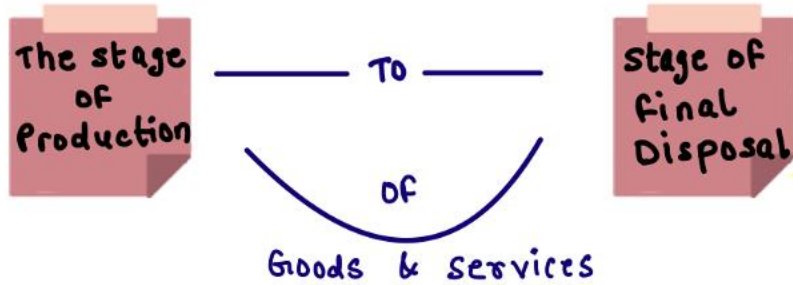


Chapter: 1 Determination of National Income

Unit 1: Macro Economic Aggregates & Measurement of National Income

National income Accounting, is the system of macro economic accounts from -



National Income Accounts -

1st Define concepts 2nd Construct Measures

Compilation

CSO

- The central statistical Organisation (CSO) in the Ministry of statistics & Programme implementation (MoSP&I) is responsible for compilation of National Accounts statistics.

DESs

- State Directorates of Economics and statistics (DESs) have the responsibility of compiling their state Domestic product and other aggregates.



Nominal GDP

$$P_0 \times Q_0$$

GDP is the value of all final goods and services produced in the country within a given period.

$$\begin{aligned} \text{GDP}_{MP} &= \text{Value of output} - \text{Intermediate Consumption} \\ &= \text{sales} + \text{change in stock} - \text{Intermediate Consumption} \\ &= \text{Sales} + (\text{closing stock} - \text{opening stock}) - \text{Intermediate Consumption} \end{aligned}$$

Real GDP

$$P_0 \times Q_1$$

Real GDP is constructed as the sum of the quantities of final goods & services time constant rather than current price.

GDP Deflator

GDP Deflator is the ratio of nominal GDP in a given year to real GDP of that year.

$$\text{GDP Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$$

The GDP Deflator is a price index used to convert nominal GDP to Real GDP.

$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{GDP Deflator}} \times 100$$

The Deflator for the base year is always 100.

Inflation Rate between 2 consecutive years

$$\text{inflation rate in year 2} = \frac{\text{GDP Deflator in year 2} - \text{GDP Deflator in year 1}}{\text{GDP Deflator in year 1}}$$

Three Golden Rules

1. Gross = Net + Depreciation

2. National = Domestic + NFIA

[NFIA = Factor Income From Abroad - Factor Income To Abroad]

3. Market Price = Factor cost + Net Indirect Tax

[NIT = Indirect Tax - subsidy]

The total Value of Production minus Value of Capital Used up in production that output (Depreciation)

$NDP_{MP} = GDP_{MP} - Depreciation$

Market Value of all final goods & services Produced within the domestic territory of a country by normal resident during a year including Net factor income from abroad.

$GNP_{MP} = GDP_{MP} + NFIFA$

$NFIFA = \text{Factor income From Abroad} - \text{Factor income To Abroad}$

Market Value of all final goods & services Produced by Normal Residents with in the domestic territory including NFIFA excluding Depreciation.

$NNP_{MP} = GDP_{MP} - Dep^n + NFIFA$

IF NFIA is (+)ve
 $GNP_{MP} > GDP_{MP}$

IF NFIA is (-)ve
 $GNP_{MP} < GDP_{MP}$



Money Value of output produced within a country's domestic limits in a year as received by the factor of production is measured as GDP_{FC}.

$GDP_{FC} = GDP_{MP} - \text{Net indirect Tax}$

$\text{Net indirect Tax} = \text{Indirect Tax} - \text{subsidy}$

Total factor income earned by factors of Productions is called NDP_{FC}.

$NDP_{FC} = GDP_{MP} - Depreciation - NIT$

$NIT = \text{Indirect Tax} - \text{subsidy}$



Factor income accruing to the Normal resident of the country during a year.

It is sum of domestic factor income & Net factor income from abroad.

$NNP_{FC} = \text{National income} = GDP_{MP} - Depreciation + NFIFA + NIT$

IF NFIFA is (+)ve

National Income > Domestic Factor income

IF NFIFA is (-)ve

National Income < Domestic Factor income

Some other concepts

Country's economic output per person. It serve as an indicator of standard of living of a country.



$\text{Per capita income} = \frac{\text{Country's GDP (Adjusted by inflation)}}{\text{Total population}}$

If GDP at market price is ₹ 6,700 crore and depreciation is ₹ 530 crore, then what will be the NDP at market price?

- (a) ₹ 6,200 crore
- (b) ₹ 6,170 crore
- (c) ₹ 7,230 crore
- (d) ₹ 6,690 crore

What will be the GDP at market price (GDP_{MP}) on the basis of following information?

