



CHAPTER – 6 : Determination of National Income

UNIT-2 : The Keynesian Theory of Determination of National Income

- The great depression 1930 promoted a revaluation of economic theory and policy.
- Classical economists lacked a comprehensive theory to explain persistent unemployment.
- John Maynard Keynes's General theory of employment, interest and money 1936, revolutionized modern economics (Specially Macro).

■ Aggregate Supply (AS)

- Ex ante or planned aggregate **supply is the total supply of goods and services** which firms in a national economy plan on selling during a specific time period.

AS = Total Production

■ Aggregate Demand (AD)

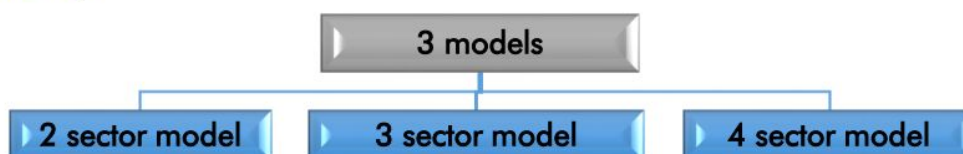
Aggregate demand (AD) is total planned expenditure in the economy.

■ Equilibrium Output

Equilibrium output occurs when **desired amount of output demanded** in economy exactly equals **amount produced** in given time period.

In short, equilibrium output refers to the output where $AD = AS$.

- Keynesian's concepts of income determination is explained through three models of economy

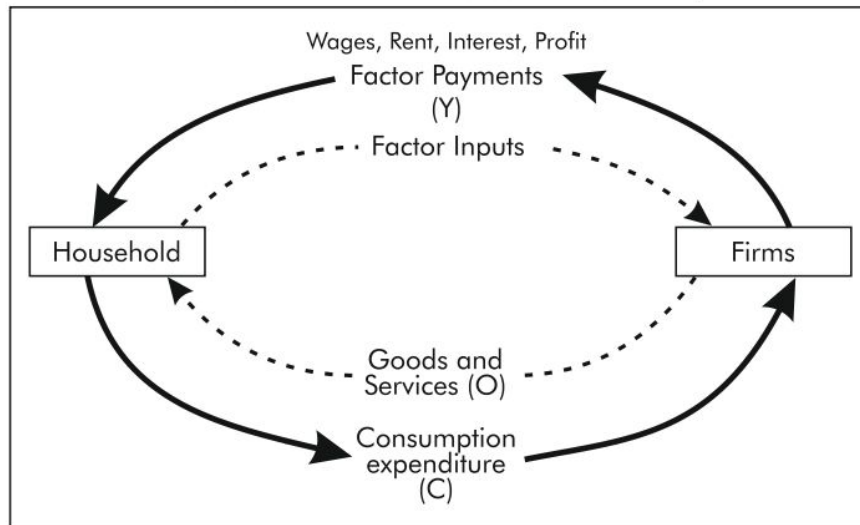


■ Two Sector Model

- Here we study – Household Sector and Business Sector
- $AD = C + I$ (I is assumed to be constant)
- $AS = C + S$
- Equilibrium is achieved when-
 $AD = AS$
OR
 $I = S$



Circular Flow in a Two Sector Economy



Factor Payments = Household Income = Household Expenditure
= Total Receipts of Firms = Value of Output

