

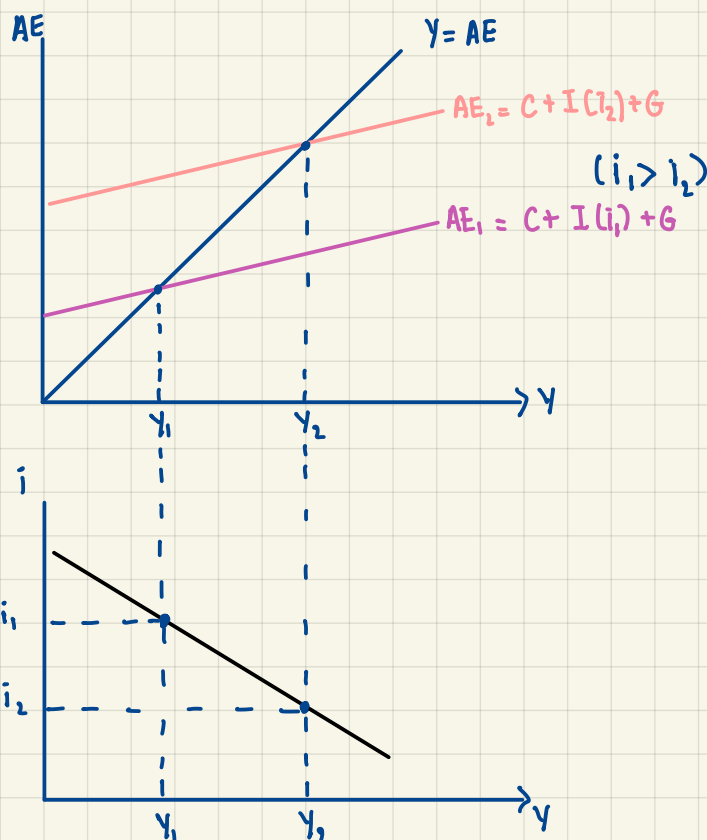
Answer

- The IS-LM Model is a general equilibrium model, which means that... there exists a common price that clear two or more markets. There are... 2... markets, which are... the goods and service market and the money market. The price that clears these markets is... the interest rate. The IS curve represents a negative relationship between interest rate and output. This is because... investment depends on interest rate now. When interest rate is high, it discourages investment and therefore, lower output. The LM curve represents a positive relationship between interest rate (i) and output (Y). This is because... when people have more income (Y), they will demand more money to spend. Each point on the IS curve is an equilibrium in the commodity market. Therefore, we have the equilibrium condition: $Y = AE$ or $Y = C(Y-T) + I(i) + G$. 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?

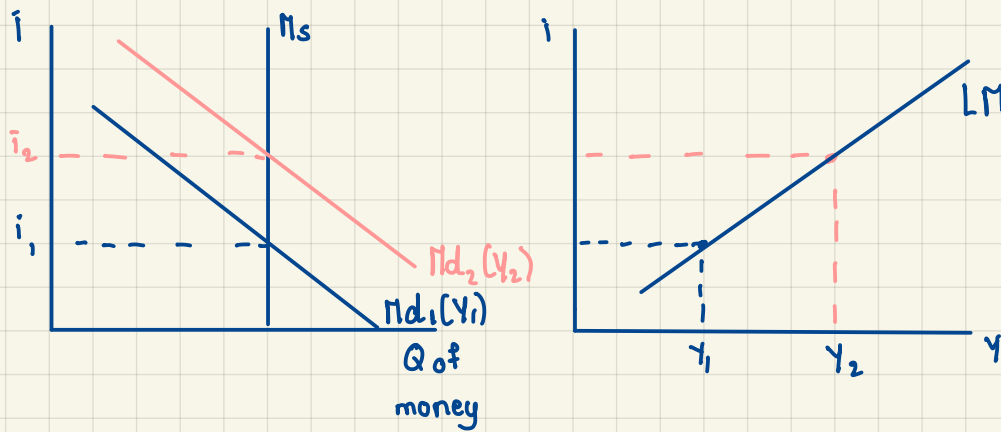
Variable	IS Curve	LM Curve
$i \uparrow$	move to the left	move to the right
$G \downarrow$	shift to downward left	move to the left
$T \downarrow$	shift to upward right	move to the right
$G \& T \uparrow$ equally	shift to upward right	move to the right
$M \downarrow$	move to the left	shift upward left
$P \downarrow$	move to the right	shift downward right

- Deriving IS curve from Keynesian cross :



Starting from Keynesian cross graph, the equilibrium condition is $Y = AE$. When there is an increase in i (investors will invest less due to higher cost of borrowing, and this will lower output (Y)). That's why output (Y) and interest (i) have negative relationship in IS curve ($i \uparrow \rightarrow Y \downarrow$).

