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Paper 4 – Business Economics

Complete Batch Details by CA Mohnish Vora (MVSIR)

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End Date	15th Apr. 2024	15th Apr, 2024
Chapters that will be covered live	All Chapters (Chp 1 & 2 are already completed)	Micro Eco Chp 3, 4, Macro Eco Chp 5, 6, 7, 8, 9 & 10
FM Chapters to be covered in recorded form	Chp 1, 2 & 5 (If a student joins now, then chp 1 ,2 & 5 will have to be covered in recordings of detailed batch)	Chp 1, 2 & 5 (Students will have to cover from YouTube revision, will upload after batch ends)
Printed Books to be provided	4 Books: Micro Economics Shastra, Macro Economics Shastra, MCQ Shastra, Super Chart Book (All Chp)	3 Books: Macro Economics Shastra, MCQ Shastra, Super Chart Book (All Chp)
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Macro Economics

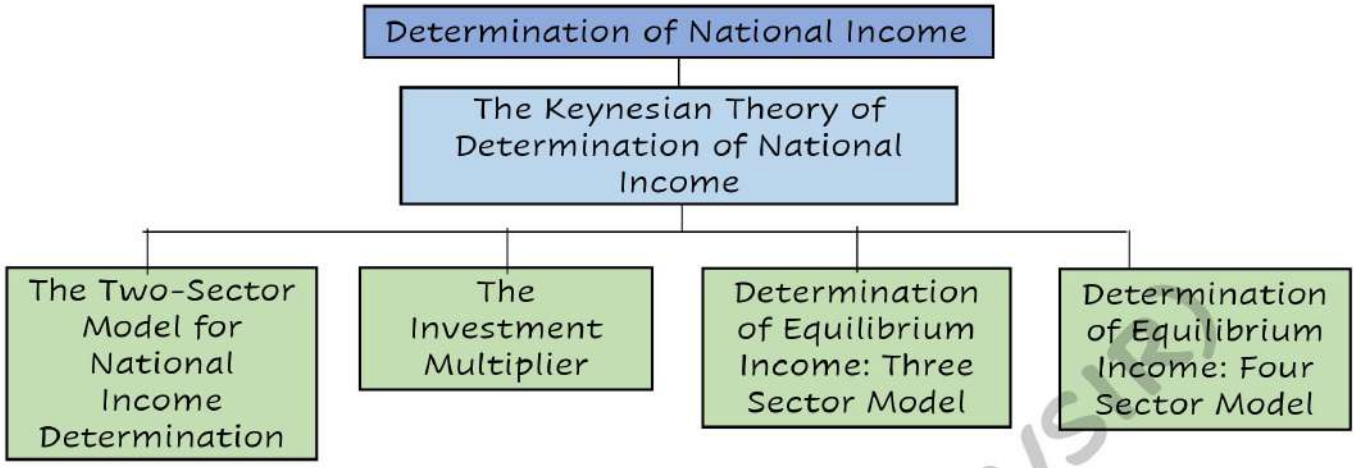
Chapter 6
Determination of National Income

Unit 2
The Keynesian Theory of Determination of National Income

Macro Economics Shastra
by MVSIR

UNIT-2: THE KEYNESIAN THEORY OF DETERMINATION OF NATIONAL INCOME

CHAPTER OVERVIEW



1. INTRODUCTION

- In **previous unit,** '**ex post**' (**realized**) values were used

Eg- **aggregate consumption (C)** denotes what **people have actually consumed**

- In this unit variables are defined in '**ex-ante**' (**anticipated**) terms or in terms of **what is intended or planned**. In theoretical model of economy which (discussed in this unit), **'ex ante' values** of these variables are our primary concern.

Eg- here '**consumption**' - what **people in an economy plan to consume**

- Ex-ante values are used, if we want to **predict** what **equilibrium value of output or GDP** is.
- The **Great Depression of the 1930's**, was the greatest economic crisis the western world had experienced.
- Before Keynes, classical economists said that **economy is self-regulating** and is always **capable of automatically achieving equilibrium** at '**natural level**' of **real GDP**
- However, Keynes in his "**General Theory of Employment Interest and Money (1936)**" argued that **markets** would **not automatically** lead to **full-employment equilibrium.**
- Keynesians believe that **prices and wages are not so flexible**; they are **sticky (rigid)**, especially **downward**. This **prevents economy** from **returning to natural level** of real GDP.
- So, **output will remain at less than full employment level** **unless** there is **insufficient spending**.

Keynes also introduced many of the building blocks of modern macroeconomics:

1. The **relation of consumption to income**, and the **multiplier**,
2. **Liquidity Preference** (the term Keynes gave to the demand for money), The importance of **expectations** in affecting consumption and investment.

The Keynesian theory of income determination is presented in three models:

i. The **two-sector** model consisting of the **household** and the **business sectors**,
ii. The **three-sector** model consisting of household, business and **government sectors**, and
iii. The **four-sector** model consisting of household, business, government and **foreign sectors**

Before we attempt to explain the determination of income in each of the above models, it is pertinent that we understand the concept of circular flow in an economy which explains the functioning of an economy.

2. CIRCULAR FLOW IN A SIMPLE TWO-SECTOR MODEL

In an economy, money flows from producers to workers as wages and flows back to producers as payment for products. In short, an economy is an endless circular flow of money.

- The basic purpose of the circular flow model is to understand how money moves within an economy. The **circular flow of income** is a process where the **national income** and **expenditure** of an economy **flow in a circular manner continuously** through time.

- Two sector economy model assumes **only two sectors** in economy viz., **households** and **firms**, with only **consumption** and **investment** outlays.

- **Households** are assumed to-
  - **own all factors of production** and
  - they sell their factor services to earn factor **incomes**
  - Income is **entirely spent to consume** all final G/S produced by business firms.

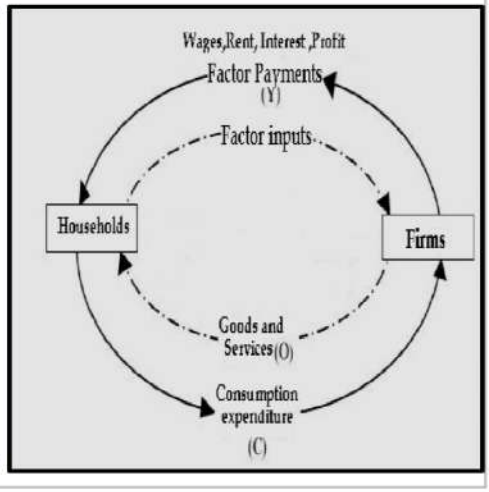
- **Business firms** are assumed to-
  - **hire factors** of production **from the households**;
  - they **produce and sell** goods and services to the households and
  - **They do not save**. There are **no corporations, corporate savings or retained earnings**.

- Since there is no govt, **Y = Yd**.

- Circular **broken lines** - factor and product flows- '**real flows**'
- **Continuous line** with arrows show **money flows**

These flows are in **opposite directions** and the value of real flows equal the money flows because the factor payments are equal to household incomes.

- No injections into or leakages from system. Since whole of household income is spent on G/S produced by firms.



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

- Before we go into the discussion on the **equilibrium aggregate income** and changes in it, we shall first try to understand the meaning of the term '**equilibrium**' (defined as a **state** in which there is **no tendency to change**; or a **position of rest**). **Output** is at equilibrium level when the **quantity of output** produced is **equal** to the **quantity demanded**.
- Logically, an economy can be said to be in equilibrium when the **production plans of the firms** and the **expenditure plans** of the households **match**.
- Having understood the working of the two-sector model and the meaning of equilibrium output, we shall now have the formal presentation of the **theory of income determination in a two-sector model** which is the simplest representation of the key principles of Keynesian economics
- Before we discuss the Keynesian theory of income determination, let us look at the **basic concepts, definitions and functions** used in his theory of income determination.

3. BASIC CONCEPTS AND FUNCTIONS

3.1 Aggregate Demand Function

Aggregate demand (AD) is what economists call **total planned expenditure**. In a simple two- sector economy, the **ex ante aggregate demand (AD)** for final goods or aggregate expenditure consists of only **two components**:

i. Ex ante aggregate demand for **consumer goods** (C), and
ii. Ex ante aggregate demand for **investment goods** (I)

$$AD = C + I$$

Of the two components, consumption expenditure accounts for the highest proportion of the GDP. In a simple economy, the variable I is assumed to be determined exogenously and constant in the short run. Therefore, the short-run aggregate demand function can be written as:

$$AD = C + \bar{I}$$

Where $\bar{I}$ = constant investment.

From the equation (2.2), we can infer that, in the short run, AD depends largely on the aggregate consumption expenditure. We shall now go over to the discussion on consumption function.

