CH 6 Unit 2 The Keynesian Theory of Determination of National Income

(1) INTRODUCTION

1930 ☹ ☹ ☹ ☹ ☹ ☹ ☹ ☹ ☹ ☹

The Great Depression

1936 :- John Maynard Keynes's General Theory of Employment, Interest and Money was published

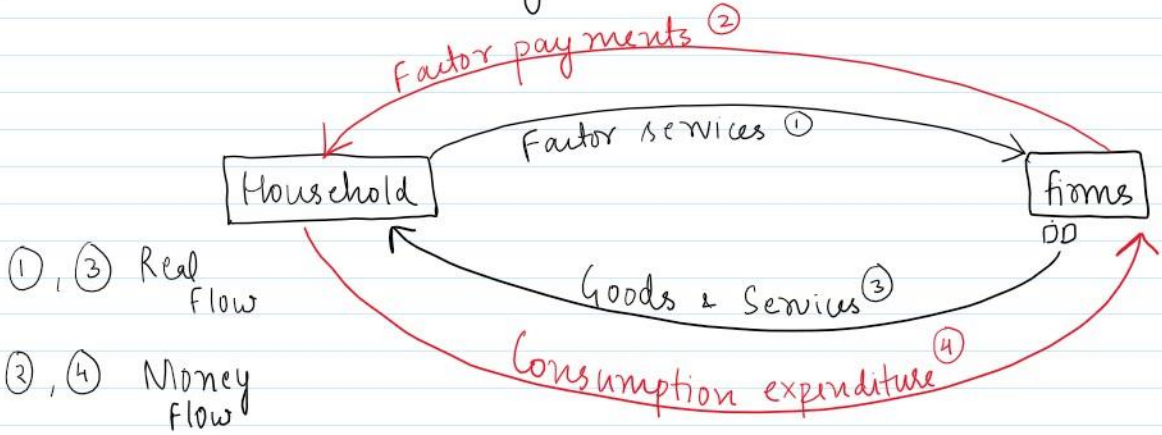
- → Consumption & Income relation
- → Savings
- → Multiplier etc

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)



①, ③ Real Flow

③, ④ Money Flow

* 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

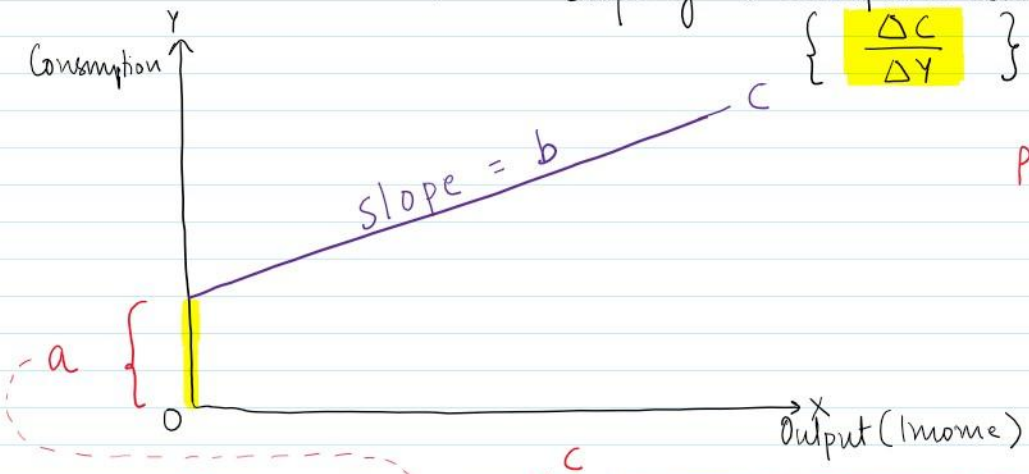
$C = f(Y)$

Consumption is the function of "Income"

$$C = a + bY$$

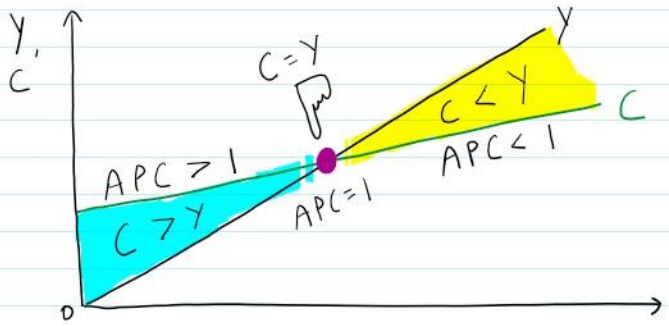
a = Autonomous consumption

b = slope of consumption curve $\left\{ \frac{\Delta C}{\Delta Y} \right\}$ → Marginal Propensity to Consume



