

CH 6 Unit 2 The Keynesian Theory of National Income Determination

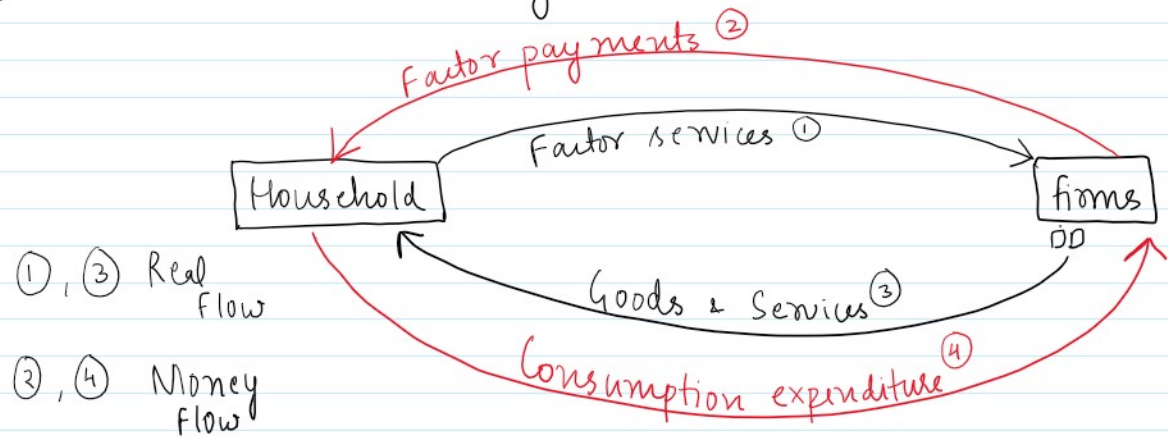
1 INTRODUCTION

1930 ☹️ ☹️ ☹️ ☹️ ☹️ ☹️ ☹️ ☹️ ☹️ ☹️  
The Great Depression

1936 :- John Maynard Keynes's General Theory of Employment, Interest and Money was published  
→ Consumption & Income relation  
→ Savings  
→ Multiplier etc

- Household & firms ☐ Two sector economy
- Household, firms & Government ☐ Three sector economy
- H/H, firms, Govt & ROW ☐ Four sector economy

2 Circular flow of Income (2 sector)



\* Factor Payments (2) = Value of Output (4) \*

③ **Aggregate Demand (AD)**

PLANNED EXPENDITURE

EX-ANTE

AD has two components :-

- a) Ex- Ante demand for **Consumer Goods (C)**
- b) Ex- Ante demand for **Investment Goods (I)**

$\therefore AD = C + I$

"Constant Investment"

3 (A) CONSUMPTION FUNCTION

$C = f(Y)$

Consumption is the function of "Income"