3.2 The Consumption Function

Consumption function expresses the functional relationship between aggregate **consumption expenditure** and aggregate **disposable income**, expressed as:

$$C = f(Y)$$

When **income is low**, **consumption** expenditures of households will **exceed** their disposable **income** and households **dissave** i.e. they either **borrow money** or **draw from their past savings** to purchase consumption goods. **(a)**

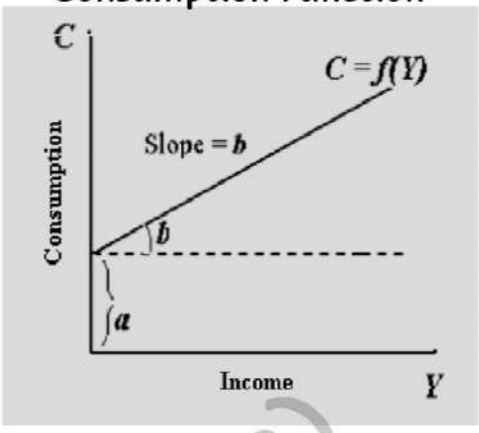
If the disposable **income increases**, consumers will **increase their planned expenditures** and current consumption expenditures rise, but **only by less than the increase in income**. **(b)**

The specific form of consumption–income relationship termed the consumption function, proposed by Keynes is as follows:

$$C = a + By \quad , \quad MPC = \Delta C / \Delta Y = b$$

The consumption function shows the **level of consumption** (C) corresponding to **each level of disposable income** (Y) and is expressed through a linear consumption function, as shown by the line marked C = f(Y) in figure 1.2.2.
The Keynesian **assumption** is that consumption increases with an increase in disposable income, but that the **increase in consumption** will be **less than** the **increase in disposable income** (b <1). i.e. **0 < b < 1**. This fundamental relationship between income and consumption plays a crucial role in the Keynesian theory of income determination.

The Keynesian Consumption Function



3.3 Relationship Between Income and Consumption

Just as marginal propensity to consume, the average propensity to consume is a **ratio** of **consumption** defining **income-consumption** relationship. The ratio of total consumption to total income is known as the average propensity to consume (APC).

$$APC = \frac{\text{Total consumption}}{\text{Total Income}} = \frac{C}{Y}$$

The table below shows the relationship between income and consumption

Relationship between Income and Consumption

Income (Y) (Rs. Crores)	Consumption (C) (Rs. Crores)	Saving (Rs. Crores)	APC (C/Y)	MPC (ΔC /ΔY)
0	50	-50	∞	-
100	125	-25	125/100 = 1.25	75/100 = 0.75
200	200	0	200/200 = 1.00	75/100 = 0.75
300	275	25	275/300 = 0.92	75/100 = 0.75
400	350	50	350/400=0.88	75/100 = 0.75
500	425	75	425/500=0.85	75/100 = 0.75

Note: The conventional Keynesian MPC is assumed to have a constant value less than 1.00 and usually greater than 0.50:

APC is calculated at various income levels. It is obvious that the proportion of income spent on consumption decreases as income increases. What happens to the rest of the income that is not spent on consumption? If it is not spent, it must be saved because income is either spent or saved; there are no other uses to which it can be put. Thus, just as consumption, saving is a function of disposable income: S=f(Y).

3.5 The Relationship Between Income, Consumption and Saving

Saving is also a function of disposable income. The saving function shows the **functional relationship** between **national income** (= disposable income in two sector model) and **saving**.

$$S = f(Y)$$

This can be illustrated with the following table and diagram.

Relationship between Income, Consumption and Saving

Disposable Income (Yd) (Rs. Crores)	Consumption (C) (Rs. Crores)	Saving (S) (Rs. Crores)
0	20	-20
60	70	-10
120	120	0
180	170	10
240	220	20

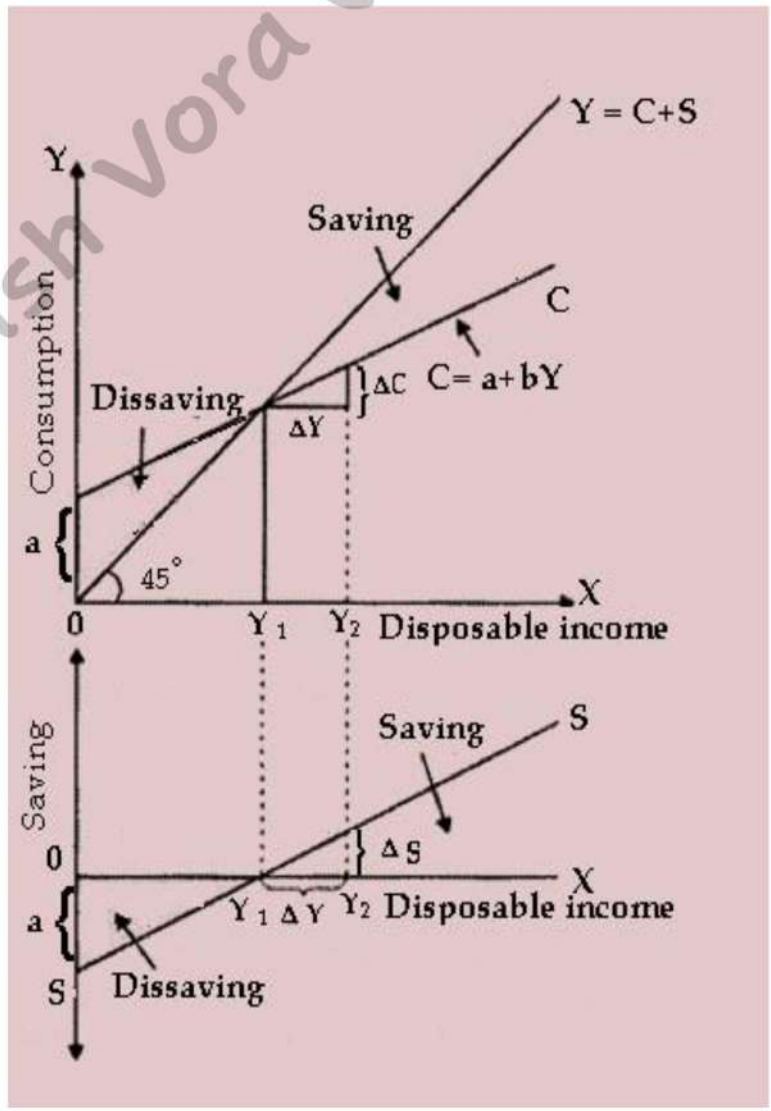
The Consumption and Saving Function

In figure 1.2.3, the consumption and saving functions are graphed. The saving function shows the level of saving (S) at each level of disposable income (Y). We know that consumption at zero level of income is positive (equal to a), and as such there should be dissaving also of the same magnitude. By definition, national income **Y = C + S**, Therefore, S = Y – C.

The **slope** of the **saving function** is the **marginal propensity to save**. If a one-unit increase in disposable income leads to an increase of 'b' units in consumption, the remainder **(1 - b)** is the increase in saving. The marginal propensity to save is the increase in saving per unit increase in disposable income.

(MPS) , s = 1-c

Saving is an **increasing function of the level of income**. In other words, saving increases as income rises.



$$MPS = \frac{\Delta S}{\Delta Y} = 1 - b \quad (2.7)$$

Marginal Propensity to Consume (MPC) is **always less than unity**, but greater than zero, i.e., 0 < b < 1 Also, MPC + MPS = 1; we have **MPS= 0 < b < 1**. Thus, saving is an increasing function of the level of income because the marginal propensity to save (MPS) = 1- b is positive, i.e. saving increases as income increases.

