The Keynesian Theory of Determination of National Income

Avyukt Education For All

Aarohi Manchanda

→ The concept of `Ex post` & 'Ex-ante'

`Ex post` → The actual value.
Realised values.
→ The goods & services actually produced & consumed
↓
Discussed in unit 1

'Ex-ante' → The planned or intended value.
Anticipated values
→ Goods & servius planned to produce & consumed
↓
will be discussed in this unit.

→ Story of the THE GREAT DEPRESSION of 1930s
↓
Greatest economic crisis the western world had experienced.

* Classical economist had no developed theory to explain persistent unemployment & no solution.

* Many economist recommended Govt spending to reduce unemployment
↓
But had no Macro economic theory to justify their recommendation.

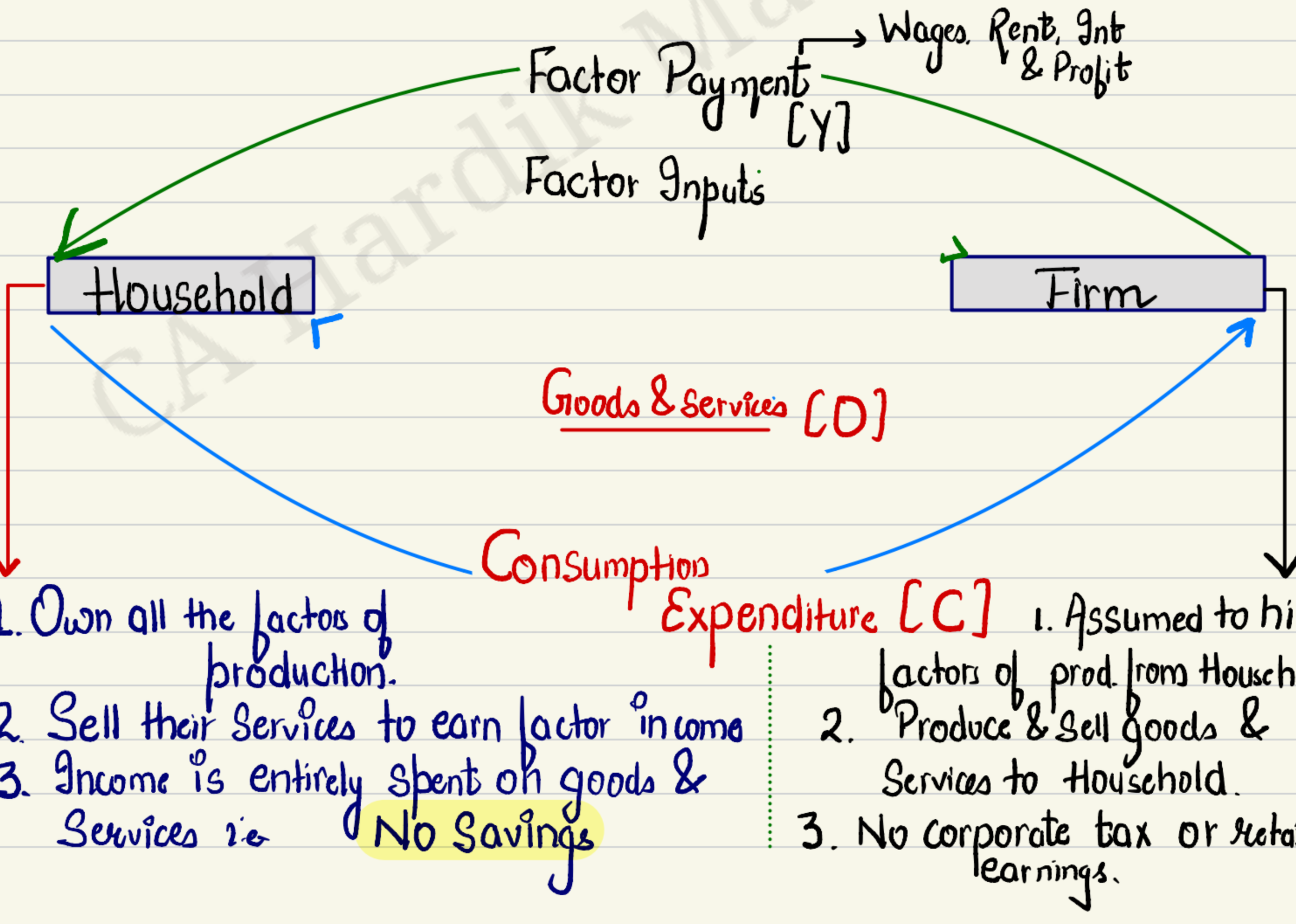
→ Macro economics was revolutionised in 1936 with the publication of John Maynard Keynes general theory of Employment, Interest & Money.

→ The Keynesian Theory of Income Determination is presented in three models :-

(i) Two-Sector Model - Household & business sector
(ii) Three-Sector Model - Household, business sector & Goverment
(iii) Four-Sector Model - Household, business sector, Goverment & foreign sector.

→ Circular flow in 2-Sector Model

→ How money moves through Society / within an economy.



1. Own all the factors of production.
2. Sell their services to earn factor income
3. Income is entirely spent on goods & Services i.e No Savings

1. Assumed to hire factors of prod. from Household.
2. Produce & Sell goods & Services to Household.
3. No corporate tax or retained earnings.

→ The total income produced [Y] accrues to Household & is equal to the disposable personal income.

$$Y = Y_d$$

↳ Disposable income.

* Real & Money flow

1. Circular broken line shows factor & product flow — Real Flow
2. Continuous line shows 'MONEY FLOW' which are generated by Real flows.

→ Since, whole of household income is spent on goods & services produced by the firm.

Factor Payments = Household income = Household expenditure = Total Receipt of firm = Value of Output

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* Meaning of equilibrium :

↳ State in which there is no tendency to change - position of rest.

→ Output is at equilibrium level When the Qty of output produced = Qty Demanded

→ Economy is at equilibrium when,

Production plans of firms = Expenditure plans of the household

Ex-ante values

↳ Demand

* Basic concepts used in Theory of Income Determination.

1. Aggregate Demand function [AD]

↓ AD is what Economist called Planned Expenditure.

Ex-ante AD for final goods / services or Aggregate expenditure.

→ Consist of 2 components :-

1. Ex-ante aggregate demand for Consumer Goods [C]
2. Ex-ante aggregate demand for Investment Goods [I]

$$AD = C + I$$

↓

Accounts for highest proportion of GDP.

→ Here, Investment [I] is assumed to be determined Exogenously & Constant in Short run.

Exogenously ↓ Externaly ↓ not influenced by Income - Influenced by external factors.

Constant → Remains the same.

Short Run, AD function:

$$AD = C + \overline{I}$$

↳ Constant Investment

→ We can conclude that in the Short Run, AD depends largely on the Aggregate consumption expenditure

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Consumption Function

Relationship b/w dependent & independent variable

→ functional relationship b/w aggregate consumption exp & aggregate disposable income.

$$C = f(Y)$$

- Dependent variable.
- Independent variable
- Consumption changes with change in Income.

Imp

1. Even when there is no income, consumption exp exists, for basic necessities.
   - Households either borrow or use their savings.
   - Dis-saving

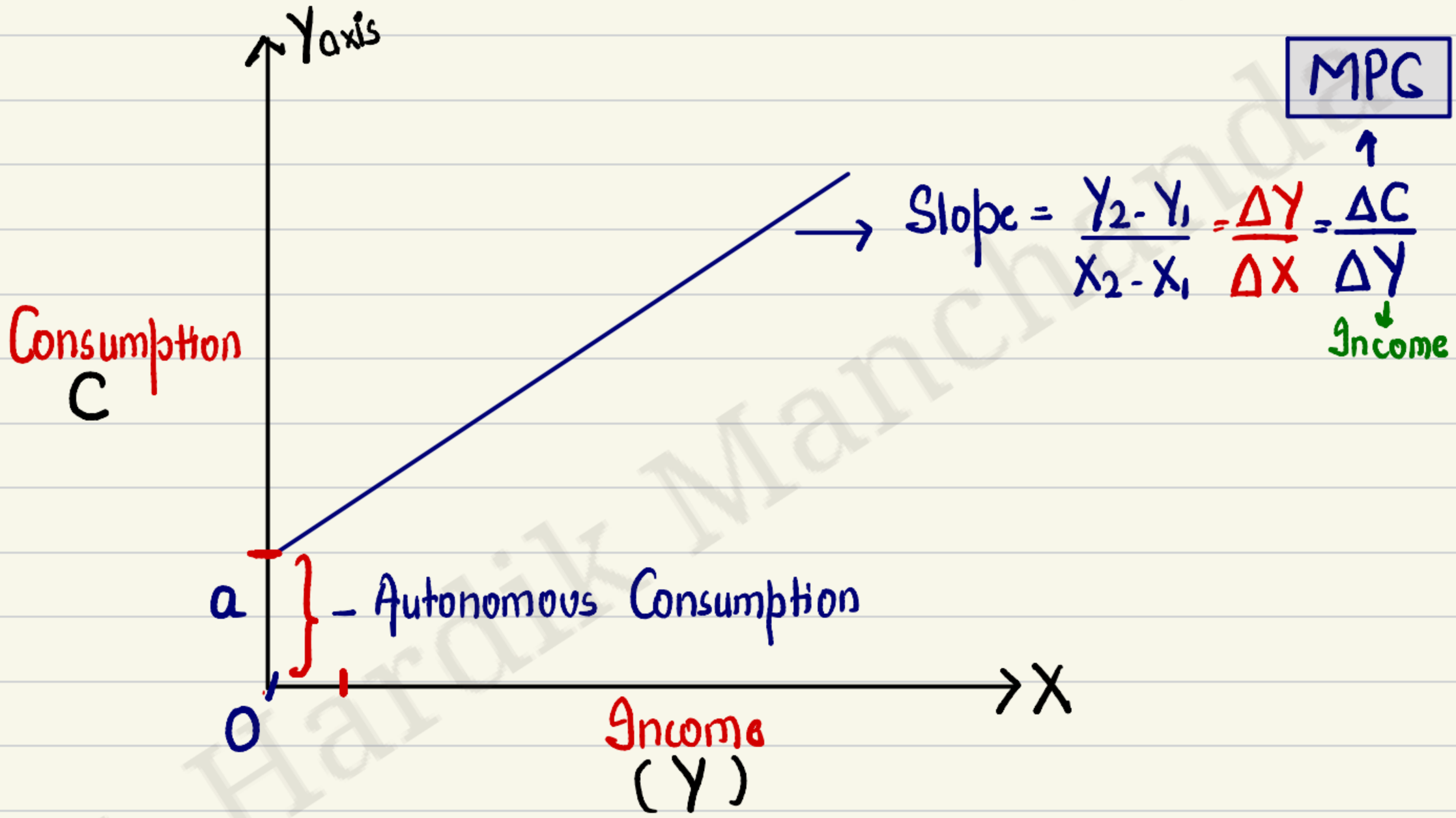
   → Such consumption exp. is called Autonomous Consumption.

