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 Keyne'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)

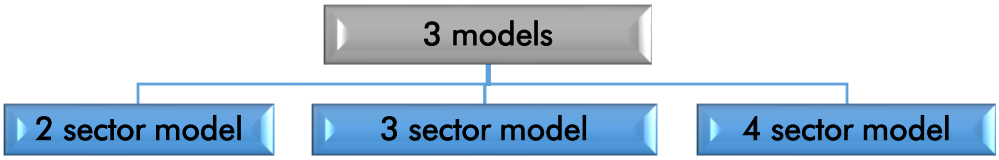
Aggregate demand (AD) is total planned expenditure in the economy.

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

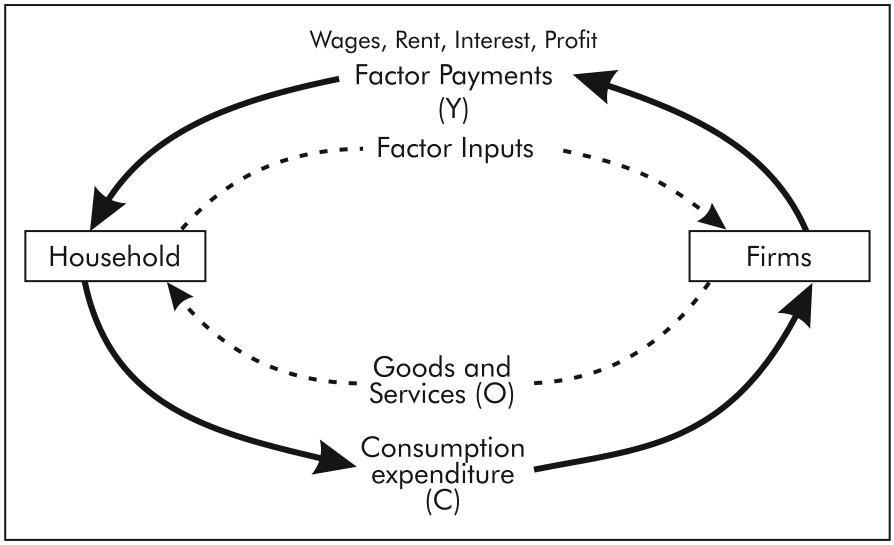
- Here we study – Household Sector and Business Sector
- AD = C + I (I is assumed to be constant)
- AS = C + S
- Equilibrium is achieved when-

  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

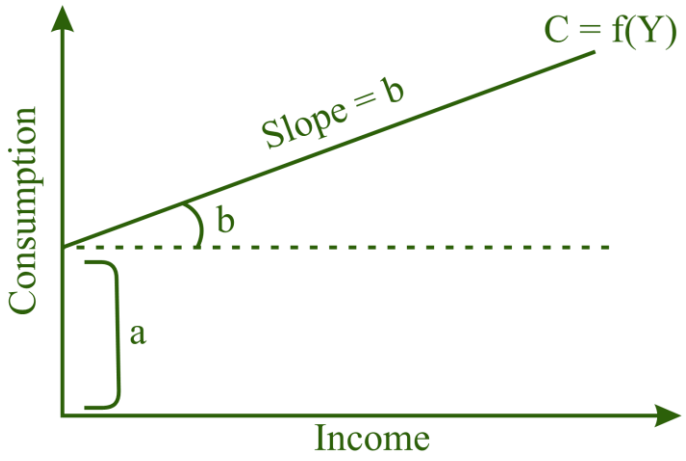
$C = f(Y)$

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) $\boxed{S = \bar{S}\ MPS.Y}$	
APS	MPS
$APC = \frac{S}{Y}$	$MPS = \frac{\Delta S}{\Delta Y}$