Average Propensity to Save (APS)

The **ratio of total saving to total income** is called average propensity to save (APS). Alternatively, it is that part of total income which is saved.

$$APS = \frac{\text{Total Saving}}{\text{Total Income}} = \frac{S}{Y} \quad (2.8)$$

3.8 Aggregate Supply:

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. It is **equal to the national income** of the economy, which is either consumed or saved.

$$AS = Y = C + S$$

Illustration - 1

What will be the value of average propensity to save when -

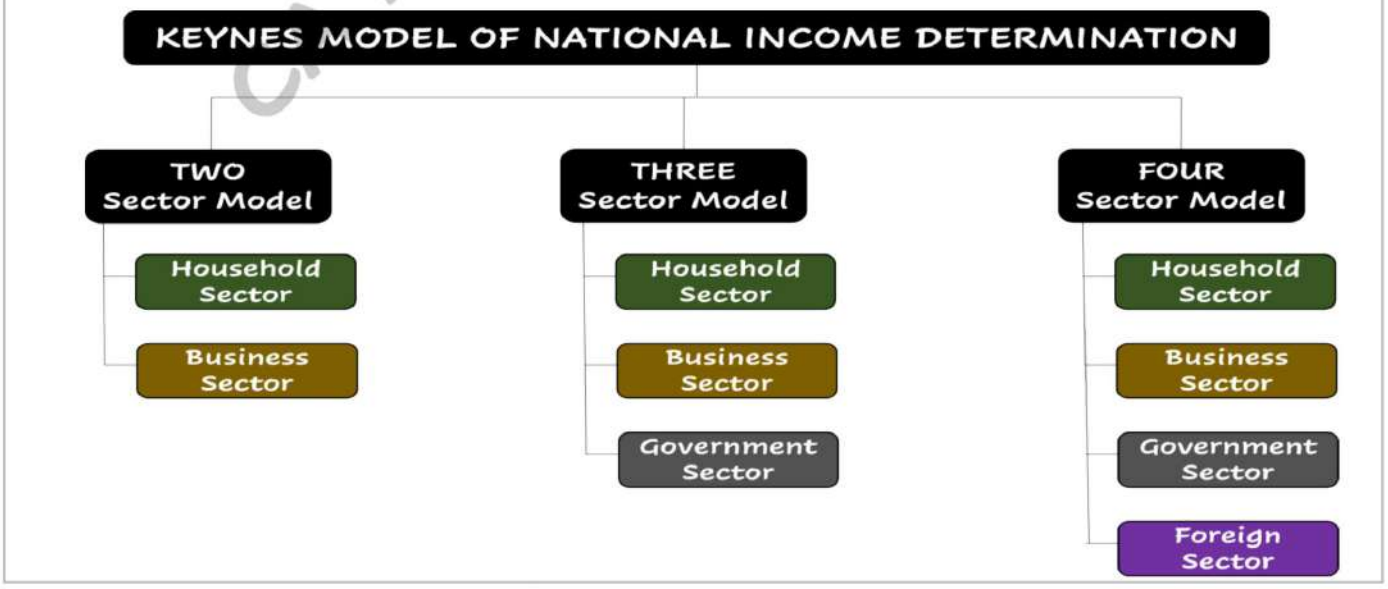
i. C = 200 at Y = 1,000

ii. S = 450 at Y = 1,200

Solution - 1

(i) $APS = \frac{S}{Y}$; S = Y – C = 1,000 – 200 = 800. Therefore, $APS = \frac{S}{Y} = \frac{800}{1000} = 0.8$

(ii) When S = 450 and Y = 1,200; $APS = \frac{S}{Y} = 450/1200 = = 0.375$



4. THE TWO-SECTOR MODEL OF NATIONAL INCOME DETERMINATION

TWO-SECTOR MODEL

Aggregate Demand

Total spending in the economy

$C + I$

Aggregate Supply

Total supply of goods and services which firms plan on selling during a specific time period

$C + S$

Equilibrium is achieved when,

$$AD = AS$$

or

$$C + I = C + S$$

or

$$I = S$$

In this section, we shall describe the two-sector model of determination of equilibrium levels of output and income in its formal form using the aggregate demand function and the aggregate supply function. The equilibrium level of income and output in the Keynesian framework is that level at which aggregate demand (C+ I) and aggregate supply (C + S) or output are equal. In other words, Investment is equal to Savings.

$C + I = C + S$
or
$I = S$

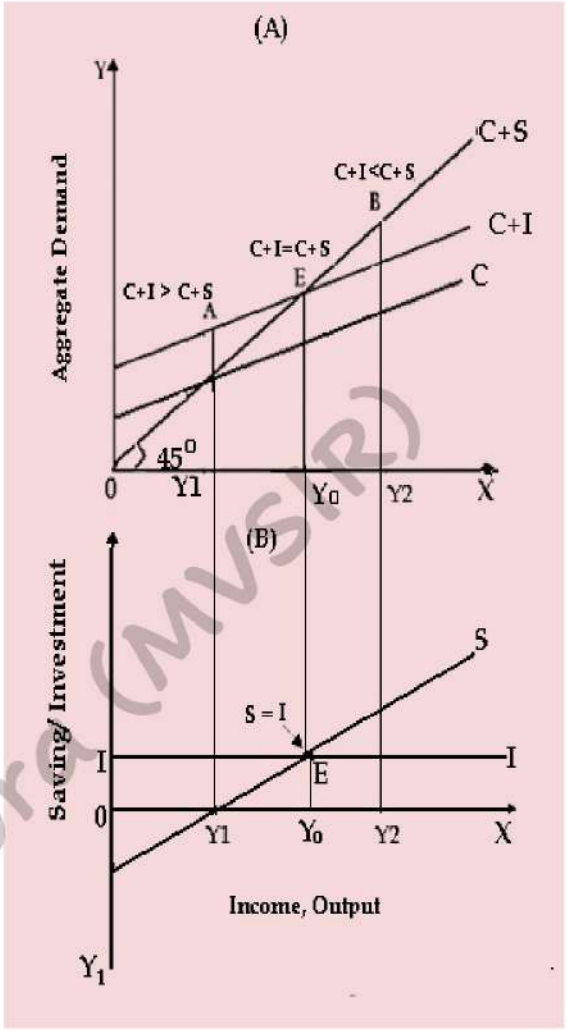
Notes

Determination of Equilibrium Income: Two Sector Model

- **Aggregate demand curve** is linear and positively sloped indicating that as the level of national income rises, the aggregate demand (or aggregate spending) in the economy also rises.
- The **consumption line** is flatter than the 45-degree line because, as income rises, consumption also increases, but by less than the increase in income.
- **Autonomous expenditure component (I)** does not depend directly on income, the (C+I) schedule lies above the consumption function by a constant amount.
- The **45-degree line** illustrates every single point at which planned aggregate expenditure, measured on Y-axis, is equal to planned aggregate production, which is measured on X axis.
- In other words, all points
  - **on** the **45°** line indicate **AD = AS**.

Thus, it shows possible equilibrium income levels.

- **below 45° line, AD < AS** → [Point B]
- **above 45° line, AD > AS** → [Point A]



- If an economy is **operating on 45-degree line**, then market is in equilibrium. Ideally, we would like equilibrium to occur at potential GDP i.e., at the level of full employment. Only at **point E** and at the corresponding equilibrium levels of income and output YO does **aggregate demand exactly equals output**. At that level, planned spending precisely matches production.

- As per Keynes, **aggregate dem** will **not always be equal** to **aggregate supply**.
  - Agg. **demand** depends on the **households' plan to consume** and to **save**
  - Agg. **supply** depends on the **producers' plan** to **produce** G/S.
  - **To achieve equilibrium**, the **households' plan must coincide with producers' plan**. At equilibrium, expected value equals realized value.

- However, as per Keynes there is **no reason to believe that**:
  - consumers' **consumption plan** always **coincides** with **producers' production** plan, and
  - that **producers' plan to invest matches** always with **households plan to save**.

- Putting it differently, there is **no reason** for C + I and C + S to be always equal

The investment function (I) is shown in panel B of the figure, equilibrium, planned investment equals savings Above the equilibrium of income Y0, saving (the distance between the 45 degree line and the consumption schedule) exceeds planned investment, while below equilibrium level of income Y0 , planned investment exceeds saving.
The equality between saving and investment can be seen directly from national income accounting . Since income is either spent or saved, Y = C+S. Without government and foreign trade, aggregate demand equals consumption plus investment, Y=C+I. Putting the two together, we have C+S = C+I, or S=I.
If the **leakages are greater than the injections**, then **national income will fall**, while if **injections are greater than leakages**, **national income will rise**. The national income will be in **equilibrium** only when **intended saving** is equal to **intended investment**. If there is any **deviation** from equilibrium, i.e. planned saving is not equal to planned investment, the **process of readjustment** will **bring the economy back to equilibrium**.

4.1 Equilibrium with Unemployment or Inflation

An important point to remember is that Keynesian equilibrium with equality of planned aggregate expenditures and output need not take place at full employment. If the aggregate expenditure line intersects the 45-degree line at the level of potential GDP, then there is full employment equilibrium. There is no recession, and unemployment is at the natural rate. But there is no guarantee that the equilibrium will occur at the potential GDP level of output. The **economy can settle at any equilibrium** which might be **higher** or **lower** than the **full employment equilibrium**.