Income (Y)	Consumption (C)	Average Propensity to Consume $\frac{C}{Y}$
0	60	N.A

Income	Consumption	Average Propensity to Consume ($\frac{C}{Y}$)
0	60	N.A
100	140	1.4
200	220	1.1
300	300	1
400	380	0.95
500	460	0.92



* Consumption, Income and Savings Relation

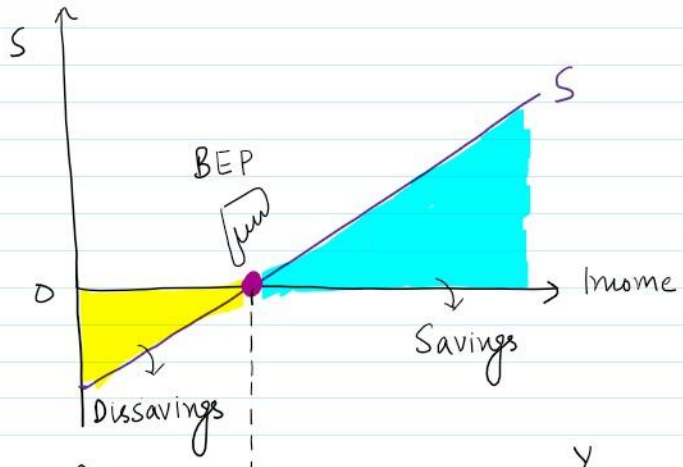
$$S = f(Y)$$

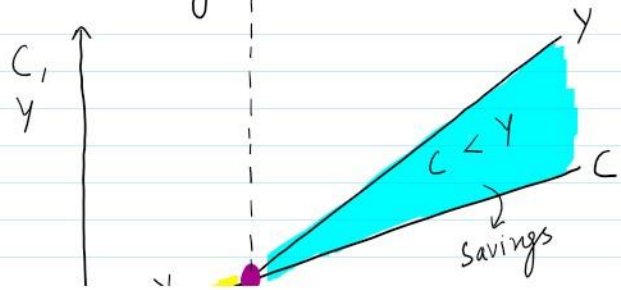
Savings is the function of Income

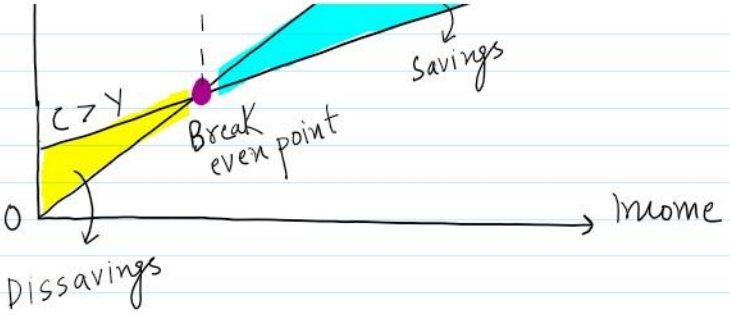
Income (Y)	Consumption (C)	Savings (Y-C)
0	60	-60
100	140	-40
200	220	-20
300	300	0
400	380	20
500	460	40

Break even Point

$$S = Y - C$$







$$S = Y - C$$
$$= Y - [a + bY]$$
$$= Y - a - bY$$
$$= -a + Y - bY$$

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

- $-a$: Negative Autonomous consumption
- $(1-b)$: Slope of Savings curve (Marginal Propensity to Save) → $\frac{\Delta S}{\Delta Y}$
- Y : Income

3(B)

$$MPC = \frac{\Delta C}{\Delta Y} \quad \text{(i.e Slope of Consumption curve)}$$

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

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

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

$$MPC + MPS = 1$$

$$APC + APS = 1$$

(4) Aggregate Supply (AS)

AS represents Income i.e Y

AS has two components :-

a) Consumption (C)

b) Savings (S)

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

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

* National Income Determination (2 sector)

Consumers. ← AD = AS → producers (firms)