Particulars	Amount (₹) crores
GNP_{MP}	1100
Net Factor Income from Abroad	200 ✓
Depreciation	50
Net Indirect Tax	100

- (a) ₹ 1,000 crores
- (b) ₹ 1,050 crores ✓
- (c) ₹ 900 crores
- (d) ₹ 1,300 crores

Which of the following is not a correct formula to calculate NNP_{MP} ?

- (a) $NNP_{MP} = GNP_{MP} - \text{Depreciation}$
- (b) $NNP_{MP} = NDP_{MP} + \text{Net Factor Income from Abroad}$
- (c) $NNP_{MP} = GDP_{MP} + \text{Net Factor Income from Abroad} - \text{Depreciation}$
- (d) $NNP_{MP} = NDP_{MP} - \text{Depreciation}$

Year	Nominal GDP in crores (₹)	Real GDP in crores (₹)
2020	600	600
2021	1050	650
2022	1250	850
2023	1500	940

Calculate the GDP Deflator for the year 2022 and 2023

- (a) 147.06 & 159.57
- (b) 100 & 161.54
- (c) 68 & 62.67
- (d) 400 & 560

The inflation rate between the years 2022 and 2023 is _____

- (a) -7.84
- (b) -8.51
- (c) 8.51 ✓
- (d) 7.84

If the GDP Deflator of a country in the year 2020 is 140.75 and in the year 2021 is 157.33, then what is the inflation rate in the year 2021?

- (a) 9.09%
- (b) 10.97%
- (c) 11.78% ✓
- (d) 12.34%

Private
Income

It is a measure of income which accrues to private sector from all sources within & outside the country.

Domestic income &
NFI FA

Factor income &
Transfer income

Private income = Factor income from Net Domestic Product accruing to private sector
 (+) Net factor income from abroad
 (+) Current transfer from Govt
 (+) Other transfers from Rest of world
 (+) National Debt interest

Personal income is the income received by household sectors including Non profit Institutions.

Personal
Income

National income
 (+) income received but not earned
 (-) income earned but not received
Personal income

Private income
 (-) Corp. Tax
 (-) Retained earning
Personal income

Disposable
Personal Income
(DI)

It is a measure of the amount of the money in the hands of individuals that is available for their consumption or savings.

PDI = Personal income
 (-) Personal Income Tax
 (-) Non tax payments

Net National Disposable
Income (NNDI)

Gross National Disposable
Income

NNDI = Net National Income
 + other current transfer
 from ROW

GNDI = NNDI +
 Depreciation or
 Gross National income +
 other transfer from ROW

From the following data, estimate National Income and Personal Income.

Items	₹. in Crores
Net national product at market price	1,891
Income from property and entrepreneurship accruing to government administrative departments	45
Indirect taxes	175
Subsidies	30
Saving of non-departmental enterprises	10
Interest on National debt	15
Current transfers from government	35
Current transfers from rest of the world	20
Saving of private corporate sector	25
Corporate profit tax	25

On basis of following information, calculate NNP at market price and Disposable personal income

Items	₹ in Crores
NDP at factor cost	14900
Income from domestic product accruing to government	150
Interest on National debt	170
Transfer payment by government	60
Net private donation from abroad	30
Net factor income from abroad	80
Indirect taxes	335
Direct taxes	100
Subsidies	262
Taxes on corporate profits	222
Undistributed profits of corporations	105

- Different Methods of Calculation of National Income

Value Added Method

(Product Method, Inventory Method, Industrial origin Method, Net output Method, commodity service Method)

When Value addition are summed up on National level, we get value of National income through this method.

Step I: Identify & classify different sectors



Step II: Estimated GVA_{MP}

$$\begin{aligned}
 GVA_{MP} &= \text{Value of output} - \text{Intermediate Consumption} \\
 &= \text{sales} + \text{change in stock} - \text{Intermediate Consumption} \\
 &= \text{Sales} + (\text{closing stock} - \text{opening stock}) - \text{Intermediate Consumption}
 \end{aligned}$$

Step III: Estimation of National Income

$$\begin{aligned}
 GDP_{MP} &= \sum GVA_{MP} \\
 \text{National income} &= GDP_{MP} \\
 &\quad (\text{NNP}_{FC}) \\
 &\quad - \text{Depreciation} \\
 &\quad + \text{NFIA} \\
 &\quad - \text{NIT}
 \end{aligned}$$

Some precautions in estimation through Value Added Method

1. Self consumption of goods — included
2. Self consumption of services — Not included
3. Value of Intermediate good — Not included
4. Value of Second hand good — Not included etc

The following table shows the production and prices of two goods, X and Y, in a hypothetical economy for the year 2023.

Goods	Quantity Produced	Price per Unit
X	100 units	₹ 10
Y	150 units	₹ 15

Calculate the nominal GDP of the economy for the year 2023.