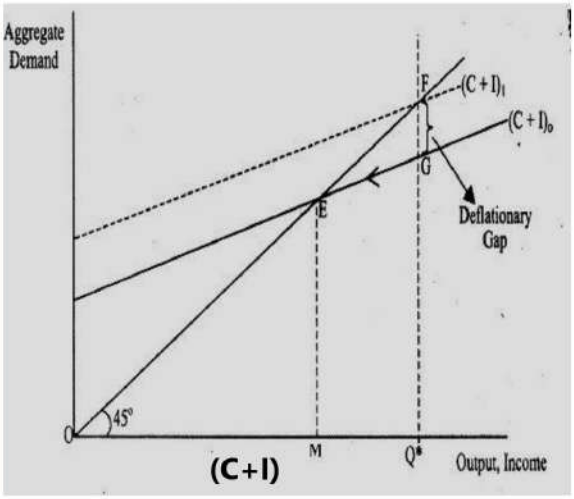
(i) Deflationary Gap

If the aggregate demand is for an amount of output **less than the full employment level** of output, then we say there is **deficient demand**.

Deficient demand gives rise to a '**deflationary gap**' or '**recessionary gap**' or '**contractionary gap**' arises in the Keynesian model of the macro economy when the **equilibrium level of aggregate production** achieved in the short-run **falls short** of what **could be produced at full employment**. Recessionary gap occurs when the economy is in a business-cycle **contraction** or **recession**.

Deficient Demand - Deflationary Gap

In above figure, OQ* is the full employment level of output. For the economy to be at full employment equilibrium, aggregate demand should be Q*F. If the aggregate demand is Q*G, it represents a situation of deficient demand. The resulting **deflationary gap** is **FG**. Firms will **experience unplanned build-up of inventories of unsold goods** and they will **respond by cutting production** and **employment** leading to **decrease in output and income** until the **under-employment equilibrium is reached at E**.

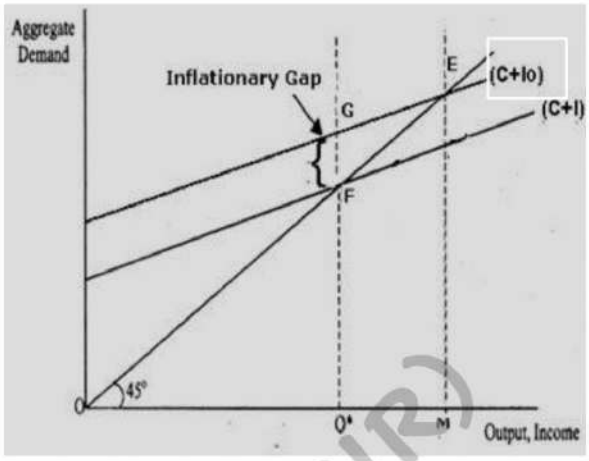


(ii) Inflationary Gap

If the **aggregate demand** is for an amount of output **greater** than the **full employment level of output**, then we say there is excess demand.

Excess demand gives rise to '**inflationary gap**' which is the amount by which actual aggregate demand exceeds the level of aggregate demand required to establish the full employment equilibrium. It **occurs during expansion** and sets in motion forces that will **cause demand pull inflation**.

Excess Demand – Inflationary Gap



In figure 1.2.6, the economy will be at full employment equilibrium at F with OQ* full employment level of output and income. Suppose the aggregate demand is for Q*G, there is excess demand and the resulting inflationary gap FG. The real output will be constant, but the rise in the price level will cause an increase in the nominal output until the new equilibrium is reached at point E. Point E is an equilibrium point because the aggregate demand ME is equal to output OM. At the new equilibrium, real output, real income and employment will be the same; nominal output and income has increased due to inflation.

In the Keynesian model, **neither wages nor interest rates** will **decline** in the face of abnormally high unemployment and excess capacity. Therefore, **output will remain at less than the full employment** rate as long as there is **insufficient spending** in the economy. Keynes argued that this was precisely what was happening during the **Great Depression**.

Illustration – 2

Calculate marginal propensity to consume and marginal propensity to save from the following data about an economy which is in equilibrium:
National income = 2500, Autonomous consumption expenditure = 300, Investment expenditure = 100

Solution – 2

$Y = C + I$
By putting the value we get, $2500 = C + 100$
$C = 2500 - 100 = 2400$
$C = \bar{C} + bY$
$2400 = 300 + 2500\ b$
$2400 - 300 = 2500b$
$b = 0.84$; MPS= 1- MPC = 1- 0.84 = 0.16

Notes

Illustration – 3

An economy is in equilibrium. Calculate national income from the following- Autonomous consumption = 100; Marginal propensity to save= 0.2; Investment expenditure= 200

Solution – 3

$Y = C + I$
$Y = \bar{C} + MPC\ (Y) + I$
where MPC = 1-MPS $Y = 100 + 0.8Y + 200 = 300 + 0.8Y$
$Y - 0.8Y = 300$
$0.2Y = 300,$
$Y = 1500$

Illustration – 4

Suppose the consumption of an economy is given by $C = 20 + 0.6\ Y$ and investment $I = 10 + 0.2$ Y. What will be the equilibrium level of National Income?

Solution – 4

$Y = C + I = 20 + 0.6\ Y + 10 + 0.2\ Y$
$Y = 30 + 0.8\ Y$
$Y - 0.8\ Y = 30$
$Y = 150$

Illustration – 5

Suppose the consumption function $C = 7 + 0.5Y$, Investment is Rs. 100, Find out equilibrium level of Income, consumption and saving?

Solution – 5

Equilibrium Condición–
$Y = C + I$, Given $C = 7 + 0.5Y$ and $I = 100$
Therefore $Y = 7 + 0.5Y + 100$
$Y - 0.5Y = 107$

$$Y = \frac{107}{0.5} = 214$$

$Y = C + I$
$214 = C + 100$
$C = 114$
$S = Y - C = 100$

Illustration – 6

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

Solution - 6

$Y = \frac{1}{1-b} (a + \bar{I})$ or $Y = C + I$

$Y = \frac{1}{1-80} (250+300) = 2750$

$C = a + \frac{b}{1-b} (a + \bar{I})$ or $C = 250 + 0.80\ Y$

$C = 250+0.8(2750)\ C = 2450$

$S = Y-C$ where $C = a + bY\ S = Y - (a + bY)$
$S = -a + (1 - b)\ Y$
$= - 250 + (1 - 0.80)2750 = 300$
Or directly,
$S = Y - C$
$S = 2750 - 2450 = 300.$

Illustration - 7

If saving function $S = -10 + 0.2Y$ and autonomous investment $I = 50$ Crores. Find out the equilibrium level of income, consumption and if investment increases permanently by Rs. 5 Crores, what will be the new level of income and consumption?

Solution - 7

$S = I$
$-10 + 0.2Y = 50$
$0.2Y = 50 + 10$
$Y = 300$ Crores $C = Y - S$

Where $S = -10 + 0.2\ (300) = 50$
$C = 300-50 = 250$ Crores
With the increase in investment by Rs. 5 Crores, the new investment will become equal to Rs. 55 Crores.
$S = I$
$-10 + 0.2Y = 55$
$Y = 325$ Crores
$C = 270$ Crores

Illustration - 8

Given the empirical consumption function $C = 100+0.75Y$ and $I = 1000$, calculate equilibrium level of national income. What would be the consumption expenditure at equilibrium level national income?

Solution – 8

C= 100+0.75Y and I = 1000,
Y=C+I in equilibrium
Y= 100+0.75 Y + 1000 =>Y = $\frac{1}{1-0.75}$ (100+1000)

Y= $\frac{1}{1-0.75}$ (1100) = 1/0.25 (1100) = 4400

Y=C + I; C= 4400 – 1000 = 3400

5. THE INVESTMENT MULTIPLIER

In this section we develop an answer to the following question: **By how much does a one unit increase in autonomous spending raise the equilibrium level of income?** There appears to be a simple answer. Since, in equilibrium , income equals aggregate demand , it would seem that a unit increase in autonomous demand or spending should raise equilibrium income by one unit . That is **not correct**. In Fact the effect of an **increase in investment** (upward shift in the investment schedule) causes an **upward shift in the aggregate demand** function. It is due to a **process of multiple increases** in equilibrium income due to increase in investment and how much increase occurs depends upon the marginal propensity to consume. The process of increase in national income due to increase in investment depicts the **investment multiplier** impact illustrated below.

