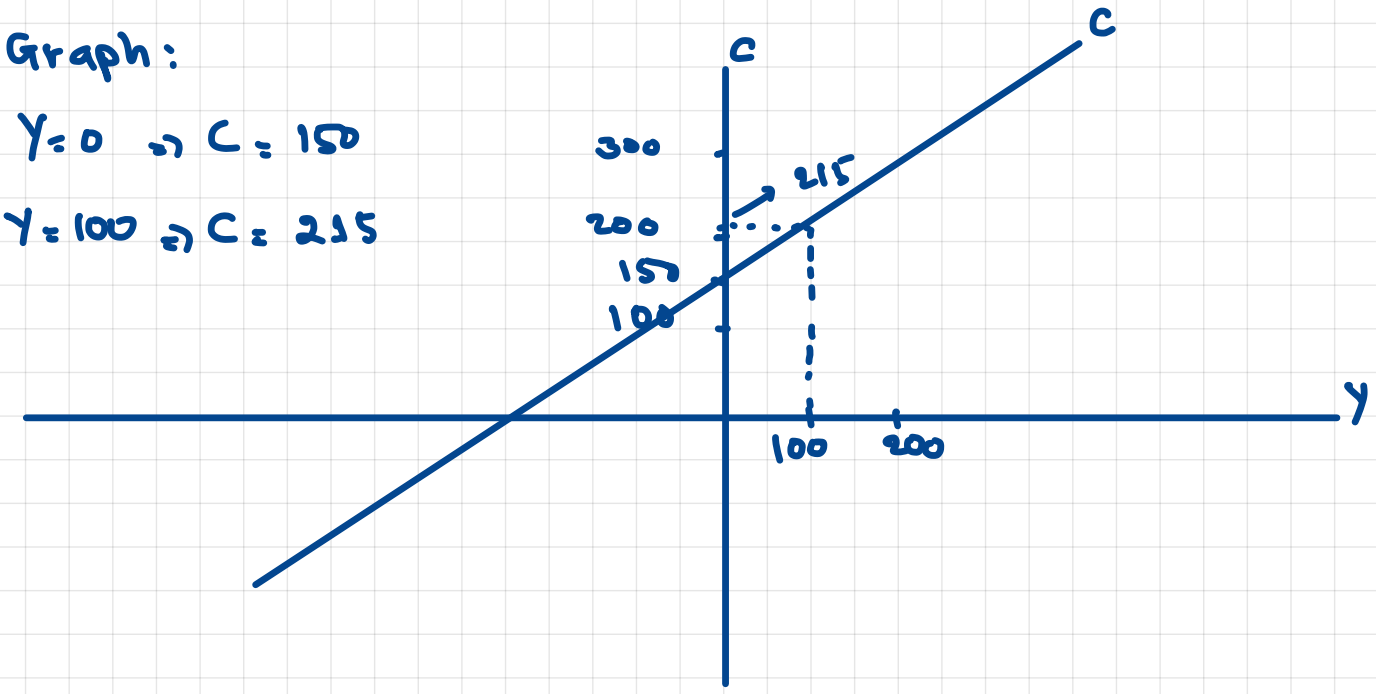
$S = -150 + 0.35Y \Rightarrow C = Y + 150 - 0.35$

$C = 150 + 0.65Y$

+ Graph:

if $Y = 0 \Rightarrow C = 150$

$Y = 100 \Rightarrow C = 215$



- All firm managers decide to buy fewer machines.
  → means lower I → AE line shift downwards →
  lower Y^*
- The government decides to build more roads.
  → means higher G → AE line shifts upwards
  → higher Y^*
- The citizens decide to save more at all income levels.
  → means higher S → AE line shifts downwards
  → lower Y^*
- The citizens decide to save larger proportion of income.
  → higher MPS → lower MPC → AE line becomes steeper
  → lower Y^*
- The government decides to raise tax.
  → higher T → AE shifts downwards → lower Y^*

⑤. Surplus occurs when aggregated output is higher than aggregated expenditure. This results in unsold inventories that signal the producers to cut down on production, shifting it back towards equilibrium.

⑥. Find Y^* with investment approach

$I = 20$, $Y = S + C \Rightarrow S = Y - C$

$S = Y - 60 - 0.6Y$

$S = -60 - 0.4Y$

$S = I$

$\Rightarrow -60 + 0.4Y = 20$

$Y^* = \frac{20 + 60}{0.4}$; $\boxed{Y^* = 200}$

⑦. Find Y^* with standard approach

$I = 20$; $C = 60 + 0.6Y$

$AE = C + I$

$AE = 60 + 0.6Y + 20$

$Y = 80 + 0.6Y$

$0.4Y = 80 \Rightarrow \boxed{Y^* = 200}$

. I increases by 20

$AE = C + I$

$AE = 60 + 0.6Y + 20 + 20$

$Y = 100 + 0.6Y$

$0.4Y = 100 \Rightarrow \boxed{Y^* = 250}$

Investment multiplier : $\frac{\Delta Y}{\Delta I} = \frac{250 - 200}{20}$

$\boxed{\frac{\Delta Y}{\Delta I} = 2.5}$

⑧. An injection of money can lead to proportional increase in output because the money injected into the economy will become someone's income, and the person will spend the money which becomes another person's income. This loops continues until it loses traction. One man's spending is another man's income.

⑨ We have established that $\frac{\Delta Y}{\Delta I} = \frac{1}{1-MPC}$

thus, MPC and investment multiplier have a positive relationship.

i.e. The more people consume the more output (Y) can result from investment.

⑩. Paradox of thift states that the more people save, the less they consume, the less output will be produced and the less income. With less income they can save less.