■ Consumption function -

It's the functional relationship b/w aggregate consumption expenditure and aggregate disposable income

$$C = f(Y)$$

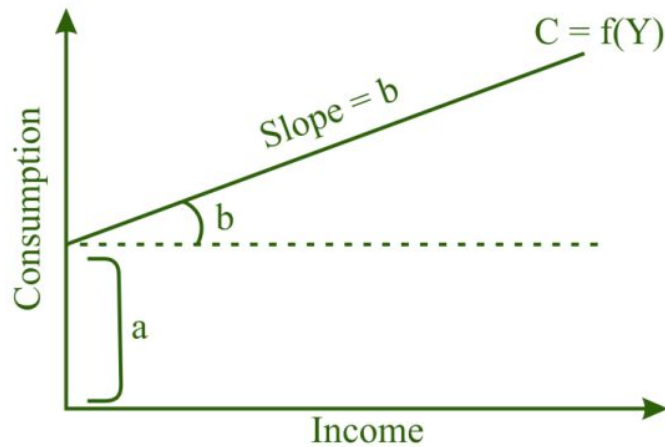
Low Income	Inc. in Income
Household spend > disposable income	This causes more disposable income.
This lead to saving	This leads to smaller inc. in consumption expenditure.

■ consumption function (Consumption- Income Relationship)

$$C = a + bY$$

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

Consumption Function OR Propensity to Consume	
Average Propensity to Consume (APC)	Marginal Propensity to Consume (MPC)
	It is denoted by 'b'
$APC = \frac{C}{Y}$	$MPC = \frac{\Delta C}{\Delta Y} = b$



■ Keynesian assumption-

- But inc. in consumption < inc. in disposable income.
- $0 < b$ or $MPC < 1$, MPC is the slope of consumption curve.
- Average propensity of consume (APC)

$$APC = \frac{\text{Total Consumption}}{\text{Total Income}}$$

- It indicates proportion of income spent on consumption at different income levels.
- APC falls with rise in income.

Income = consumption + saving i.e. $Y = C + S$

Saving = Income - Consumption

- Saving is function of disposable income. $S = f(Y)$

Saving Function (Equation) $S = \bar{S} + MPS \cdot Y$	
APS	MPS
$APC = \frac{C}{Y}$	$MPS = \frac{\Delta S}{\Delta Y}$

■ Relationship B/W Income, Consumption and Saving

- Saving function shows a functional relationships b/w national income and savings.