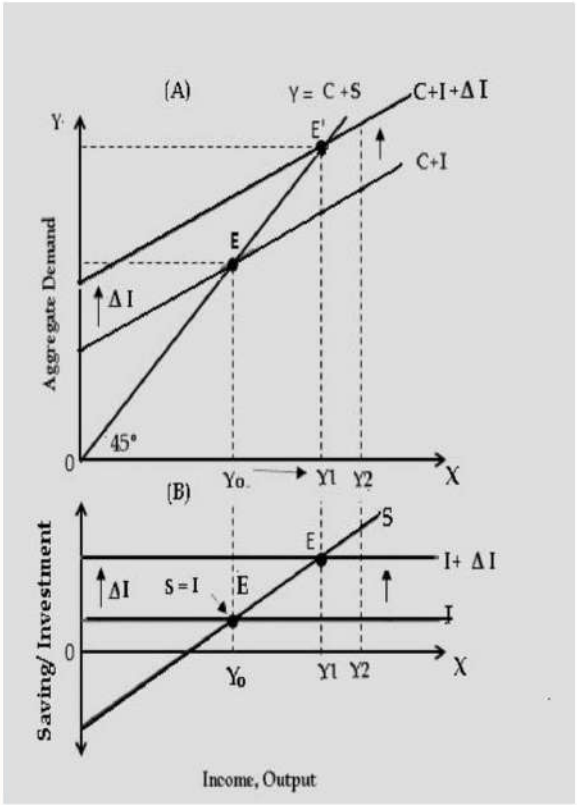
Effect of Changes in Autonomous Investment

In the figure, an **increase in autonomous investment by ΔI shifts** the aggregate demand schedule from C+I **to C+I+ΔI**.

Correspondingly, the **equilibrium shifts from E to E1** and the **equilibrium income increases more than proportionately** from **Yo to Y1**.

Why and how does this happen? Due to the operation of the investment multiplier.

Multiplier refers to the phenomenon whereby a **change in an injection of expenditure** will lead to a **proportionately larger change** (or multiple changes) in the equilibrium level of national income.
The investment multiplier **explains how many times the equilibrium aggregate income increases** as a result of an **increase in autonomous investment**.
When the level of investment increases by an amount, say ΔI, the equilibrium level of income will increase by some multiple amounts, Δ Y. The ratio of ΔY to ΔI is called the **investment multiplier → k**.



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

The size of the multiplier effect is given by $\Delta Y = k \Delta I$.
For example, if a change in investment of Rs. 2000 million causes a change in national income of Rs. 6000 million, then the multiplier is 6000/2000 =3. Thus multiplier indicates the change in equilibrium national income for each rupee change in the desired autonomous investment. Since the increase in national income (ΔY) is the result of increase in investment (ΔI), the multiplier is called 'investment multiplier.'
The process behind the multiplier can be compared to the 'ripple effect' of water. Let us assume that the initial disturbance comes from a change in autonomous investment (ΔI) of 500 units. The economy being in equilibrium, an upward shift in aggregate demand leads to an increase in national income which in a two sector economy will be, by definition, distributed as factor incomes. There will be an equal increase in disposable income. Firms experience increased demand and as a response, their output increases. The process further continues as an autonomous rise in investment leads to induced increases in consumer demand as income increases.

We find at the end that the increase in equilibrium income per rupee increase in investment is:

$$\frac{\Delta y}{\Delta I} = \frac{1}{1-MPC} = \frac{1}{MPS} \quad (2.12)$$

From the above, we find that the marginal propensity to consume (MPC) is the determinant of the value of the multiplier and that there exists a direct relationship between MPC and the value of multiplier. Higher the MPC more will be the value of the multiplier, and vice-versa. On the contrary, higher the MPS, lower will be the value of multiplier and vice-versa. The maximum value of multiplier is infinity when the value of MPC is 1 i.e. the economy decides to consume the whole of its additional income. We conclude that the value of the multiplier is the reciprocal of MPS.
For example, if the value of MPC is 0.75, then the value of the multiplier as per (2.11) is:

$$\frac{1}{1-MPC} = \frac{1}{0.25} = 4$$

The multiplier concept is central to Keynes's theory because it explains how shifts in investment caused by changes in business expectations set off a process that causes not only investment but also consumption to vary. The multiplier shows how shocks to one sector are transmitted throughout the economy.

Increase in income due to increase in initial investment, does not go on endlessly. The process slows down & ultimately comes to a halt. Causes responsible for the decline in income are called **leakages**.
Income that is not spent on currently produced goods/services are regarded as having leaked out of income stream. **The more powerful these leakages are, the smaller will be the value of multiplier.**
The leakages are caused due to:

1) **progressive rates of taxation** which result in no appreciable increase in consumption despite increase in income
2) **high liquidity preference** and idle saving or holding of cash balances and an equivalent fall in marginal propensity to consume

3) **increased demand** for consumer goods being **met out of existing stocks** or through **imports**

4) **additional income spent on purchasing existing wealth** or purchase of government securities and shares from shareholders or bond holders

5) **undistributed profits** of corporations

6) part of increment in income used for **payment of debts**

7) case of **full employment, additional investment** will only lead to **inflation**,

8) **scarcity of goods and services** despite having high MPC

The MPC, on which the multiplier effect of increase in income depends, is high in underdeveloped countries; but ironically the value of multiplier is low. Due to structural inadequacies, increase in consumption expenditure is not generally accompanied by increase in production.
E.g. increased demand for industrial goods consequent on increased income does not lead to increase in their real output; rather prices tend to rise.
An important element of Keynesian models is that they **relate to short-period equilibrium** and contain no dynamic elements. There is nothing like Keynesian macro-economic dynamics. When a shock occurs, for example when there is a change in autonomous investment due to change in some variable, one equilibrium position can be compared with another as a matter of comparative statics. There is no link between one period and the next and no provision is made for an analysis of processes through time.

Illustration – 9

In an economy investment expenditure is increased by Rs. 400 Crores and marginal propensity to consume is 0.8. Calculate the total increase in income and saving.

Solution – 9

MPC = 0.8; ΔI = 400 Crores
Multiplier (K)= 1 /1- MPC = 1 /1- 0.8 =1/ 0.2= 5
MPS= 1 - MPC = 1 – 0.8 = 0.2
Increase in income (ΔY) = K xΔI = 5 × 400=2,000 Crores
Increase in saving= ΔY × MPS = 2,000 × 0.2 = 400 Crores

Illustration – 10

An increase in investment by 400 Crores leads to increase in national income by 1,600 Crores. Calculate marginal propensity to consume.

Solution – 10

Increase in investment (ΔI) = 400 Crores
Increase in national income (Δ Y) = 1,600 Crores
Multiplier (K) =$\Delta Y/\Delta I$ = K= 1,600/ 400 = 4
We know, K= 1 /1 –MPC
4= 1 /1 -MPC
MPC= 0.75

Illustration - 11

In an economy, investment is increased by Rs 600 Crores. If the marginal propensity to consume is 0.6, calculate the total increase in income and consumption expenditure.

Solution - 11

MPC = 0.6; ΔI = Rs. 600 Crores
Multiplier (K) = 1/ 1- MPC = 1/ 1 – 0.6 = 1/ 0.4 =25.
Increase in income (ΔY) = K × ΔI = 2.5 × Rs 600 Crores= Rs. 1,500 Crores
Increase in consumption (ΔC) =ΔY × MPC = Rs1, 500Crores × 0.6 = Rs. 900 Crores.

Illustration - 12

Suppose in a country investment increases by Rs. 100 Crores and consumption is given by C = 10 + 0.6Y
(where C = consumption and Y = income). How much increases will there take place in income?

Solution - 12

$$\text{Multiplier} = k = \frac{1}{1-MPC} \qquad k = \frac{1}{1-0.6} = 2.5$$

Substituting the value of k and ΔI value in ΔY= kΔI
ΔY= 2.5 - 100= Rs. 250Crores
Thus, increase in investment by Rs 100 Crores will cause equilibrium income to rise by Rs. 250 Crores.

Notes

THREE-SECTOR MODEL

1) Household Sector
2) Business Sector
3) Government Sector

Aggregate Demand

$$AD = C + I + G$$

Aggregate Supply

$$AS = C + S + T$$

Equilibrium is achieved when,

$$AD = AS$$

or

$$C + I + G = C + S + T$$

or

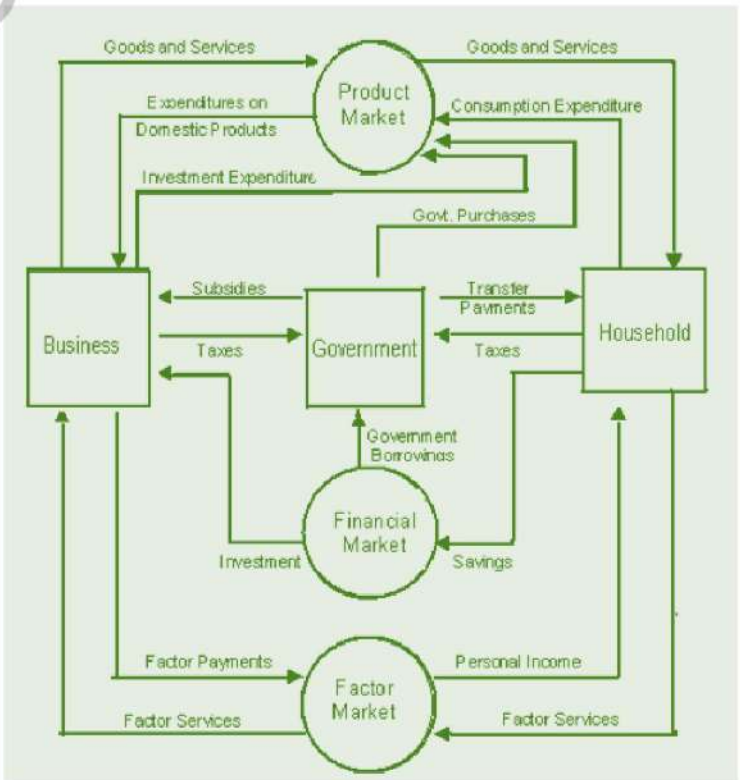
$$I + G = S + T$$

6. DETERMINATION OF EQUILIBRIUM INCOME: THREE SECTOR MODEL

Aggregate demand in the three sector model of closed economy (neglecting foreign trade) consists of three components namely, household consumption(C), desired business investment demand(I) and the government sector's demand for goods and services(G). Thus in equilibrium, we have

