



ECONOMICS

Unit-11. "Money, Interest and Income"

» Federal Reserve is the first institution to be blamed when the economy gets in trouble.

11.1 The goods market and the IS curve:

• IS curve shows the relation between Interest Rates (i) and level of outputs (Y). [Investment depends on Interest Rate]

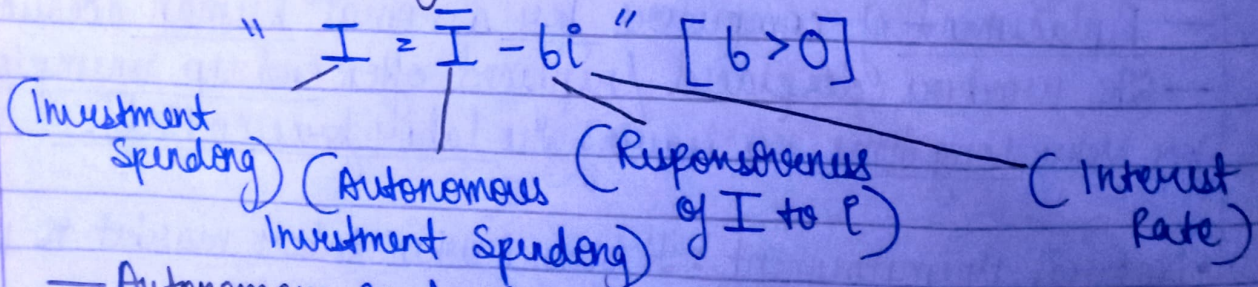
∴ IS Curve ⇒ Planned Spending = Planned Income

» The Investment Demand Schedule:

— ↑ Investment = ↓ Interest Rate (You'll get more profit as interest rate is low)
 { And vice versa }

» Investment and Interest Rate:

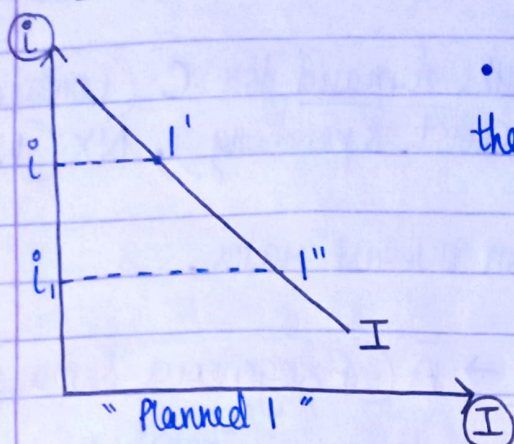
• Investment Spending Function -



— Autonomous is having freedom to govern itself.



>> The Investment Schedule :



• If b (responsiveness of I to i) is large, then a small \uparrow in i will make a large \downarrow in I .

• The Investment Schedule is negatively sloped, $\uparrow i = \downarrow I$ ($\downarrow AD$)

- This is negatively sloped to reflect the assumption that any
- ① \downarrow in interest rates [i to i_1] = \uparrow in Investment spending [I' to I_1']
 - ② and \uparrow in interest rates [i_1 to i] = \downarrow in Investment spending [I_1'' to I']

• The ① increases profit on the capital stock, i.e. \uparrow Planned Investment spending.

• The ② decreases profit on the capital stock, i.e. \downarrow Planned Investment spending.

• The position of Investment Schedule is determined by the Slope.

• If Investment is (\uparrow responsive to i) so, a small \downarrow in i = large \uparrow in I making the investment Flat —

• If Investment is (\downarrow responsive to i) so, a large \downarrow in i = small \uparrow in I making the investment Vertical ||

• Changes in \bar{I} shifts the Investment Schedule.

• \uparrow in \bar{I} (autonomous Investment spending) = \uparrow in I making the Schedule shift "Rightward".