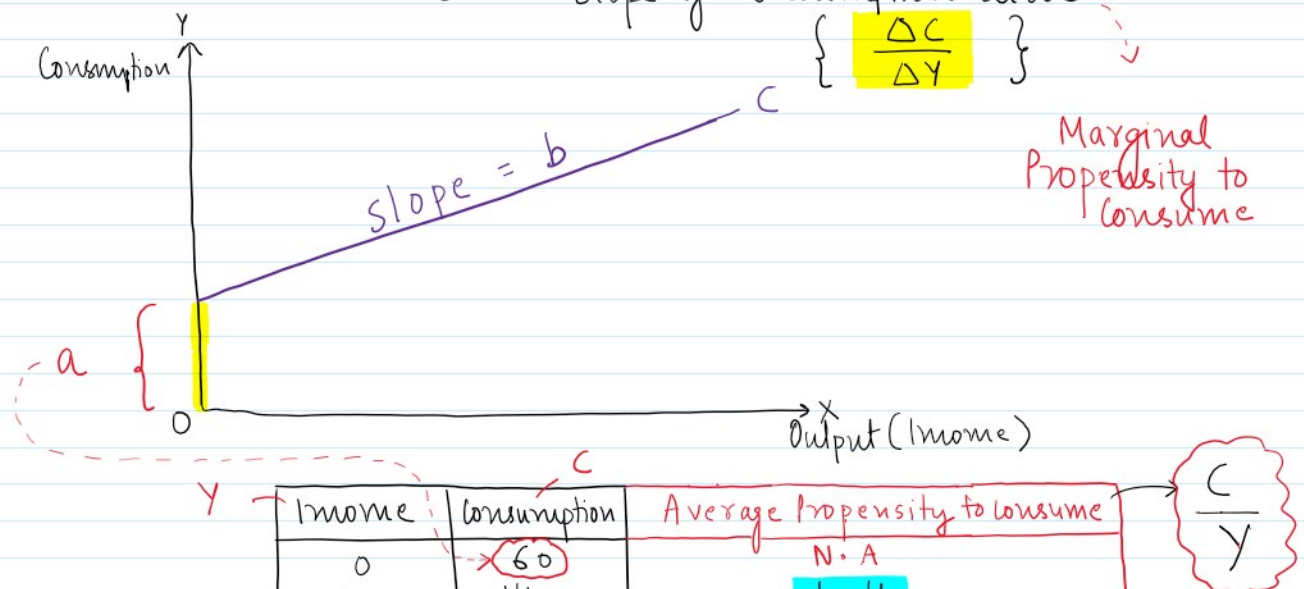
$C = a + bY$

a = Autonomous consumption

b = slope of consumption curve

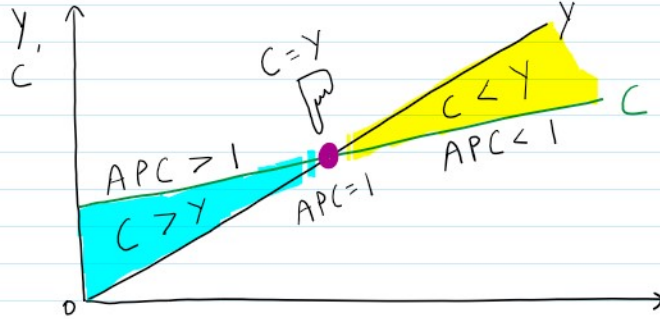
$\left\{ \frac{\Delta C}{\Delta Y} \right\}$

Marginal Propensity to Consume



Income	Consumption	Average Propensity to consume
0	60	N.A
100	140	1.4
200	220	1.1
300	300	1
400	380	0.95
500	460	0.92

$\bar{y}$



\* Consumption, Income and Savings Relation

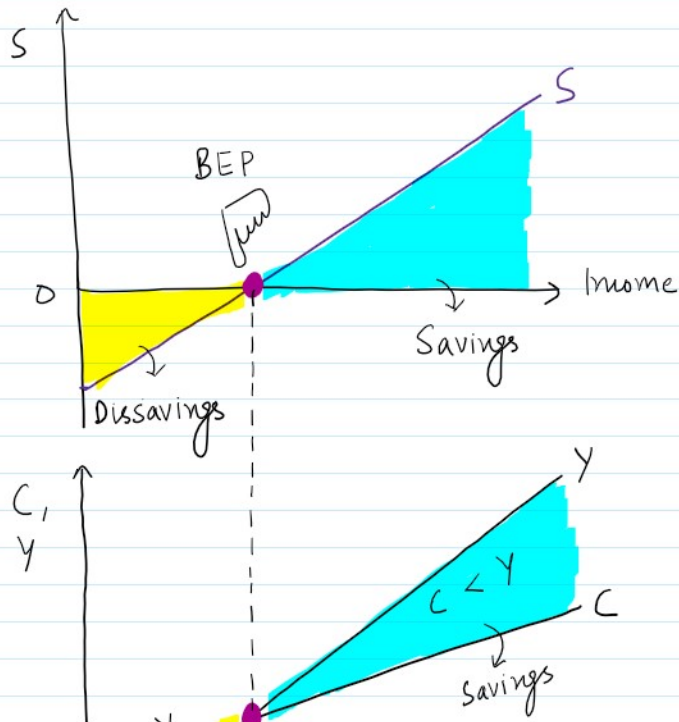
$$S = f(Y)$$

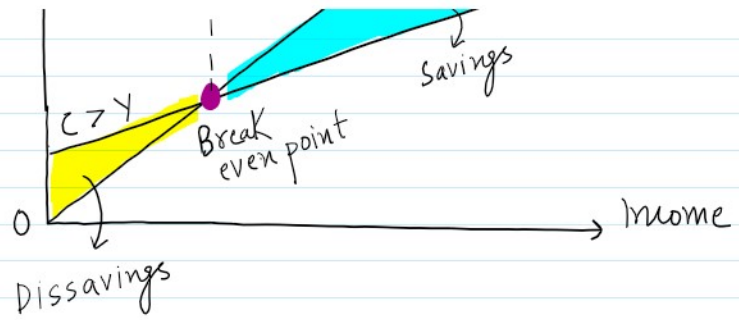
Savings is the function of Income

Income (Y)	Consumption (C)	Savings (Y-C)
0	60	-60
100	140	-40
200	220	-20
300	300	0
400	380	20
500	460	40

Break even point

$$S = Y - C$$





$$\begin{aligned}
 S &= Y - C \\
 &= Y - [a + bY] \\
 &= Y - a - bY \\
 &= -a + Y - bY
 \end{aligned}$$

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

Negative Autonomous consumption
Slope of Savings curve
Income

(Marginal Propensity to Save) →

$$\frac{\Delta S}{\Delta Y}$$

3(B)  $MPC = \frac{\Delta C}{\Delta Y}$  (i.e. slope of consumption curve)