$$Y = C + I + G$$

Since there is no foreign sector, GDP and national income are equal. As prices are assumed to be fixed, all variables are real variables and all changes are in real terms. To help interpret these conditions, we turn to the flowchart below. Each of the variables in the model is a flow variable.



Circular Flow in a Three Sector Economy

The three-sector, three-market circular flow model which accounts for government intervention highlights the role played by the government sector. From the above flow chart, we can find that The government sector adds the following key flows to the model:

1) **Taxes** on households and business sector to **fund government purchases**
2) **Transfer payments** to household sector and **subsidy payments** to the business sector
3) **Government purchases** goods and services from business sector and **factors of production from household** sector, and
4) **Government borrowing in financial markets** to **finance the deficits** occurring when taxes fall short of government purchases

However, unlike in the two sector model, the whole of national income does not return directly to the firms as demand for output.
There are two flows out of the household sector in addition to consumption expenditure namely,

- **saving** flow and
- flow of **tax** payments to the government. These are actually leakages.

The saving leakage **flows into financial markets**, which means that the part that is saved is held in the form of some financial asset (currency, bank deposits, bonds, equities, etc.). The tax flow goes to the government sector.

The **leakages** which occur in the household sector do not necessarily mean that the total demand must fall short of output. There are additional demands for output on the part of the business sector itself for investment and from the government sector. In terms of the circular flow, these are injections.

The **investment** injection is shown as a flow from financial markets to the business sector. The purchasers of the investment goods, financed by borrowing, are actually firms in the business sector themselves. Thus, investment represents an equivalent flow of funds lent to business sector.

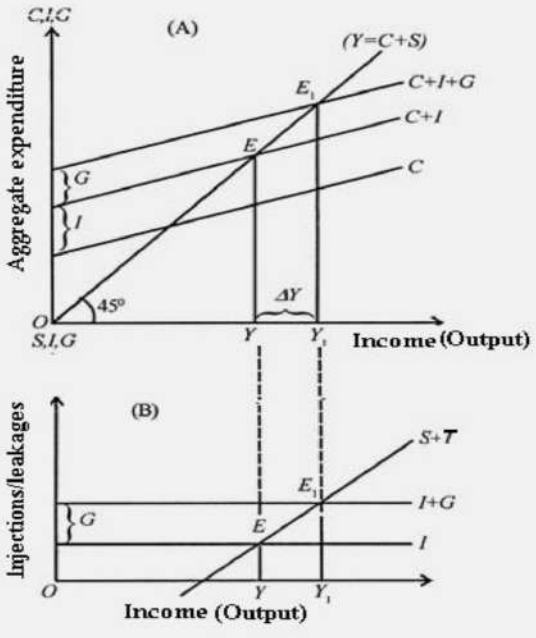
Determination of Equilibrium Income: Three Sector Model

The three-sector Keynesian model is commonly constructed assuming that government purchases are autonomous. This is not a realistic assumption, but it will simplify our analysis. Determination of income can also be explained with the help of aggregate demand and aggregate supply

$$AD = C + I + G$$
$$AS = C + S + T$$

The equilibrium national income is determined at a point where both aggregate demand and aggregate supply are equal, that is,

$$AD = Y = AS$$
$$C + I + G = Y = C + S + T$$



- The variables measured on the vertical axis are C, I & G.
- The autonomous expenditure components namely, investment and government spending do not directly depend on income and are exogenous variables determined by factors outside the model. These lines of autonomous expenditure are horizontal as their level does not depend on Y. Therefore, C + I + G schedule lies above the consumption function by a constant amount.
- The line S + T in the graph plots the value of savings plus taxes. This schedule slopes upwards because saving varies positively with income. Just as government spending, level of tax receipts (T) is decided by policy makers.
- The equilibrium level of income is shown at the point E1 where the (C + I + G) schedule crosses the 45° line, and aggregate demand is therefore equal to income (Y). In equilibrium, it is also true that the (S + T) schedule intersects the (I + G) horizontal schedule.

We shall now see why other points on the graph are not points of equilibrium

I) Consider a level of income below Y
- Aggregate demand exceeds income; i.e, the (C + I + G) schedule is above the 45° line. Equivalently at this point I + G is greater than S + T.
- With demand outstripping production, desired investments will exceed actual investment and there will be an unintended inventory shortfall and therefore a tendency for output to rise.

II) At levels of income above Y1
- Output will exceed demand; people are not willing to buy all that is produced.
- Excess inventories will accumulate, leading businesses to reduce their future production. Employment will subsequently decline and output will fall back to the equilibrium level.
- It is only at Y that output is equal to aggregate demand; there is no unintended inventory shortfall or accumulation and, consequently, no tendency for output to change.

An important thing to note is that the change in total spending, followed by changes in output and employment, is what will restore equilibrium in the Keynesian model, not changes in prices.

6.1 The Government Sector and Income Determination

Case 1 : Income Determination with Lump Sum Tax

Assumptions

1) Govt. imposes lump sum tax, i.e. taxes that do not depend on income,
2) Govt. has a balanced budget (G=T) and
3) There are no transfer payments.

Here,
$C = a + b\ Yd$
Where $Yd = Y - T$ (disposable income), T = lump sum tax

$$Y = [\ 1\ /(1-b)\ ]\ x\ [\ a - bT + I + G\ ]$$

$$\text{Multiplier} = 1\ /(1-b)$$

Illustration – 13

Suppose we have the following data about a simple economy:
C = 10 + 0.75Yd, I = 50, G = T = 20
where C is consumption, I is investment, Yd is disposable income, G is government expenditure and T is tax.

a) Find out the equilibrium level of national income.
b) What is the size of the multiplier?

Solution – 13

(a) Since G = T, budget of the government is balanced
Substituting the values of C, I and G in Y
we have, Y=C+I+G
Y = a + bYd + I + G
Y= 10 + 0.75 (Y – 20) + 50 + 20
Y= 10 + 0.75 Y- 15 + 50 + 20 or, Y – 0.75 Y = 65
or, Y (1 – 0.75) = 65
or, 0.25 Y = 65
or, Y = 65 /.25 = 260
The equilibrium value of Y = 260
(b) The value of the multiplier is = 1/ (1 – MPC) = 1/ (1 – b) = 1/ (1 – 0.75) = 1/0.25 = 4

Case 2 : Income Determination with Lump Sum Tax & Transfer payments

Assumptions

1) Govt. imposes lump sum tax, i.e. taxes that do not depend on income,
2) Govt. has a balanced budget (G=T) and
3) There are transfer payments.

Here,
C = a + b Yd
Where Yd= Y- T+ TR
where T is a lump sum tax and TR is autonomous transfer payments

$$Y = [\ 1 / (1-b)\ ] \times [\ a - bT + bTR + I + G\ ]$$

$$\text{Multiplier} = 1 / (1-b)$$

Illustration – 14

Suppose the structural model of an economy is given –
C = 100+ 0.75 Yd; I = 200, G = T = 100; TR= 50,
find the equilibrium level of income?

Solution – 14

Y= C+ I+ G
Y = 100+ 0.75 Yd + 200 + 100
Y= 100 + 0.75(Y– 100 + 50) + 200 + 100
Y = 100 + 0.75Y -75 + 37.5 +200 +100
Y = 1450

Or use $Y = \frac{1}{1-b}\ (a - bT + bTR + I + G)$ to calculate income.

Case 3 : Income Determination with tax as a function of Income

Assumptions

1) Govt. imposes tax, which consists of both lump sum tax and proportional taxes. The tax function is defined as;

Tax function $T = \overline{T} + t\,Y$

2) There are no transfer payments.