» The interest rate and Aggregate Demand : The IS Curve :

- Aggregate Demand consists of the demand for C (Consumption), I (Investment Spending), G (Govt. Spending), NX (Net exports).
- Investment Spending depends on interest rates.

$$AD = C + I + G + NX \rightarrow \bar{A} \text{ (Exogenous demand)}$$

$$C = \bar{C} + cY_d \quad [Y_d = CY - (tY) + (TR)]$$

/ Transfers

$$C = \bar{C} + cY - ctY + cTR \text{ (taxes)}$$

$$C = \bar{C} + \frac{c(1-t)}{1-c(1-t)} Y + cTR$$

multiplier.

$$\text{So, } \bar{A} = \bar{C} + \frac{c(1-t)}{1-c(1-t)} \bar{I} + \bar{G} + \bar{NX}$$

- This is Autonomous Model.
- Free from any government.
- G, NX, cTR are all exogenous.
- C is part of autonomous.
- Exogenous Demand is which is caused by a change outside the AD model, caused by external factors.
— Like Changes in economy & consumer attitudes.
- Autonomous Spending \bar{A} is $= \bar{C} + \frac{c(1-t)}{1-c(1-t)} \bar{I} + \bar{G} + \bar{NX}$

"Every variable
is autonomous"

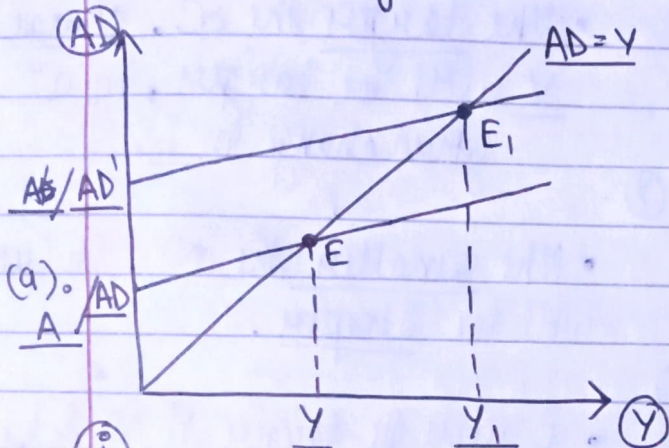
∴ In IS Curve & LM Curve, IS curve represents Goods and LM Curve represents Money.



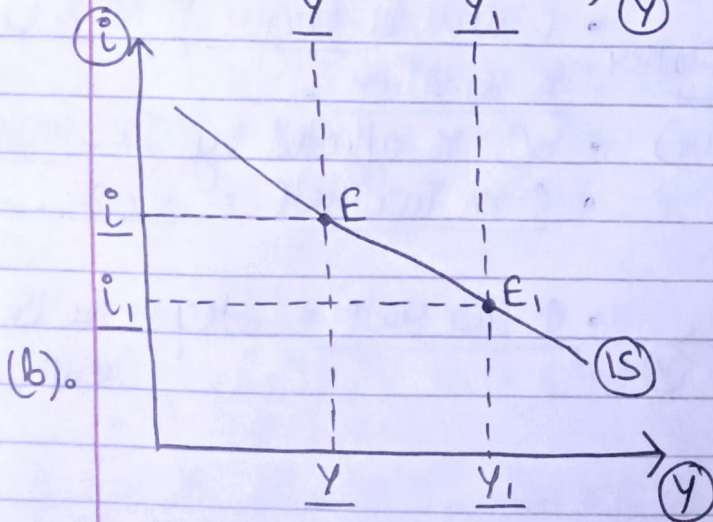
- ∴ IS Curve represents Goods Market in equilibrium.
- ∴ AD = Income (Output (Y))

∴ This is why IS Curve is called Goods Market Equilibrium Schedule.

→ The Slope of the IS Curve :



- There is a negative relationship between (Y) and (i) .
- If $Y \uparrow = i \downarrow$.
- IS Curve is negatively sloped.
- Steepness of the curve depends on (b) and multiplier "α".



- Suppose, b is large (I is ↑ very when small ↓ in i is there), makes AD change larger, making the slope shifting UP & K.