$MPS = \frac{\Delta S}{\Delta Y}$  (i.e. slope of Savings curve)

$APC = \frac{C}{Y}$

$APS = \frac{S}{Y}$

$MPC + MPS = 1$   
 $APC + APS = 1$

④ Aggregate Supply (AS)

AS represents **Income** i.e.  $Y$

AS has two components :-

a) Consumption ( $C$ )

b) Savings ( $S$ )

$$Y = V - r + C$$

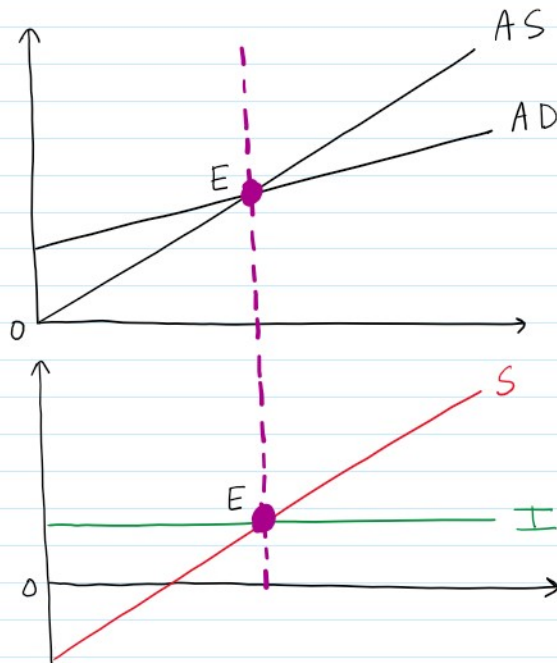
$$AS = \boxed{Y = C + S}$$

\* **National Income Determination** (2 sector)

Consumers.  $\leftarrow$  AD = AS  $\rightarrow$  producers (firms)  
 DDD  
 DDD  
 "Realised"  
 Realised Value = Expected Value  
 DDD  
 DDD  
 "expect"

