

Exercise 6

IS-LM Model

*↑
interest rate*

- The IS-LM Model is a general equilibrium model, which means that... *there exists common price that clears 2 or more markets*.....
 There are... *2*... markets, which are... *Goods market and Money market*.....
 The price that clears these markets is... *interest rate*.....
 The IS curve represents a *negative*..... relationship between
 *Y* and *i* This is because... *higher interest rate*.....
discourage investment, as the result, Y falls.....
 The LM curve represents a *positive*..... relationship between
 *Y* and *i* This is because... *at higher level of income*.....
people will demand more money, as the result, i rise.....
 Each point on the IS curve is an equilibrium in the *Goods*... market.
 Therefore, we have the equilibrium condition: *Y = AE*.....
 Each point on the LM curve is an equilibrium in the *money*.. market.
 Therefore, we have the equilibrium condition: *M_d = M_s*.....

- Ceteris Paribus (other things equal), how will each variable affect each curve – shift (to which direction?) or movement?

Variable	IS Curve	LM Curve
$i \uparrow$	<i>movement along the curve</i>	<i>movement along the curve</i>
$G \downarrow$	<i>shift to the left</i>	-
$T \downarrow$	<i>shift to the right</i>	-
$G \& T \uparrow$ equally	<i>not affected</i>	-
$M \downarrow$	-	<i>shift to the left</i>
$P \downarrow$	-	<i>shift to the right</i>

- Explain, together with diagrams, how we can derive the IS curve from Keynesian Cross, and how we can derive the LM curve from the money market.

- Assume a closed economy with the government. The economy has the following parameters:

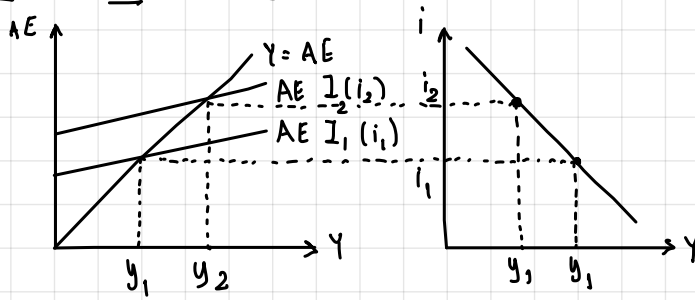
$$\begin{aligned}
 C &= C_0 + C_1(Y - T) & I &= I_0 - I_1 \cdot i & G &= G_0 & T &= T_0 \\
 L(i, Y) &= L_Y \cdot Y - L_i \cdot i & M &= M_0 & P &= P_0
 \end{aligned}$$

Answer the following questions.

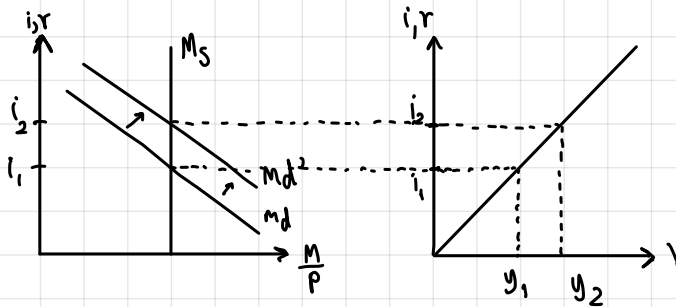
- What are I_1 , L_Y , and L_i ?
- Why are I_1 and L_i negative?
- Derive the IS equation that shows how i and Y are related.

3. Explain, together with diagrams, how we can derive the IS curve from Keynesian Cross, and how we can derive the LM curve from the money market.

IS : $i \uparrow \rightarrow I \downarrow \rightarrow AE \downarrow \rightarrow Y \downarrow$



LM : $Y \uparrow \rightarrow Md \uparrow \rightarrow i \uparrow$



4. Assume a closed economy with the government. The economy has the following parameters:

$$C = C_0 + C_1(Y - T) \quad I = I_0 - I_1 \cdot i \quad G = G_0 \quad T = T_0$$

$$L(i, Y) = L_Y \cdot Y - L_i \cdot i \quad M = M_0 \quad P = P_0$$

Answer the following questions.

