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Income Determination

Introduction

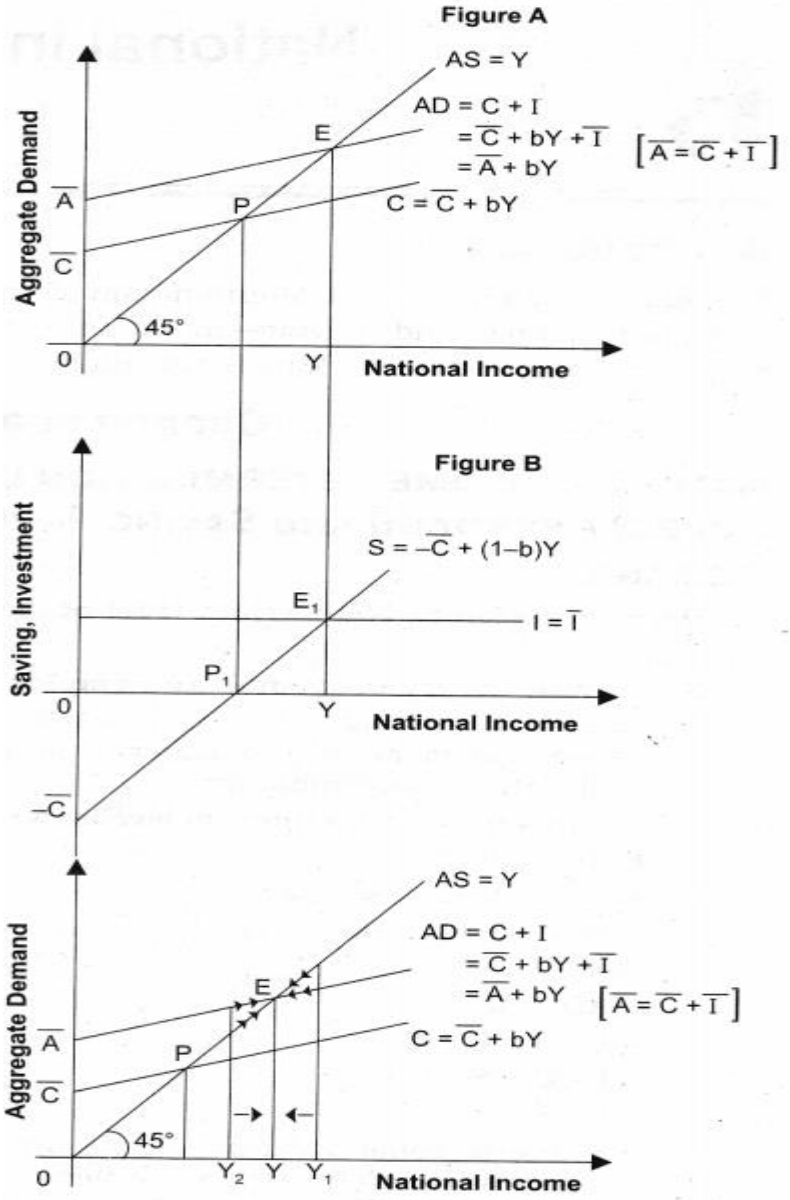
This chapter is a numerical determination of national income under Aggregate demand— Aggregate supply and Saving—Investment approach. Concept of Multiplier, based numerical on it and its working is also highlighted.

National Income Determination Under Aggregate Demand And Supply Approach And Saving, Investment Approach, Effective Demand

1. Determination of equilibrium level of national income
Or
Keynesian theory of income and employment
(a) It refers to that point which has come to be established under the given condition of aggregate demand and aggregate supply, and has tendency to stick to that level under this given condition:
Condition to get equilibrium level of NY
• AD = AS
• Investment = Saving
How is Investment = Saving?
Here,
AD = AS
C + I = C + S
I = C + S – C
I = S
(b) If due to some disturbance, we divert from that position, then the economic forces will work in such a manner so as to drive us back to the original position,
i. e., aggregate demand is equal to aggregate supply.
(c) Any movement from that point would be unstable. In short, it is a position of rest.
(d) It can be explained with the help of following schedule and diagram:

NY	C	S	I	AD	AS	Resulting tendency
3000	3000	NIL	400	3400	3000	Expansion
4000	3800	200	400	4200	4000	Expansion
5000	**4600**	**400**	**400**	**5000**	**5000**	**Equilibrium**
6000	5400	600	400	5800	6000	Contraction
7000	6200	800	400	6600	7000	Contraction

(e) Figure B is derived from figure A. In figure A at point P, income is equal to consumption, which is known as to be breakeven point. Corresponding to point P, we derive point P_1; in figure B, where saving is equal to zero. In figure A, the equilibrium level of national income is attained at point E, where aggregate supply = aggregate demand. Corresponding to point E, we derive the point E_1, where saving = investment.



2. Determination of equilibrium level of national income through Aggregate demand-Aggregate

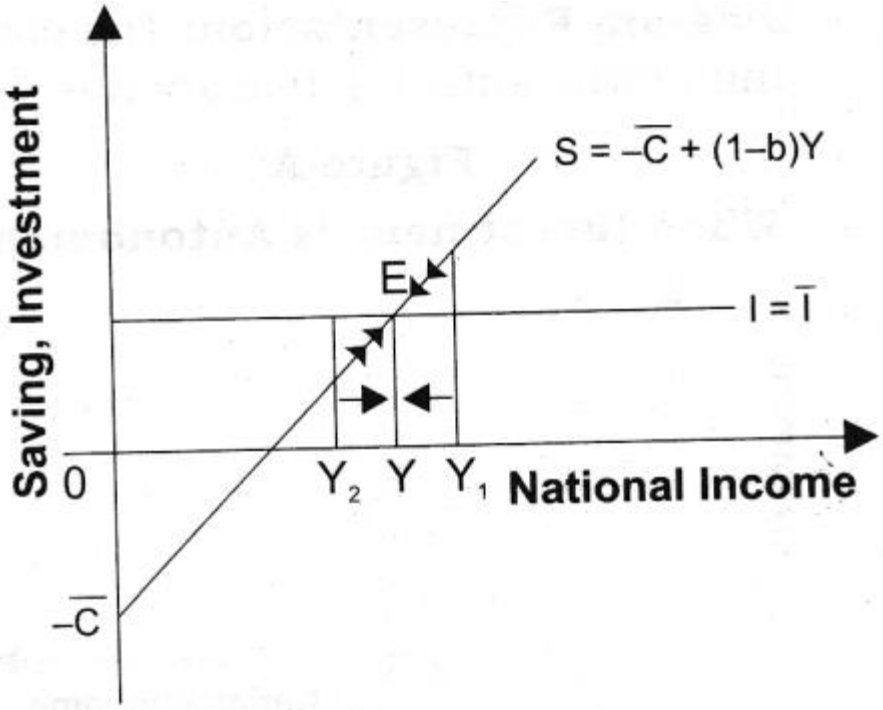
Supply Approach
(a) It refers to the point that has come to be established under the given condition of aggregate demand and aggregate supply, and has tendency to stick to that level under this given condition where Aggregate Demand = Aggregate Supply.
(b) If due to some disturbance, we divert from that position, the economic forces will work in such a manner so as to drive us back to the original position, i.e., aggregate demand is equal to aggregate supply.
(c) In the above mentioned figure, at point P, income = consumption, which is known as to be a break-even point. The equilibrium level of national income is attained at point E, where aggregate demand = aggregate supply.
(d) If due to some disturbance we divert from our position, like when AD > AS [at Y_2], then, production will have to be increased to meet the excess demand. Consequently, national income will increase. As we know positive relationship exists between national income and consumption, so consumption will increase, which will thereby increase the aggregate demand till we reach the equilibrium.
(e) As against it, when AD < AS [at Y_1], then there would be stockpiling and producers will produce less. National income will fall and as a result consumption will start falling, which will thereby fall the aggregate demand till we reach the equilibrium.