- ₹ 2,500
- ₹ 3,250
- ₹ 3,500
- ₹ 4,000

Calculate Gross Value Added at Factor Cost.

S. No.	Contents	₹ (in crore)
(i)	Units of Output Sold (units)	1,000
(ii)	Price per Unit of Output	30
(iii)	Depreciation	1,000
(iv)	Intermediate Cost	12,000
(v)	Closing Stock	3,000
(vi)	Opening Stock	2,000
(vii)	Excise Duty	2,500
(viii)	Sales Tax	3,500

Which method measures the contribution of each producing enterprise in the domestic territory of a country over an accounting year by consolidating production of each industry less intermediate purchases from all other industries?

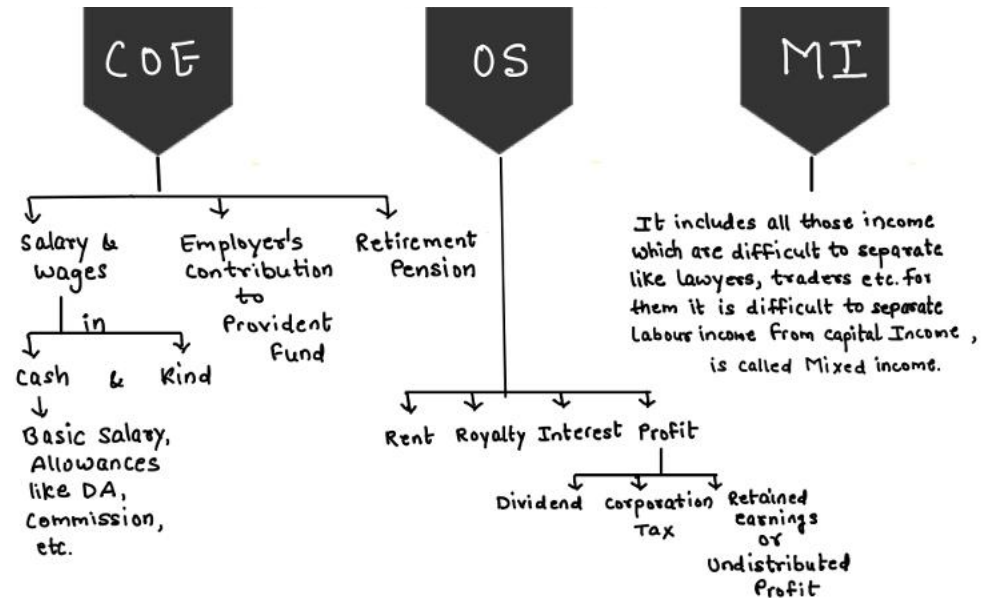
- (a) Income Disposal Method
- (b) Value Added Method
- (c) Income Method
- (d) Expenditure Method

Income Method

[Factor Payment Method or Distributed share Method]

National income calculated by summation of factor incomes within domestic territory.

$$\begin{aligned}
 \text{NDP}_{FC} &= \text{Compensation of employees} \\
 &+ \text{Operating surplus} \\
 &+ \text{Mixed Income of self employed} \\
 \text{NNP}_{FC} &= \text{NDP}_{FC} + \text{NFIA}
 \end{aligned}$$



Precautions

1. Capital Gain – Not included
2. Transfer income – Not included
3. Financial Assets like shares, Bonds – Not included
4. Employee contribution to PF – Not included etc.
5. Income from sale of Second hand good – Not included.

From the following data, calculate the value of operating surplus

S. No.	Contents	₹ (in crore)
(i)	Royalty	5
(ii)	Rent	75
(iii)	Interest	30
(iv)	Net domestic product at factor cost	400
(v)	Profit	45
(vi)	Dividends	20

Calculate (i) National Income,

S. No.	Contents	₹ (in crore)
(i)	Compensation of Employees	2,000
(ii)	Rent	400
(iii)	Profit	900
(iv)	Dividend	100
(v)	Interest	500
(vi)	Mixed Income of Self-employed	7,000
(vii)	Net Factor Income to Abroad	50
(viii)	Net Exports	60
(ix)	Net Indirect Taxes	300
(x)	Depreciation	150
(xi)	Net Current Transfer to abroad	30

Expenditure Method

[Income Disposal Approach]

National income is the aggregate final expenditure in an economy during an accounting year.

$$GDP_{MP} = C + GDCF + NX$$

$$NMP_{FC} \text{ or National Income} = GDP_{MP} - \text{Depreciation} + NFIA - NIT$$

C

Final consumption Expenditure
 ↓ Private Final consumption Expenditure ↓ Government Final consumption Expenditure

It include final sale of Goods & services to Households & NPO serving households
 Expenditure by Govt. on Production of services like defense, Education etc.

GDCF

Gross Domestic Capital Formulation (Gross Investment)

It is that part of country's Total expenditure which is not consumed but added to the nation's fixed tangible Assets & stocks.
 It consist of acquisition of fixed assets & the accumulation of stocks.