- If i changes largely, Y will also change largely making the slope flat. [Diagram showing a flatter IS curve]

[Derivation of IS Curve]

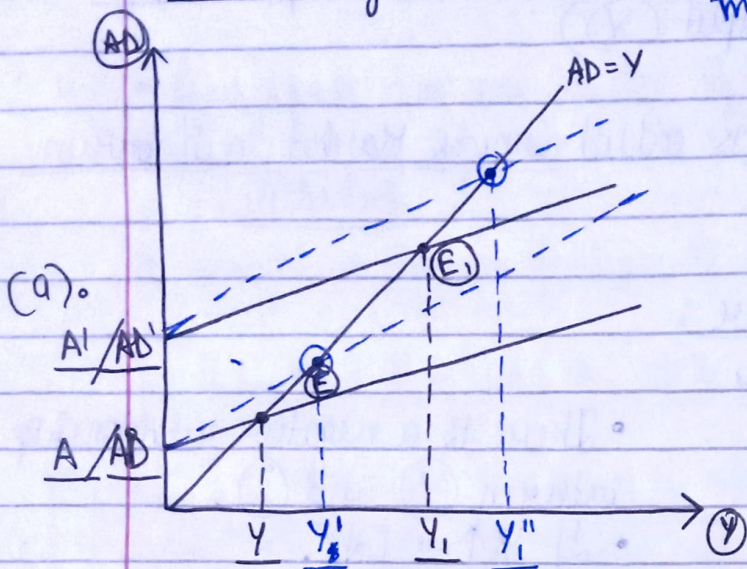
"If b is large"
"If I is sensitive to i"

- And if b is small, IS Curve will be very steep making the curve vertical [Diagram showing a vertical IS curve]

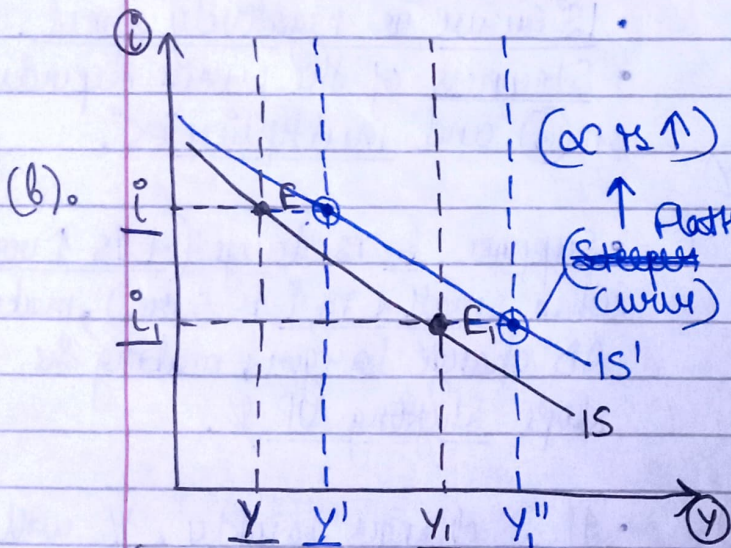


>> The Role of the Multiplier " α ": Multiplier when applied, multiplies the effect on the economy

$$\bullet \text{ The Multiplier } = \frac{1}{\alpha} = \frac{1}{1 - c(1-t)}$$



- When α is large, IS curve will be flatter.
- The larger the α , change in Y will be larger, by a given change in I.



- The smaller the α , IS curve will be steeper.

- i will be larger if α & be smaller.

- α is affected by Tax rate
- ↑ in Tax rate = ↓ α .

- ↑ Tax rate = steeper the IS curve

(Effects of α on IS curve)
"Large"

