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Income Determination

Aggregate Demand, Aggregate Supply And Three Components

1. Aggregate Demand:

(a) Aggregate demand refers to the total demand for final goods and services in an economy during an accounting year.

(b) Aggregate demand is aggregate expenditure on ex-ante (planned) consumption and ex-ante (planned) investment that all sectors of the economy are willing to incur at each income level.

Note: In terms of Keynes, aggregate demand refers to the total amount of money, which the buyers are ready to spend on purchase of goods and services, produced in an economy during a given period. It should be kept in mind that Keynes measured aggregate demand not in terms of physical goods and services but as a part of total income that society is ready to spend.

(c) Components of aggregate demand: The components of aggregate demand are:

(i) Private (or Household) consumption demand

- The total expenditure incurred by all the households of the country on their personal consumption is known as private consumption expenditure.

- Consumption demand depends mainly on disposable income and propensity to consume.

(ii) Private investment demand

- Private investment demand refers to the demand for capital goods by private investors.

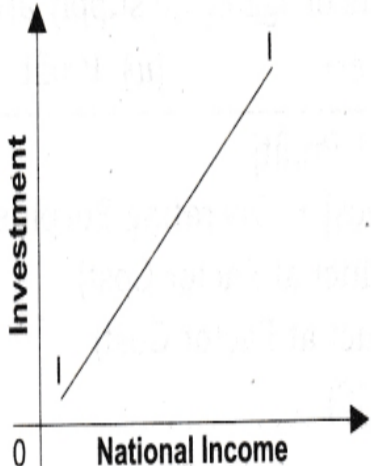
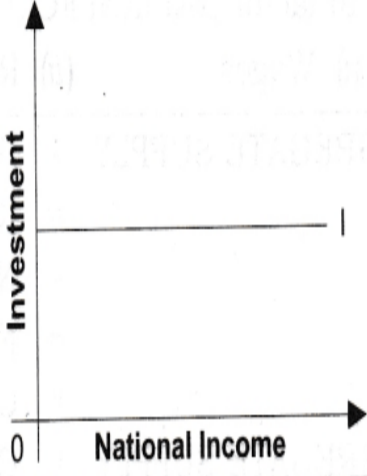
- It is addition to the existing stock of real capital assets such as machines, tools, factory – building etc.

- Investments demand depends upon marginal efficiency of capital (Marginal efficiency of investment) and interest rate.

- Investment is of two types, Autonomous Investment and Induced investment, but in Keynes theory investment is assumed to be Autonomous.

- The basic difference between Induced Investment and Autonomous Investment

Induced Investment	Basis	Autonomous Investment
It refers to the investment which is made with the motive of earning profit.	Motive	It refers to the investment, which is made irrespective of level of income.
It is generally done in private sector.	Sector	It is generally done in government sector.

<p>It is income elastic. If national income goes up, induced investment also goes up. Its reason is that increase in NY leads to increase in demand for goods and services and for meeting the same, investment is increased.</p>	<p>Income Elasticity</p>	<p>It is income inelastic, i.e., it is not affected by change in income level. The volume of autonomous investment is the same at all levels of income.</p>
<p>Its curve is upward sloping rises up to Right.</p> 	<p>Curve</p>	<p>Its curve is a straight line parallel to horizontal axis.</p> 

(iii) Government demand for goods and services Its curve is upward sloping rises up to Right.

• In a modern economy, the government is an important buyer of goods and services.

It is income inelastic, i.e., it is not affected by change in income level. The volume of autonomous investment is the same at all levels of income.

Its curve is a straight line parallel to horizontal axis.

• The government demand may be on account of public needs for roads, schools, hospitals, power, irrigation etc, for the maintenance of law and order and for defence.

(iv) Demand for net export (X – M)

• Net export represents foreign demand for goods and services produced by an economy.

• When exports exceed imports, net exports is positive and when imports exceed, net exports is negative.

• Exports and imports of a country are influenced by a number of factors such as foreign trade policy, exchange- rate, prices and quality of goods etc.

Thus, aggregate demand consists of these four types of demand.