GDFC

Acquisition of fixed Assets



1. Final Expenditure on plant & machinery
2. Construction Expenditure
3. Govt investment Expenditure on Road, Bridge, etc.
4. Acquisition of Valuables.

Accumulation of stock



Expenditure on changes in inventory

Net Export (NX)

The difference between exports & imports of a country during the accounting year.

Calculate National Income

S. No.	Contents	₹ (in crore)
(i)	Personal Tax	80
(ii)	Private Final Consumption Expenditure	600
(iii)	Undistributed Profits	30
(iv)	Private Income	650
(v)	Government Final Consumption Expenditure	100
(vi)	Corporate Tax	50
(vii)	Net Domestic Fixed Capital Formation	70
(viii)	Net Indirect Tax	60
(ix)	Depreciation	14
(x)	Change in stocks	(-10)
(xi)	Net Import	20
(xii)	Net Factor Income to Abroad	10

Calculate Net Domestic product at Market price

S. No.	Contents	₹ (in crore)
(i)	Private Final Consumption Expenditure	400
(ii)	Opening Stock	10
(iii)	Consumption of Fixed Capital	25
(iv)	Import	15
(v)	Government Final Consumption Expenditure	90
(vi)	Net Current Transfers to Rest of the World	5
(vii)	Gross Domestic Fixed Capital Formation	80
(viii)	Closing Stock	20
(ix)	Exports	10
(x)	Net Factor Income to Abroad	(-5)

Summing up-

For Developed countries most suitable Method is Income Method & for growing & developing economies expenditure Method is suitable. As a matter of fact, countries like India are unable to estimate their National income wholly By one method. Therefore-

In Agriculture sector
↓
Production Method

In small scale sector
↓
Income Method

In Construction sector
↓
Expenditure Method

The system of Regional Accounts in India

Regional Accounts provide database of transactions which help in decision making at regional level.

At present all the states & Union territories of India compute state income estimates & district level estimate.

State income or Net state Domestic Product (NSDP) is a measure in monetary terms of the value of all goods & services produced in the state within a given period of time (a year).

Per capita state income is obtained by dividing the NSDP by midyears projected population of state.

The state level estimates are prepared by state income units of respective Directorates of Economics and Statistics (DESs)

The central statistical organization (CSO) assists the states in the preparation of these estimates.

In the preparation of state income estimates, certain activities as railways, banking, insurance etc., cuts across state boundaries, their economic contribution cannot be assigned to any one state directly, these are called
* **Supra-regional sectors** of economy.

estimates for these compiled for the economy as a whole & allocated to states accordingly.

GDP and Welfare

GDP is not always taken as index of the welfare of the people of the country. GDP excludes the followings which are critical for wellbeing of citizens—

- 1) Income Distribution
- 2) Quality Improvements
- 3) Production hidden from Government, like drugs.
- 4) Non-market Production
- 5) Disutility of loss of leisure time
- 6) Economic 'bads' like crime, pollution etc.
- 7) Volunteer work & services
- 8) Positive & Negative externalities
- 9) Many other things which contribute in welfare like fairness, gender equality etc
- 10) Distinction between production that makes us better off & that which only prevents us from becoming worse off.

Limitation of National Income Accounting

- 1) Lack of agreed definition of National income
- 2) Transfer payments
- 3) Valuation of Govt. services
- 4) Difficulty of incorporating distribution of income
- 5) Services of durable goods
- 6) Valuation of new good at constant price
- 7) Distinction between Final & Intermediate good.

Challenges in measurement of NI

- 1) Inadequacy & reliability of available data
- 2) Production for self consumption
- 3) Lack of proper occupational classification
- 4) Accurate estimation of Depreciation
- 5) Non-monetised sector
- 6) Absence of recording income due to illiteracy

Unit 2: Keynes Two sector, Three Sector & Four sector Models

2-sector Model

consisting of the household and the business sector

3-sector Model

consisting of Household, business and govt sectors

4-sector Model

consisting of Household, business, govt. and foreign sectors

Circular Flow in 2-sector Model

The purpose is to understand how money moves within an economy. There are 2 primary players:

i) Household -- own all factors of production & sell their services to earn factor income which they entirely spent to consume all final goods & services produced by firms.

ii) Business firm -- They hire factors of production from the households, they produce & sell goods & services to households & do not save.

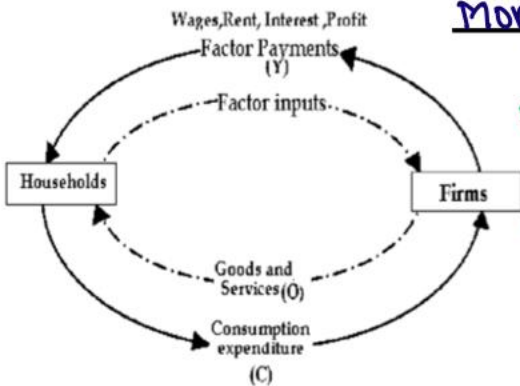
There are 2 flows --

Real Flow

↓
Flow of Actual goods or services

Money Flow

↓
Flow of payment for services or consumption



There are NO injections & leakages from system.
Factor Payments = Household income = Household Expd = Total Receipts of firms = Value of output

BASIC CONCEPTS AND FUNCTIONS

Equilibrium

It defined as a state in which no tendency to change, or position of rest.