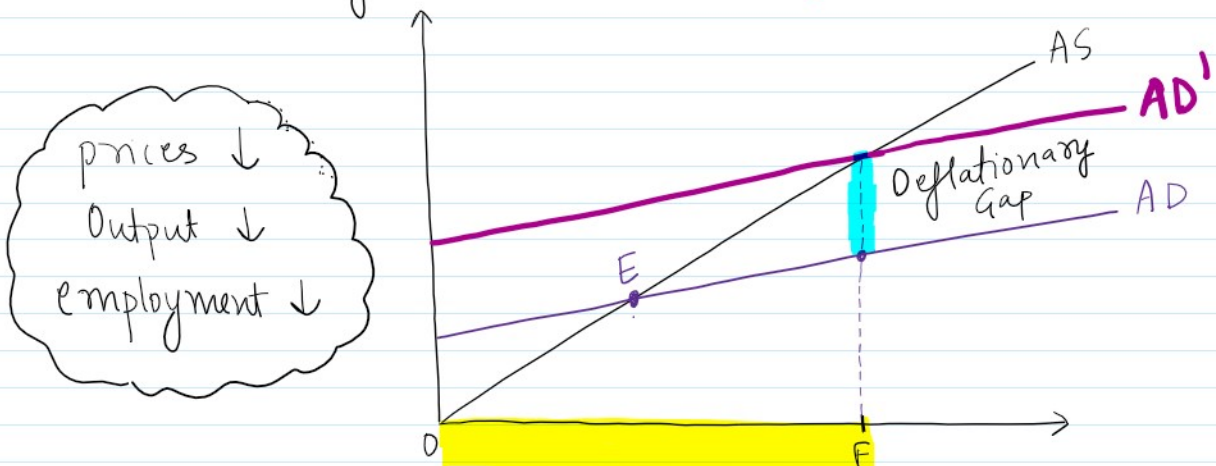
$$C + I = C + S$$

$$I = S$$



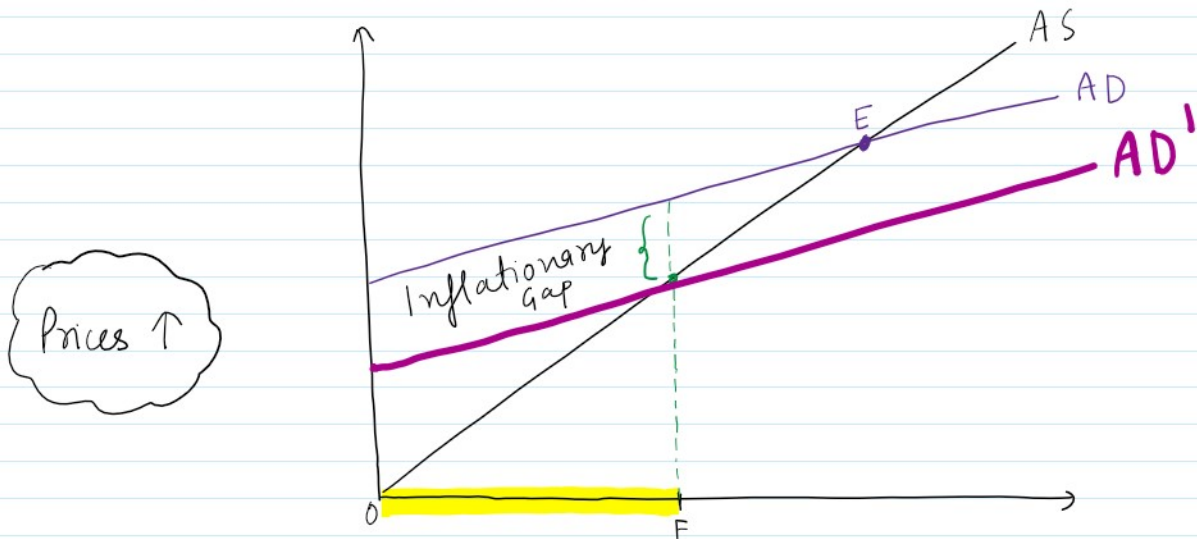
\* EQUILIBRIUM with **Unemployment** or **Inflation**

(a) **Deficient Demand** (demand  $\neq$   $\frac{Y}{P}$ )





(b) Excess demand



⑤ Investment Multiplier

→ It shows the responsiveness of change in Investment on change in income

i.e.  $K = \frac{\Delta Y}{\Delta I}$

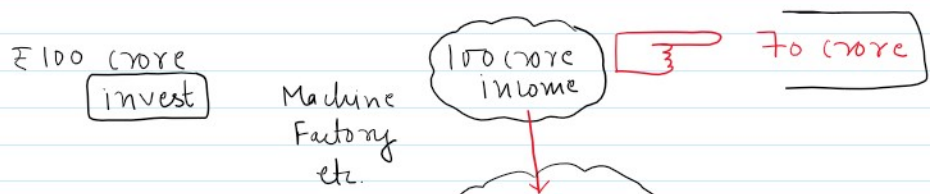
Change in Income

Change in Investment



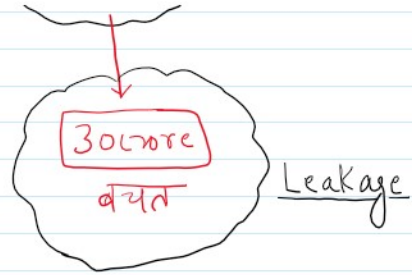
$\therefore K = \frac{500}{100} = 5 \text{ times}$

→ This process stops due to LEAKAGES (i.e. Savings)



Investment

Factory etc.