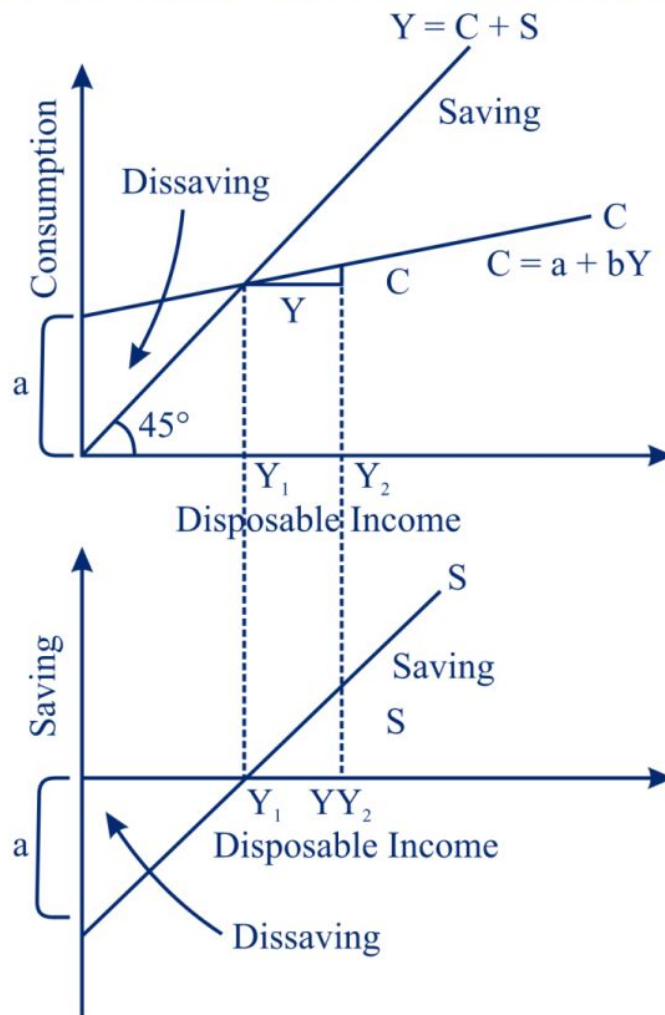


Fig- The consumption and saving function

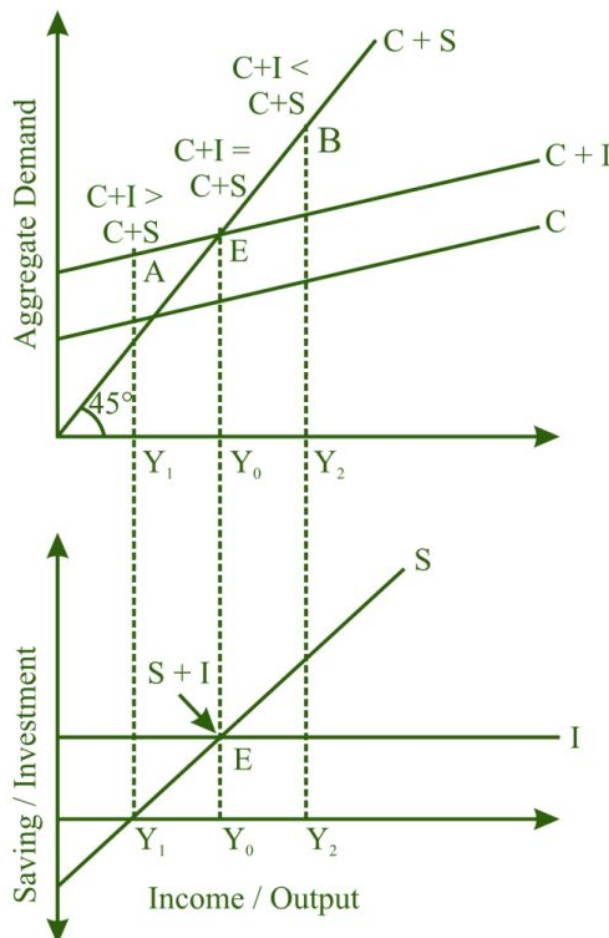
- At zero income, there is consumption, resulting in dissaving at the same magnitude.
- Slope of saving function = MPS (marginal propensity to save)
- $0 < MPS < 1$
- $MPC + MPS = 1$

■ Average Propensity To Save (APS)

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

■ TWO – Sector Model of National Income Determination:

- Its model of determination of equilibrium level of output using AD function and AS function.
- The AD curve is linear and positively sloped (National income rises, AD also increases).
- Aggregate expenditure line is flatter than 45° lines as consumption inc. with increase in income.



Determination of Equilibrium income: 2 sector model

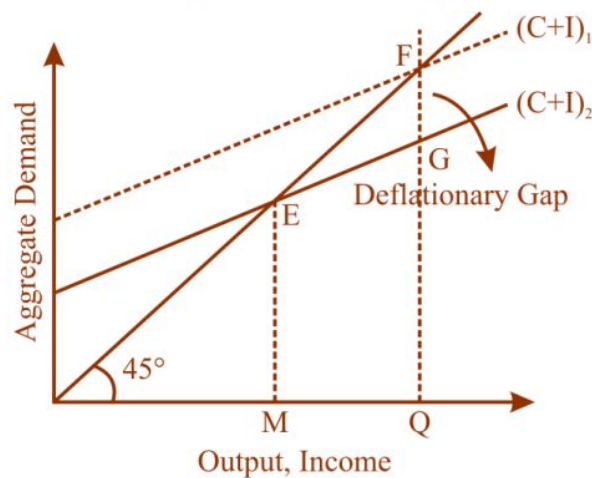
- 45° line: Planned aggregate expenditure = aggregate output signifying equilibrium income levels.
- Points below 45° line = Planned aggregate expenditure > GDP
- Points above 45° line = Planned aggregate expenditure < GDP.
- Equilibrium occurs at potential GDP (full employment), AD = Output.
- Equilibrium is achieved when, planned investment = Savings.