An economy can be said in equilibrium when the Production plans of the firms & expenditure plans of Households match.

Aggregate Demand

Aggregate demand (AD) is total planned expenditure. In 2-sector economy ex-ante aggregate demand for final goods consists of 2 components.

Ex Ante Aggregate demand for consumer goods (C)

Ex Ante Aggregate demand for Investment (I)

$$AD = C + I$$

Where - \bar{I} = constant investment

In short run AD largely depends on consumption Exp.

Consumption Function

The functional relationship between consumption expenditure & Disposable income.

$$C = F(Y)$$

The specific form of consumption - income relationship termed the consumption function, proposed by Keynes is -

Where - $C = a + by$

C = Aggregate consumption expenditure

Y = Total Disposable income

a = constant term called autonomous consumption; it is value of consumption at zero level of disposable income.

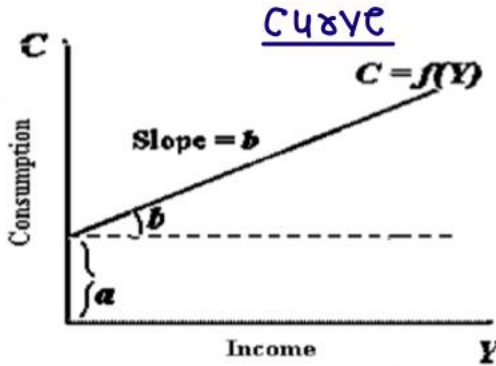
b = slope of the function, called MPC...

consumption function

Schedule

Y	C
0	20
40	50
80	80
120	110
160	140
200	170

Y < C
BEP
Y = C
Y > C



Average propensity to consume (APC)

APC

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

- APC = 0 _____ No
- APC > 1 _____ Yes
- APC = 1 _____ Yes
- APC < 1 _____ Yes
- APC = (-)ve _____ No

Marginal propensity to consume (MPC)

MPC

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

change in consumption / change in Income

$0 < MPC < 1$

MPC = 0? Yes if entire change in Income will be save

MPC = 1? Yes if entire change in Income will be consume

Saving Function

The Functional relationship between National income or disposable income and saving.

$S = F(Y)$

There is direct relationship between saving & disposable income

By Definition National income $Y = C + S$

Therefore $S = Y - C$

The linear saving function is -

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

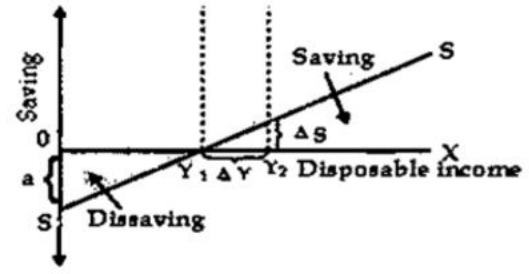
Where S = saving & $(1-b) = MPS$

Saving Function

Schedule

Y	C	S
0	20	-20
40	50	-10
80	80	0
120	110	10
160	140	20
200	170	30

Curve



Average propensity to save (APS)

APS

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

- APS = 0 _____ Yes
- APS > 1 _____ No
- APS = 1 _____ No
- APS < 1 _____ Yes
- APS = (-)ve _____ Yes

Marginal propensity to save (MPS)

MPS

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

change in saving / change in Income

$0 < MPS < 1$

MPS = 0? Yes if entire change in Income will be consume.

MPS = 1? Yes if entire change in Income will be save.

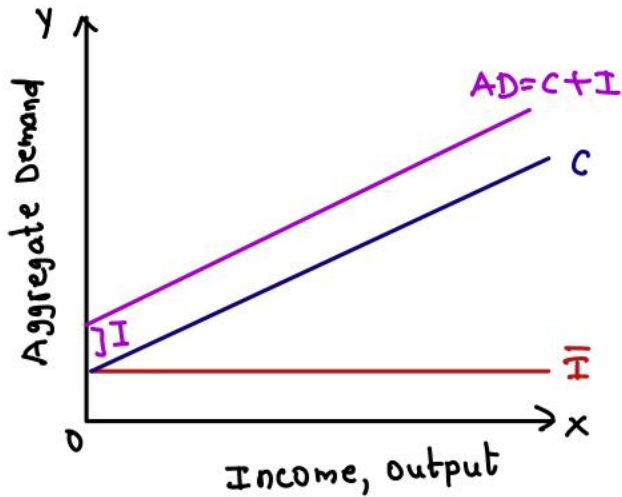
Aggregate Demand

Ex Ante or planned Aggregate Demand (AD) is the sum total of demand in the economy, which has two components -