2. When $Y\uparrow$ → Consumer will increase their Consumption exp - $C\uparrow$, but only by less than increase in Income

   $Y\uparrow > C\uparrow$

Consumption function $\Rightarrow C = a + b\bar{y}$ (b: Slope; $\bar{y}$: Income)

- a → Autonomous Consumption → Dis-saving
  - ↳ Value of consumption at zero level of disposable income



MPC

$$\text{Slope} = \frac{Y_2 - Y_1}{X_2 - X_1} = \frac{\Delta Y}{\Delta X} = \frac{\Delta C}{\Delta Y}$$

(Income)

b = Marginal Propensity to Consume [MPC]

↳ $\frac{\Delta C}{\Delta Y}$

Eg.	Income (Y)	Consumption (C)
	500	200
	1500	500

$$\frac{\Delta C}{\Delta Y} = \frac{300}{1000} = 0.3$$

Increase in consumption per unit increase in Income

→ The consumption function shows the consumption corresponding to each level of disposable income (C)

Eg- Autonomous Consumption = 50
MPC = 0.45
Calculate Consumption exp at income level of ₹800

$$C = a + bY$$
$$= 50 + 0.45 \times 800$$
$$C = ₹410$$

Eg-	Income	Consumption	MPC
	0	200	–
	500	400	$\frac{\Delta C}{\Delta Y} = \frac{200}{500} = 0.4$

* Keynes Assumption:

→ $0 < MPC < 1$ → $\Delta C < \Delta Y$

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→ Relationship b/w Income & Consumption.

↓

Average Propensity to Consume (APC)

$= \frac{C}{Y}$ - $\frac{\text{Total consumption}}{\text{Total Income}}$

	Income	Consumption	MPC	APC
Eg.-	100	70	—	$\frac{70}{100} = 0.7$
	220	130	$\frac{60}{120} = 0.5$	$\frac{130}{220}$, 0.59

Savings = Y - C

= 220 - 130 = 90

$Y = C + S$

Eg- $C = 50 + 0.75Y$

Income [Y]	Consumption	APC	MPC	Savings
0	50	∞	—	(50)
100	125	1.25	$\frac{75}{100} = 0.75$	(25)
200	200	1	$\frac{75}{100} = 0.75$	0
300	275	0.92	0.75	25
400	350	0.88	0.75	50

→ Proportion of Income spent on consumption decreases as Income increases

↓

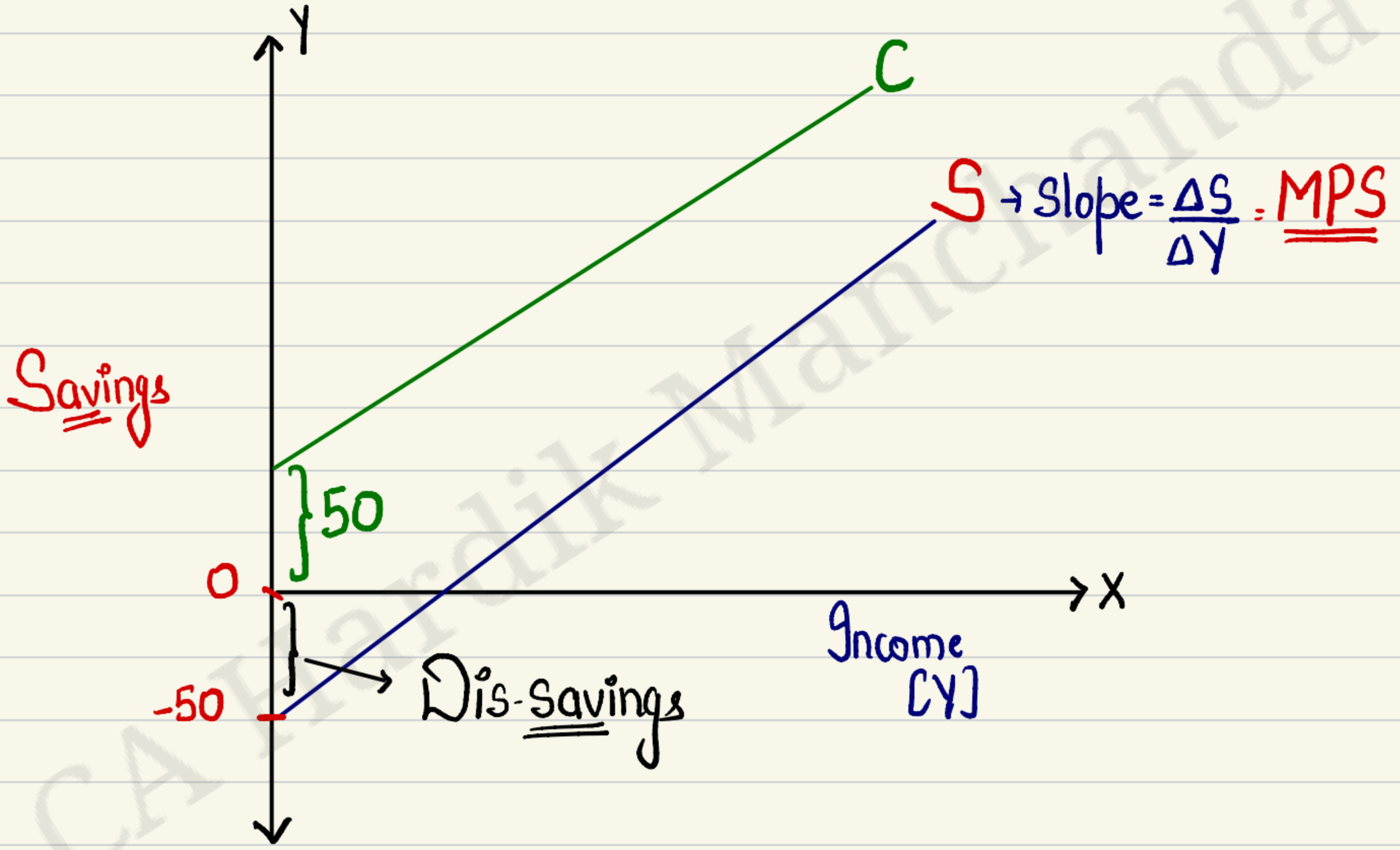
Proportion of Income is saved as income increases.

→ Relationship b/w Income, Consumption & Savings

* Savings is also function of Disposable Income

$$S = f(Y)$$

$Y \uparrow \rightarrow S \uparrow$



Eg.	Y	C	S	MPC	MPS
	0	50	(50)	-	ΔS/ΔY
	150	90	60	ΔC/ΔY = 40/150 = 0.27	= 110/150, 0.73

MPS - Marginal Propensity to Save - Change in Savings per unit change in Income.

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→ Average Propensity to Save (APS)

$$APS = \frac{\text{Total Savings}}{\text{Total Income}} = \frac{S}{Y}$$

.....

→ $APC = \frac{\text{Total consumption}}{\text{Total Income}} = \frac{C}{Y}$

$$APS = \frac{\text{Total Savings}}{\text{Total Income}} = \frac{S}{Y}$$

$$APC + APS = \frac{C}{Y} + \frac{S}{Y}$$

$$= \frac{C+S}{Y} = \frac{Y}{Y} = 1$$

→ $\boxed{APC + APS = 1}$

* MPC + MPS

$$\frac{\Delta C}{\Delta Y} + \frac{\Delta S}{\Delta Y} = \frac{\Delta C + \Delta S}{\Delta Y}$$

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

→ $MPC + MPS = 1$

$b + MPS = 1$

$\boxed{MPS = 1 - b}$

MPS = 1 − b → If one unit increase in disposable income leads to an increase of 'b' units, the remaining (1−b) is the increase in savings.

* Saving function. (from consumption function)

$$C = a + bY \checkmark$$

$$= 20 + 0.6Y$$

$$S = -20 + (1-b)Y$$

↓

Dissaving

$$= -20 + 0.4Y$$

$$\boxed{S = -a + (1-b)Y}$$

Eg- If autonomous consumption is ₹2000 & MPC = 0.8. Calculate total savings at income level of ₹20,000.

$$S = -2000 + 0.2 \times 20,000$$
$$= ₹2000$$

Eg- If the consumption function is, $C = 10 + 0.7Y$, then increase in disposable income by ₹200 will result in increase in savings by ____ ?