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

However, for the sake of simplicity Keynes included only two types of demand,

-> Consumption demand (C)

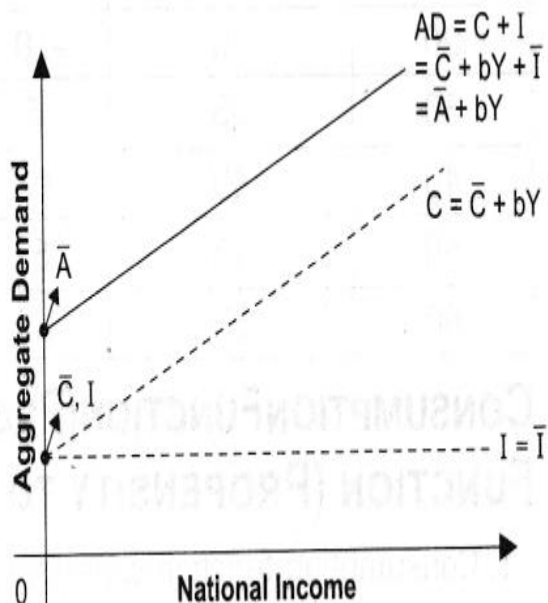
-> Investment demand (I)

$$AD = C + I$$

Aggregate demand can be explained with the help of AD schedule and AD curve.

Aggregate Demand Schedule

National Income (Y)	Consumption (C)	Autonomous Investment (I)	AD = C + I
0	20	20	40
10	25	20	45
20	30	20	50
30	35	20	55
40	40	20	60
50	45	20	65



2. Aggregate Supply:

(a) The concept of aggregate supply (ΔS) is related with the total supply of goods and services by all the producers in an economy. Four factor of production like land, labour, capital and enterprise are required for the production of goods and services. Producers pay rent to land, wages and salaries to labour, interest to capital and Profits to the entrepreneur for their services in production. This payment is factor- cost from producer's point of view and factor-income from factor-owner angle.

(b) Thus, aggregate supply is the total amount of money value of goods and services, (which is paid to the factor of production against their factor services) that all the producers are willing to supply in an economy. In other words, it is the total cost of production of goods and services produced in a country or it is the value of net national product at factor cost (NNP_{FC}). Thus, the main components of aggregate supply are:

- (i) Wages (ii) Rent (iii) Interest (iv) Profit

$$\begin{aligned}
 \text{AGGREGATE SUPPLY} &= [\text{Wages}] + [\text{Rent} + \text{Interest} + \text{Profit}] \\
 &= [\text{Compensation of Employees}] + [\text{Operating Surplus}] \\
 &= \text{NDP}_{FC} \text{ (Net Domestic product at Factor Cost)} \\
 &= \text{NNP}_{FC} \text{ (Net National Product at Factor Cost)} \\
 &= \text{Consumption (C) + Saving (S)} \\
 \text{AGGREGATE SUPPLY} &= C + S
 \end{aligned}$$

(c) Keynes assumed his economy to be a closed capitalist economy and whenever any economy is closed capitalist, then Net Factor Income from Abroad (NFIA) is 0. National Income (NNP_{FC}) = Domestic Income (NDP_{FC}) + Net Factor Income from Abroad (NFIA)

National Income (NNP_{FC}) = Domestic Income (NDP_{FC}) + 0

In short,

Aggregate Supply = NNP_{FC} = NDP_{FC} = Factor Income = Rent + Interest + Wages + Profit

(d) As we know income is either consumed or saved, hence for the sake of simplicity Keynes has

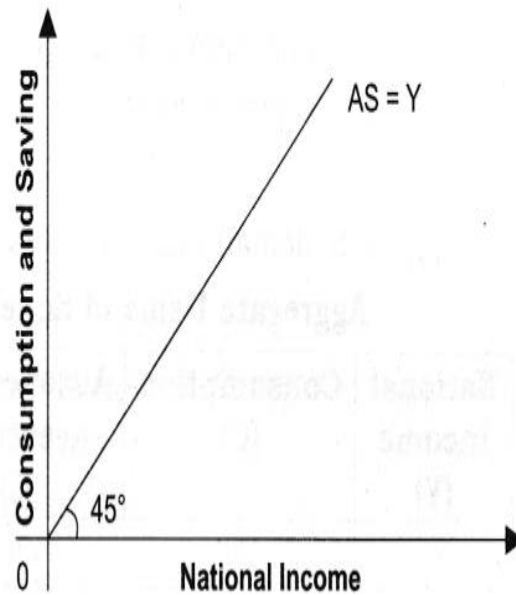
regarded only two main constituents of aggregate supply:

(i) Consumption (C)