→ Investment multiplier can also be calculated as :-

$$\frac{1}{1 - MPC}$$

or

$$\frac{1}{MPS}$$

K & MPC have a **direct** relation

K & MPS have **inverse** relation

MPC	K
0.2	1.25
0.5	2
0.8	5

MPS	K
0.2	5
0.5	2
0.8	1.25

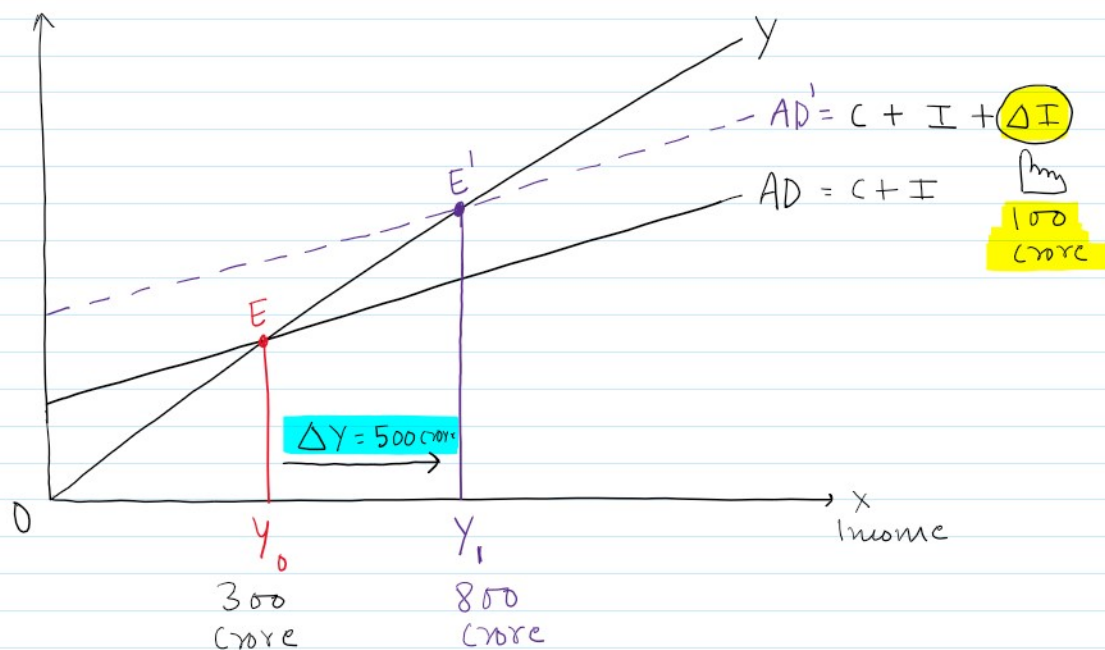
MPC ↑ K ↑

MPS ↑ K ↓

$$1 \leq K \leq \infty$$

$$\frac{\Delta Y = 500}{\Delta I = 100}$$

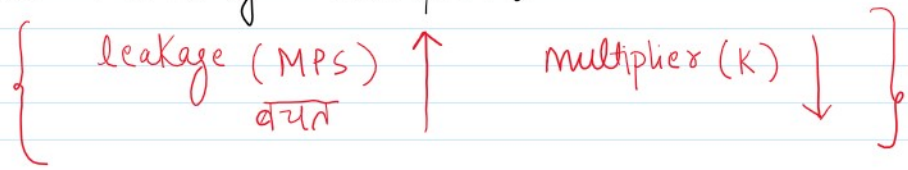
K = 5 times



Core

Core

\* More powerful these leakages are, the smaller the value of multiplier.



Leakages are caused due to :-

- a) Increase in Taxes
- b) Decrease in MPC
- c) Increase in demand of Consumer goods
- d) Undistributed profits of companies (i.e. Retained Earnings)

\* Underdeveloped countries

MPC is HIGH

( $\frac{0.01}{0.01}$  खर्चा ज्यादा करना पड़ते हैं)

K is LOW

Why ???

Increase in consumption ✓  
 but Increase in production is not possible  
 rather prices increase