$$AD = C + I$$

Aggregate Demand
Schedule Curve

Y	C	I	AD
0	20	20	40
40	50	20	70
80	80	20	100
120	110	20	130
160	140	20	160
200	170	20	190



Aggregate supply

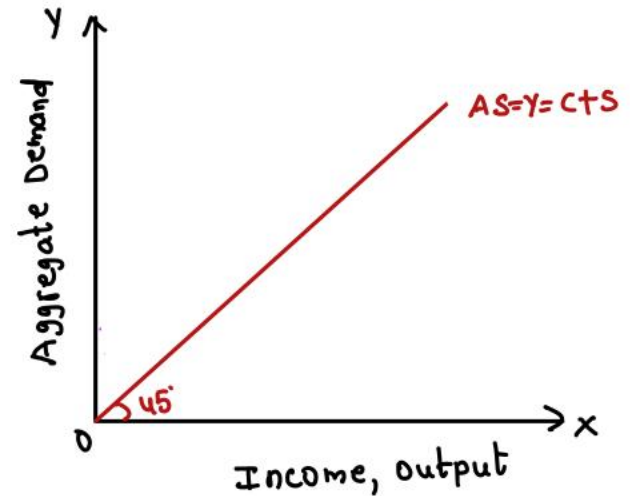
Ex ante or planned aggregate supply is total supply of goods & services which firms in a economy plan or selling during a specific period of time period. It is equal to National income of the economy, which is either consumed or saved.

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

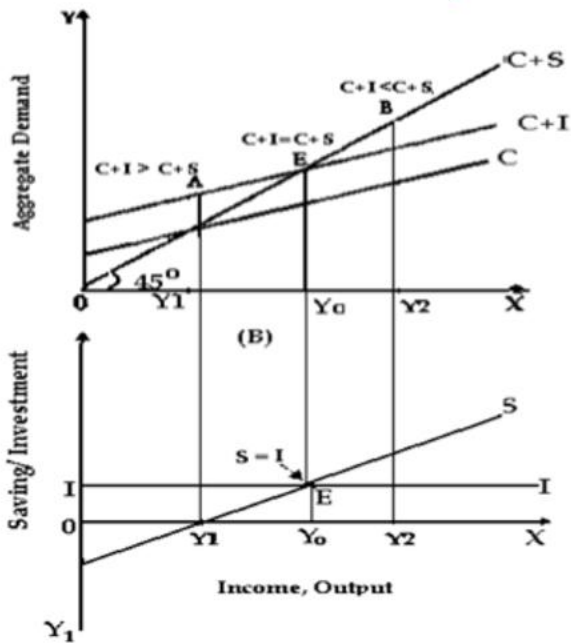
Therefore - $AS = Y = C + S$

Aggregate supply
Schedule Curve

Y	C	S	AS
0	20	-20	0
40	50	-10	40
80	80	0	80
120	110	10	120
160	140	20	160
200	170	30	200



Determination of Equilibrium income in 2 sector



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

In Equilibrium

$AD = AS$
 $C + I = Y$

$Y = C + I$

THE INVESTMENT MULTIPLIER

Investment multiplier explain how many times the aggregate income increases as a result of an increase in autonomous investment.

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

The process behind multiplier compared to "ripple effect" of water. The increase in equilibrium income per rupee increase in investment is :

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

If the Marginal Propensity to Consume (MPC) is 0.8, the value of the investment multiplier will be

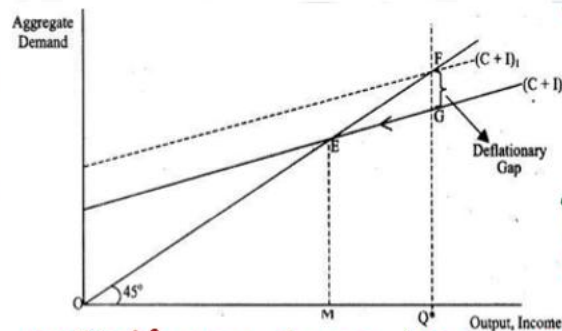
- (a) 2
- (b) 3
- (c) 4
- (d) 5

If the investment multiplier is 4, a ₹ 100 million increase in investment will lead to a total increase in national income of:

- (a) ₹ 200 million
- (b) ₹ 400 million
- (c) ₹ 600 million
- (d) ₹ 800 million

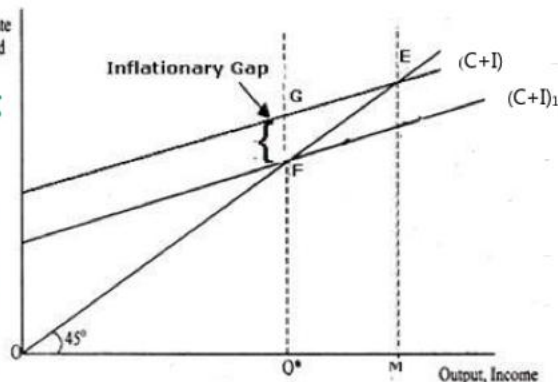
Increase in investment by Rs 500 crores will increase the national income by Rs. 1500 crores. Can we find marginal propensity to consume?