Here,

$C = a + b\,Yd$

Where $Yd = Y - \overline{T} - t\,Y$

where T is a lump sum tax and TR is autonomous transfer payments

$$Y = \{ 1 / 1 - [b\,(1-t)] \} \times [\, a - b\overline{T} + I + G \,]$$

$$\text{Tax Multiplier} = 1 / 1 - b(1-t)$$

Illustration - 15

For a closed economy, the following data is given –
Consumption $C = 75 + 0.5\,(Y-T)$; Investment $I = 80$; Total tax $T = 25 + 0.1Y$; Government expenditure $G = 100$.

a) Find out equilibrium income?
b) What is the value of multiplier?

Solution - 15

$Y = C + I + G$

$Y = 75 + 0.5(Y - 25 - 0.1Y) + 80 + 100$

$Y(1 - 0.5 + 0.05) = 75 - 12.5 + 80 + 100$

$$Y = \frac{1}{1 - 0.5 + 0.05}\ (242.5)$$

$$\text{Multiplier} = \frac{1}{1 - b(1-t)} = 1/[1 - 0.5(1 - 0.1)] = 1.82$$

Case 4 : Income Determination with Tax (as a Function of Income), Government Expenditure and Transfer Payments

Assumptions

1) Govt. imposes tax, which consists of both lump sum tax and proportional taxes. The tax function is defined as;

Tax function $T = \overline{T} + t\,Y$

2) There are transfer payments.

Here,

$Yd = Y - \overline{T} - tY + TR$

$$Y = \{ 1 / 1 - [b(1-t)] \} \times [\, a - b\overline{T} + bTR + I + G \,]$$

$$\text{Multiplier} = 1 / 1 - b(1-t)$$

Illustration - 16

Suppose C= 100 + 0.80 (Y- T + TR); I = 200; T= 25+0.1Y; TR= 50; G = 100
Find out equilibrium level of Income?

Solution - 13

$Y = C + I + G$
$Y= 100 + 0.80 (Y- T + TR) + I+ G$
$Y=100 +0.80(Y - 25 - 0.1Y + 50) + 200 + 100$
$Y - 0.80 Y +0.08 Y = 420$
$Y(1-0.8+0.08) =420$
$Y= 1500$

Notes

FOUR-SECTOR MODEL

1) Household Sector
2) Business Sector
3) Government Sector
4) Foreign Sector

Aggregate Demand

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

Aggregate Supply

$$AS = C + S + T$$

Equilibrium is achieved when,

$$AD = AS$$

or

$$C + I + G + (X - M) = C + S + T$$

or

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

7. DETERMINATION OF EQUILIBRIUM INCOME: FOUR SECTOR MODEL

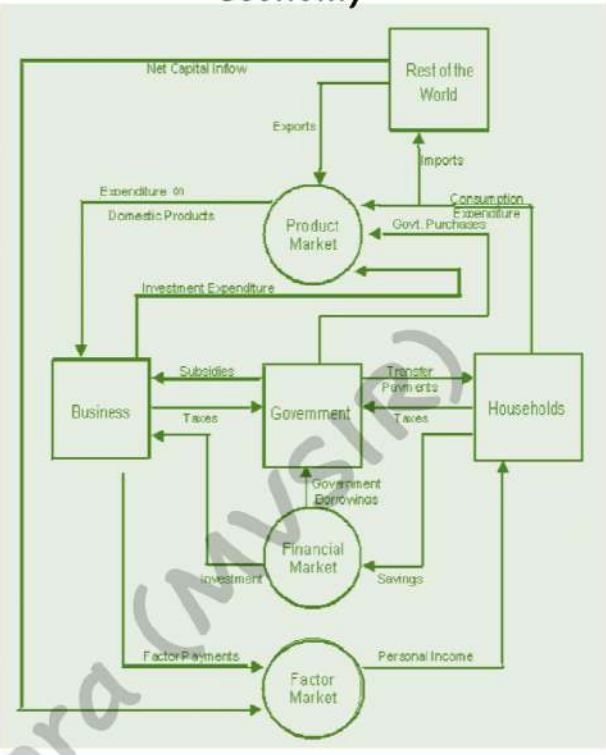
The four sector model includes all four macroeconomic sectors, the household sector, the business sector, the government sector, and the foreign sector. The foreign sector includes households, businesses, and governments that reside in other countries. The following flowchart shows the circular flow in a four sector economy.

In the four sector model, there are three additional flows namely: exports, imports and net capital inflow which is the difference between capital outflow and capital inflow. The C+I+G+(X-M) line indicates the aggregate demand or the total planned expenditures of consumers, investors, governments and foreigners (net exports) at each income level.

In equilibrium, we have

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

Fig: Circular Flow in a Four Sector Economy



- The domestic economy trades goods with the foreign sector through exports and imports. Exports are the injections in the national income, while imports act as leakages or outflows of national income.
- Exports represent foreign demand for domestic output and therefore, are part of aggregate demand. Since imports are not demands for domestic goods, we must subtract them from aggregate demand. The demand for imports has an autonomous component and is assumed to depend on income.
- Imports depend upon marginal propensity to import which is the increase in import demand per unit increase in GDP. The demand for exports depends on foreign income and is therefore exogenously determined and are autonomous. Imports are subtracted from exports to derive net exports, which is the foreign sector's contribution to aggregate expenditures.
- Since import has an autonomous component (M) and is assumed to depend on income(Y) and marginal propensity to import (m), the import function is expressed as

  M= M + mY

- Marginal propensity to import

  m = Δ M / Δ Y ..... is assumed to be constant.

Notes

As noted above, the equilibrium level of national income is determined at the level at which the aggregate demand is equal to aggregate supply. As the aggregate demand in the four sector model is given in equation 2.14, the equilibrium condition is expressed as follows-

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

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

The equilibrium level of National Income can now be expressed by –

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

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

$Y - bY + mY = a - bT + I + G + X - M$

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

The economy being in equilibrium, suppose export of country increases by ΔX autonomously, all other factors remaining constant. By incorporating the increase in exports by ΔX, the equilibrium equation of the country can be expressed as

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

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

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

We get, $Y + \Delta Y = Y + \frac{1}{1-b+m}\Delta X$

Subtracting Y from both sides, we get $\Delta Y = \frac{1}{1-b+m}\Delta X$

By rearranging $\Delta Y = \frac{1}{1-b+m}\Delta X$, we get

Or alternatively written as

$$\frac{\Delta Y}{\Delta} = \frac{1}{1-b+m}$$

The term $\frac{1}{1-b+m}$ is known as foreign trade multiplier whose value is determined by marginal propensity to consume (b) and marginal propensity to import (m).

If in the model proportional income tax and government transfer payments are incorporated, then only the denominator of multiplier will change.

If income tax is of form $T = \bar{T} + t\,Y$ where $\bar{T}$ is constant lump-sum, t is the proportion of income tax and $TR > 0$ and autonomous, then the four sector model can be expressed as: –

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

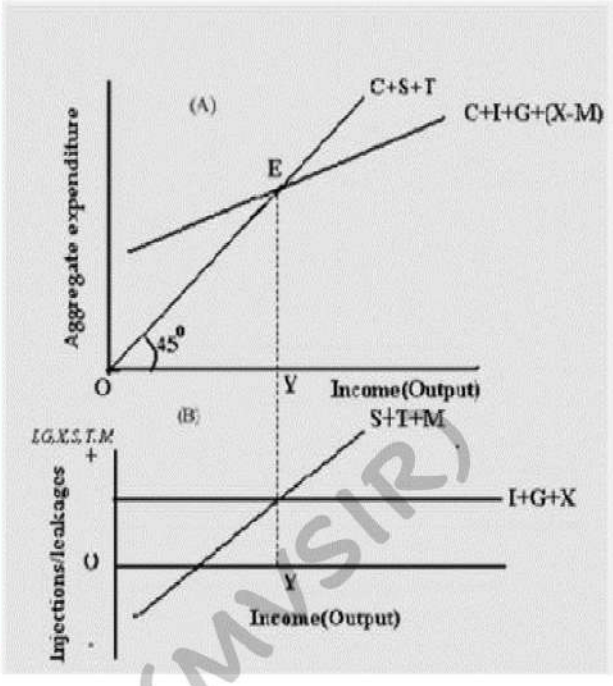
Where $C = a + b(Y - \bar{T} - t\,Y + TR)$ $M = \bar{M} + mY$.