(ii) Saving (S)

$$AS = C + S$$

National Income (Y)	Consumption (C)	Saving (S)	AS = C + S
0	20	-20	0
10	25	-15	10
20	30	-10	20
30	35	-5	30
40	40	0	40
50	45	5	50
60	50	10	60



Consumption Function (Propensity To Consume) And its types, Saving Function (Propensity To Save) And Its Types

1. Consumption function expresses functional relationship between aggregate consumption and national income.

Thus, consumption (C) is a function of income (Y). $C = F(Y)$

Where, C = Consumption; F = Function; Y = Disposable income Consumption at a point of time can be measured with the equation:

$$C = \bar{C} + bY$$

Where, C = Consumption

\bar{C} = Minimum level of consumption when income is zero

b = Marginal propensity to consume

Y = Level of income

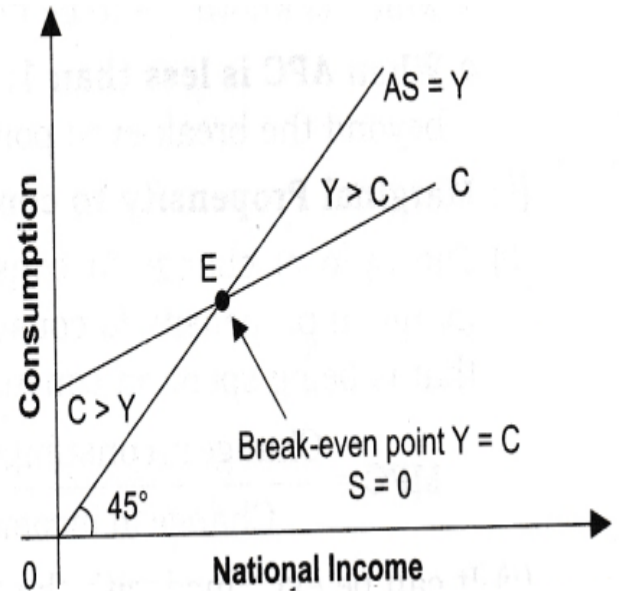
2. According to Keynes, as income increases consumption expenditure also increases but increase in consumption is smaller than the increase in income. In other words, consumption lags behind income. This is called Keynes' Psychological law of Consumption. According to Keynes, propensity to consume of the people remains stable in the short period.

3. Break-even point refers to that point in the level of income at which consumption is just equal to income. In other words, whole of income is spent on consumption and there is no saving. Below this level of income, consumption is greater than income but above this level, income is greater than

consumption.

Consumption and Saving Schedule

National Income(Y)	Consumption (C)	Saving (S)
40,000	46,000	-6,000
50,000	53,000	-3,000
60,000	60,000	0
70,000	67,000	3,000
80,000	74,000	6,000



In the given imaginary household schedule of consumption and saving, at annual income level of Rs.60,000, consumption is Rs.60,000 and in consequence there is no saving. This is break-even point.

It is evident from the table and diagram that:

- (i) As the income increases, consumption also increases, but the increase in consumption remains less than the increase in income.
- (ii) Income can be zero but consumption can never be zero in the economy.
- (iii) When $C > Y$, savings are negative.
- (iv) When $C = Y$, savings are zero. This is known as break-even point. This is shown by point E in the diagram. Thus break-even point indicates a point where consumption becomes equal to income or consumption curve cuts the income curve.

4. There are two types of propensity to consume:

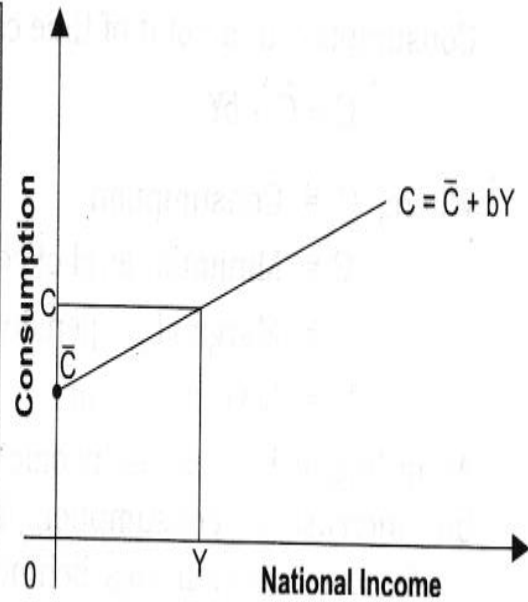
(a) Average propensity to consume (APC)