Relationship B/W Income, Consumption and Saving

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

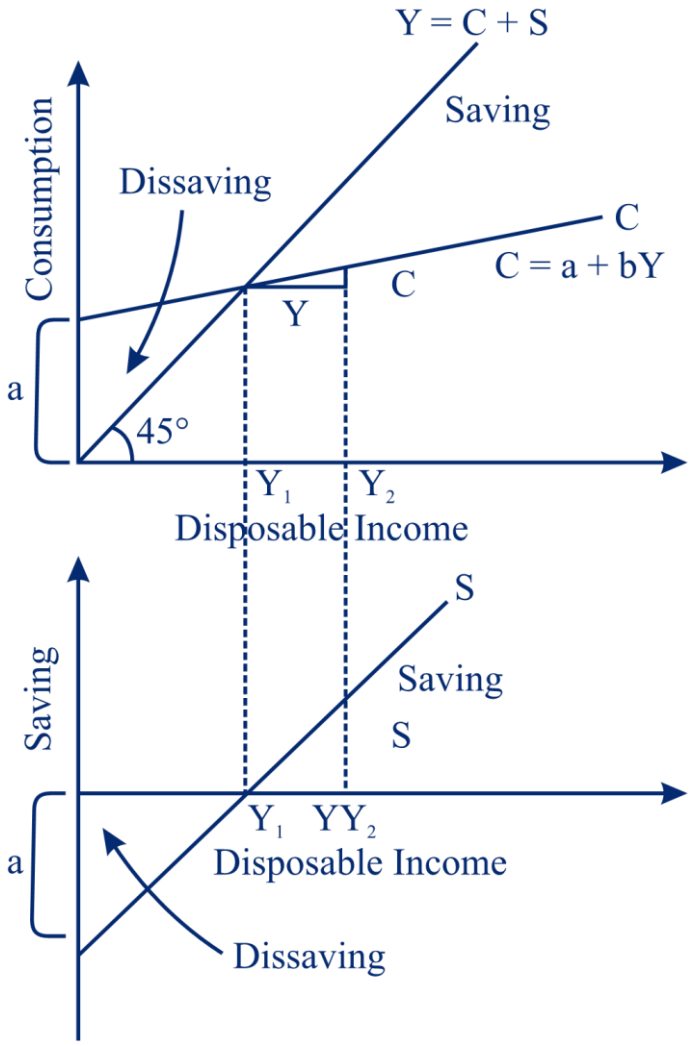


Fig- The consumption and saving function

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

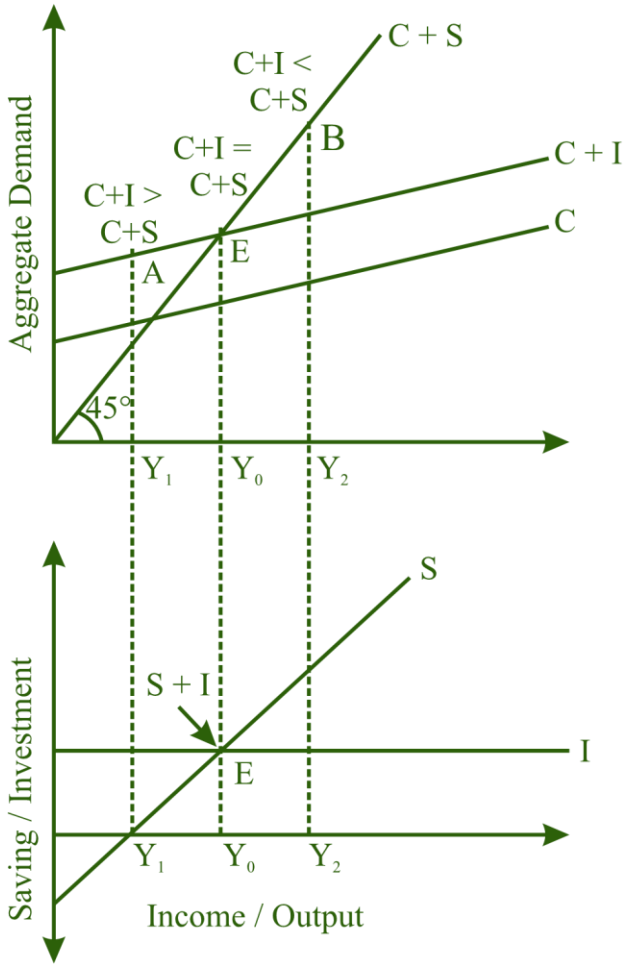
- $0 < MPS < 1$
- MPC + MPS = 1

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

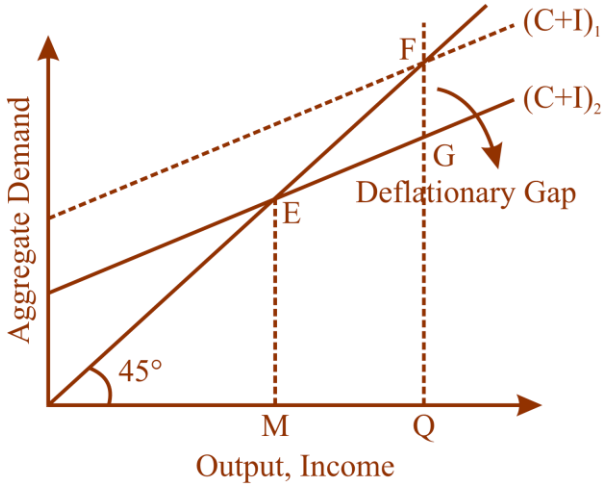
- 45° line: Planned aggregate expenditure = aggregate output signifying equilibrium income levels.
- Points below 45° line = Planned aggregate expenditure > GDP
- Points above 45° line = Planned aggregate expenditure < GDP.
- Equilibrium occurs at potential GDP (full employment), AD = Output.
- Equilibrium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