3. (a) Ex-ante saving and ex-ante investment:

(i) In an economy what we plan (or intend or desire) to save during a particular period is called ex-ante saving.
(ii) Against it, what we plan (or intend or desire) to invest during a particular period is called ex-ante investment.
(b) Ex-post saving and ex-post investment.
(i) In an economy what we actually save or what is left after deducting consumption expenditure from income is called ex-post (or realized) saving.
(ii) As against it what we actually invest or what we actually add to the physical assets of an economy is called ex-post (or realized) investment.

4. Determination of equilibrium level of national income through Saving-Investment Approach

(a) It refers to the point that has come to be established under the given condition of aggregate demand and aggregate supply, and has tendency to stick to that level under this given condition where Aggregate Demand (AD)= Aggregate Supply (AS). AD = AS
Consumption (C) + Investment (I) = Consumption (C) + Saving (S)
I = S
(b) If due to some disturbance, we divert from that position, the economic forces will work in such a manner so as to drive us back to the original position, i.e., Saving is equal to Investment.



(c) In the above figure, the equilibrium level of national income is attained at point E, where saving = investment which is derived from a point where AD = AS.
(d) If due to some disturbance we divert from our position like when investment > saving [at Y_2], then production will have to be increased to meet the excess demand. Consequently, national income will increase leading to rise in saving until saving becomes equal to investment. It is here that equilibrium level of income is established because what the savers intend to save becomes equal to what the investors intend to invest.
(e) As against it, when saving > investment [at Y_1], then there would be stockpiling and producers will produce less. .National income will fall and as a result saving will start falling until it becomes equal to investment. It is here the equilibrium level of income is derived.
5. Effective Demand: The level at which the economy is in equilibrium, i.e., where aggregate demand = aggregate supply, is called effective demand. It can also be explained with the help of the following table:

NY	C	S	I	AD	AS	Resulting tendency
3000	3000	NIL	400	3400	3000	Expansion
4000	3800	200	400	4200	4000	Expansion
5000	**4600**	**400**	**400**	**5000**	**5000**	**Equilibrium**
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Effective Demand

Paradox Of Thrift, It's Reasons With Numirical Example

1. The term thrift means savings and the paradox of thrift shows how an attempt by the economy as a whole to save more out of its current income will ultimately results in lower savings for the economy.
2. If all the people in the economy make an effort to save more, then the total savings of the community will not increase, on the contrary they will decrease. This is called the paradox of thrift.
3. Reasons for "Paradox of thrift" to operate
(a) As we know that one person's expenditure is another person's income.
(b) If individual 'A' decides to save more by reducing his consumption expenditure, the income of individual 'B' will be less and individual 'B' in turn will spend less.
(c) Thus, if all individuals in the economy decide to save more, the income received by each individual will be less and overall income will fall and also lower will be the total savings.
4. Diagram Representation: The concept of paradox of thrift with the help of diagrams and mathematical illustration is as under:

Figure A

When Investment is Autonomous

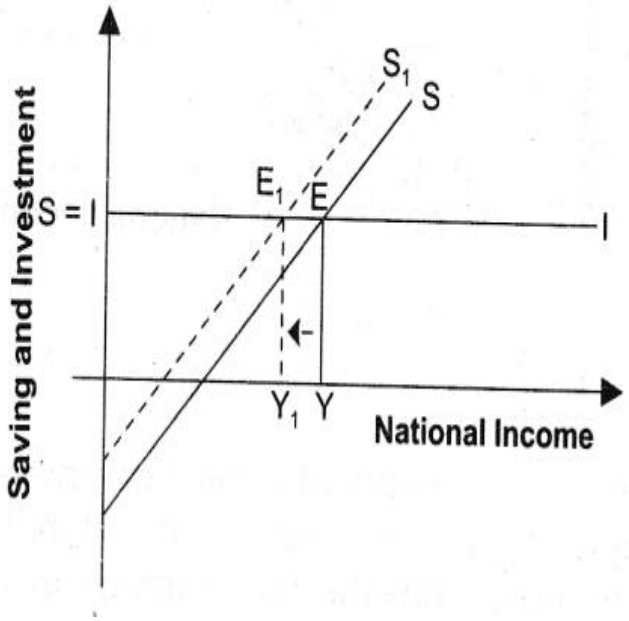
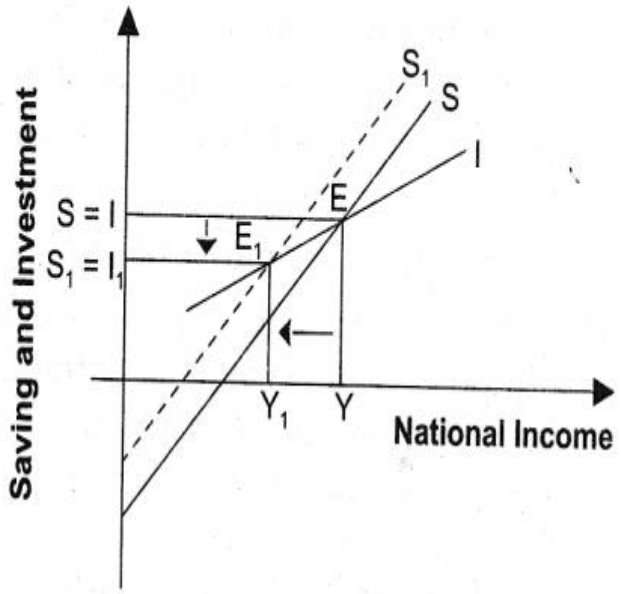


Figure B

When Investment is Induced



When Investment is Autonomous When Investment is Induced
(a) Paradox of thrift fails in keyne's theory (when Investment is autonomous):
In figure A, society, households plan to save more at each income level. So, saving curve shifts up and left from S to . Equilibrium national income falls from Y to Yr The thing which has to be remembered is that savings is equal to autonomous investment, that is, remains unchanged.
(b) Paradox of thrift is possible when investment is induced: In figure B, we have induced investment function which makes the investment curve upward positively sloping. With the increase in savings, not only the equilibrium income falls, but also savings decline.
5. Numerical Illustration: Suppose the original savings function is given as,
S = -50 + 0.5Y and investment (I) = 25 + 0.25Y.
Equilibrium level of income will be attained at the level where
Saving = Investment ! -50 + 0.5Y = 25 + 0.25Y
0. 25Y = 75 Y = 300
Therefore, savings at Y=300 will be S = -50 + 0.5 (300) = 100
Suppose, eveiy individual in the economy decides to save 25 more at each level of income. The new savings function will be
S2 = -50 + 25 + 0.5Y – -25 + 0.5Y.
The new equilibrium income will be attained at the level where

s2 = i
-25 + 0.5Y = 25 + 0.25Y 0.25Y = 50 Y = 200
Therefore, savings at Y = 200 will be S = -25 + 0.5 (200) = -25 + 100 = 75
Thus, when everybody in the economy decides to save more, the equilibrium level of income falls and the total savings also fall. This is called the paradox of thrift.

Elements In Understanding Investment (Marginal Efficiency Of Investment And Market Rate Of Interest), Investment Demand Function

1. Elements In Understanding Investment: A private investor's demand for investment depends on two things:
(a) The rate of return on investment or M.E.I: The expected rate of return from'an additional unit of investment is called marginal efficiency of investment (M.E.I). It is defined as the expected rate of return of an additional unit of capital goods. M.E.I is very important factor in determining the investment demand. M.E.I. is determined by two factors.
(i) Supply Price: The cost of replacing the machine under consideration with a brand new machine is known its supply price. For example, if a machine of Rs.1 lakh is replaced in place of old machine, then Rs. 1 lakh is the supply price.
(ii) Prospective Yields: It refers to expected net returns(of all costs) from the capital asset over its lifetime. For example, if the given machine is expected to yield revenue of Rs. 10,000 and running expenditure is Rs.2000, the prospective yield will be, 10000 – 2000 = 8000.
(iii) Formula of Marginal efficiency of investment: In the given examples, marginal efficiency of investment will be,