Continued. →

$$Y[1 - c(1+t)] = \bar{A} - b$$

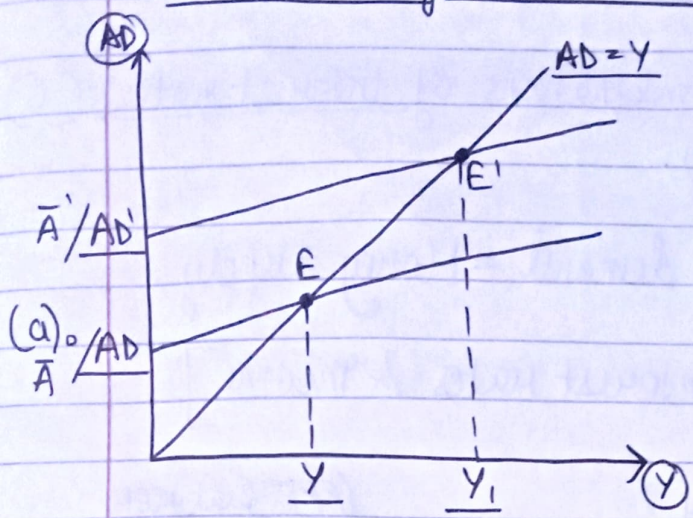
$$Y = \frac{\bar{A} - b}{1 - c(1-t)}$$

multiplier

$$\therefore Y = \alpha (\bar{A} - b) \text{ — IS Equation}$$



>> The position of the IS curve: (Shift) depends on $\Delta \bar{A}$.



- When there is an $\uparrow \bar{A}$ (Autonomous Spending), IS Curve shifts to the right, above the IS to IS'.

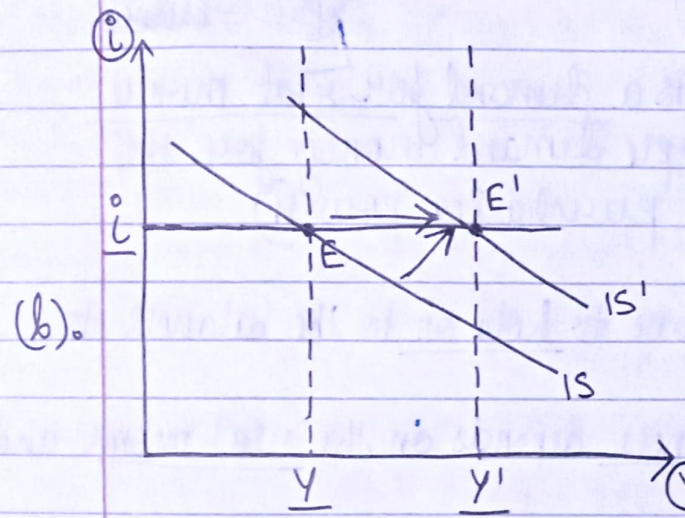
- When A increases to A', the equilibrium level also \uparrow from E to E' on same level of interest rate (i).

- E' is the equilibrium for New Goods market equilibrium point i.e. IS'.

- $\uparrow \bar{A} =$ Shifts IS Curve to Right

- $\Delta =$ Change.

- ΔY is the result of $\Delta \bar{A}$.



• $\bar{A} = \bar{C} + \bar{c}TR + \bar{I} + \bar{G} + \bar{NX}$

- $\uparrow G$ or TR Shifts the IS Curve to Right, depending on the size of multiplier.

- $\downarrow G$ or TR Shifts the IS Curve to Left.

IS Equation:

$AD = \bar{C} + \bar{I} + \bar{G} + \bar{NX}$

$AD = (\bar{C} + \bar{c}TR + c(1-t)Y) + (\bar{I} - bi) + \bar{G} + \bar{NX}$

$AD = \bar{A} + c(1-t)Y - b$ [AD=Y]

$Y = \bar{A} + c(1-t)Y - b$

$Y - c(1-t)Y = \bar{A} - b$

$Y [1 - c(1-t)] = \bar{A} - b$

$\bar{C}, \bar{c}TR, \bar{I}, \bar{G}, \bar{NX}$ are all \bar{A} .



11.2 The Money Market and The LM Curve :

- The LM Curve shows combinations of Interest rates (i) and level of output (Y).

$$\underline{LM} \Rightarrow \text{Money demand} = \text{Money supply.}$$

[Demand depends on Interest rates & income]

>> The demand for Money :

~~Real money balances~~

- The demand for money is a demand for real money balances. (L) (because people demand money for the purchasing power)
- The ↑ price, ↑ people have to hold on to the balances to buy goods.
- The demand for real balances depends on the real income and interest rates.
- The demand of money depends on the cost of holding money.
- ↑ i = more costly it is to hold money, less cash will be held.
- When it's more costly to hold money, people should transfer them to bonds.