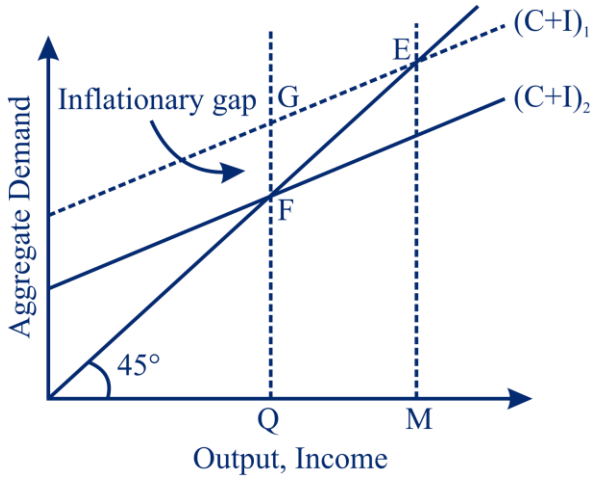
Deflationary GAP

- 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 :

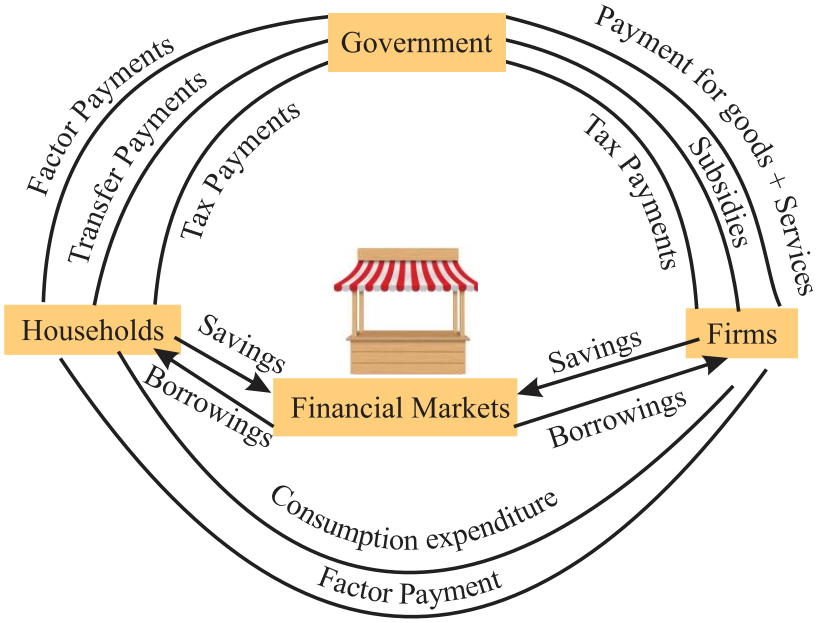
- Household + Business + Government Sector
- AD = C + I + G
- AS = C + S + T