⑥ Determination of Equilibrium Income

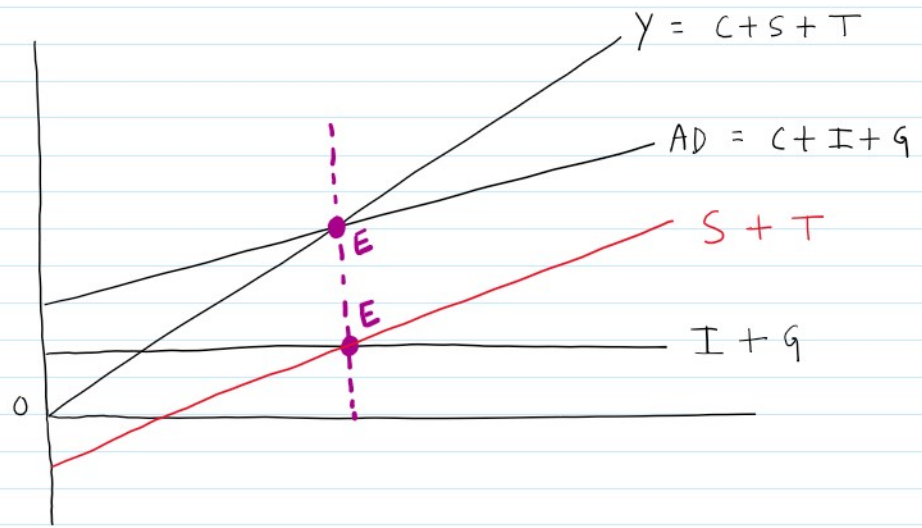
- ③ sector



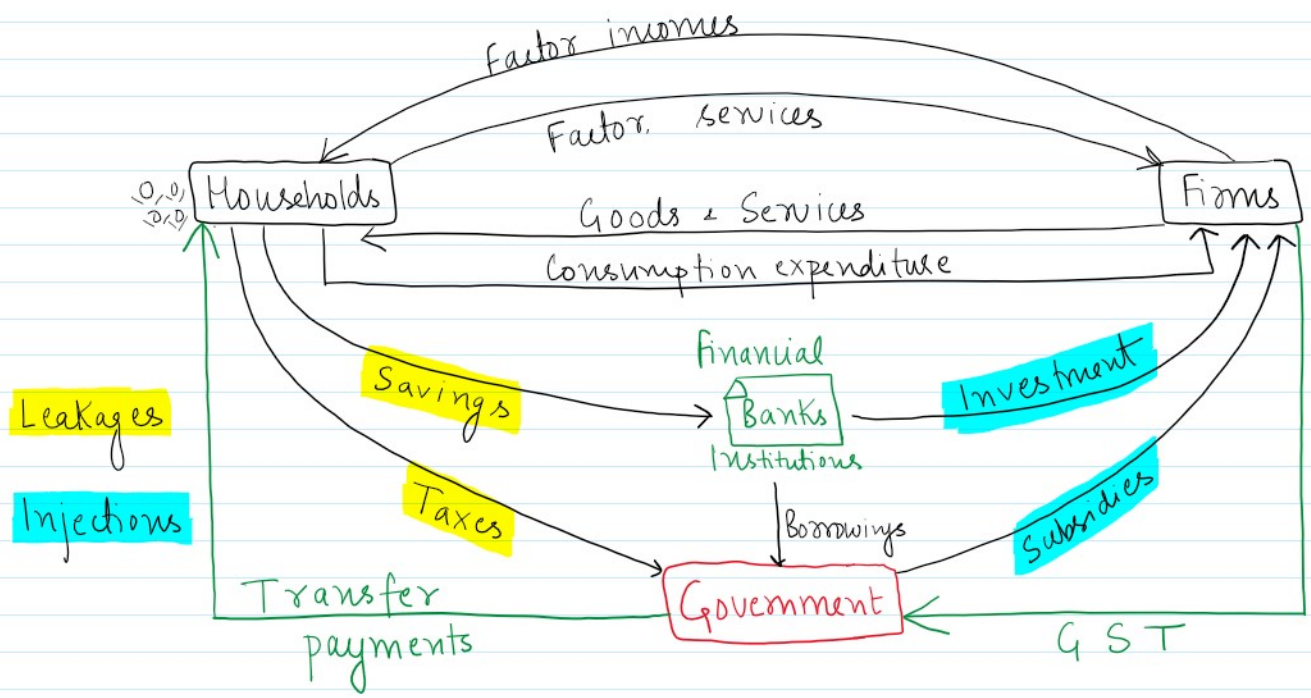
AS = AD  
 $C + S + T = C + I + G$   
 $S + T = I + G$

Taxes i.e. Government income ← (connected to T in the equation above)  
 Government expenditure (सरकार का खर्चा) → (connected to G in the equation above)

$S + T = I + G$



Circular flow of Income



(R) FORMULA (V. Imp)

$Y = C + I + G$

here  $C = a + b Y_d$

here  $Y_d = Y - T$  (Disposable Income) Lumpsum Taxes

$Y = a + b Y_d + I + G$

$$\begin{aligned} Y &= a + bY_D + I + G \\ Y &= a + b(Y - T) + I + G \\ Y &= a + bY - bT + I + G \\ Y - bY &= a - bT + I + G \\ Y(1 - b) &= a - bT + I + G \end{aligned}$$

3 sector  $\bar{A}$  equilibrium condition.

$$Y = \frac{1}{(1-b)} [a - bT + I + G]$$

(ii) When  $Y_D = Y - T (+) TR$

Disposable income

Autonomous transfer payment

Now

$$Y = C + I + G$$

$$Y = [a + bY_D] + I + G$$

$$Y = a + b(Y - T + TR) + I + G$$

$$Y = a + bY - bT + bTR + I + G$$

$$Y - bY = a - bT + bTR + I + G$$

$$Y(1 - b) = a - bT + bTR + I + G$$

$$Y = \frac{1}{(1-b)} [a - bT + bTR + I + G]$$

(iii) When Tax is a function of Income

$$T = \bar{T} + tY$$

Total Tax

Autonomous constant Tax

income tax Rate

Now

$$Y = C + I + G$$

Now

$$Y = C + I + G$$

$$Y = a + bY_D + I + G$$

$$Y = a + b(Y - T) + I + G$$

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

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

$$Y = a + bY - b\bar{T} - btY + I + G$$

$$Y - bY + btY = a - b\bar{T} + I + G$$

$$Y(1 - b + bt) = a - b\bar{T} + I + G$$

$$Y = \frac{1}{(1 - b + bt)} [a - b\bar{T} + I + G]$$

"TAX MULTIPLIER"