Deriving the LM curve from the money market



Starting from money market, we know that equilibrium condition is $M_d = M_s$, but M_s is constant and M_d is determined by liquidity preference theory.

So, when there is an increase in income (Y), the demand for money will increase to $(M_{d1} \rightarrow M_{d2})$

However, if interest rate is still at i_1 , there will be shortage. When there is a shortage, people convert bond/share to money. Then, bond issuers will increase i ($i_1 \rightarrow i_2$). That's why there's a positive relationship between income (Y) and interest (i).

4.1. I_1 is endogenous variable of investment which also refers to the slope of investment that depends on i .

L_y is sensitivity of M_d to change in output (Y).

L_i is sensitivity of M_d to change in interest (i).

4.2. I_1 and L_i have negative sign because interest (i), which is the variable that both I_1 and Y_1 depend on, have negative relationship with investment (I) and output (Y).

4.3. Derive IS equation that shows how i and Y are related.

$$Y = AE \Leftrightarrow Y = C_0 + C_1(Y-T) + I_0 - I_1 \cdot i + G_0$$

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

$$i = \frac{C_0 + C_1(Y-T) + I_0 + G_0 - Y}{I_1} = \frac{C_0 - C_1T + I_0 + G_0 + C_1Y - Y}{I_1} = \frac{C_0 - C_1T + I_0 + G_0 + (C_1-1)Y}{I_1}$$

4.4 Slope of IS curve is $\frac{C_1-1}{I_1}$

4.5. Derive LM equation that shows how i and Y are related.

$$M_s = M_d$$

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

$$\frac{\Pi_0}{P_0} = L_y Y - L_i \bar{i}$$

$$L_i \bar{i} = L_y Y - \frac{\Pi_0}{P_0}$$

$$\bar{i} = \frac{L_y}{L_i} Y - \frac{1}{L_i} \cdot \frac{\Pi_0}{P_0}$$

4.6. The slope of LM curve is $\frac{L_y}{L_i}$.

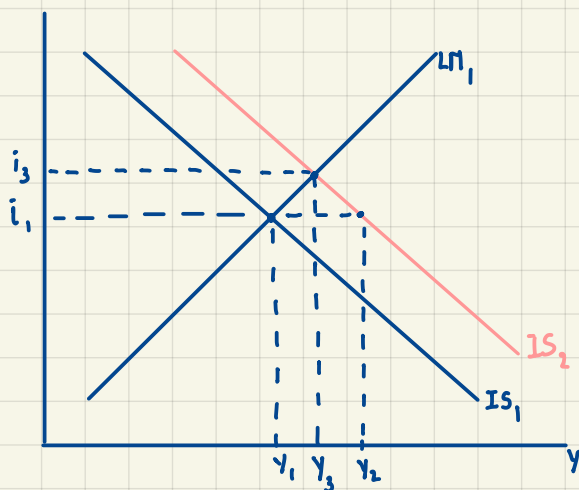
5. For IS curve, the slope depends on C_i and I_i . When C_i increases, AE will increase, and thus, Y increases too. For I_i , the investment depends on i , so when i increases, it discourages investors.

Hence, investment goes down, and AE falls too. These are the effects i and C_i have on IS curve.

For LM curve, the slope depends on L_y and L_i . When Y increase, L_y will increase too. This is because when people become richer, they demand more money. On the contrary, the increase in i will decrease in L_i and Π_d .

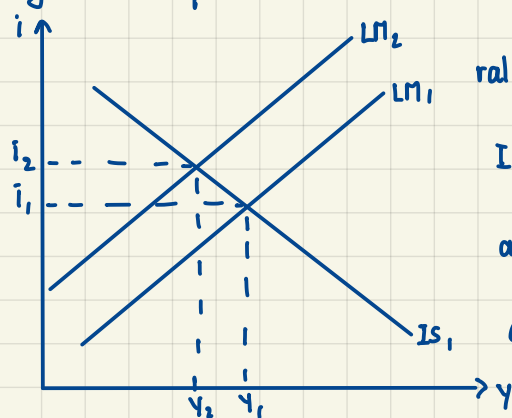
6. Crowding-Out effect is the reduction in private spending due to the increase of public spending.

This is because when government increases its spending, the demand for money will rise, and thus, the interest rate also goes up which discourages investors.