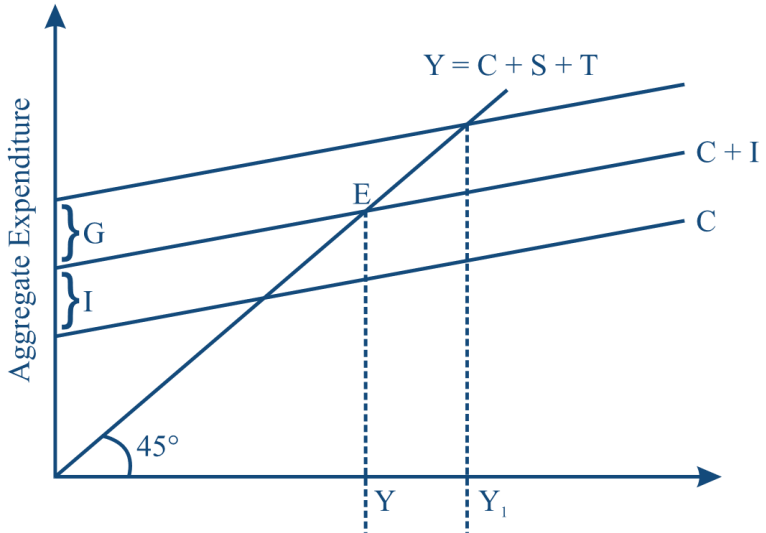
- Equilibrium is achieved when –

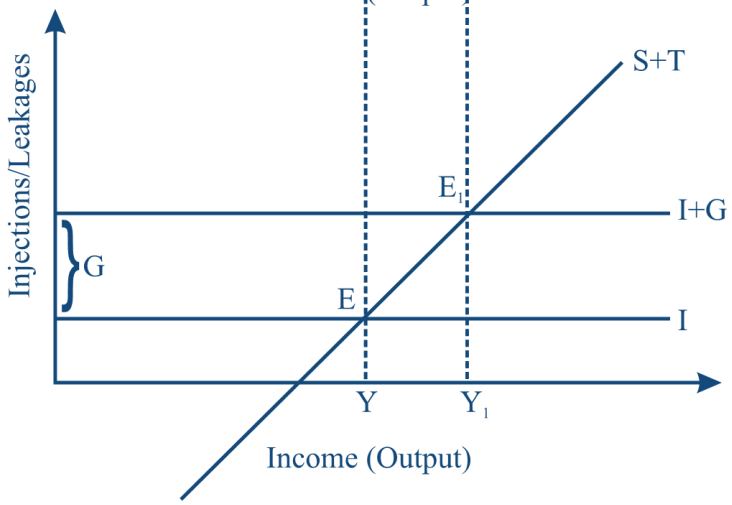
  AD = AS

  or

  I + G = S + T


Government
Factor Payments
Transfer Payments
Tax Payments
Tax Payments
Subsidies
Payment for goods + Services
Households
Savings
Borrowings
Financial Markets
Savings
Borrowings
Firms
Consumption expenditure
Factor Payment


Y = C + S + T
C + I
C
G
I
E
45°
Aggregate Expenditure
Y
Y1
Income (Output)


S+T
I+G
I
G
E1
E
Injections/Leakages
Y
Y1
Income (Output)

- 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

$$C = a + bYd$$

When, $Yd = Y - T$

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

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

Income Determination with Lump Sum Taxes and Transfer Payments :

Consumption function – $C = a + bYd$

$$Yd = Y - T + TR$$

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

$Y = a + b(Y - T + TR) + I + G$ [T = Lump sum tax TR 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

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

$\overline{T}$ = Autonomous constant tax

t = Income tax rate

T = Total tax.

$Y = C + I + G$

$Y = a + bYd + I + G$

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

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

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

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

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

Investment multiplier

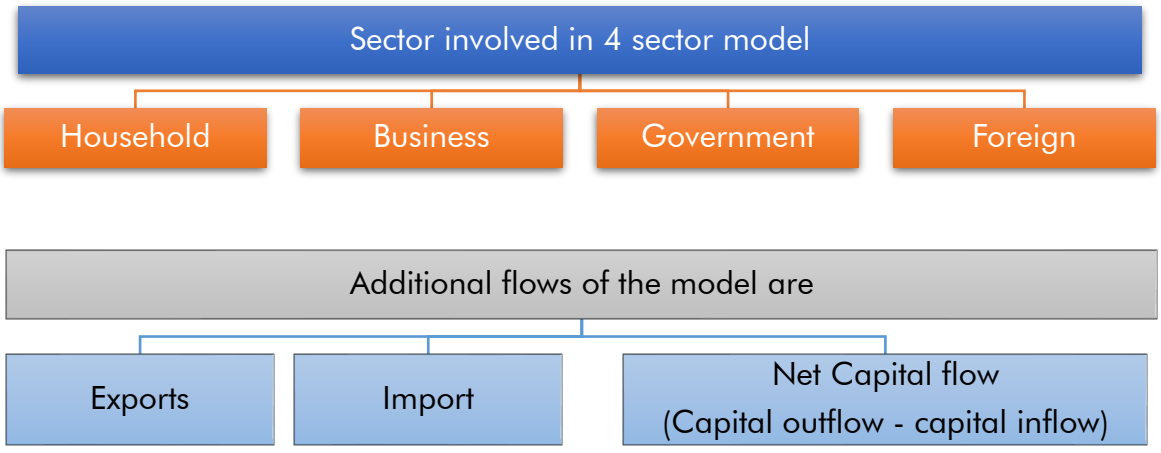
- **Income Determination with Taxes as a function of income, Govt. Expenditure and Transfer Paymeents**