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$\Delta Y = 200$, MPC = 0.7

$\Delta C = 0.7 \times 200$

$= 140$

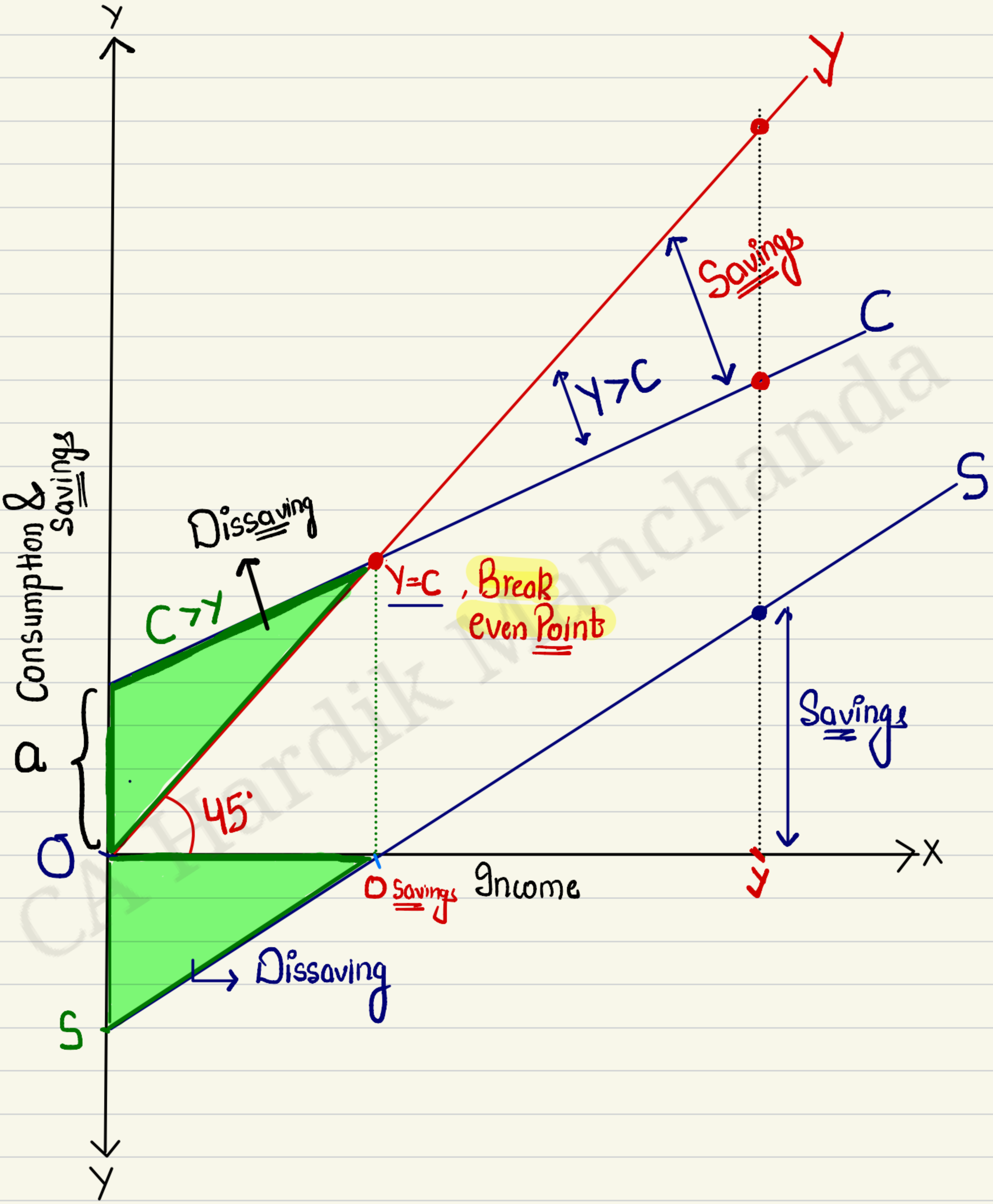
→ MPS = 0.3

$\Delta S = 0.3 \times 200$

$= ₹60$

Income (Y)	C	S
0	20	(20)
60	70	(10)
120	120	0
180	170	10
240	220	20

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Y
Consumption & Savings
a
O
45°
C>Y
Dissaving
Y=C, Break even Point
Y
Savings
C
Y>C
S
Savings
O Savings
Income
Y
X
Dissaving
S
Y

At Break even point,

$Y = C$

$\frac{C}{Y}$ ← APC = 1, so, APS = 0 (Zero Savings)

Imp:

1. Saving is an Incremental function of Income.

   ↓

   APS keeps on increasing

2. Consumption is a decreasing function of Income

   ↓

   APC keeps on decreasing

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Aggregate Supply : Planned (Ex-Ante) aggregate supply is the total supply of goods & services which firms are planning to sell during a specific time period.

Total value of goods & services produced = Factor Income

↓

Total output

↓

Every unit of goods produced generate income for household.

AS = National Income

↓

Which is either Consumed or Saved = C + S

$\Rightarrow$ **AS = Y $\Rightarrow$ C + S**

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→ Equilibrium in 2-Sector Model.

$$AD = AS$$

Planned Exp = Planned production

Equilibrium → $C+I = C+S$

$I = S$

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a] Consumption line is positively sloped since cons. increases as income increases but less than increase in income.

→ It is flatter than 45 degree line.

b] Investment exp [I] is exogenous i.e does not vary with change in income. It is constant

c] AD line (Aggregate exp line) is linear & positively sloped indicating that as the level of national income rises, the AD in the economy also rises.

* Point below 45 degree line (AS): [A]

AS > AD

GDP - Output > Planned exp.

* Point above 45 degree line [B]

AD > AS

Planned exp > GDP

→ Only at Point E & at corresponding equilibrium level of income & output Y_0, does aggregate demand exactly equals to output

↳ Planned spending precisely matches production.

* We know that,

$$AD = C + I$$
$$AS = C + S$$

At Equilibrium,

$$AD = AS$$
$$C + I = C + S$$
$$I = S$$

Investment = Savings

Imp points according to Keynes:

1] AD will not always be equal to Aggregate Supply.

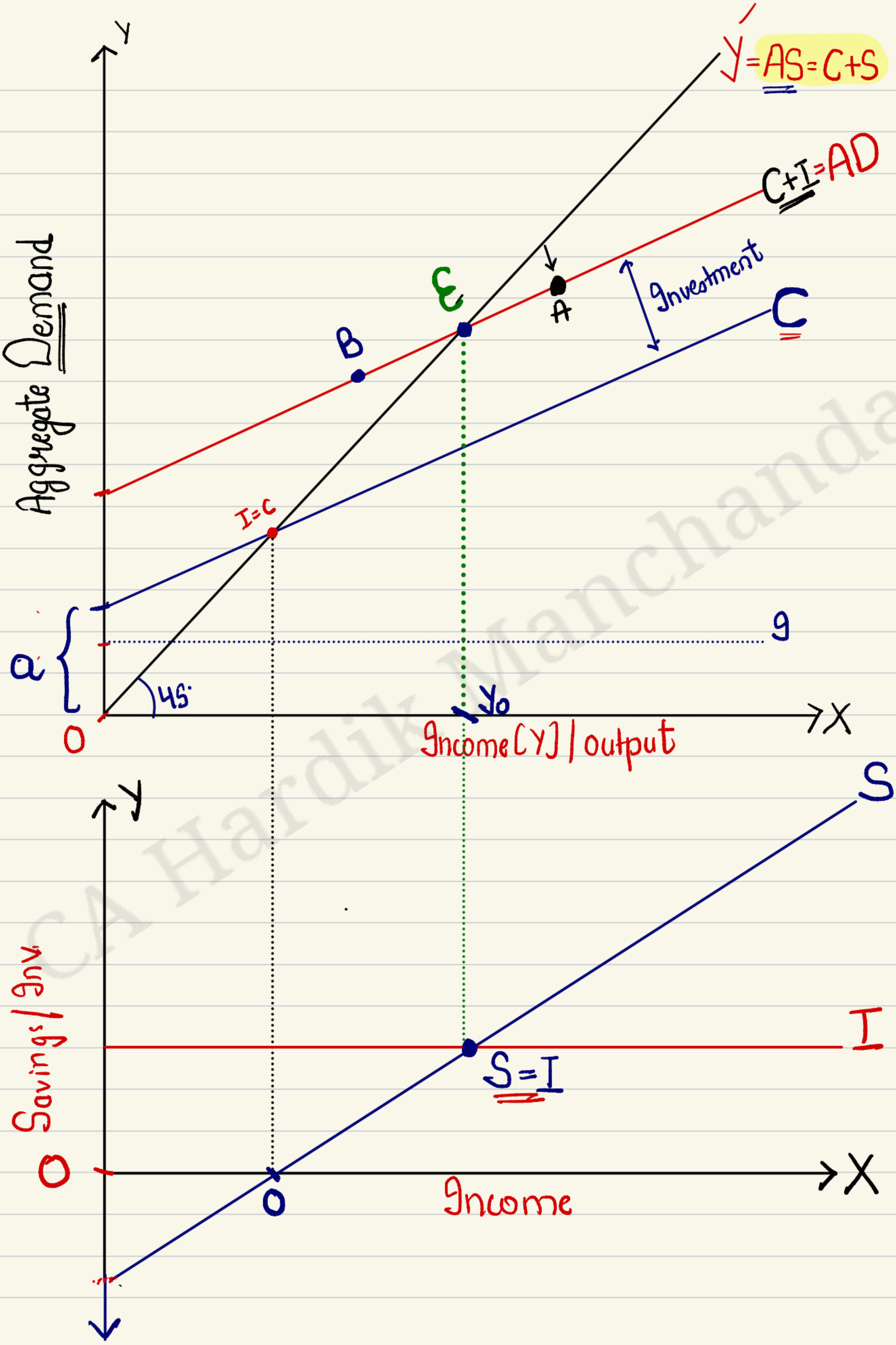
↓

There is no reason to believe that:

a] Consumers consumption plan always coincide with producers production plan.

b] The producers plan to Invest matches always with households plan to save.

→ For equilibrium, the household plan must coincide with producers plan.


Y
Aggregate Demand
Y' = AS = C+S
C+I = AD
Investment
C
E
A
B
I=C
a
45°
0
Y₀
X
Income [Y] / output
g
Y
Savings / Inv.
S
I
S=I
0
Income
X

* Leakages & Injection

↓
Outflow of Income from circular flow of model.

→ That part of Income which is not used to purchase goods & Services.

↓
Savings

↳ Inflow of Income to the circular flow.

↓
Investment

Eg.

	Y	C	Leakage S	=	Injection Investment
1.	1000	900	100		100
2.	1000	800	200		200

At equilibrium, **Leakage = Injections**

✓ If, Leakage > Injections.
Savings > Investment, National Income will fall.

If, Leakage < Injections.
Savings < Investment, National will rise.