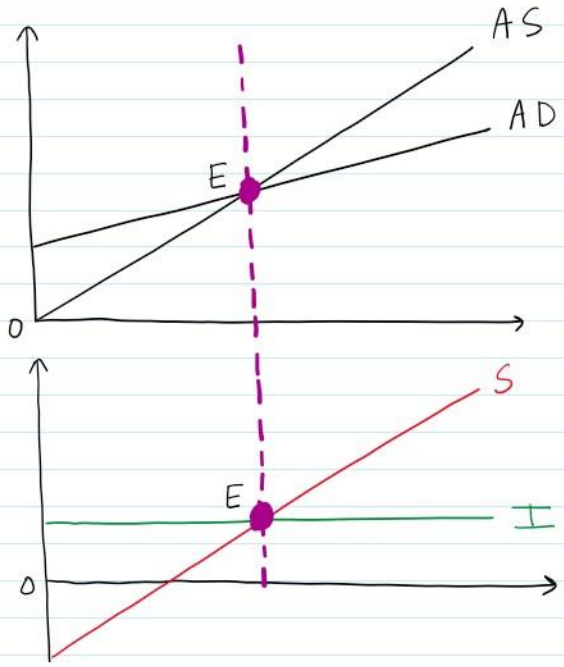
DDD
DDD
" Realised"

Realised = Expected
Value = Value

DDD
DDD
" expect "

$$C + I = C + S$$

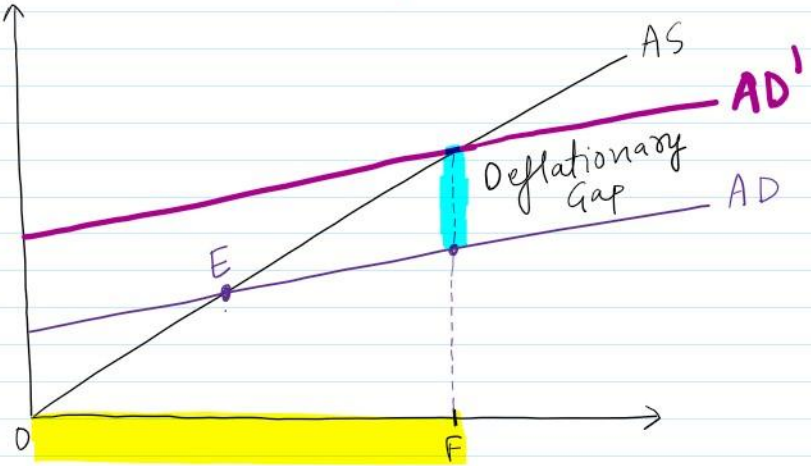
$$I = S$$



* EQUILIBRIUM with Unemployment or Inflation

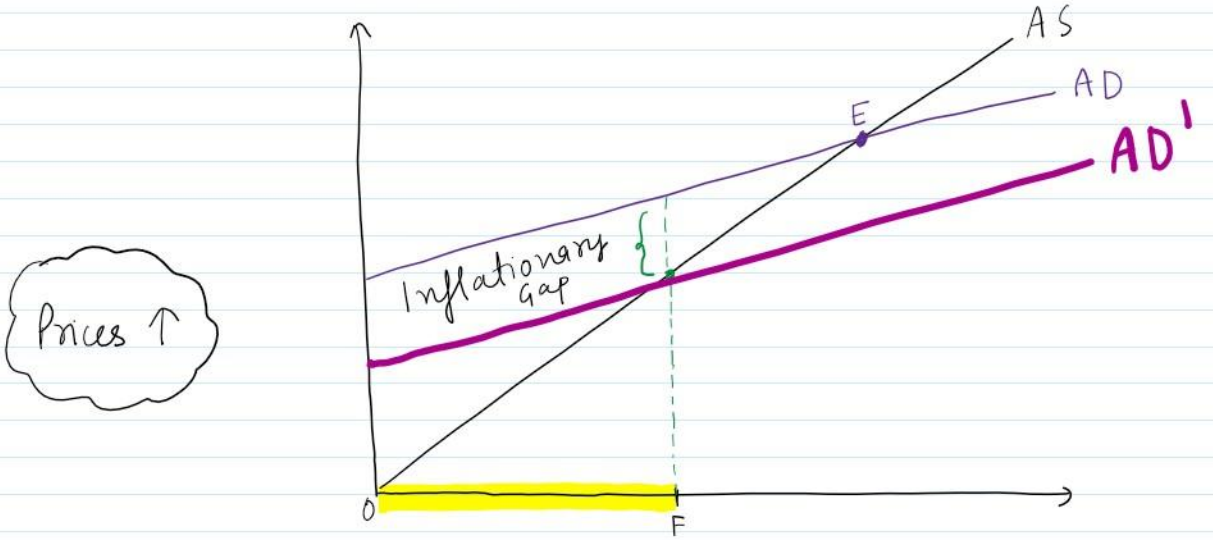
(a) Deficient Demand (demand कम है)