$$\text{MEI} = \frac{\text{Prospective Yield}}{\text{Supply Price}} \times 100$$

$$\frac{8000}{100000} \times 100 = 8\%$$

(b) The Market Rate of Interest: It refers to cost of funds borrowed for financing the investment. There exists inverse relationship between rate of interest and investment demand. Higher interest implies lower level of investment demand.
(c) Decision whether to invest or not
(i) The investor goes on making additional investments until M.E.I becomes equal to the rate of interest. If M.E.I is greater than the rate of interest, the investors has to increase the investment and if the rate is higher than the M.E.I, no investment is to be made.
(ii) For example, if an entrepreneur has to pay 15% market rate of interest on the loan taken by him and he expected rate of profit i.e., M.E.I. is 30%, then he will surely go for the investment and will continue making investment till M.E.I. = Rate of Interest (ROI).
2. Investment demand function: Investment demand function is the relationship between rate of interest and investment demand. There exists inverse relationship between rate of interest and investment demand. Higher interest implies lower level of investment demand.

Concepts Of Investment Multiplier

1. Investment Multiplier
Meaning: The ratio of change in national income (ΔY) due to a change in investment (ΔI) is known as

multiplier (K).

Formula:

$$K = \frac{\Delta Y}{\Delta I} \quad \text{or} \quad K \times \Delta I = \Delta Y$$

Where K is multiplier,

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

Derivation of Formula: As we know that,

$$Y = C + I$$

Multiplying the whole equation by Δ, we get,

$$\Delta Y = \Delta C + \Delta I$$

Dividing both sides of (*ii*) by ΔY, we get,

$$\frac{\Delta Y}{\Delta Y} = \frac{\Delta C}{\Delta Y} + \frac{\Delta I}{\Delta Y}$$

Or $$1 = \frac{\Delta C}{\Delta Y} + \frac{\Delta I}{\Delta Y}$$

Rearranging (*iv*), we get,

$$\frac{\Delta I}{\Delta Y} = 1 - \frac{\Delta C}{\Delta Y}$$

Or Reciprocately,

$$\frac{\Delta Y}{\Delta I} = \frac{1}{1 - \frac{\Delta C}{\Delta Y}}$$

As we know, $K = \frac{\Delta Y}{\Delta I}$ and $\frac{\Delta C}{\Delta Y} = MPC$, we get,

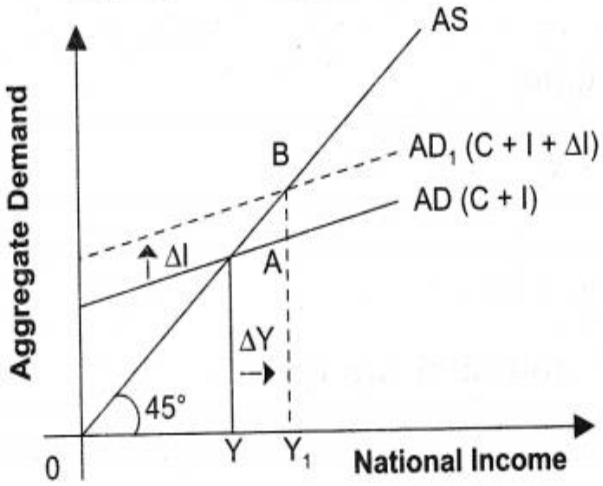
$$K = \frac{1}{1 - MPC}$$

Since, MPC + MPS = 1, we obtain,

$$K = \frac{1}{MPS}$$

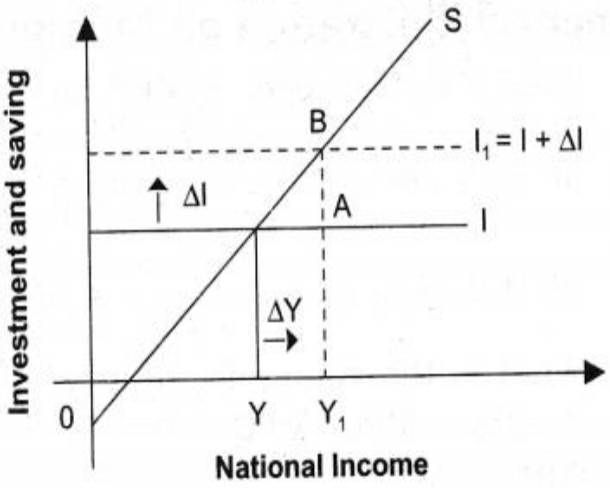
(*d*) Diagrammatically Representation of Multiplier