■ Equilibrium with Unemployment and Inflation :

Keynesian equilibrium may not necessarily occur at full employment, it occurs when planned aggregate expenditure equals output, which may or may not equal to potential GDP.

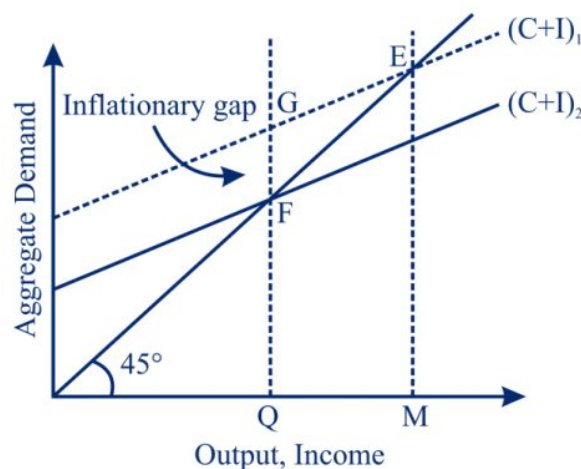
■ Deflationary GAP

- AD for an output < full employment of output, this causes a deficient demand.
- Deficient demand gives rise to 'deflationary gap' or 'recessionary gap' or 'contractionary gap'.
- This occurs when the economy is in a business cycle or recession.



■ Inflationary GAP

- $AD > AS$ corresponding to full employment levels of output in the economy.
- It is the excess of anticipated expenditure over the value of full employment output.
- Inflationary gap – A gap by which actual AD exceeds the AD required to establish full employment equilibrium.





F = Economy at full employment equilibrium

OQ = Full employment output and income

FG = Inflationary gap

■ Investment Multiplier (K)

It expresses the relationship b/w an initial increase in investment and the resulting increase in aggregate income.

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

Eg- Additional Investment = ₹ 2,000 Cr.

Additional Income = ₹ 6,000 Cr.

Value of multiplier = $6,000/2,000 = 3$

■ Multiplier and MPC

- Direct relationship b/w multiplier and MPC.
- Inc. in MPC – Inc. multiplier (vice versa).
- Concept – One person's expenditure is others income.

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

- Maximum value of multiplier = Infinity and Minimum value of multiplier = 1
- The Keynesian theory explains how shifts in investment triggers changes in both investment and consumption throughout economy.
- In underdeveloped countries, MPC is high, multiplier is Low (Structural inadequacies).

■ Determination of National Income

■ Three Sector Economy :