• Demand for real balances (L) ↑ ^{with} level of real income also.
 but with Interest Rates (i) ↓ (L)

$$\therefore \underline{L} = kY - hi \quad "k, h > 0"$$

⇒ k (Sensitivity of the demand for real balances to the level of income (Y))



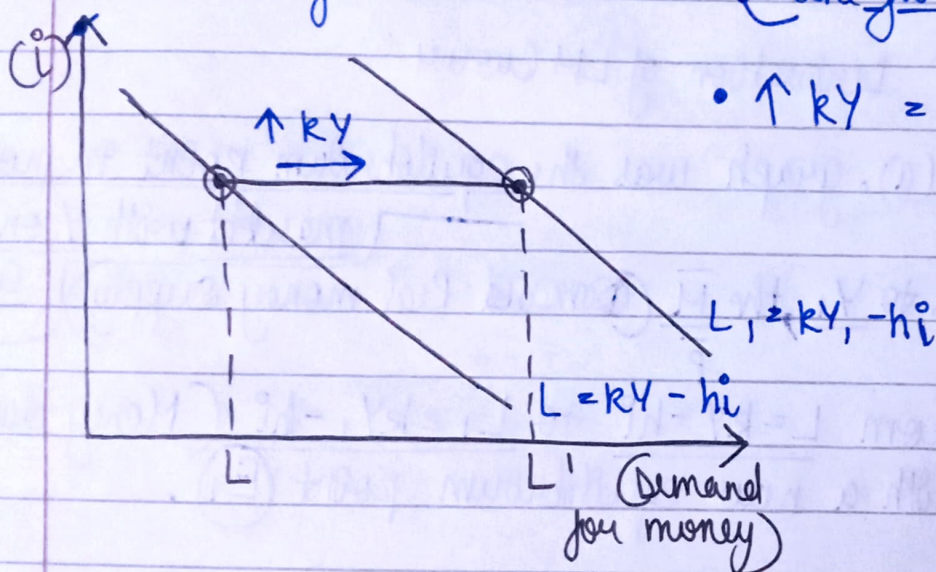
⇒ h (Sensitivity of L to the interest rates i)

∴ $L = kY - hi$ ~~(by level of income)~~

[For a given level of income (Y), the quantity demanded is ↓ function of the interest rate (i)]

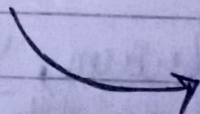
• ↑ level of income = ↑ L (The further to the right of DC)

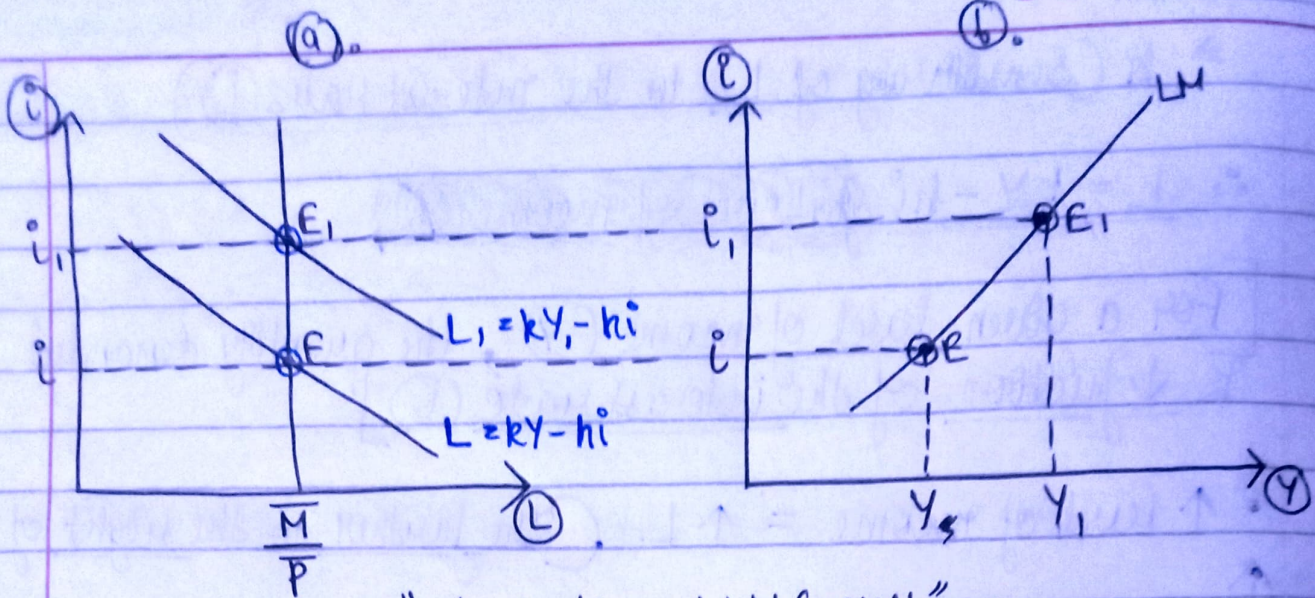
• ↑ kY = ↑ L (Rightward shift)