prices ↓
Output ↓
employment ↓



Full employment level of output

(b) Excess demand



(5) Investment Multiplier

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

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

ΔY — Change in Income

ΔI — Change in Investment

आय

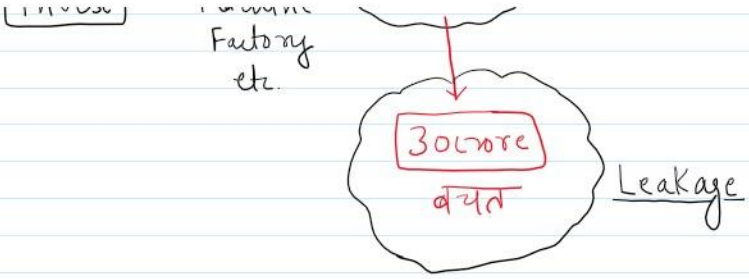
100 crore → invest निवेश → income

100 + 100 + 100 + 100 + 100 = 500 crore

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

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

₹100 crore invest → Machine Factory etc. → 100 crore income → 30 crore



→ Investment multiplier can also be calculated as :-

$$\frac{1}{1-MPC} \quad \text{or} \quad \frac{1}{MPS}$$

K & MPC have a **direct** relation

K & MPS have **inverse** relation

MPC	K
0.2	1.25
0.5	2
0.8	5

MPC ↑ K ↑

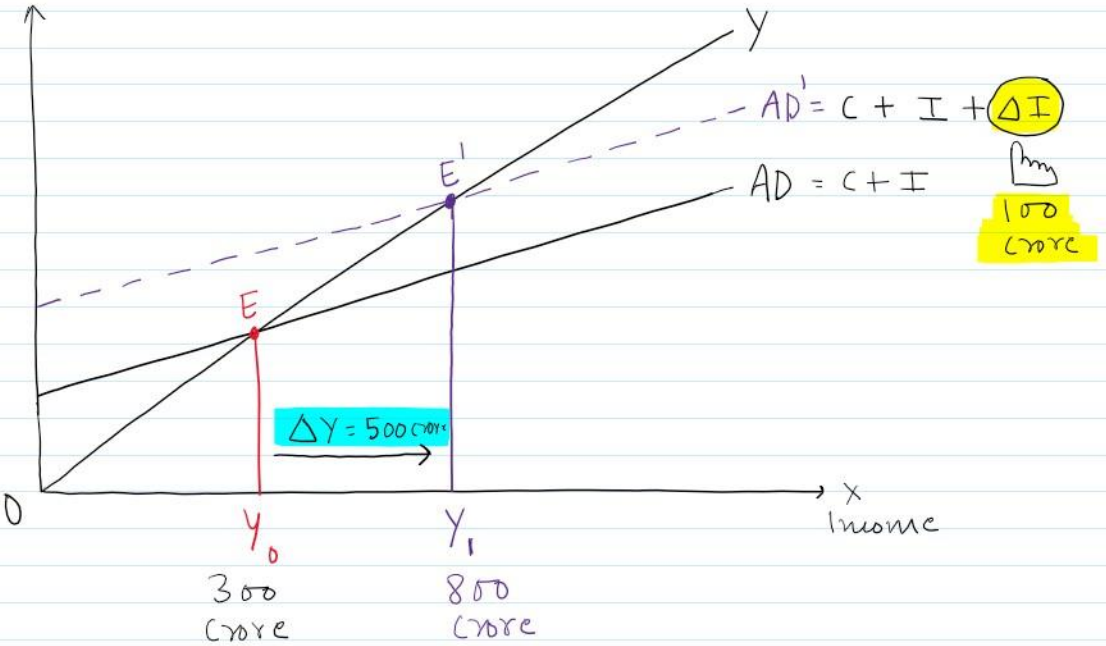
MPS	K
0.2	5
0.5	2
0.8	1.25

MPS ↑ K ↓

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

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

K = 5 times



300 crore 600 crore

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

{ leakage (MPS) ↑ (बचत) multiplier (K) ↓ }

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 (लोग खर्चा ज्यादा करना चाहते है)

K is LOW

Why ???