Through Aggregate demand and Aggregate Supply Approach



$$K = \frac{\Delta Y}{\Delta I} = \frac{YY_1}{BA}$$

Through Saving and Investment Approach



$$K = \frac{\Delta Y}{\Delta I} = \frac{YY_1}{BA}$$

(e) **Maximum Value of Multiplier**

(i) The multiplier can have the maximum value if MPC = 1. As we know,

$$K = \frac{1}{1 - MPC} = \frac{1}{1-1} = \infty$$

(ii) The multiplier can have the maximum value if MPS =0. As we know,

$$K = \frac{1}{MPS} = \frac{1}{0} = \infty$$

(f) **Minimum Value of Multiplier**

(i) The multiplier can have the minimum value if MPC becomes(0) zero. As we know,

$$K = \frac{1}{1 - MPC} = \frac{1}{1-0} = 1$$

(ii) The multiplier can have the minimum value if MPS =1. As we know,

$$K = \frac{1}{MPS} = \frac{1}{1} = 1$$

(g) **Relationship between Marginal Propensity to consume (MPC) and multiplier.**

(i) If we put maximum value of MPC, i.e., 1, we get maximum value of multiplier, i.e., ∞.

(ii) As against it, if we put minimum value of MPC, i.e., 0, we get the minimum value of multiplier, i.e. 1.

(iii) So, positive relationship exists between MPC and multiplier. It means when MPC increases, the multiplier also increases and vice-versa.

$$MPC\uparrow \rightarrow K\uparrow$$

(h) **Relationship between Marginal Propensity to Save (MPS) and multiplier.**

(i) If we put minimum of MPS i.e. 0, we get maximum value of multiplier, i.e., ∞.

(ii) As against it if we get maximum value of MPS, i.e., 1, if we get minimum value of multiplier, i.e.,1.

(iii) Hence, inverse relationship exists between MPS and multiplier. It means if MPS increases, the multiplier decreases and vice-versa.

$$MPS\uparrow \rightarrow K\downarrow$$

Words that Matter

1. Ex-ante saving: In an economy what we plan (or intend or desire) to save during a particular period is called ex-ante saving.

2. Ex-ante Investment: In an economy, what we plan (or intend or desire) to invest during a particular period is called ex-ante investment.
3. Expost Saving: In an economy what we actually save or what is left after deducting consumption expenditure from income is called ex-post (or realized) saving.
4. Expost Investment: In an economy, what we actually invest or what we actually add to the physical assets of an economy is called ex-post (or realized) investment.
5. Effective Demand: The level at which the economy is in equilibrium, i.e., where aggregate demand = aggregate supply, is called effective demand.
6. Paradox of Thrift: The term thrift means savings and the paradox of thrift shows how an attempt by the economy as a whole to save more out of its current income will ultimately results in lower savings for the economy.
7. Marginal efficiency of Investment: The expected rate of return from an additional unit of investment is called marginal efficiency of investment (M.E.I). In other words, it is the expected rate of return of an additional unit of capital goods.
8. Supply Price: The cost of replacing the machine under consideration with a brand new machine is known its supply price. .
9. Prospective Yields: It refers to expected net returns (of all costs) from the capital asset over its lifetime.
10. Market Rate of Interest: It refers to cost of funds borrowed for financing the investment. There exists inverse relationship between rate of interest and investment demand. Higher interest implies lower level of investment demand.
11. Multiplier: The ratio of change in national income (ΔY) due to change in investment (ΔI) is known as multiplier (K).