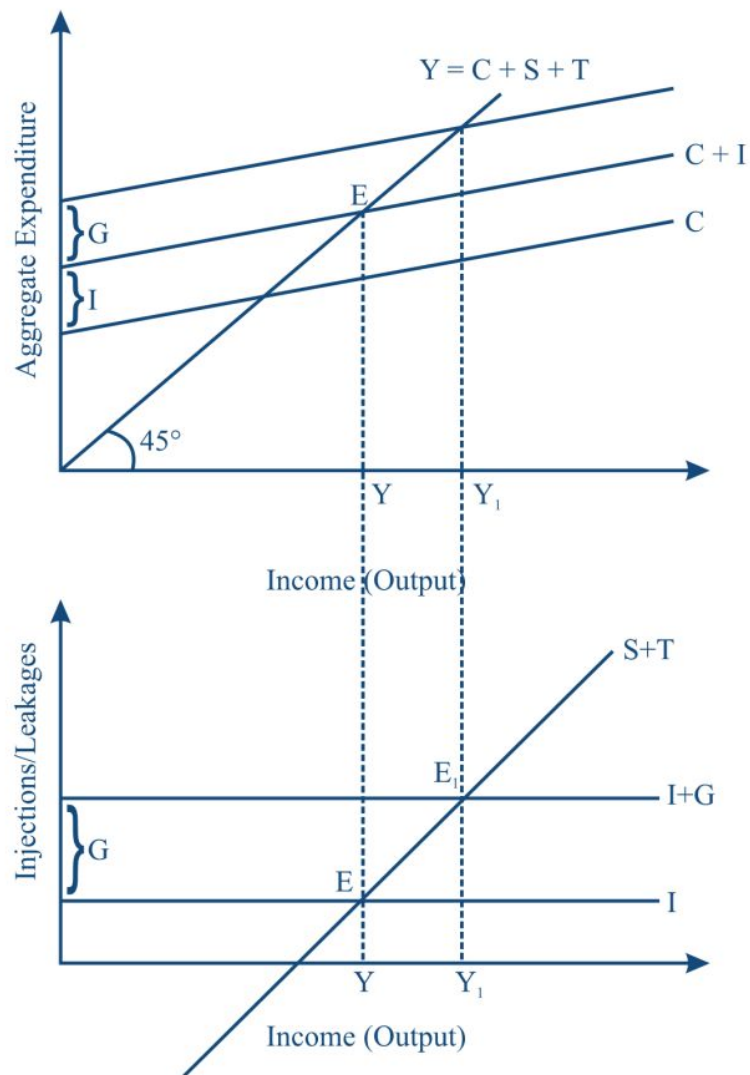
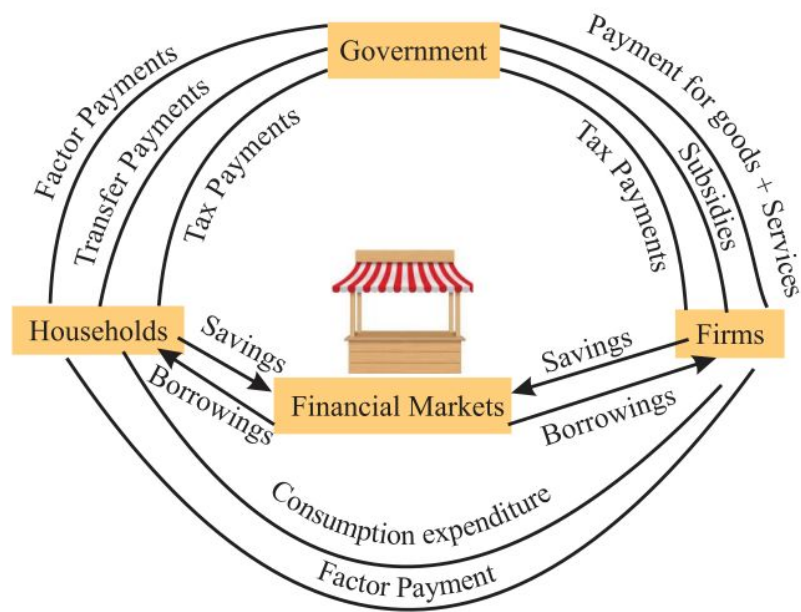
- Household + Business + Government Sector
- $AD = C + I + G$
- $AS = C + S + T$

- Equilibrium is achieved when –

$$AD = AS$$

or

$$I + G = S + T$$





- AD = Income (at equilibrium point)
- Points- Below equilibrium: $AD > AS$
Above equilibrium: $AD < AS$

■ **The Government Sector and Income Determination :**

Government influences level of income (taxes, transfer payments, government purchases etc.)

■ **Income Determination with Lump Sum Taxes :**

Lump sum taxes i.e., taxes that do not depend on income, has balanced budget.

$$G = T$$

There are no transfer payments.