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→ Classical economist v/s Keynesian Theory

↓

1) Economy is self-regulating
2] Capable of achieving equilibrium at the Natural level of GDP

↓

Level of GDP that is obtained when economy's natural resources are fully employed

↓

Market would not automatically lead to full-employment equilibrium & the resulting Natural level of real GDP

↓

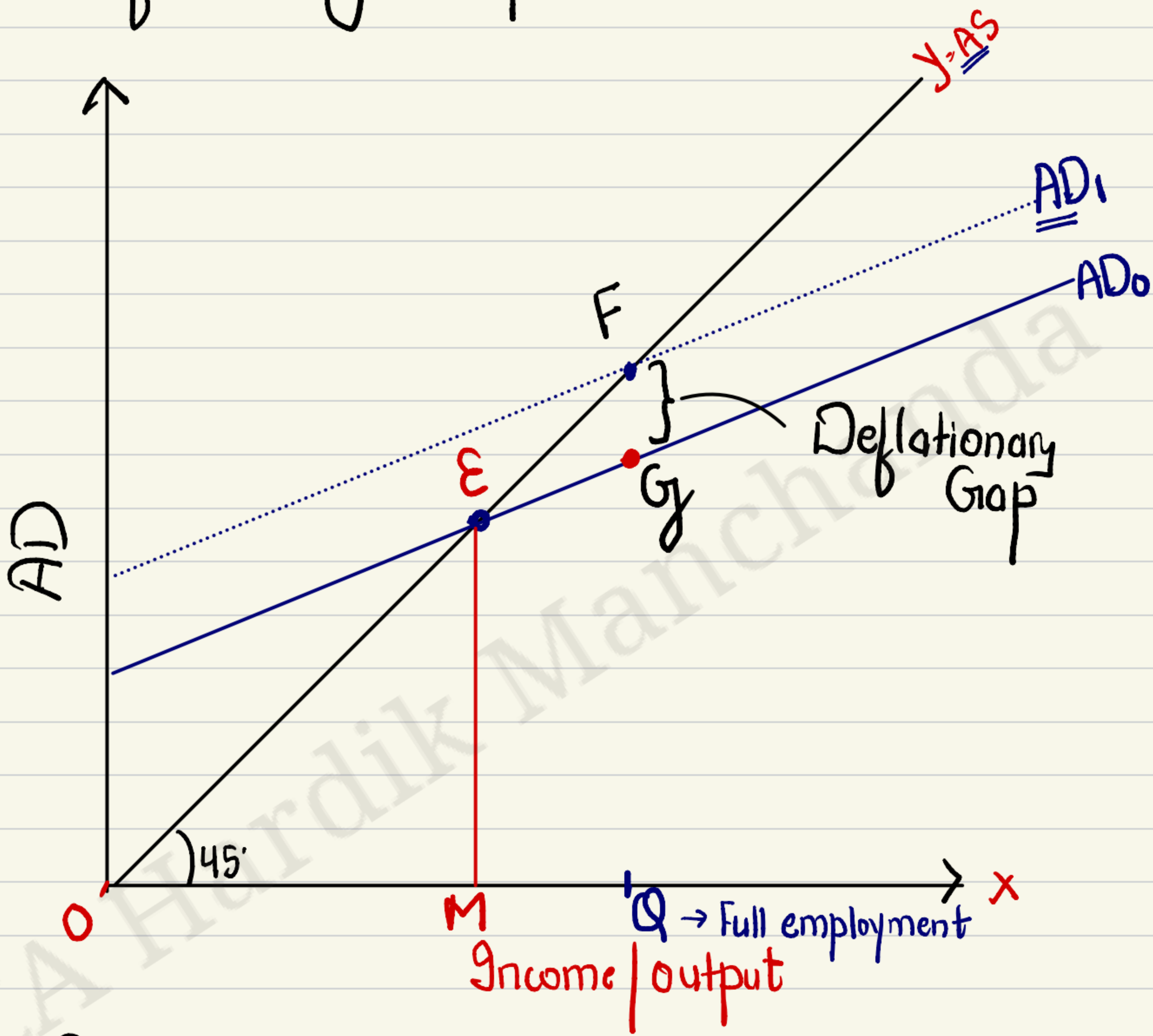
Economy could settle in equilibrium at any level of unemployment.

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* If the aggregate exp [AD] line intersects the 45° line [AS] at the level of potential GDP, then there is full employment equilibrium.

↳ But there is no guarantee that equilib. will occur at potential GDP level of output.

(i) Deflationary Gap



→ OQ is the full employment level of output, where AD = QF.

but,

At AD = GQ, there is deficient demand.

Deflationary Gap = FG

↓

Unplanned build up of Inventories

↓

Production ↓

↓

Employment ↓

↓

Income ↓

→ If AD is for an amount of output less than the full employment level output, the we say there is a deficient demand.

↓

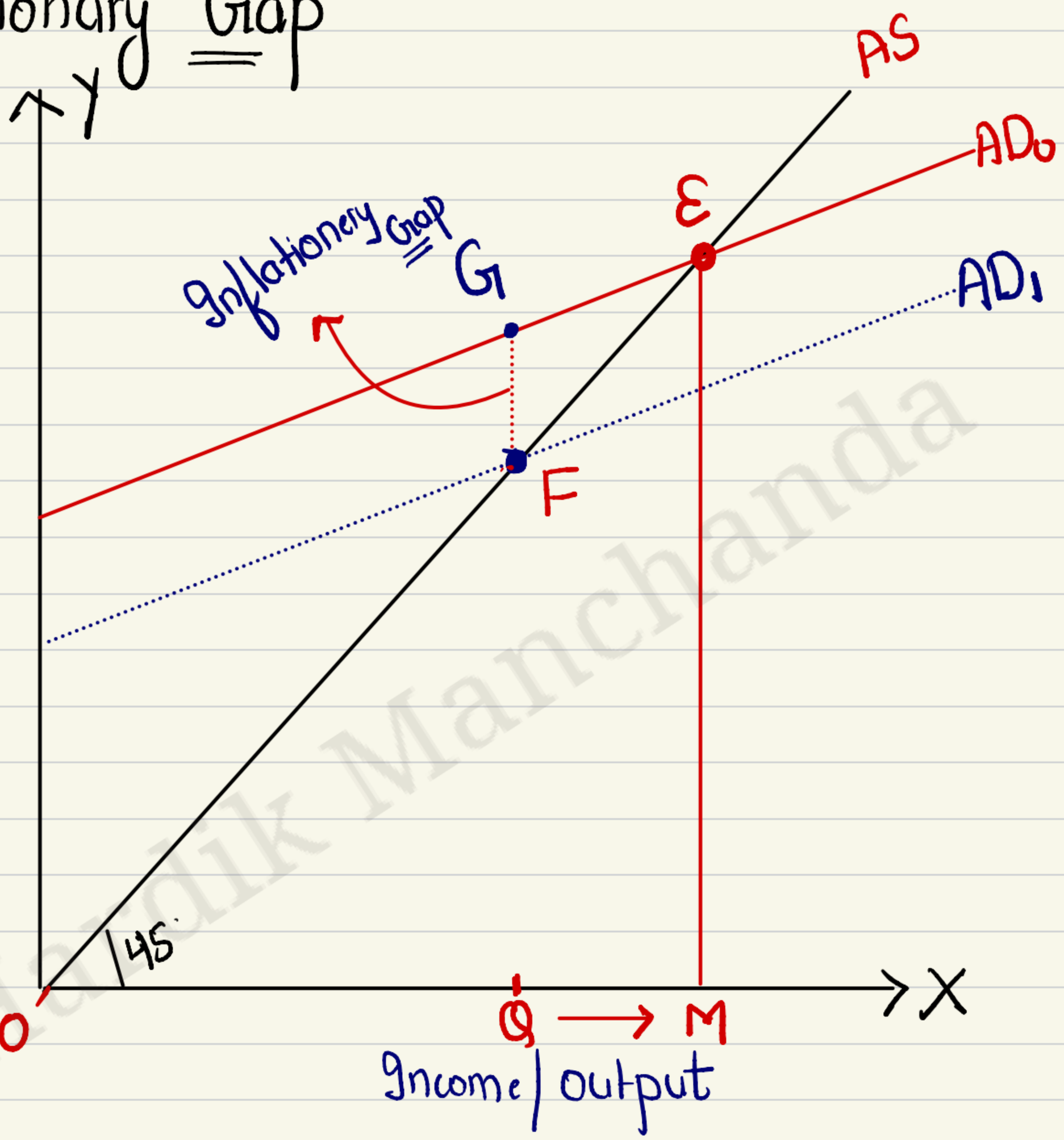
Gives rise to deflationary gap or Recessionary gap

↳ Also known as 'Contractionary gap'

* It occurs when economy is in business cycle - Contraction or Recession.

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(ii) Inflationary Gap



→ Economy at full employment equilibrium at F. when OQ is the level of output & income. & AD = FQ

but,

When AD = GQ, then there is excess demand, resulting in Inflationary gap = FG

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→ The real Output will be constant, but rise in price level will cause increase in nominal output & equilibrium will be at 'E'.

Prices ↑ ⟶ Nominal Output ↑

→ At new equilibrium, Real Output, real Income & employment will be the same.

In the Keynesian Model,

Neither wages nor interest rates will decline in the face of abnormally unemploy-ment & excess capacity.

↓

Output will remain at less than full employment rate as long as there is insufficient spending in the economy.

ILLUSTRATION 2

Calculate marginal propensity to consume and marginal propensity to save from the following data about an economy which is in equilibrium:

National income = 2500, Autonomous consumption expenditure = 300, Investment expenditure = 100

$AD = AS$

$Y = 2500 = C + S$

$a = 300$

$g = 100 = S$

$Y = C + S$

$2500 = C + 100$

$C = 2400$

$C = a + bY$

$2400 = 300 + b2500$

$2100 = b \times 2500$

$\Rightarrow b = \frac{2100}{2500} = 0.84$

MPC = 0.84

MPS = 1 - b

= 1 - 0.84 = 0.16

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ILLUSTRATION 3

An economy is in equilibrium. Calculate national income from the following-

Autonomous consumption = 100; Marginal propensity to save= 0.2; Investment expenditure= 200

$a = 100$ $\quad$ $MPS = 0.2$ $\quad$ $I = 200$

$-a = -100$ $\quad$ $MPC = 0.8$ $\quad$ $S = 200$

$$S = -a + MPS \times Y$$

$$200 = -100 + 0.2Y$$

$$\frac{300}{0.2} = Y$$

$$Y = 1500$$

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ILLUSTRATION 4

Suppose the consumption of an economy is given by C = 20+ 0.6 Y and investment I= 10+ 0.2 Y. What will be the equilibrium level of National Income?

$C = 20 + 0.6Y \qquad I = 10 + 0.2Y$

$Y = C + I$

$AS = AD$

$Y = 20 + 0.6Y + 10 + 0.2Y$

$Y = 30 + 0.8Y$

$0.2Y = 30$

$\Rightarrow Y = 150$

ILLUSTRATION 5

Suppose the consumption function C= 7+ 0.5Y, Investment is ₹ 100, Find out equilibrium level of Income, consumption and saving?

$C = 7 + 0.5Y \qquad I = 100$

$S = 100$ ✓

$Y = C + S$

$Y = 7 + 0.5Y + 100$

$0.5Y = 107$

$Y = 214$

$C = 7 + 0.5 \times 214$

$= 114$

ILLUSTRATION 6

If the consumption function is C= 250 + 0.80 Y and I = 300. Find out equilibrium level of Y, C and S?

$C = 250 + 0.8Y$, $I = 300$

$S = 300$

$Y = C + S$

$Y = 250 + 0.8Y + 300$

$0.2Y = 550$

$Y = 2750$

$C = 250 + 0.8 \times 2750$

$= \underline{2450}$

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ILLUSTRATION 7

If saving function S = -10 + 0.2Y and autonomous investment I = 50 Crores. Find out the equilibrium level of income, consumption and if investment increases permanently by ₹5 Crores, what will be the new level of income and consumption?