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

(6) Determination of Equilibrium Income - (3) sector

HH (✓) Firms (✓) Govt (✓)

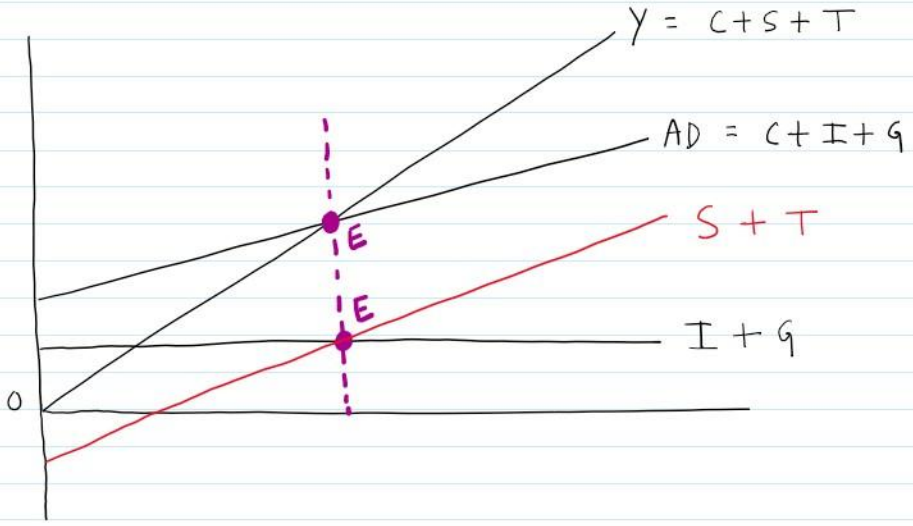
AS = AD

Taxes i.e ← Government income

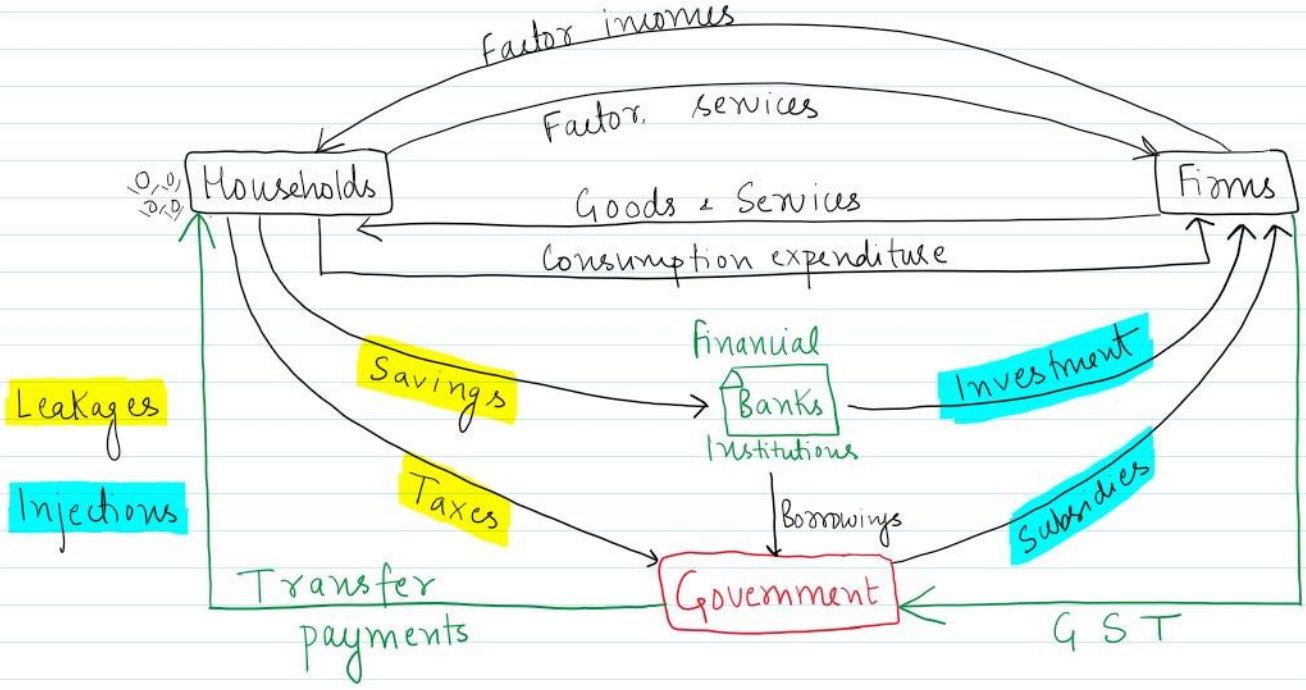
C + S + T = C + I + G → Government expenditure (सरकार का खर्चा)