- (i) The ratio of aggregate consumption expenditure to aggregate income is known as average propensity to consume. It indicates the percentage (or ratio) of income which is being spent on consumption. It is worked out by dividing total consumption expenditure (C) by total income (Y).
Average Propensity to Consume (APC)

$$APC = \frac{\text{Consumption (C)}}{\text{Income (Y)}}$$

- (ii) It can be explained with the help of following schedule and diagram:

National Income (Y)	Consumption (C)	APC = $\frac{C}{Y}$
0	80	—
100	160	1.6
200	240	1.2
300	320	1.06
400	400	1
500	480	0.96



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

(iii) Important Points for APC:

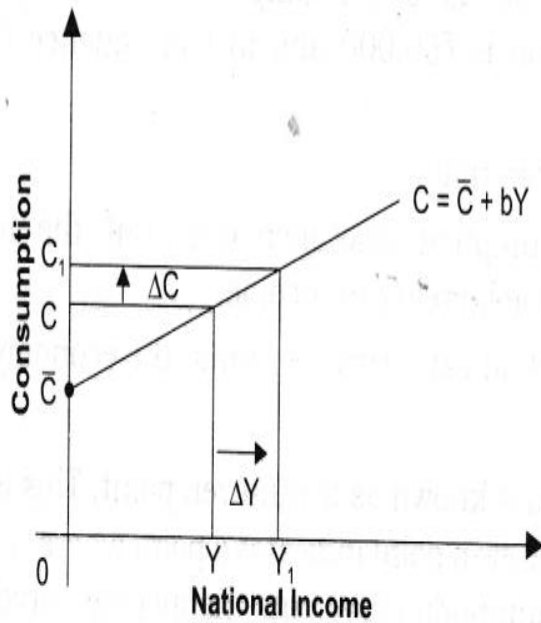
- When APC is more than 1: When APC is more than 1, consumption is more than national income, i.e. before the break-even point.
- APC = 1: When APC is equal to 1, consumption is equal to national income, which is known as to be break-even point.
- When APC is less than 1: When consumption is less than national income, i.e. beyond the break-even point.

(b) Marginal Propensity to consume (MPC):

(i) The ratio of change in consumption (C) to change in income (Y) is known as marginal propensity to consume. It indicates the proportion of additional income that is being spent on consumption.

$$MPC = \frac{\text{Change in consumption } (\Delta C)}{\text{Change in income } (\Delta Y)}$$

(ii) It can be explained with the help of following schedule and diagram:



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

$$MPC = \frac{CC_1}{YY_1}$$

Case 1 Constant MPC (As assumed by Keynes)					Case 2 Falling Marginal Propensity (General Case)				
Y	C	ΔY	ΔC	MPC = $\frac{\Delta C}{\Delta Y}$	Y	C	ΔC	ΔY	MPC = $\frac{\Delta C}{\Delta Y}$
3000	3000	—	—	—	3000	3000	—	—	—
4000	3800	1000	800	0.8	4000	3800	800	1000	0.8
5000	4600	1000	800	0.8	5000	4550	750	1000	0.75

6000	5400	1000	800	0.8	6000	5250	700	1000	0.7
7000	6200	1000	800	0.8	7000	5900	650	1000	0.65

It is so because the same proportion of additional income is spent on consumption. It means, lesser proportion of additional income is spent on consumption

(iii) Important points for MPC:

- Value of MPC varies between 0 and 1: As we know that increase in income is either spent on consumption or saved for future use.

➤ If the entire additional income is consumed, i.e., $\Delta Y = \Delta C + \Delta S[0]$

Then, $\Delta Y = \Delta C$ and $\text{MPC} = \frac{\Delta C}{\Delta Y} = 1$.

➤ If the entire additional income is saved, i.e. $\Delta Y = \Delta C[0] + \Delta S$.

Then, $\Delta Y = \Delta S$ or $\Delta C = 0$ and $\text{MPC} = \frac{\Delta C}{\Delta Y} = 0$.

In normal situations, value of MPC varies between 0 and 1.

• MPC falls with the successive increase in income: It happens because as an economy becomes richer, it has the tendency to consume smaller percentage of each increment to its income.

5. (a) **Propensity to save (or saving function)** shows the functional relationship between aggregate savings and income.

$$S = f(Y)$$

In other words, the part of income which is not spent on current consumption is known as saving.