- (a) 3
- (b) 0.75
- (c) 0.70
- (d) 0.66



IF AD is for an amount of output is less than full employment level

Deflationary Gap = $AD_f - AD$



IF AD is for an amount of output is more than full employment level

Inflationary Gap = $AD - AD_f$



In an economy the consumption function is represented as $C = 500 + 0.8Y$ where C is consumption and Y is disposable income. Calculate the level of consumption when disposable income (Y) is ₹ 1,000.

- (a) ₹ 1,200
- (b) ₹ 1,300
- (c) ₹ 1,400
- (d) ₹ 1,500

If the Marginal Propensity to Save (MPS) is 0.2, what is the value of the investment multiplier?

- (a) 1.2
- (b) 5
- (c) 0.2
- (d) 0.8

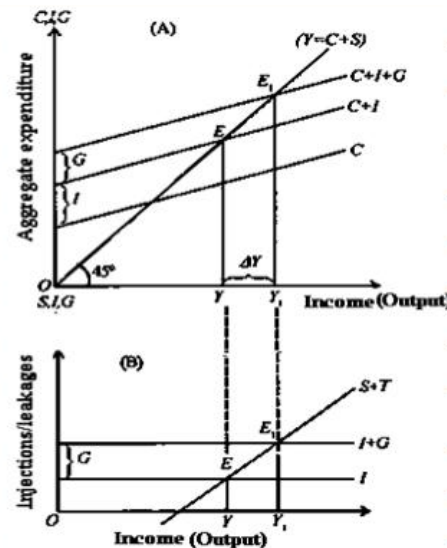
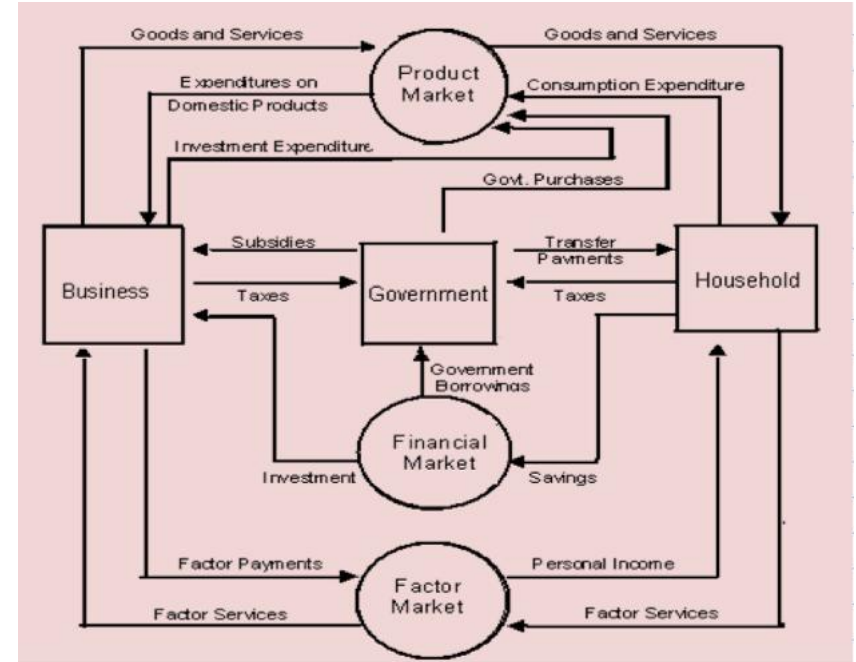
If the consumption function is $C = 250 + 0.80Y$ and $I = 300$. Find out equilibrium level of Y , C and S ?

- (a) 7250, 4250, 3000
- (b) 2750, 2450, 300
- (c) 5270, 5240, 30
- (d) 2750, 2450, 3000

Find the aggregate demand, when consumption is Rs.2000 crores, investment is Rs.700 Crores, Government Spending is Rs. 750 Crores, total exports is Rs.150 Crores and total expenditure on imports are 50 Crores.