S + T = I + G

$$S + T = I + G$$



Circular flow of Income



(R) FORMULA (V.Imp)

$$Y = C + I + G$$

here $C = a + b Y_D$

here $Y_d = Y - T$ ---> Lumpsum Taxes

(Disposable Income)

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

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

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

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

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

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

3 sector ✠ equilibrium condition.

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

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

Y_D — Disposable income

TR → Autonomous transfer payment

Now

$$Y = C + I + G$$

$$Y = \left[a + bY_D\right] + I + G$$

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

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

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

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

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

(iii) When **Tax is a function of Income**

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

T — Total Tax

$\overline{T}$ — Autonomous constant Tax

t — income tax Rate

Now

$$Y = C + I + G$$

Now

$$Y = C + I + G$$

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

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

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

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

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

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

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

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

"TAX MULTIPLIER"

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

Now,

$$Y = C + I + G$$

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

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

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

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

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

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

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

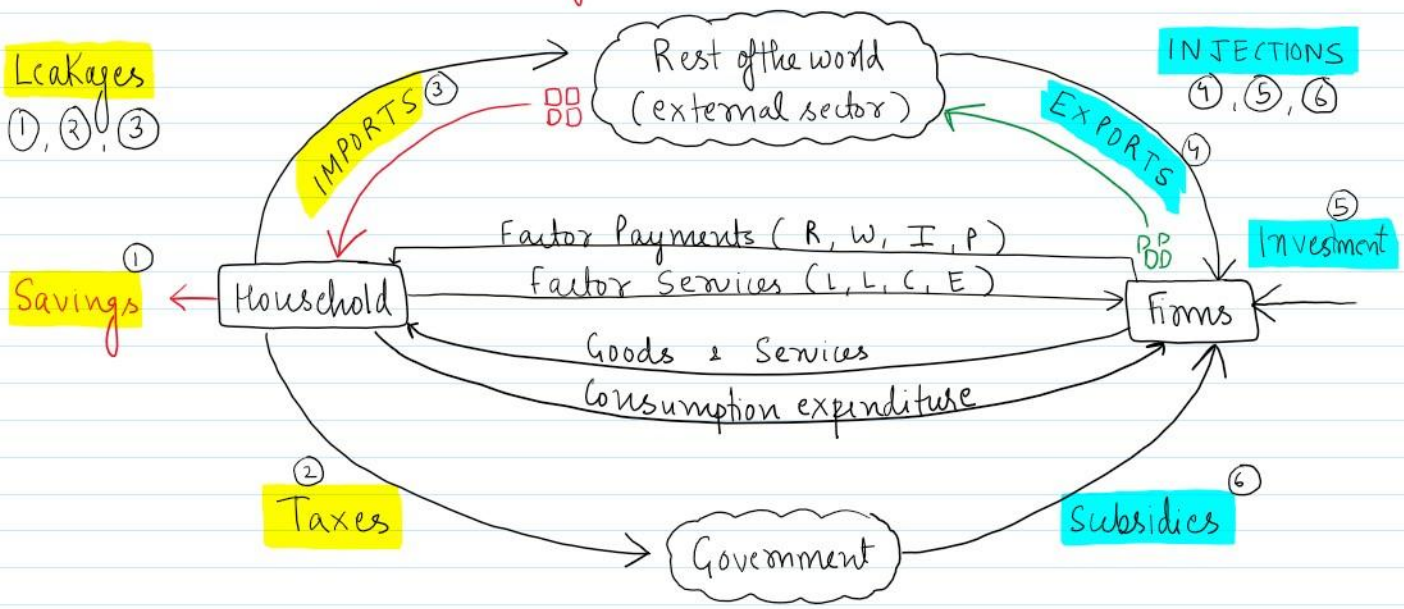
$$Y = \frac{1}{(1 - b + bt)}\left[a - b\bar{T} + bTR + I + G\right] \quad (R)$$