■ **Consumption function can be expressed as following**

$$C = a + bY_d$$

$$\text{When, } Y_d = Y - T$$

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

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

■ **Income Determination with Lump Sum Taxes and Transfer Payments :**

Consumption function – $C = a + bY_d$

$$Y_d = Y - T + TR$$

$$C = a + b(Y - T + TR)$$

$$Y = a + b(Y - T + TR) + I + G \quad [T = \text{Lump sum tax } TR = \text{autonomous transfer payments}]$$

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

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

■ **Income Determination with Tax as a Function of Income**

$$\text{Tax function } T = \bar{T} + tY$$

$\bar{T}$ = Autonomous constant tax

t = Income tax rate

T = Total tax.



$$Y = C + I + G$$

$$Y = a + bY_d + I + G$$

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

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

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

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

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

Investment multiplier

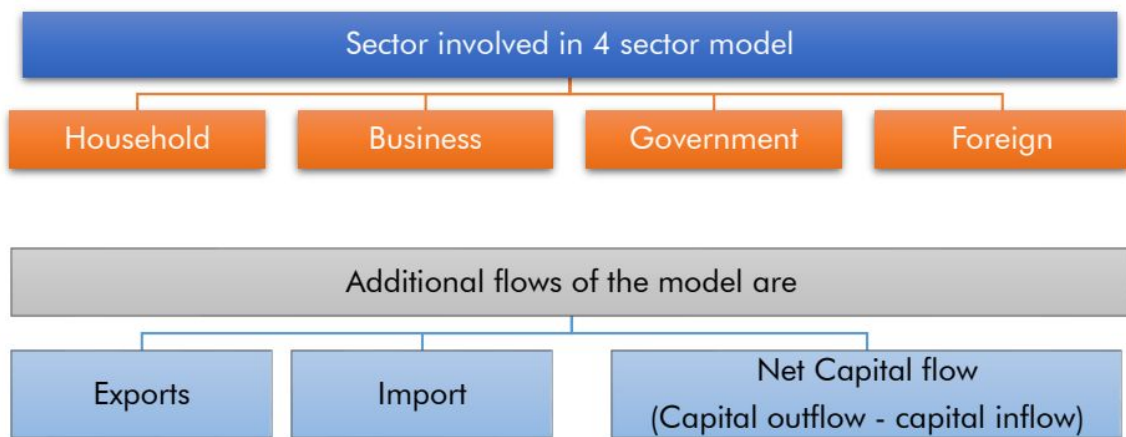
- **Income Determination with Taxes as a function of income, Govt. Expenditure and Transfer Payments**

$$C = a + b(Y - \bar{T} - tY + TR)$$

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

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

- **Determination of Equilibrium Income – 4 Sector Model :**



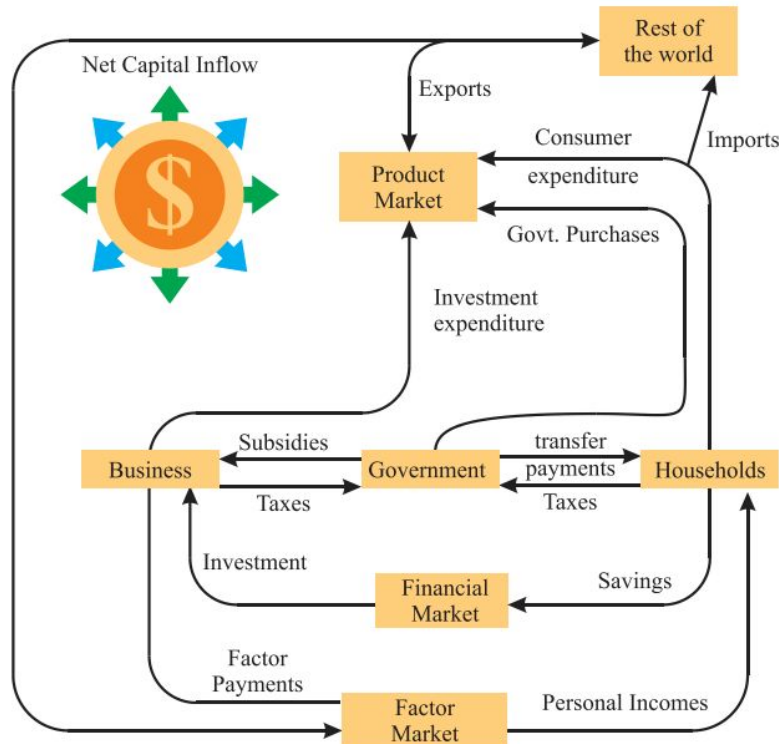
- **Four Sector Model**
 - Household + Business + Government + Foreign Sector
 - $AD = C + I + G + (X - M)$
 - $AS = C + S + T$