By deducting consumption expenditure (C) from income(Y), we get saving(S).

$$S = Y - C$$

The saving function can be derived from the consumption function in the following manner:

$$C = \bar{C} + bY$$

As we know, income is either consumed or saved:

$$Y = C + S \quad \text{or} \quad S = Y - C$$

$$S = Y - (\bar{C} + bY) = Y - \bar{C} - bY = -\bar{C} + Y - bY = -\bar{C} + (1 - b) Y$$

$$S = -\bar{C} + \text{MPSY}$$

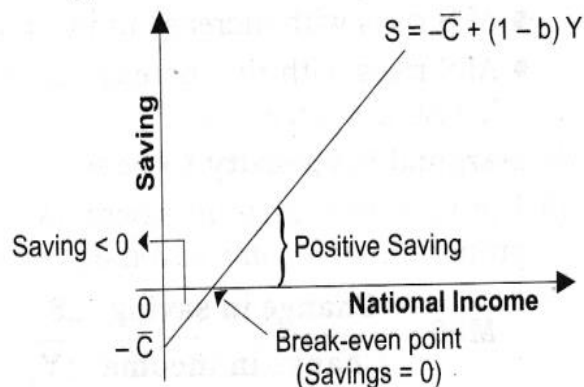
Where,

$-\bar{C}$ = Dis-saving or negative saving which is equal to the minimum consumption when income is zero

$1 - b$ = MPS or the rate at which savings increase

(b) It can be explained with the help of following schedule and diagram:

Y	C	S = Y - C
0	20	-20
10	25	-15
20	30	-10
30	35	-5
40	40	0
50	45	5



It is evident from the saving-function schedule and diagram that as income increases saving also increases. Saving can be both negative and positive. Prior to break-even point saving is negative, at

break-even point saving is zero and after the break-even point saving is positive.

(c) Important points for Saving function:

(i) Starting Point of Saving Curve:

- Saving curve (SS) starts from point $-c$ on the Y-axis, indicating that there is negative saving (equal to amount of autonomous consumption) when national income is zero. Note: The saving curve will have a negative intercept on Y-axis of the same magnitude as the consumption curve has positive intercept on the Y-axis. It happens because if consumption is positive at zero level of income, then there would be dis-savings of the same magnitude.

- Break-even point ($S = 0$).

Saving curve crosses the X-axis at point R which is known as break-even point as at this point saving is zero (or consumption is equal to income).

- Positive Saving: After the break-even point saving is positive.

6. Types of propensity to save

(a) Average propensity to save (APS):

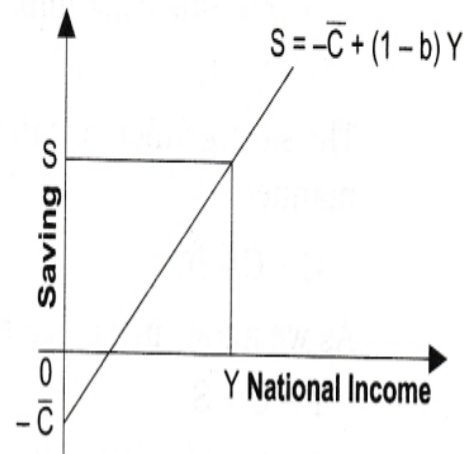
(i) The ratio of aggregate saving to aggregate income is known as average propensity to save (APS). By dividing aggregate saving by aggregate income, we get APS. Symbolically,

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

For instance, if income (Y) is ₹100 crore and saving (S) is ₹40 crore, then $APS = 40/100 = 0.4$. This indicates that 40% of the income is saved and 60% is consumed. APS is shown diagrammatically:

Y	S	$APS = \frac{S}{Y}$
₹100 Crore	₹40 Crore	0.4

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



ii) Important Points for APS:

(ii) Important Points for APS:

- APS can never be 1 or more than one.

As saving can never be equal to or more than national income.

- APS can be 0: APS is 0 when income is equal to consumption i.e., saving = 0. This point is known as break-even point.

- APS can be negative or less than 1.

At income levels which are lower than the break-even point APS can be negative as there will be dis-savings in the economy.

- APS rises with increase in income.

- APS rises with the increase in income because the proportion of income saved keeps on increasing.