$S = -10 + 0.2Y$, $I = 50$

$S = 50$

$50 = -10 + 0.2Y$

$60 = 0.2Y$

$Y = 300$

$C = a + bY$

$= 10 + 0.8 \times 300$

$= 250$

$I = 55 \rightarrow S = 55$

$55 = -10 + 0.2Y$

$65 = 0.2Y$

$Y = 325$

$Y = C + S$

$325 = C + 55$

$C = 270$

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ILLUSTRATION 8

Given the empirical consumption function C= 100+0.75Y and I = 1000, calculate equilibrium level of national income. What would be the consumption expenditure at equilibrium level national income?

$C = 100 + 0.75Y$. $I = 1000$

$S = 1000$

$Y = C + S$

$Y = 100 + 0.75Y + 1000$

$0.25Y = 1100$

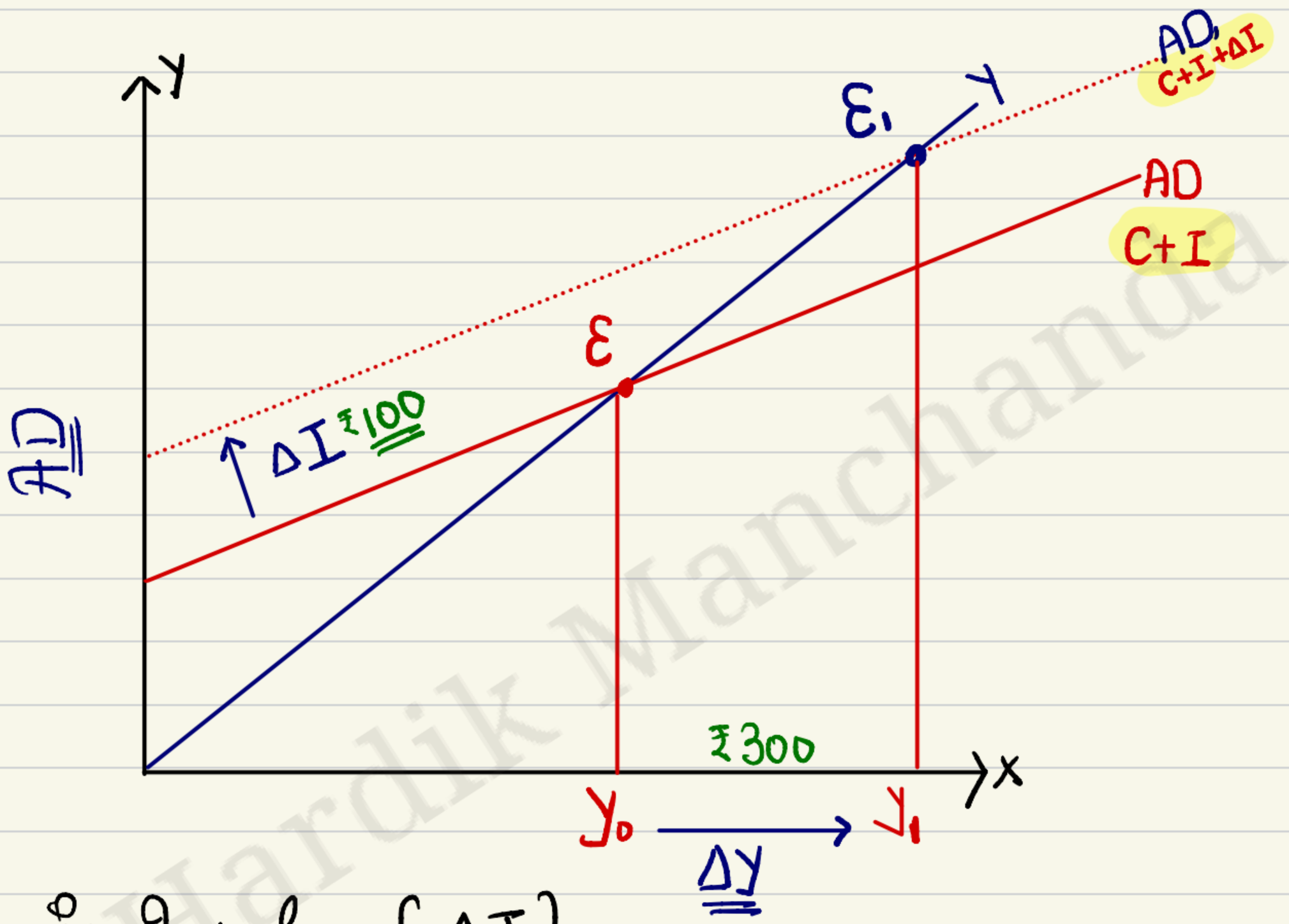
$Y = 4400$

$C = 100 + 0.75 \times 4400$

$C = 3400$

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INVESTMENT MULTIPLIER



→ Inc. in Inv. exp [ΔI] leads to proportionately larger change in the equilibrium level of Income [ΔY]

$$\Delta Y > \Delta I$$

* The Inv. Multiplier explains, how many times the income increases as a result of increase in Investment

Eg- If $\Delta I = ₹500$, causes change in national income by ₹3000.

$$\text{Multiplier} = \frac{3000}{500} = 6$$

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

↳ Multiplier indicates change in equilibrium income for each rupee change in autonomous investment.

Let us understand how this works:

MPC = 0.8



Purchased capital goods of ₹5000

↓ ΔI = 5000



→ Y↑5000

Spent ₹4000 on consumption of goods & serv.

Y↑4000

Spent ₹3200 on goods & services

Y↑3200

MPC = 0.8
MPS = 0.2

0.8

ΔI	ΔY	ΔC	ΔS
5000	5000	4000	1000
	4000	3200	800
	3200	2560	640
5000	→ ?		5000

At equilibrium,

$$I = S$$

$$5000 = \Delta Y \times MPS$$

$$5000 = \Delta Y \times 0.2$$

$$\frac{5000}{0.2} = \Delta Y$$

$$\Delta Y = 25000$$

$$k = \frac{\Delta Y}{\Delta I} = \frac{25000}{5000} = 5$$

$$K = \frac{\Delta Y}{\Delta Y \times MPS} = \boxed{\frac{1}{MPS}} = \boxed{\frac{1}{1-MPC}}$$

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* MPC is the determinant of the value of Multiplier.

Eg. 1) $\Delta I = ₹100$, MPC = 1, MPS = 0

$K = \frac{1}{0} = \infty$, Max value of Multiplier = ∞

2) $\Delta I = 100$, MPC = 0, MPS = 1

$K \Rightarrow \frac{1}{1}, 1$

* Direct relationship b/w MPC & Multiplier
  - Higher the MPC, higher the K.
* Inverse relationship b/w MPS & Multiplier.

→ Multiplier ↗ unexpected change — Shows how Shocks to one Sector are transmitted throughout economy.

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Multiplier & Leakage

→ Income that is not spent on consumption of goods & services - Leakage
  └ reduces the effect of Multiplier.

Causes of Leakage:

1. Progressive rate of taxation.
   └ More Income more taxes.,
   less consumption.

2. High liquidity preference - Low MPC
   ↓
   holding of cash balance

3. Increased demand for consumer goods, met out of existing stock or through import

4. Additional Income spent on purchasing existing wealth or purchase of shares & securities.

5. Undistributed profit of corporations.

6. Part of increment in Income used for payment of debt.

7. Case of full employment, additional investment will only lead to inflation

8. Scarcity of goods & Services despite having high MPC

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→ MPC is High in underdeveloped countries but the value of Multiplier is Low.

↓

Due to Structural Inadequacies.

- Lack of infrastructure
- Unskilled workforce.

⇢ Inc in consumption Exp is not accompanies by Inc. in production.

ILLUSTRATION 9

In an economy investment expenditure is increased by ₹400 Crores and marginal propensity to consume is 0.8. Calculate the total increase in income and saving.

$\Delta I = 400$, MPC = 0.8, MPS = 0.2

$K = \frac{1}{0.2} = 5$

$K = \frac{\Delta Y}{\Delta I} \Rightarrow K \times \Delta I = \Delta Y$

$5 \times 400 = 2000$

Inc in Income = 2000

Savings = 2000×0.2

= 400

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ILLUSTRATION 10

An increase in investment by 400 Crores leads to increase in national income by 1,600 Crores. Calculate marginal propensity to consume.

$$K = \frac{1600}{400} = 4$$

$$\Rightarrow \quad K = \frac{1}{MPS} \quad \Rightarrow \quad 4 = \frac{1}{MPS} \Rightarrow MPS = \frac{1}{4} = 0.25$$

$$MPC = 0.75$$

ILLUSTRATION 12

Suppose in a country investment increases by ₹ 100 Crores and consumption is given by C = 10 + 0.6Y (where C = consumption and Y = income). How much increases will there take place in income?

$$\Delta I = ₹100$$

$$MPC = 0.6 \rightarrow MPS = 0.4$$

$$K = \frac{1}{0.4} = 2.5$$

$$\Delta y = 100 \times 2.5$$
$$= 250$$

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ILLUSTRATION 11

In an economy, investment is increased by Rs 600 Crores. If the marginal propensity to consume is 0.6, calculate the total increase in income and consumption expenditure.

MPS = 0.4

$$K = \frac{1}{0.4} = 2.5$$

$\Delta Y = 600 \times 2.5$

= ₹1500

$\Delta C = 1500 \times 0.6$

= 900

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- Determination of Equilibrium Income :

Three Sector Model.