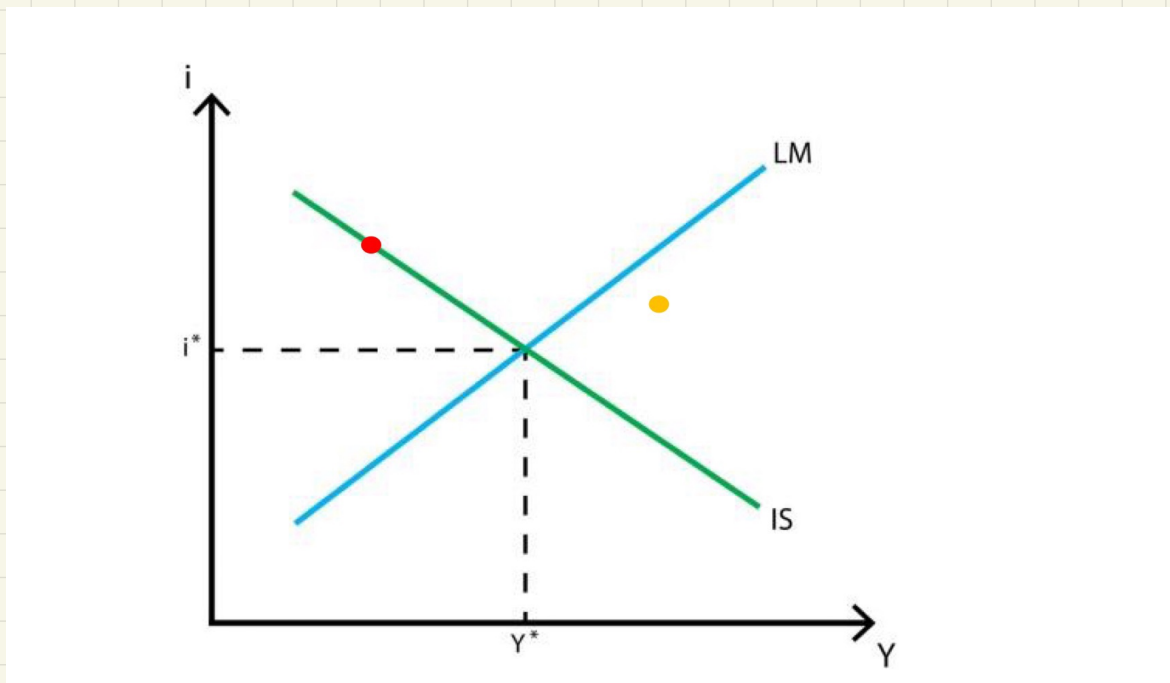


First, the general equilibrium is at i_1, Y_1 . Then, when G ↑, IS_1 shift up to IS_2 and at the same i_1 , it creates Y_2 but when i_1 goes up to i_2 . It reduces investment, so output Y_2 falls to Y_3 which is higher than Y_1 . Therefore, the new general equilibrium is at Y_3, i_3 .

7. The central bank decreasing its money supply, i.e. contractionary monetary policy will result in new general equilibrium which has higher i and lower Y . On the diagram below, i_2, Y_2 is new general equilibrium.

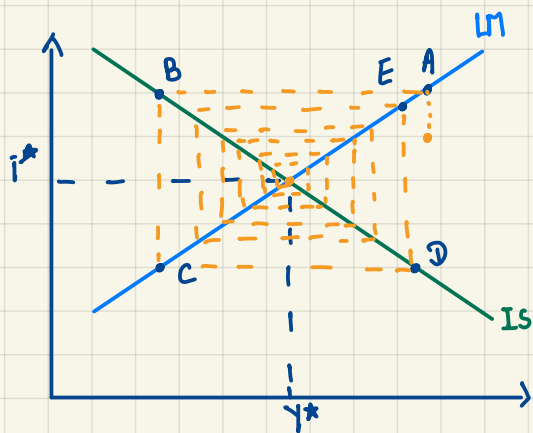


When M_s decreases, i will increase ($i_1 \rightarrow i_2$) which make I and AE go down in goods & service market. Then, Y will fall as well ($Y_1 \rightarrow Y_2$). LM will shift upward ($LM_1 \rightarrow LM_2$) according to change in i , and these process create new general equilibrium.



8.1. At the red point, market that is in equilibrium is goods & service market. Market that is not in the equilibrium is money market.

8.2. Explanation of how the goods and money markets at orange point will adjust towards the general equilibrium.



At orange point, it's not in equilibrium in both markets.

For money market (MM), i is too low, so it must adjust up.

For goods market (GM), when i is up to point A, it makes $I \downarrow$, $AE \downarrow$, and $Y \downarrow$, and it moves from A to B.