» The Supply of Money, Money market equilibrium, & the LM Curve:

- Nominal Money (M) is controlled by the Federal Reserve.
- Nominal quantity of Money is \bar{M} .
- Assuming the price level is constant at the level of \bar{P} , so Real money supply is $\frac{\bar{M}}{\bar{P}}$.





"Derivation of LM Curve"

- Point E on the (a). graph was the equilibrium point in money market with Y on LM
- When Y increases to Y_1 , the $\frac{\bar{M}}{P}$ (Demand Real money supply) Curve also increases from $L = KY - hi$ to $L_1 = KY_1 - hi$ (Money demand)
 $\therefore i$ also \uparrow , with a new equilibrium point (E_1) .

- LM Schedule shows = Interest rates, level of incomes, so that the "Demand for real balances (L) = Supply for real balances ($\frac{\bar{M}}{P}$)"

"Money Market Equilibrium"

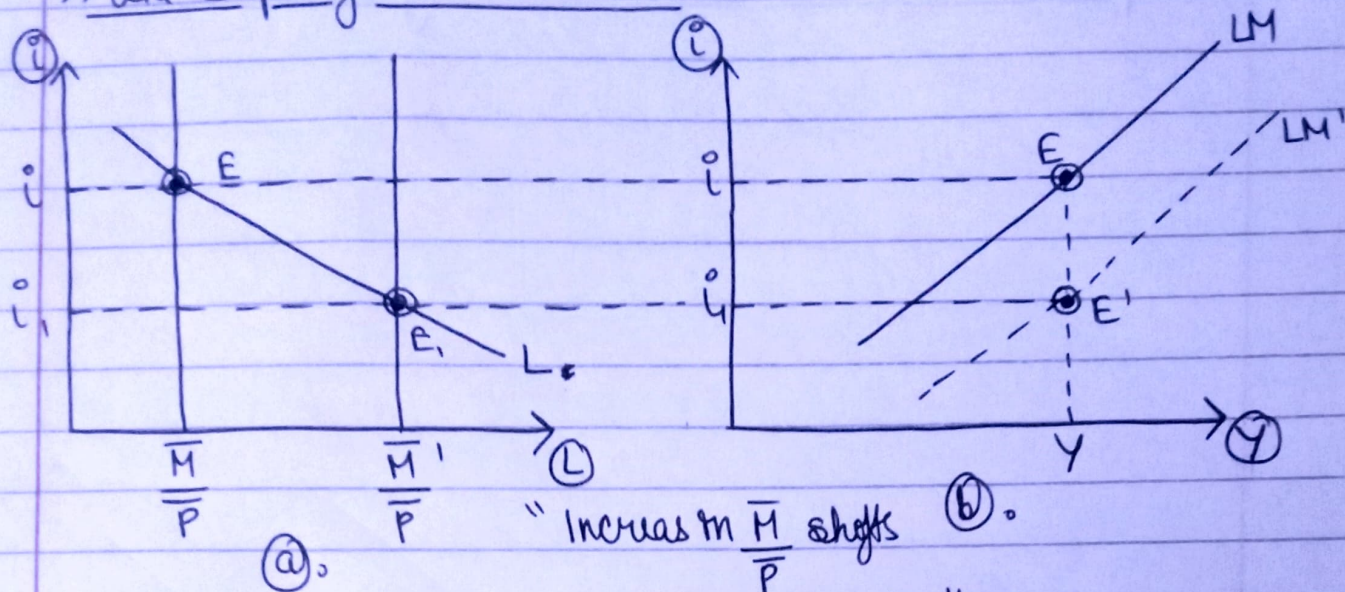
- LM Curve is positively sloped.
- $\uparrow i = \downarrow L$
- To maintain equilibrium, Y has to \uparrow .
- For Money market equilibrium:

$$\frac{\bar{M}}{P} = KY - hi \Rightarrow i = \frac{1}{h} \left[KY - \frac{\bar{M}}{P} \right] \rightarrow \text{"LM Curve"}$$

\therefore For i :



>> The Slope of the LM Curve:



- Why Steeper LM Curve: LM Curve Right"

— When $\uparrow k$ of Y .

— When $\downarrow h$ of i .

- By using equation: " $i = \frac{1}{h} \left[kY - \frac{\bar{M}}{\bar{P}} \right]$ "

>> $\uparrow k = \downarrow h$ (Larger the k , smaller the h)

>> The Position of the LM Curve:

- Δ in $\frac{\bar{M}}{\bar{P}}$ shifts the LM Curve.

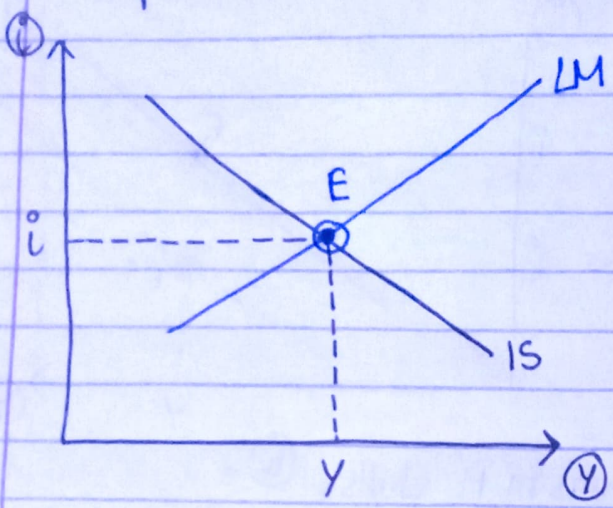
• Equilibrium point E with i on LM Curve.

- If $\frac{\bar{M}}{\bar{P}} \uparrow =$ LM shifts right.

— To keep equilibrium of the same level of Y , i must down to i_1 . i.e., new equilibrium point E_1 .

— LM Curve shifts down & right.

>> Equilibrium and the Goods & Money Market :

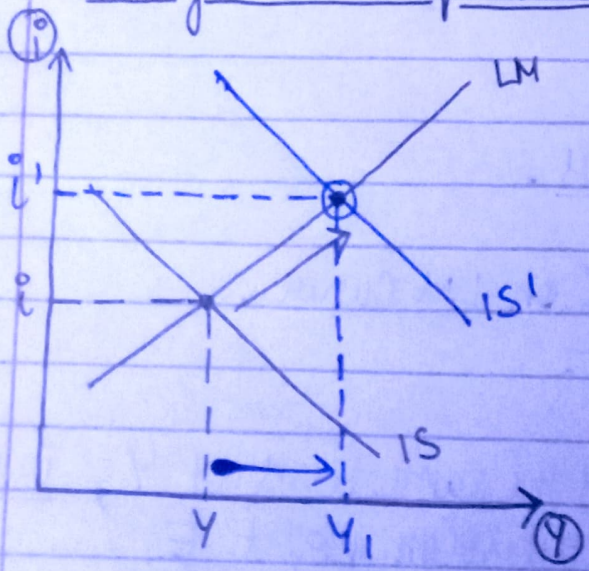


- IS & LM Schedules tells the conditions that what satisfies the conditions for goods and money market to be in equilibrium.
- E is the equilibrium point where the interest rate (i) & level of output (Y) meet, i.e. IS & LM meet. (Income)