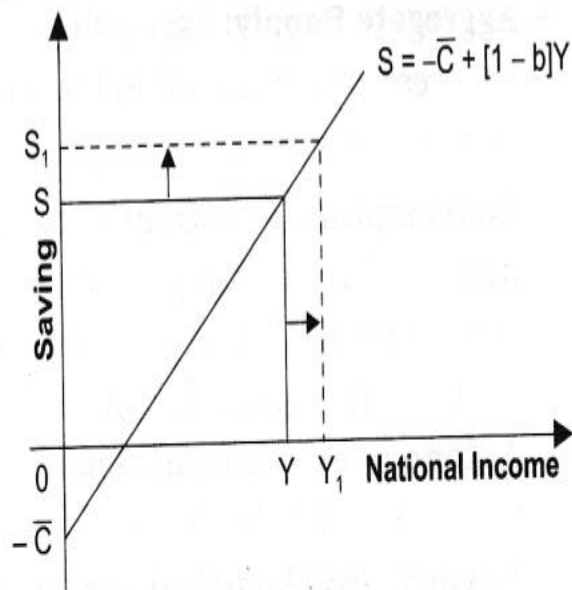
(b) Marginal Propensity to Save:

(i) The ratio of change in saving (ΔS) to change in income (ΔY) is called MPS. It is proportion of income saved out of additional (incremental) income. Symbolically,

$$\text{MPS} = \frac{\text{Change in saving } (\Delta S)}{\text{Change in income } (\Delta Y)}$$

(ii) For instance, if the income goes up from ₹100 crore to ₹200 crore and consequently saving (S) rises from ₹50 crore to ₹100 crore, $\text{MPS} = 50/100 = 0.5$ or 50%. It indicates that 50% of the additional income is saved. MPS is shown diagrammatically as,

$$\text{MPS} = \frac{\Delta S}{\Delta Y} = \frac{SS_1}{YY_1}$$



Y	S	$\text{MPS} = \frac{\Delta S}{\Delta Y}$
100	50	—
200	100	$50/100 = 0.5$

(c) **Important points for MPS:** MPS varies between 0 and 1

- If the entire additional income is saved, i.e., $\Delta C = 0$, $\text{MPS} = \frac{\Delta S}{\Delta Y} = 1$.

- However, if the entire additional income is consumed, i.e., $\Delta S = 0$, $\text{MPS} = 0$.

In normal situations value of MPS varies between 0 and 1.

Words that Matter

1. Aggregate demand: It is aggregate expenditure on ex-ante (planned) consumption and ex-ante (planned) investment that all sectors of the economy are willing to incur at each income level.

2. Induced Investment: It refers to the investment which is made with the motive of earning profit.

3. Autonomous Investment: It refers to the investment, which is made irrespective of level of income.

4. Aggregate Supply: Aggregate supply is the total amount of money value of goods and services, (which is paid to the factor of production against their factor services) that all the producers are willing to supply in an economy.

5. Consumption Function: Consumption function (Propensity to consume) expresses functional relationship between aggregate consumption and national income. Thus, consumption (C) is a function of income (Y).

$$C = F(Y) \text{ and } C = C + bY$$

6. Autonomous Consumption: It refers to minimum level of consumption i.e. (c), which is needed for survival, i.e., consumption at zero level of national income.

7. Keynes' Psychological law of Consumption: According to Keynes, as income increases consumption expenditure also increases but increase in consumption is smaller than the increase in income. In other words, consumption lags behind income.

8. Break even Point: Break-even point refers to that point in the level of income at which consumption is just equal to income. In other words, whole of income is spent on consumption and there is no saving.

9. Average Propensity to Consume: The ratio of aggregate consumption expenditure to aggregate income is known as average propensity to consume.

$$APC=C/Y$$

10. Marginal Propensity to consume: The ratio of change in consumption (C) to change in income (Y) is known as marginal propensity to consume. It indicates the proportion of additional income that is being spent on consumption.

$$MPC=\Delta C/\Delta Y$$

11. Saving Function: Saving function (Propensity to save) shows the functional relationship between aggregate savings and income.

$$S = f(Y) \text{ and } S = -C + (1 - b) Y$$

12. Average Propensity to Save: The ratio of aggregate saving to aggregate income is known as average propensity to save (APS).

$$APS=S/Y$$

13. Marginal Propensity to Save: The ratio of change in saving (ΔS) to change in income (ΔY) is called MPS. It is proportion of income saved out of additional (incremental) income. Symbolically,

$$MPC= \Delta S/\Delta Y$$