- 4.1 What are I_1 , L_Y , and L_i ?
- 4.2 Why are I_1 and L_i negative?
- 4.3 Derive the IS equation that shows how i and Y are related.

4.1 I_1 is the investment which depends on i which means that if i increases, I_1 will decrease.

L_0 is the liquidity of money which depends on Y which related as positive relationship. L_i is the liquidity of money which will decrease if i increases.

4.2 I_1 decreases because when i increases, it will make investment decrease. L_i decreases because when i increases, ppl will not hold money but they deposit money to the bank instead which can be interpreted as $i \uparrow \rightarrow L \downarrow$.

4.3

$$Y = AE$$

$$Y = C + I + G$$

$$Y = C_0 + C_1(Y - T) + I_0 - I_1 i + G_0$$

$$Y = C_0 + C_1 Y - C_1 T + I_0 - I_1 i + G_0$$

$$I_1 i = C_0 + C_1 Y - C_1 T + I_0 + G_0 - Y$$

$$i = \frac{C_0 + C_1 Y - C_1 T + I_0 + G_0 - Y}{I_1}$$

4.4

$$i = \frac{C_0 + C_1 Y - C_1 T + I_0 + G_0 - Y}{I_1}$$

$$i = \frac{(C_1 - 1)Y + C_0 - C_1 T + I_0 + G_0}{I_1}$$

$$i = \frac{-(1 - C_1)}{I_1} Y + \frac{C_0 - C_1 T + I_0 + G_0}{I_1}$$

$$4.4 \quad i = \frac{C_0 + C_1 Y - C_1 T + I_0 + G_0 - Y}{I_1}$$

$$i = \frac{(C_0 - 1)Y + C_0 - C_1 T + I_0 + G_0}{I_1}$$

$$\frac{1}{1 - C_1} = M \quad i = - \left(\frac{1}{m} \times \frac{1}{I_1} \right) Y + \frac{C_0 - C_1 T + I_0 + G_0}{I_1}$$

$$\text{slope of IS curve is } - \left(\frac{1}{m} \times \frac{1}{I_1} \right)$$

$$4.5 \quad M_0 = M_p$$

$$\frac{M}{P} = L(Y, i)$$

$$\frac{M_0}{P_0} = L_0 \cdot Y - L_1 \cdot i$$

$$L_1 \cdot i = L_0 \cdot Y - \frac{M_0}{P_0}$$

$$i = \frac{L_0 \cdot Y - \frac{M_0}{P_0}}{L_1}$$

$$4.6 \quad \frac{m}{p} = L(Y, i)$$

$$\frac{M_0}{P_0} = L_0 \cdot Y - L_1 \cdot i$$

$$L_1 \cdot i = L_0 \cdot Y - \frac{M_0}{P_0}$$

$$i = \frac{L_0 \cdot Y - \frac{M_0}{P_0}}{L_1} \quad \#$$

$$\text{slope of LM curve is } \frac{L_0}{L_1}$$

5 slope of IS curve depend on

- interest elasticity of investment (sensitivity)

→ high sensitivity → when interest rate change it cause investment change a lot

→ low sensitivity → when interest rate change it cause investment change a little

- MPC or multiplier : multiplier = $\frac{1}{MPC}$ so lower MPC lead to increasing

multiplier are large, when interest rate increase output decrease a lot

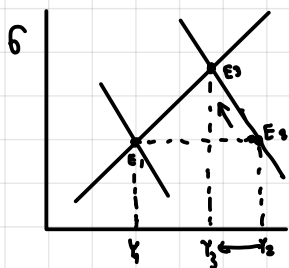
slope of LM curve depend on

- sensitivity of M_d to change in ψ

↳ if C_y is large the LM will be steep

- sensitivity of m_d to change in i

→ if L_i is small the LM will be steep



when government increase its spending it increase AE, firm will produce more for matching demand so Y will increase. So, when ppl have more income M_d will shift to the right and lead to higher interest rate however, at high interest rate its discourage investor to invest so, output fall.

7 when central bank decrease M_s bond issuer will increase interest rate that cause decreasing in investment and LM shift to the left

to summarize → MM : $P \uparrow M_s \downarrow$
→ GM