- (a) 3550 Cr
- (b) 3300 Cr
- (c) 3600 Cr
- (d) 3350 Cr

AD of 3-sector economy (closed economy) consist of -
Household consumption C Investment Demand I Govt sector Demand G



In Equilibrium
 $AD = AS$
 $C + I + G = C + S + T$
 or
 $AD = AS$
 $C + I + G = Y$
 $Y = C + I + G$

Income Determination with Lump Sum Tax

$$Y = C + I + G$$

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

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

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

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

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

$$C = a + bY_d$$

$$Y_d = Y - T$$

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

govt exp multiplier = $\frac{1}{1-b}$

Income Determination with Lump Sum Tax and Transfer payments

$$Y = C + I + G$$

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

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

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

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

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

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

$$C = a + bY_d$$

$$Y_d = Y - T + TR$$

Income Determination with tax as a function of Income

$$Y = C + I + G$$

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

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

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

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

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

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

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

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

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

$$Y_d = Y - T$$

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

the tax multiplier

$$\frac{1}{1-b+bt}$$

$$\frac{1}{1-b(1-t)}$$

Income Determination with Tax (as a Function of Income).

Government Expenditure and Transfer Payments

$$Y = C + I + G$$

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

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

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

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

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

$$Y - by + btY = a - bT + bTR + I + G$$

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

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

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

$$C = a + bY_d$$

$$Y_d = (Y - T + TR)$$

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

$C = 200 + 0.8Y_d$; $G = T = 150$; $I = 200$; $TR = 75$.
Find equilibrium income.

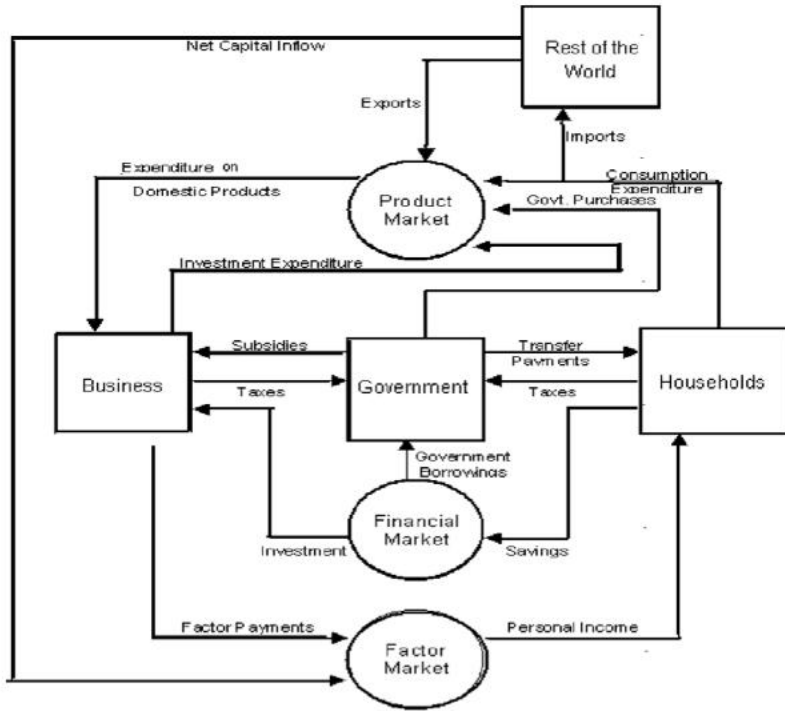
- (a) 625
- (b) 2450
- (c) 2250
- (d) 800

Suppose $C = 100 + 0.8(Y - T + TR)$ $I = 200$; $T = 25 + 0.1Y$; $TR = 50$; $G = 100$
Find out equilibrium level of Income?

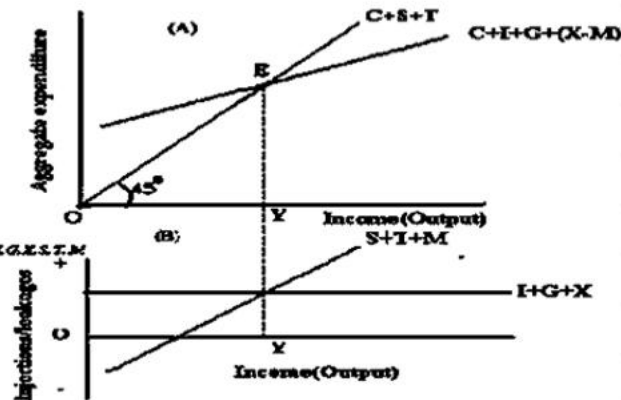
- (a) 1180
- (b) 1400
- (c) 1500
- (d) 1100

In 3 sector model these are following sectors-

- Household
Sector
(C)
- Business
Sector
(I)
- Government
Sector
(G)
- Foreign
Sector
(X-M)



At Equilibrium $AD = AS$
 $C + I + G + (X - M) = C + S + T$



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

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

Foreign Sector and Income Determination

Income determination with Import Function & Tax -

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

$C = a + bY_d$

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

$M = \bar{M} + mY$

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

$Y_d = Y - T$

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

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

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

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

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

The foreign trade multiplier $\frac{1}{(1 - b + m)}$

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 $M = 10 + 0.05Y$

Calculate foreign trade multiplier.

(a) 3.33

(b) 4.44

(c) 6.66

(d) 2.66