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

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

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

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



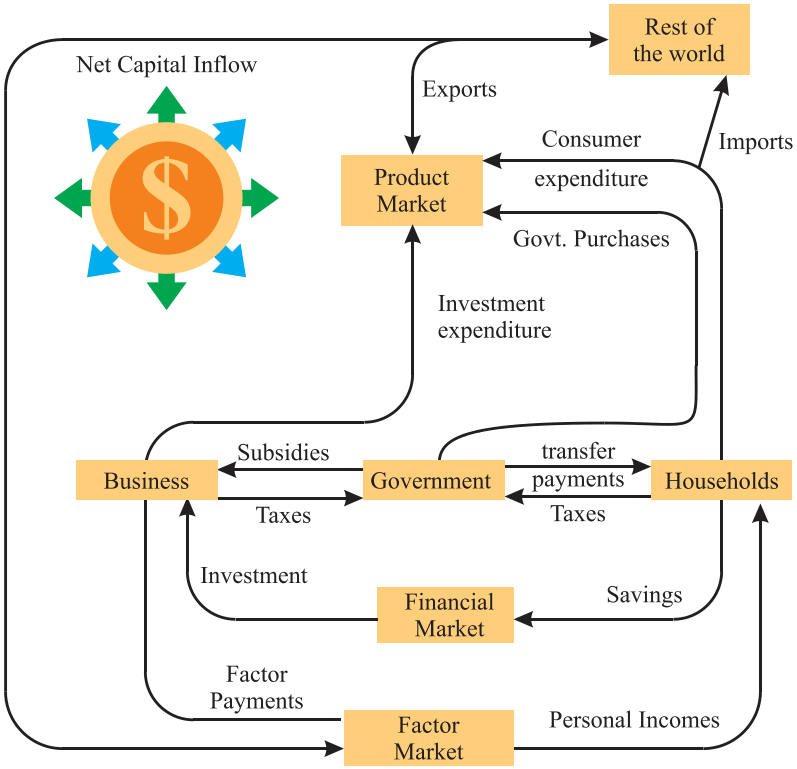
- **Four Sector Model**
  - Household + Business + Government + Foreign Sector
  - AD = C + I + G + (X – M)
  - AS = C + S + T

- Equilibrium is achieved when –

  AD = AS

  or

  I + G + X = S + T + M



Demand for exports-

1. Depends on foreign income.
2. Exogenously determined.
3. 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 -

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

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

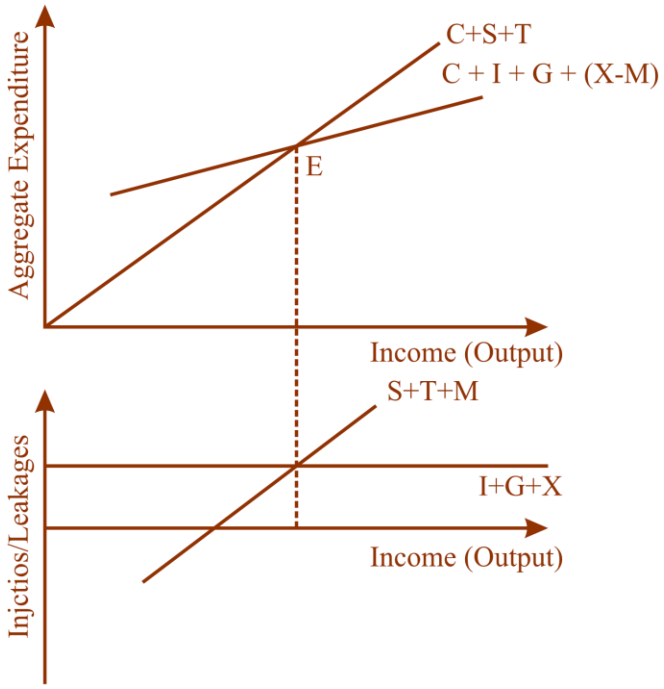
$M = \bar{M} + mY$

- 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: Leakages = Savings
  - In 3 sector Model: Leakages = Savings + Taxes
  - In 4 sector Model: Leakages = Savings + Taxes + Imports
- Injection- It is an inflow of income to the circular flow. Due to injection, the volume of income increases.
  - In 2 sector Model: Injection = Investment
  - In 3 sector Model: Injection = Investment + Govt. Exp.
  - In 4 sector Model: Injection = Investment + Govt. Exp. + Exports