(iv) When  $Y_D = Y - T + TR$

Now,

$$Y = C + I + G$$

$$Y = a + bY_D + I + G$$

$$Y = a + b[Y - T + TR] + I + G$$

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

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

$$Y = a + bY - b\bar{T} - btY + bTR + I + G$$

$$Y - bY + btY = a - b\bar{T} + bTR + I + G$$

$$Y(1 - b + bt) = a - b\bar{T} + bTR + I + G$$

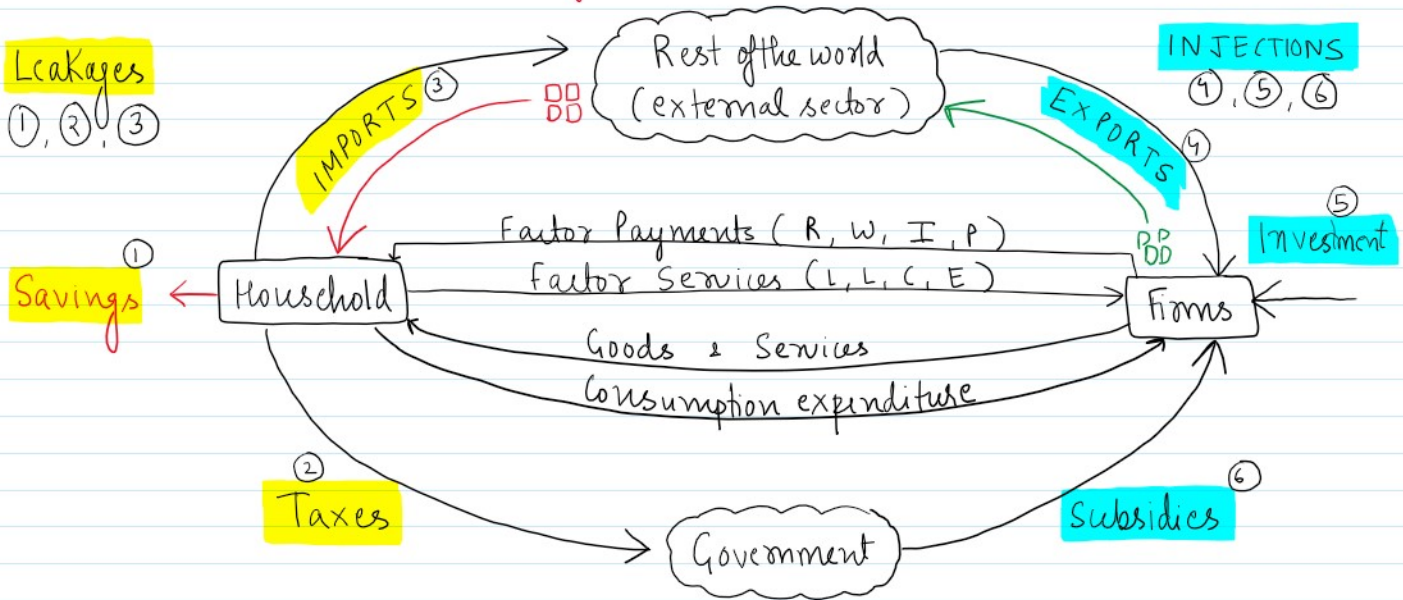
$$Y = \frac{1}{(1 - b + bt)} [a - b\bar{T} + bTR + I + G]$$

"TAX MULTIPLIER"