The equilibrium level of National Income can now be expressed as:

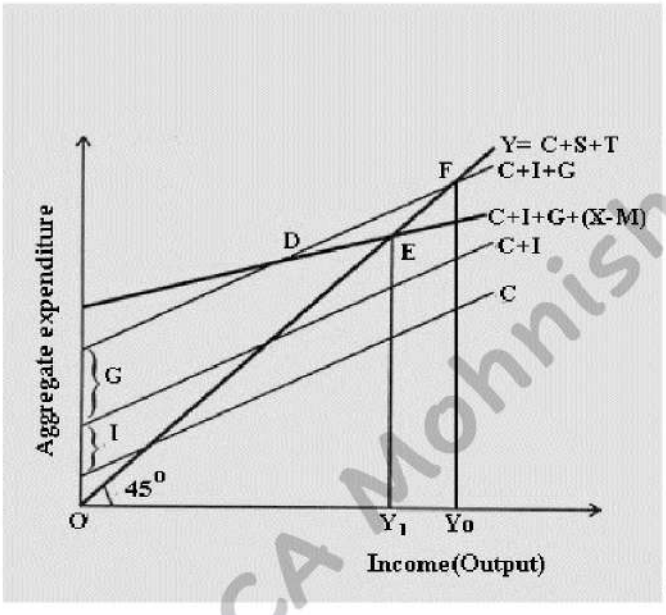
$$Y = \frac{1}{1-b+m}(a - b\bar{T} + bTR + I + G + X - \bar{M})$$

Determination of Equilibrium Income: Four Sector Model

- Equilibrium is identified as the intersection between the C + I + G + (X - M) line and the 45-degree line. The equilibrium income is Y.
- From panel B, we find that the leakages (S+T+M) are equal to injections (I+G+X) only at equilibrium level of income.
- If net exports are positive (X > M), there is net injection and national income increases.
- Conversely, if (X < M), there is net withdrawal and national income decreases. The figure in next page depicts a case of (X < M).



Effects on Income When Imports are Greater than Exports



We have seen above that equilibrium income is expressed as a product of two terms: $\Delta Y = k\ \Delta I$; i.e. the level of autonomous investment expenditure and the investment multiplier. The autonomous expenditure multiplier in a four sector model includes the effects of foreign transactions and is stated as $\frac{1}{1-b+m}$ where 'm' is the propensity to import which is greater than zero. You may recall that the multiplier in a closed economy is $\frac{1}{1-b}$

- The greater the value of 'm', the lower will be the autonomous expenditure multiplier. The more open an economy is to foreign trade, (the higher m) the smaller will be the response of income to aggregate demand shocks, such as changes in government spending or autonomous changes in investment demand.
- The higher the value of m, larger the proportion of this induced effect on demand for foreign, not domestic, consumer goods. Consequently, the induced effect on demand for domestic goods and, hence on domestic income will be smaller.
- The increase in imports per unit of income constitutes an additional leakage from circular flow of (domestic) income at each round of multiplier process & reduces value of autonomous exp. multiplier.

- An increase in demand for exports of a country is an increase in aggregate demand for domestically produced output & will increase equilibrium income just as an increase in govt spending or an autonomous increase in investment.
- In summary,
  - an increase in demand for a country's exports has an expansionary effect on equilibrium income,
  - whereas an autonomous increase in imports has a contractionary effect on equilibrium income.
- However, this should not be interpreted to mean that exports are good and imports are harmful in their economic effects. Countries import goods that can be more efficiently produced abroad, & trade increases overall efficiency of the worldwide allocation of resources. This forms the rationale for attempts to stimulate the domestic economy by promoting exports and restricting imports.

Illustration - 17

The consumption function is C = 40 + 0.8Yd,T= 0.1Y, I = 60 Crores G = 40 Crores, X = 58 and M = 0.05 Y. Find out equilibrium level of income, Net Export, net export if export were to increase by 6.25.

Solution - 17

C= 40+ 0.8Yd
C= 40 + 0.8 (Y- 0.1Y)
Y= C + I+ G + (X – M)
Y= 40+0.8(Y-0.1Y)+60+40+(58-0.05Y)
Y= 40+0.8(0.9Y)+60+40+58-0.05Y
Y-0.72Y+0.05Y =198
Y(1-0.72+0.05) =198
Y(0.33) =198
Y= 198/0.33 = 600 Crores
Net Export= X-M = 58 – 0.05Y 58 – 0.05 (600) =58- 30= 28
If exports increase by 6.25, then exports = 64.25
Then, Y = 40+ 0.8 (Y- 0.1Y) + 60 + 40 + (64.25- 0.05Y)
Y(1-0.72+0.05) = 204.5
Y(0.33) = 204.5
Y=204.5/0.33 = 619.697
Then import = .05 × 619.697= 30.98
Net Export= 64.25- 30.98= 33.27 Crores
Thus, there is surplus in balance of trade as Net Exports are positive.

Illustration - 18

An economy is characterized by the following equation-

Consumption	C= 60+0.9Yd
Investment	I = 10
Government expenditure	G = 10
Tax	T = 0
Exports	X = 20
Imports	M = 10 +0.05 Y

What is the equilibrium income?
Calculate trade balance and foreign trade multiplier.

Solution - 18

$Y = C + I + G + (X - M)$
$= 60+0.9(Y - 0) + 10 +10 + (20- 10 -0.05Y)$
$= 60+ 0.9\ Y +30 -0.05\ Y$
$Y= 600$
Trade Balance $= X - M = 20-10-0.05(600)=- 20$
Thus, trade balance in deficit.

Foreign trade multiplier$= \frac{1}{1-b+m} = \frac{1}{1-0.9+0.05} = 6.66$

8. CONCLUSION

According to the Keynesian theory of income and employment, national income depends upon the aggregate effective demand. If the aggregate effective demand falls short of that output at which all those who are both able and willing to work are employed, it will result in unemployment in the economy. Consequently, there will be a gap between the economy's actual and optimum potential output. On the contrary, if the aggregate effective demand exceeds the economy's full employment output (production capacity), it will result in inflation. Nominal output will increase, but it simply reflects higher prices, rather than additional real output. It is not necessary that the equilibrium aggregate output will also be the full employment aggregate output. It is undesirable and a cause of great concern for the society and government if a large number of people remain unemployed. In the absence of government policies to stabilise the economy, incomes will be unstable because of the instability of investment. By making appropriate changes in government spending (G) and taxes, the government can counteract the effects of shifts in investment. Appropriate changes in fiscal policy by adjusting government expenditure and taxes could keep the autonomous expenditure constant even in the face of undesirable changes in the investment.

Notes

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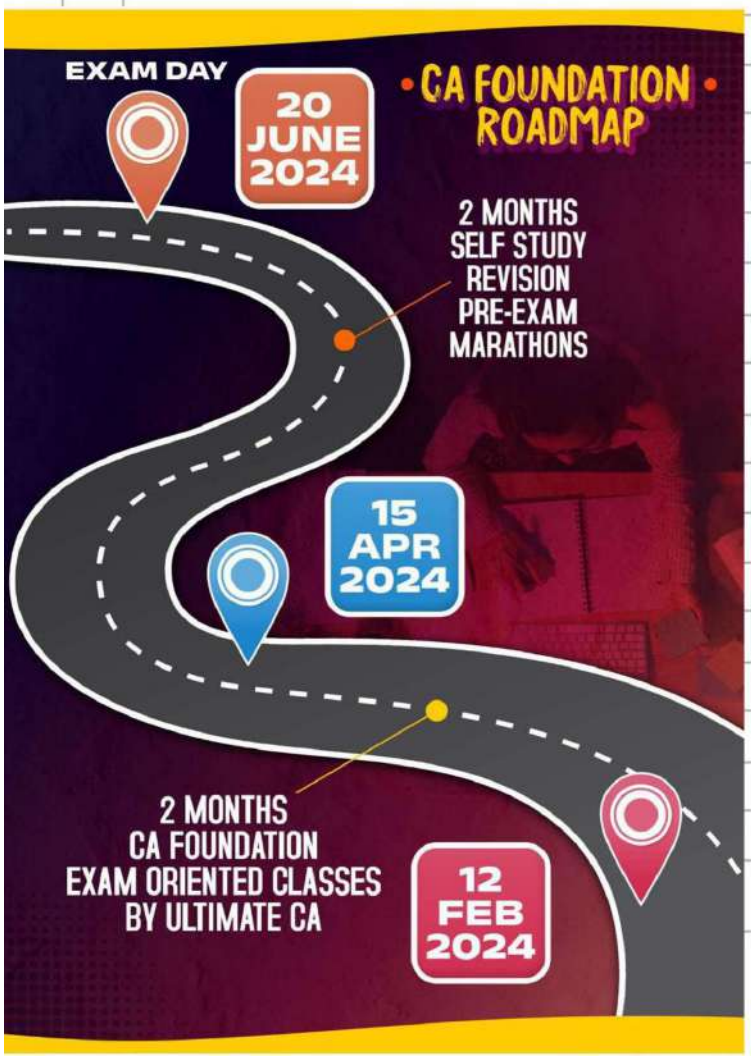

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