• Assuming :

- Price level is constant.
- Firms supplying the output is demanded at this price.
- LM Curve Flat.

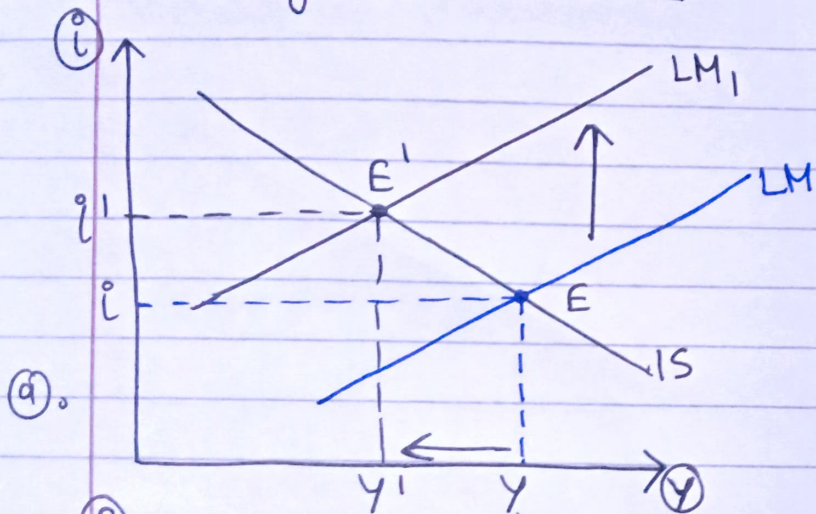
>> Changes in the Equilibrium levels of Income and Interest Rates :



- If IS or LM shifts, or changes, when i & Y changes.
- Because of A increasing :
 - Shifts the IS Curve from IS to IS' and Y to Y' , Shifts to the right.
 - The change in Y is smaller than the change in the IS slope.

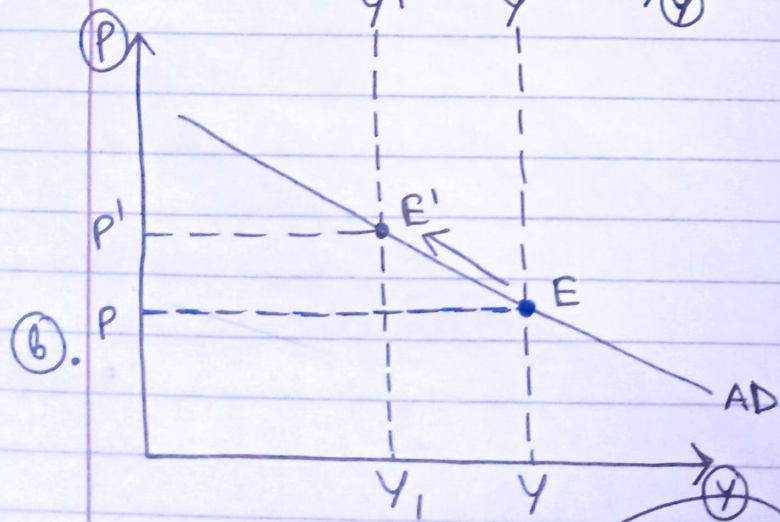


Deriving the AD Schedule :



- AD schedule is made out of IS-LM equilibrium, having \bar{A} , MS (nominal money supply) constant and P may vary.

- $\uparrow P = \downarrow \frac{\bar{M}}{P}$ (real MS) and LM will shift to left.



- This makes AD curve downward.

- Derived AD Curve