"TAX MULTIPLIER"

"TAX MULTIPLIER"

(7)* Equilibrium level of Income - (4) sector economy

1. Circular Flow of Income



(2) EQUILIBRIUM

$$AS = AD$$

$$Y = AD$$

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

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

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

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

New

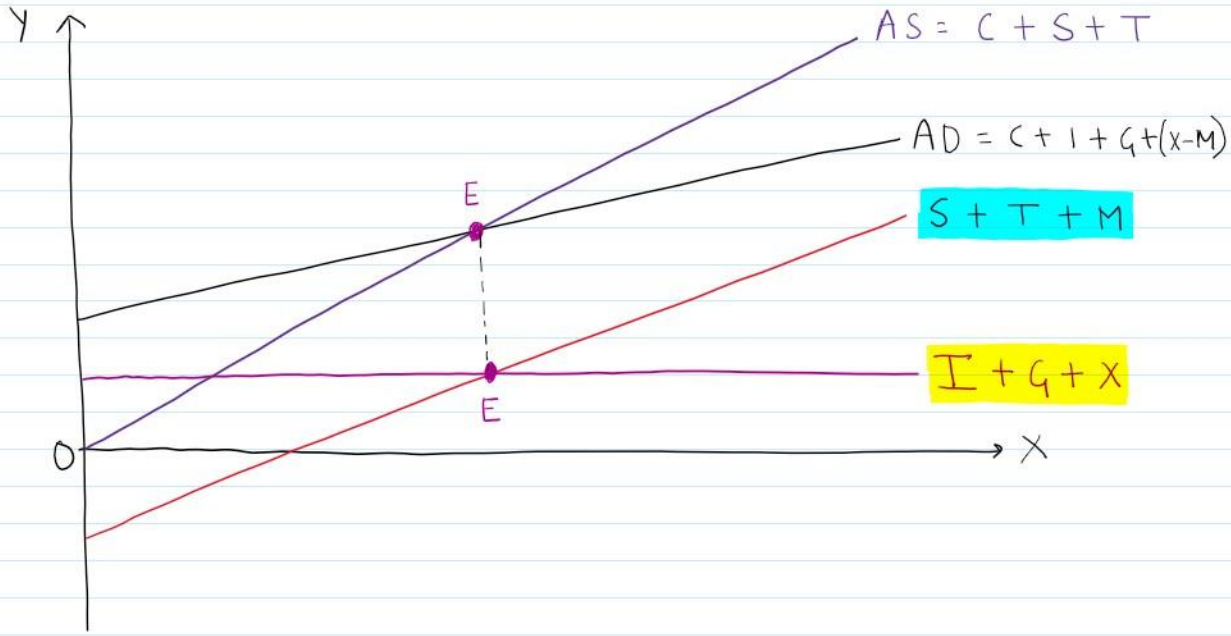
$$* \quad M = \overline{M} + mY$$

$\overline{M}$ ← Autonomous Imports; m ← propensity to import; Y → Income

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

$Y \uparrow$

$AS = C + S + T$



At equilibrium

$$AS = AD$$

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

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

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

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

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

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

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

"FOREIGN TRADE MULTIPLIER"

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

☞ if $X < M$ then National Income DECREASES

☞ if $X < M$ then National Income DECREASES

☞ if m increases then foreign trade multiplier DECREASES

(m → 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) ΔI ii) ΔC

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

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

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

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

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

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

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

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

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- $C = 60 + 0.9Y_D$

$T = 10$

Q5- $C = 60 + 0.9Y_D$

$I = 10$

$G = 10$

$T = 0$

$X = 20$

$M = 10 + 0.05Y$

Find equilibrium level of income.

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

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

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

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

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

$Y = 90 + 0.85Y$

$Y - 0.85Y = 90$

$0.15Y = 90$

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