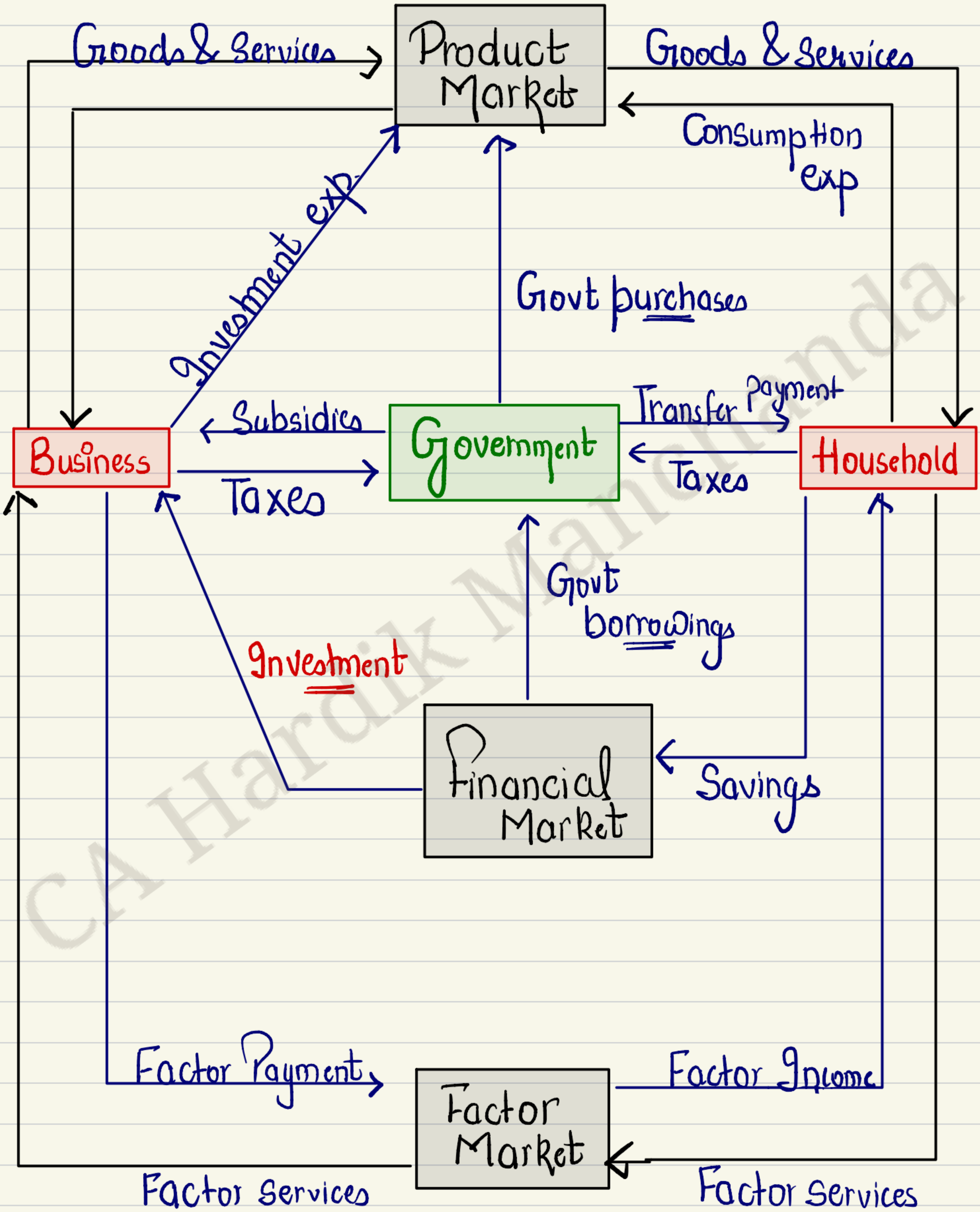
- Household
- Business
- Government

$$AD = C + I + G$$

- C → Household Comsumption
- I → Investment
- G → Govt Sector, demand for goods & Services.

$$AS = Y = C + S + \text{Taxes}$$

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Goods & Services
Product Market
Goods & Services
Consumption exp
Investment exp
Govt purchases
Business
Subsidies
Government
Transfer Payment
Household
Taxes
Taxes
Govt borrowings
Investment
Financial Market
Savings
Factor Payment
Factor Market
Factor Income
Factor Services
Factor Services

→ Role played by Govt Sector in 3-sector Model:

1. Taxes on households & business Sector to fund govt purchases.

2. Transfer payment to household & Subsidy to business.

3. Govt purchases goods & services from business Sector & factors of prod. from household Sector.

4. Govt borrowing in financial markets to finance deficit.

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* $AD = \underbrace{C + I}_{\text{Autonomous - do not directly depend on Income.}} + G_1$

$AS = C + S + T$

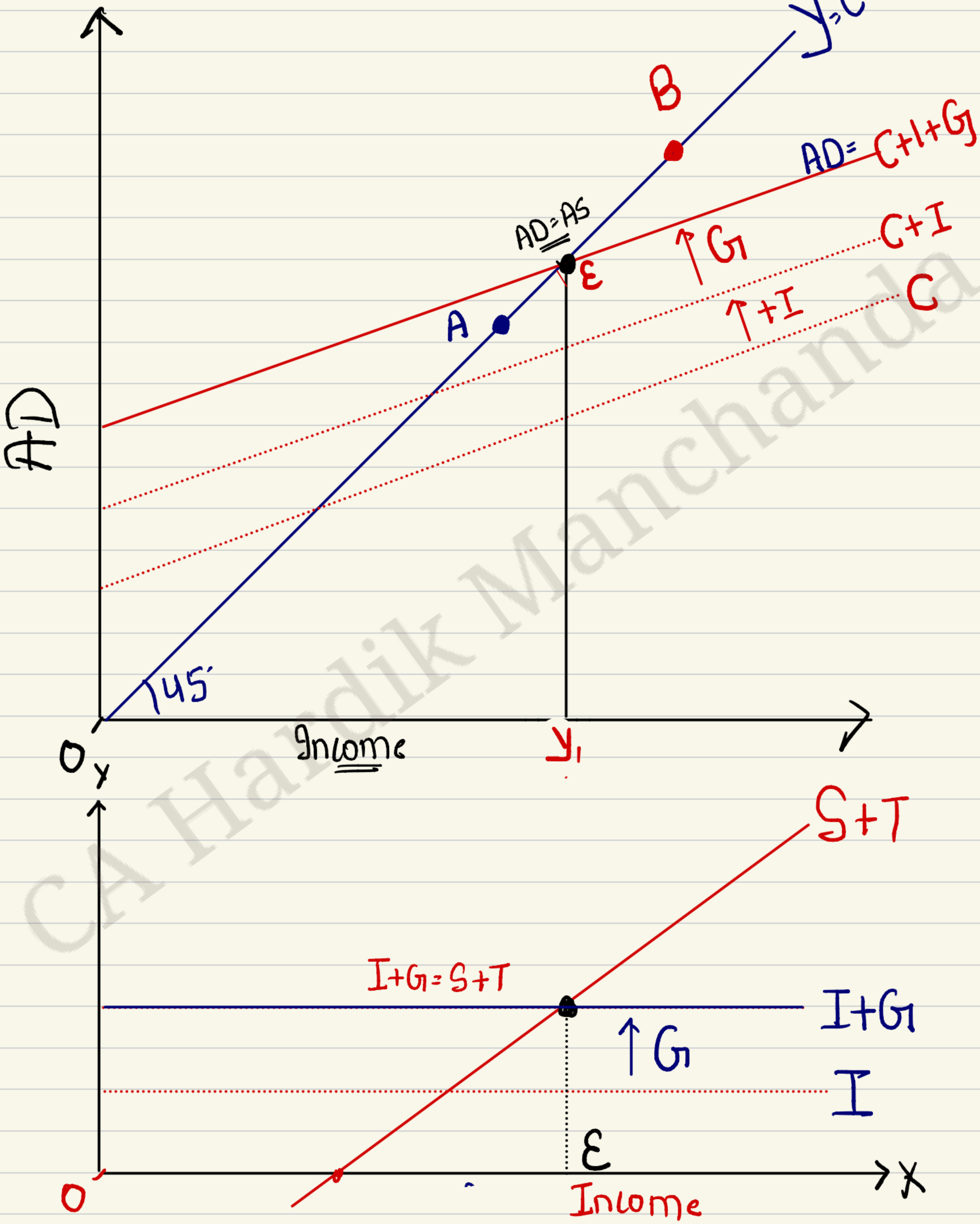
At equilibrium,

$$AD = AS$$

$$\cancel{C} + I + G_1 = \cancel{C} + S + T$$

$$\Rightarrow \underbrace{I + G_1}_{\text{Injections}} = \underbrace{S + T}_{\text{Leakages}}$$

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Y=C+S+T
B
AD=C+I+G
AD=AS
G
C+I
E
A
+I
C
AD
45°
O
Income
Y
S+T
I+G=S+T
I+G
G
I
E
O
X
Income

Why Other Points on the graph are not Point of Equilibrium.

1. Consider level of Income below Y_1 - A

$AD > AS(Y)$

$I + G > S + T$

↳ Production ↑

Employment ↑

Y ↑

2. Level of Income above Y_1

$AS > AD$

$S + T > I + G$

↳ Future prod. ↓

Employment ↓

Y ↓

→ It is imp to note that change in Output / Employment is, What will restore equilibrium, not changes in price.

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— Govt Sector & Income Determination

↓

Govt influences the level of Income through **Taxes**, Transfer payment, Govt purchases & govt borrowing

- Lump Sum Tax $[\bar{T}]$
  - ↓
  - Do not depend on Income
    - ↳ Autonomous Tax
- Proportionate Tax $[tY]$ — Tax Rate
  - ↓
  - depends on Income - changes with change in Income

Eg. $t = 0.3$ [30%]
$Y = 100$
$= 100 \times 0.3 \Rightarrow 30$

$$\text{Total tax, } T = \bar{T} + tY$$

↓

Tax as a function of Income.

⇒ Disposable Income,

$$Y_d = Y - T$$

$$Y_d = Y - [\bar{T} + tY]$$

$$Y_d = Y - \bar{T} - tY$$

→ In case transfer payment is received:

$$Y_d = Y - \bar{T} - tY + TR$$

TR → Autonomous

* Consumption function:

$$C = a + bY_d$$

$$C = a + b[Y - \bar{T} - tY + TR]$$

At equilibrium,

$$Y = C + I + G$$

$$Y = a + b[Y - \bar{T} - tY + TR] + I + G$$

eg.