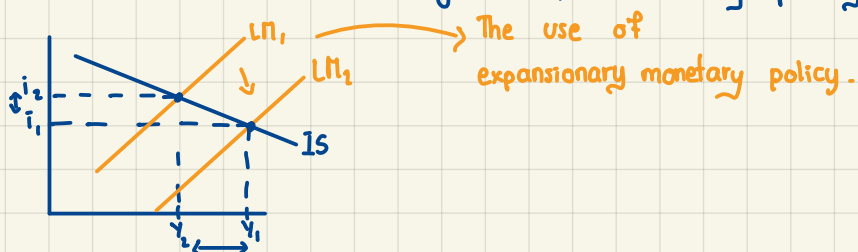
At B, i is high, Y is low that makes $M_d \downarrow$ and $i \downarrow$. This is shown in point C.

At C, when i is low, I goes up which makes AE and Y increase, indicated in D.

When i is low, there is shortage of money in MM, and then i will raise due to people converting bonds for money. i raising is shown in point E.

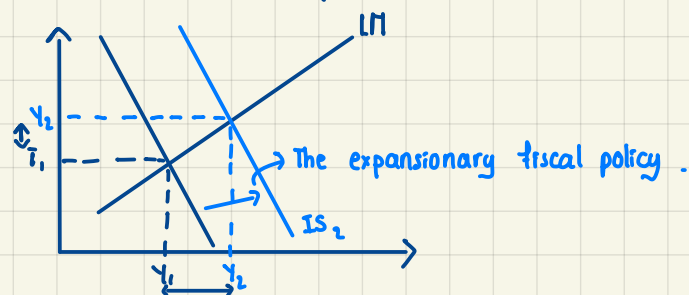
This process will go on until the point is at Y^* and i^* .

9.1. When consumers have high MPC, monetary policy should be used because IS is flat and



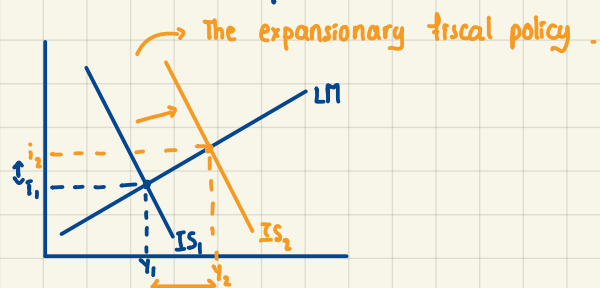
9.2. When investment is not sensitive to changes in interest rate, fiscal policy should be used be-

cause IS is steeper than LM.



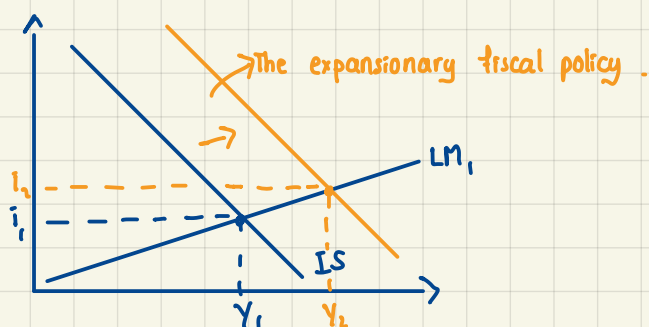
9.3. Money demand is very sensitive to interest rate, fiscal policy should be used because LM is flat

and IS is steep.



9.4. When money demand is very sensitive to changes in income Y , IS is steeper than LM, so

fiscal policy should be used.



10.1. Derive IS equation

$$Y = AE = C + I + G$$

$$Y = 100 + 0.5(Y - 40) + 80 - 100i + 40$$

$$= 100 + 0.5Y - 20 + 80 - 100i + 40$$

$$= 200 + 0.5Y - 100i$$

$$100i = 200 + 0.5Y - Y$$

$$i = 2 - \frac{0.5Y}{100}$$

$$\underline{i = 2 - 0.005Y}$$

10.2. Derive LM equation

$$M_d = M_s$$

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

$$0.5Y - 200i = \frac{400}{2}$$

$$200i = 0.5Y - 200$$

$$i = \frac{0.5Y}{200} - 1$$

$$i = 0.0025Y - 1$$

10.3. Find the general equilibrium output and interest rate

$$\text{We have } i = 2 - 0.005Y$$

$$i = 0.0025Y - 1$$

$$\Rightarrow 2 - 0.005Y = 0.0025Y - 1$$

$$0.0025Y = 2 + 1 - 0.005Y$$

$$0.0075Y = 3$$

$$Y = \frac{3}{0.0075} = 400$$

$$\Rightarrow i = 2 - 0.005Y$$

$$= 2 - 0.005(400) = 0$$

Therefore, the general equilibrium output is $Y = 400$, and
the general equilibrium interest rate is $i = 0$