- Equilibrium is achieved when –

$$AD = AS$$

or

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



Demand for exports-

- Depends on foreign income.
- Exogenously determined.
- Autonomous.

■ demand for imports -

Depends on marginal propensity to import, i.e., increase in import demand per unit increase in GDP.

- $\bar{M}$ = Autonomous import.
- m = marginal propensity to import.
- Y = Income



■ **Equilibrium condition -**

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

$$C = a + b(Y - \bar{T})$$

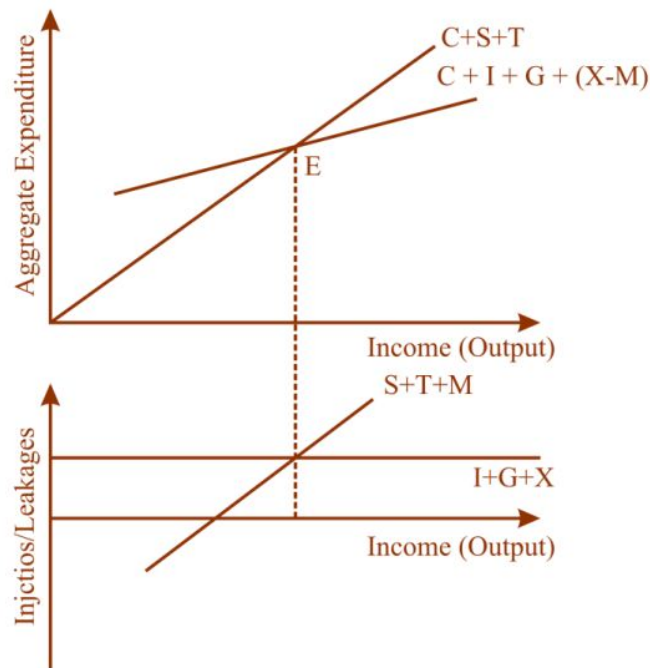
$$M = \bar{M} + mY$$

■ **Equilibrium level of National Income-**

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

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

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



Leakages = $S + T + M$; Injections = $I + G + X$

INJECTIONS	LEAKAGES
$X > M$	$X < M$
Exports are positive	Net withdrawal
Income increases	Income decreases



LEAKAGE and INJECTIONS IN DIFFERENT SECTORS

- Leakage- It is referred to as an outflow of income from the circular flow model. Leakages are that part of the income which is not used to purchase goods or what households withdraws.
 - In 2 sector Model: $\text{Leakages} = \text{Savings}$
 - In 3 sector Model: $\text{Leakages} = \text{Savings} + \text{Taxes}$
 - In 4 sector Model: $\text{Leakages} = \text{Savings} + \text{Taxes} + \text{Imports}$
- Injection- It is an inflow of income to the circular flow. Due to injection, the volume of income increases.
 - In 2 sector Model: $\text{Injection} = \text{Investment}$
 - In 3 sector Model: $\text{Injection} = \text{Investment} + \text{Govt. Exp.}$
 - In 4 sector Model: $\text{Injection} = \text{Investment} + \text{Govt. Exp.} + \text{Exports}$