$C = 10 + 0.75Y_d$
$I = 50$
$G = T = 20$ → Balance Budget

Calculate eq. Income.

$$Y_d = Y - 20$$

$$Y = C + I + G$$
$$Y = 10 + 0.75[Y - 20] + 50 + 20$$
$$Y = 80 + 0.75Y - 15$$

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$$\Rightarrow Y = 65 + 0.75Y$$
$$0.25Y = 65$$
$$Y = \frac{65}{0.25} = \underline{\underline{260}}$$

Ill.14

$$C = 100 + 0.75Y_d$$
$$I = 200$$
$$G = T = 100$$
$$TR = 50$$

1. $Y_d = Y - 100 + 50$
$= Y - 50$

$$Y = C + I + G$$
$$Y = 100 + 0.75[Y - 50] + 200 + 100$$

$$Y = 400 + 0.75Y - 37.5$$
$$0.25Y = 362.5$$
$$Y = 1450$$

Ill.15

$$C = 75 + 0.5[Y - T]$$
$$I = 80$$
$$T = 25 + 0.1Y$$
$$G = 100$$

$$Y_d = Y - 25 - 0.1Y$$
$$Y_d = 0.9Y - 25$$

$$K = \frac{1}{1 - 0.5(1 - 0.1)}$$

$$= \frac{1}{1 - 0.45} = \frac{1}{0.55}$$

$$= \boxed{1.82}$$

Avyukt Education For All
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$$Y = C + I + G_1$$
$$Y = 75 + 0.5(0.9Y - 25) + 80 + 100$$

$$Y = 255 + 0.45Y - 12.5$$
$$0.55Y = 242.5$$
$$Y = \frac{242.5}{0.55} \Rightarrow \boxed{440.91}$$

Eg.

$$C = 80 + 0.7Y_d$$
$$I = 200$$
$$T = 20 + 0.25Y$$
$$TR = 75$$
$$G = 50$$

$$Y_d = Y - 20 - 0.25Y + 75$$
$$= 0.75Y + 55$$

$$Y = 80 + 0.7(0.75Y + 55) + 50 + 200$$

$$Y = 330 + 0.53Y + 38.5$$

$$0.47Y = 368.5$$
$$Y = 784.04$$

$$K = \frac{1}{1 - 0.7(1 - 0.25)} = \frac{1}{1 - 0.525} = \frac{1}{0.475} = \underline{\underline{2.11}}$$

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Multiplier - $k = \frac{1}{1-MPC}$. in 2-Sector economy.

Govt/ Inv. ..... Spent - ₹100 → Y ₹100

MPC = 0.8
t = 0.1

C = 100 × 0.9 × 0.8

72

0.8 [1-t]

MPC [1-0.1]

0.8 × 0.9

0.72 ✓

MPC [1-t]

$$K = \frac{1}{1-MPC(1-t)}$$

ILLUSTRATION 16

Suppose C= 100 + 0.80 (Y- T + TR); I = 200; T= 25+0.1Y; TR= 50; G = 100

Find out equilibrium level of Income?

$$K = \frac{1}{1-0.8[1-0.1]} = \frac{1}{1-0.8\times0.9} = \frac{1}{1-0.72}$$

$$K = \frac{1}{0.28} \Rightarrow 3.57$$

$$Y = 100 + 0.8[Y - 25 - 0.1Y + 50] + 100 + 200$$

$$Y = 400 + 0.8[0.9Y + 25]$$

$$Y = 400 + 0.72Y + 20$$

$$0.28Y = 420$$

$$\boxed{Y = 1500}$$

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Determination of Equilibrium Income – Four Sector Model

- Household
- Business
- Govt
- Foreign Sector

Three additional flows in 4 Sector model:

1. Exports
2. Imports
3. Net capital inflow [Cap inflow - cap outflow]

* $\underline{\underline{AD}} = C + I + G + \underbrace{(X - M)}_{\text{Net export}}$

Total planned exp

- Trade balance

→ **Exports** :- Injections in the national income

↳ foreign demand for domestic Output.

↳ Demand for export depends on foreign Income & is

Exogenous & Autonomous

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→ **Imports** : Leakage or Outflow of national income.

↳ Not demand for domestic goods, deducted from AD

Import function:

$$\acute{M} = \overline{M} + mY$$

↓ Autonomous

↳ Marginal propensity to import

↓ $\frac{\Delta M}{\Delta Y}$ - Slope

At Equilibrium,

$$AD = AS\,[Y]$$

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

↓

$$C = a + bY_d$$

$$M = \overline{M} + mY$$

$$\cancel{C} + S + T = \cancel{C} + I + G + X - M$$

$$\Rightarrow \underbrace{S + T + M}_{\text{Leakage}} = \underbrace{I + G + X}_{\text{Injections}}$$

Leakage ⌊ Decrease the level of income

Injections ⌊ Increases the level of income.

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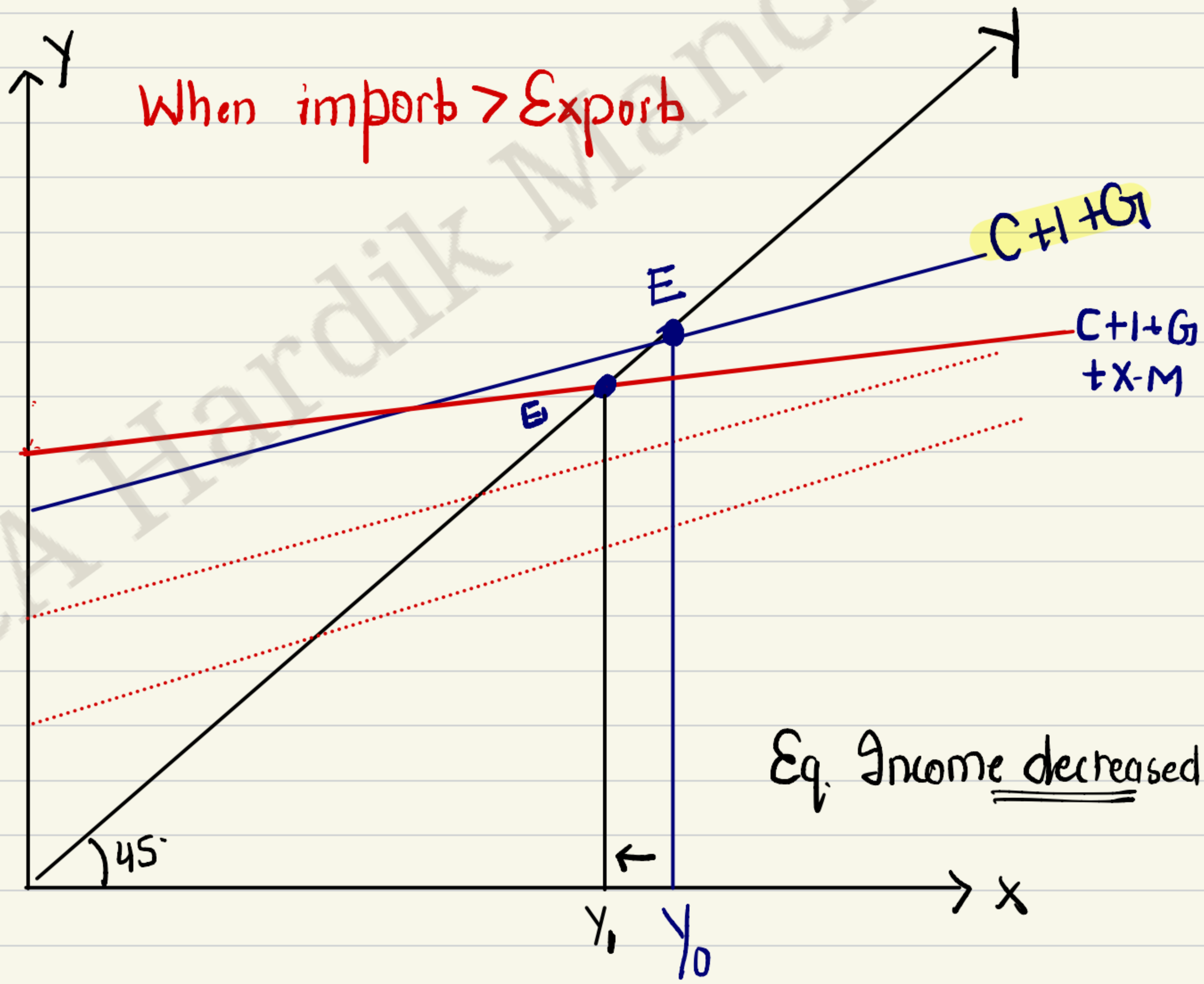
Imp

→ If X > M → Net exports are positive
↳ Injections > Leakage

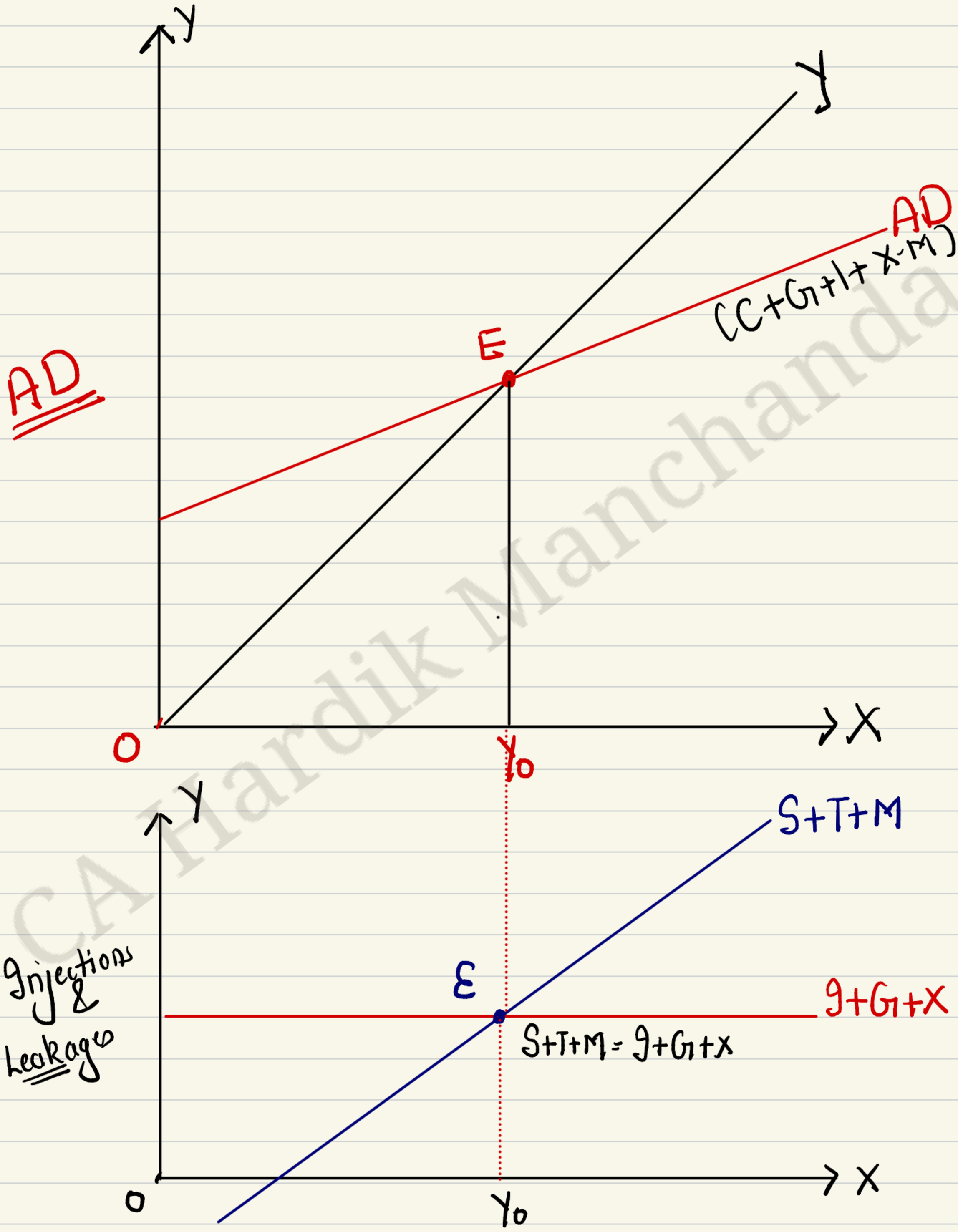
National Income Increases.