# " TAX MULTIPLIER "

⑦\* Equilibrium level of Income - ④ sector economy

## 1. Circular flow of Income



## ② EQUILIBRIUM

$$AS = AD$$

$$Y = AD$$

$$C + S + T = C + I + G + \text{Net exports.}$$

$$C + S + T = C + I + G + (X - M)$$

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

$$S + T + M = I + G + X$$

New

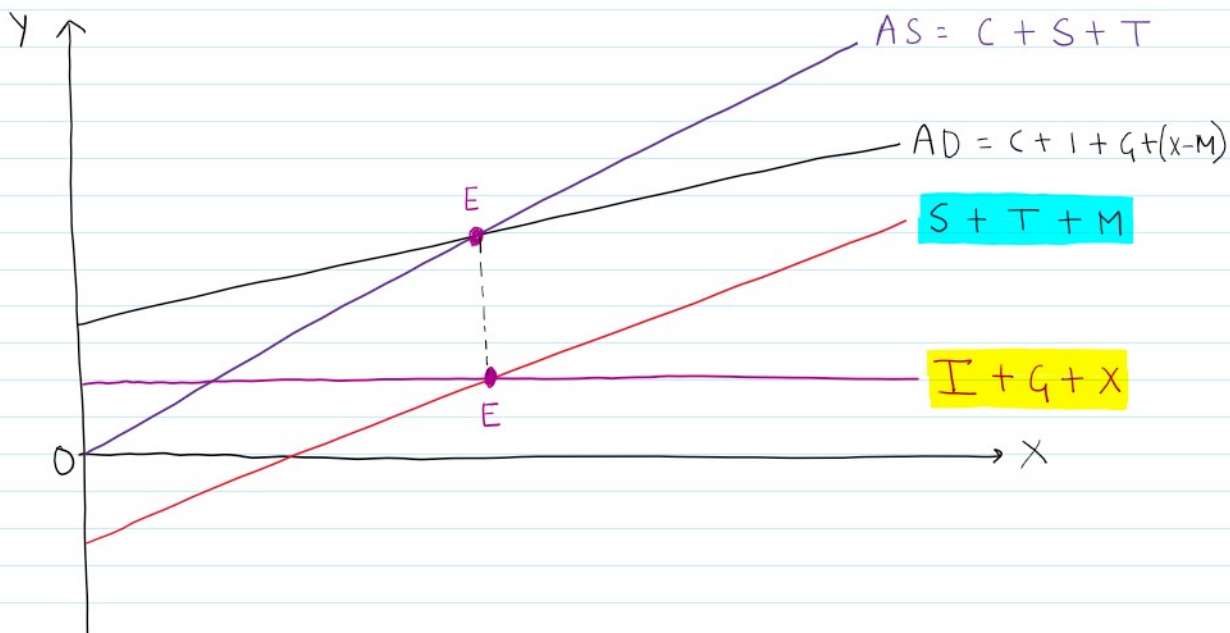
$$* M = \bar{M} + mY$$

Autonomous Imports
propensity to import
Income

here  $m = \frac{\Delta M}{\Delta Y} = \frac{\text{change in Imports}}{\text{change in Income}}$

Y ↑

$$AS = C + S + T$$



At equilibrium

$$AS = AD$$

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

$$Y = (a + bY_d) + I + G + X - [\bar{M} + mY]$$

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

$$Y = a + \underbrace{bY}_{\text{}} - bT + I + G + X - \bar{M} - \underbrace{mY}_{\text{}}$$

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

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

$$\textcircled{R} \quad Y = \frac{1}{(1 - b + m)} [a - bT + I + G + X - \bar{M}]$$

" FOREIGN TRADE MULTIPLIER "

\* Foreign Trade Multiplier =  $\frac{1}{(1 - b + m)} = \frac{\overset{\text{Income}}{\Delta Y}}{\underset{\text{Exports}}{\Delta X}}$

if  $X < M$  then National Income DECREASES

if  $X < M$  then National Income **DECREASES**

if  $m$  increases then foreign trade multiplier **DECREASES**  
*propensity to import*

Q1 :-  
 $b = 2$   
 $m = 4$   
find FTM

Sol:- FTM =  $\frac{1}{(1 - b + m)}$   
 $= \frac{1}{1 - 2 + 4}$   
 $= \frac{1}{3}$   
 $= 0.3\bar{3}$

Q2 :-  
 $b = 2$   
 $m = 6$   
find FTM

Sol:- FTM =  $\frac{1}{1 - b + m}$   
 $= \frac{1}{1 - 2 + 6}$   
 $= \frac{1}{5} = 0.2$

Q3 -  
 $\Delta Y = 1000$   
MPC = 75%  
find i)  $\Delta I$   
ii)  $\Delta C$

Sol:- MPC = 75% =  $\frac{75}{100} = 0.75$

$$K = \frac{1}{1 - \text{MPC}} = \frac{1}{1 - 0.75} = \frac{1}{0.25} = 4$$

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

$$4 = \frac{1000}{\Delta I}$$

$$\therefore \Delta I = \frac{1000}{4} = 250$$

$$\text{MPC} = 0.75 = \frac{\Delta C}{\Delta Y}$$

$$0.75 = \frac{\Delta C}{1000}$$

$$\therefore \Delta C = 0.75 \times 1000 = 750$$

Q4-  $C = 100 + 0.8(Y - T + TR)$

$$I = 200$$

$$T = 25 + 0.1Y$$

$$TR = 50$$

$$G = 100$$

Find equilibrium level of income i.e.  $Y$

Sol:-

Equilibrium

$$Y = C + I + G$$

$$Y = 100 + 0.8(Y - T + TR) + 200 + 100$$

$$Y = 100 + 0.8(Y - (25 + 0.1Y) + 50) + 200 + 100$$

$$Y = 100 + 0.8(Y - 25 - 0.1Y + 50) + 300$$

$$Y = 100 + 0.8(0.9Y + 25) + 300$$

$$Y = 100 + 0.72Y + 20 + 300$$

$$Y - 0.72Y = 100 + 20 + 300$$

$$0.28Y = 420$$

$$Y = \frac{420}{0.28} = 1500$$

Q5-  $C = 60 + 0.9Y_D$

$$T = 10$$

$$\underline{Q5-} \quad C = 60 + 0.7Y_D$$

$$I = 10$$

$$G = 10$$

$$T = 0$$

$$X = 20$$

$$M = 10 + 0.05Y$$

Find equilibrium level of Income.

$$\text{Sol:-} \quad Y = C + I + G + (X - M)$$

$$Y = 60 + 0.9Y_D + 10 + 10 + \{20 - (10 + 0.05Y)\}$$

$$Y = 60 + 0.9(Y - T) + 20 + 20 - 10 - 0.05Y$$

$$Y = 60 + 0.9(Y - 0) + 30 - 0.05Y$$

$$Y = 60 + 0.9Y + 30 - 0.05Y$$

$$Y = 90 + 0.85Y$$

$$Y - 0.85Y = 90$$

$$0.15Y = 90$$

$$Y = \frac{90}{0.15} = 600$$