→ If X < M → Net exports are negative
↳ Leakages > Injections

National Income decreases



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Y
AD
E
(C+G+I+X-M)
AD
O
Y0
X
Y
S+T+M
Injections & Leakages
E
I+G+X
S+T+M = I+G+X
O
Y0
X

→ Foreign Trade Multiplier

Export Multiplier

$\frac{\Delta Y}{\Delta X}$

$$Y = a + b(Y-T) + I + G_1 + X - \bar{M} - mY$$

$$\Rightarrow Y = a + bY - bT + I + G_1 + X - \bar{M} - mY$$

$$\Rightarrow Y - bY + mY = a - bT + I + G_1 + X - \bar{M}$$

$$Y(1-b+m) = a - bT + I + G_1 + X - \bar{M}$$

$$Y = \frac{1}{(1-b+m)}(a - bT + I + G_1 + X - \bar{M})$$

Now, Suppose exports increase by ΔX

↳ this will lead to ΔY

$$\rightarrow Y + \Delta Y = \frac{1}{(1-b+m)}(a - bT + I + G_1 + X + \underline{\Delta X} - \bar{M})$$

$$\rightarrow Y + \Delta Y = \frac{1}{(1-b+m)}(a - bT + I + G_1 + X - \bar{M}) + \frac{\Delta X}{1-b+m}$$

$$\cancel{Y} + \underline{\Delta Y} = \cancel{Y} + \frac{\Delta X}{1-b+m}$$

$$\boxed{\frac{\Delta Y}{\Delta X} = \frac{1}{1-b+m}}$$

9) proportional tax is included.

$$FTM = \frac{1}{1-b(1-t)+m}$$ ✓

→ The greater the value of 'm', lower will be the autonomous exp Multiplier.
↳ FTM

The more open an economy is to foreign trade, the smaller will be the response of income to Aggregate demand shocks.
↳ change in govt spending / Investment

→ Higher m : larger proportion of Income is spent on foreign goods not domestic goods.

* Expansionary & Contractionary effect

1. Inc. in demand for Exports - AD↑ → Eq. Income↑
Expansionary.

2. Inc. in Imports → AD↓ → Eq. Income↓
Contractionary.

* This should not be interpreted that: Exports are goods & imports are harmful.

→ Countries import goods that can be efficiently produced abroad & trade increases the overall efficiency of worldwide allocation of resources.

Ill.18

✓ An economy is characterised by the following equation-

Consumption	$C = 60 + 0.9Y_d$
Investment	$I = 10$
Government expenditure	$G = 10$
Tax	$T = 0$
Exports	$X = 20$
Imports	$M = 10 + 0.05\ Y$

What is the equilibrium income?

Calculate trade balance and foreign trade multiplier.

$$Y = C + I + G + X - M$$
$$= 60 + 0.9Y + 10 + 10 + 20 - 10 - 0.05Y$$
$$Y = 90 + 0.85Y$$
$$0.15Y = 90 \Rightarrow \boxed{Y = 600}$$

→ FTM = $\frac{1}{1-b+m}$ = $\frac{1}{1-0.9+0.05}$ = $\frac{1}{0.15}$

= 6.67

→ Trade Balance = X - M

= 20 - 10 - 0.05×600

= -20 ↳ Deficit

H.W - 9ll.17

ILLUSTRATION 17 64.25

The consumption function is C = 40 + 0.8Y_d, T = 0.1Y, I = 60 Crores G = 40 Crores, X = 58 and M = 0.05 Y. Find out equilibrium level of income, Net Export, net export if export were to increase by 6.25.

Y_d = Y - 0.1Y

= 0.9y

Y = C + I + G + X - M

Y = 40 + 0.8 × 0.9Y + 60 + 40 + 58 - 0.05Y

Y = 198 + 0.72Y - 0.05Y

0.33Y = 198

Y = 600

Net exports = X - M

= 58 - 0.05×600

= 28

At. X = 64.25

$$Y = 40 + 0.72Y + 60 + 40 + 64.25 - 0.05Y$$
$$Y = 204.25 + 0.67Y$$
$$0.33Y = 204.25$$

$$Y = 618.94$$

Net exports = $64.25 - 0.05 \times 618.94$

= 33.303

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CA Final

Multiple Choice Questions

AS=AD

1) In the Keynesian model, equilibrium aggregate output is determined by

AS

(a) aggregate demand

(b) consumption function

(c) the national demand for labor

(d) the price level

2) Keynes believed that an economy may attain equilibrium level of output

(a) only at the full-employment level of output

(b) below the full-employment level of output

(c) only if prices were inflexible

(d) a) and c) above

3) According to Keynes, consumption expenditure is determined by

(a) the level of interest rates

(b) extent of government taxes and subsidies

(c) disposable income

(d) autonomous investment expenditure

4) The marginal propensity to consume (MPC) can be defined as

(a) a change in spending due to a change in income

(b) a change in income that is saved after consumption

(c) part of income that is spent on consumption.

(d) part of income that is not saved.

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5) If the consumption function is expressed as C = a + bY then b represents

(a) autonomous consumer expenditure when income is zero

(b) the marginal propensity to consume.

(c) the expenditure multiplier when consumption is increased

(d) part of disposable income

6) If the consumption function is expressed as C = a + bY then a represents

(a) autonomous consumer expenditure.

(b) the marginal propensity to consume.

(c) the consumption income relationship

(d) Non- linear consumption function

7) If the consumption function is C = 20 + 0.5Yd, then an increase in disposable income by Rs. 100 will result in an increase in consumer expenditure by `----------

(a) 25

(b) 70

(c) 50

(d) 100

8) If the autonomous consumption equals Rs. 2,000 and the marginal propensity to consume equals 0.8. If disposable income equals Rs. 10,000, then total consumption will be _____

(a) 8,000

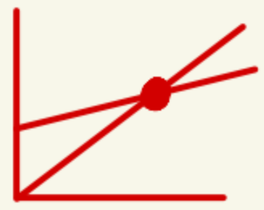
(b) 6,000

(c) 10,000

(d) None of the above

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Equilibrium



9) In the Keynesian cross diagram, the point at which the aggregate demand function crosses the 45-degree line indicates the

(a) level of full employment income.

(b) less than full employment level of income.

(c) equilibrium level of income which may or may not be full employment level of income

(d) autonomous level of income which may not be full employment level of income

No foreign sector

10) In a closed economy, aggregate demand is the sum of

(a) consumer expenditure, demand for exports and government spending.

(b) consumer expenditure, planned investment spending and government spending.

C+I+G

(c) consumer expenditure, actual investment spending, government spending and net exports.

(d) consumer expenditure, planned investment spending, government spending, and net exports.

11) Under equation C= a+by, b=0.8, what is the value of 2 sector expenditure multiplier?

$$K = \frac{1}{1-MPC} = \frac{1}{0.2}$$

(a) 4

(b) 2

(c) 5

(d) 1

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12) Suppose in an economy

Consumption Function	C = 170+0.80 Y
Investment spending	I = 200
Government Spending	G = 150
Tax	Tx = 30+0.30Y
Transfer payments	Tr = 60
Exports	X = 45
Imports	M = (20 + 0.2Y)

Equilibrium level of income is:

$Y_d = Y - 30 - 0.3Y + 60$
$= 0.7Y + 30$

(a) 1021.5

(b) 880.8

(c) 889.06

(d) 989.06

$Y = 170 + 0.8[0.7Y + 30] + 200 + 150 + 45 - 20 - 0.2Y$
$Y = 545 + 0.56Y + 24 - 0.2Y$
$0.64Y = 569$

13) Suppose you are given following information-

Consumption function C = 10 + 0.8Yd $Y_d = Y - 50$

Tax T = 50

Investment spending I = 135

Government Spending G = 60

Exports X = 35

Imports M = 0.05 Y

$Y = 10 + 0.8[Y - 50] + 135 + 60 + 35 - 0.05Y$
$= 10 + 0.8Y - 40 + 135 + 60 + 35 - 0.05Y$
$Y = 200 + 0.75$
$0.25Y = 200 \Rightarrow Y = 800$

Where Y and Yd are income and personal disposable income respectively.

Net exports at equilibrium level is:

(a) 25

(b) -10

(c) 5

(d) -5

$35 - 0.05 \times 800$
$35 - 40$
$= -5$

14) An increase of investment by Rs. 600 Crores resulted in an increase in national income by Rs. 2400 Crores. MPC is:

(a) 0.25

(b) 4

(c) 0.75

(d) 0.5

$k = \frac{\Delta Y}{\Delta I} = \frac{2400}{600} = 4 = \frac{1}{1-MPC}$

$4(1-MPC) = 1$

$1-MPC = 0.25$

$1 - 0.25 = MPC$

$0.75 = MPC$

Injections > Leakage

15) If net exports are positive, national income will:

(a) increase

(b) Decrease

(c) No change

(d) either a or b

16) Suppose in an economy

C = 100 + b(Y – 50 –t Y) ; I = 50; G = 50 ;X = 10; M = 5 + 0.1Y; MPC (b) = 0.8; Proportional income tax rate (t) = 0.25

Foreign trade multiplier will be:

(a) 3.33

(b) 2

(c) 3

(d) 10

$\frac{1}{1-b(1-t)+m} = \frac{1}{1-0.8(1-0.25)+0.1}$ (m = 0.1, 1 − MPC(1 − t) = 0.75)

$\frac{1}{1-0.6+0.1} = \frac{1}{0.5} = 2$

x —— Chapter over :) —— x

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