



INDIAN SCHOOL MUSCAT
DEPARTMENT OF COMMERCE AND HUMANITIES
CLASS - XII
ECONOMICS (030)

DETERMINATION OF INCOME AND EMPLOYMENT

Involuntary unemployment: Involuntary unemployment occurs when those who are able and willing to work at the going wage rate do not get work.

Full employment: when all resources of the economy are fully and efficiently employed to produce maximum attainable output

Ex-Ante Variables: It refers to planned variables.

Ex-Post Variables: It refers to actual variables.

Aggregate demand: Aggregated demand means the total demand for final goods in an economy. It also means the aggregate expenditure on final goods in an economy.

The components of aggregate demand are:

1. **Consumption expenditure:** Demand for goods and services for private consumption also called private final consumption expenditure.
2. **Investment Expenditure:** Demand for private investment
3. **Govt. Purchases of goods and services:** Demand for goods and services by the government
4. **Net exports:** Difference between exports and Imports of goods and services

Since the determination of income and employment is to be studied in the context of two sector model, the third and fourth components of aggregate demand are not discussed in details. The two sectors taken are households and firms.

1. **Consumption Expenditure:** Demand for goods and services for private consumption by household sector. It is also called private final consumption expenditure OR consumption expenditure. Consumption expenditure is **Ex-Ante i.e. planned consumption** expenditure. It is influenced by many variables such as price, income, wealth, expected income, tastes and preferences. Keynes fundamental Psychological Law of Consumption states that *“men are disposed, as a rule and on the average, to increase their consumption as their income increases, but not by as much as the increase in their income”*. This relationship between consumption and income is called the consumption function.

Consumption function equation for the economy is=

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

Where,

C = Consumption

\bar{C} = Autonomous Consumption

b = Marginal Propensity to Consume

Y = Level of income

The intercept \bar{C} represents autonomous consumption, that is, the amount of consumption expenditure when income is zero.

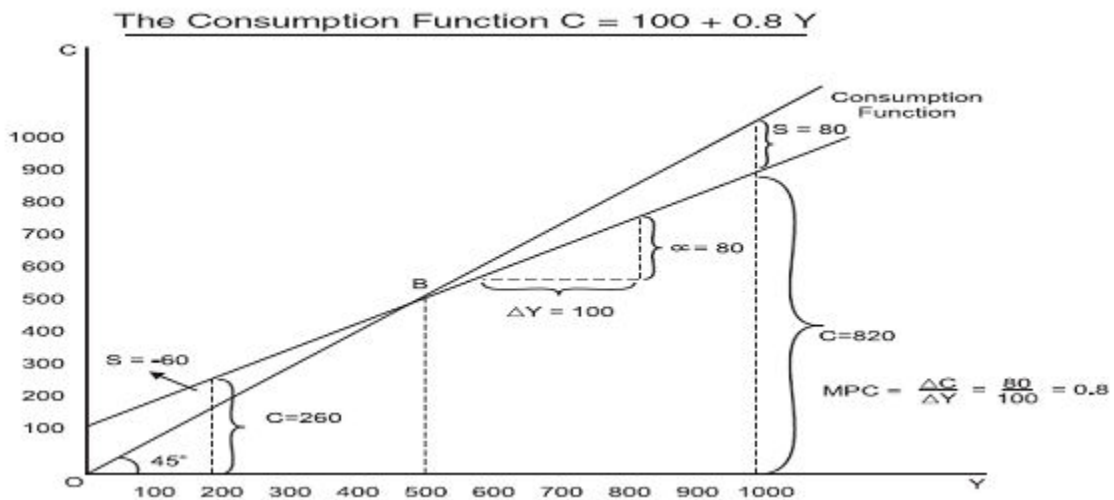
\bar{C} is assumed to be positive. There is consumption even in the absence of any income. The slope of the consumption function is Marginal Propensity to Consume 'MPC' OR 'b'. MPC measures the rate of change in consumption per unit change in income. For example, if b is 0.6, then a rupee change in income causes a 0.60 rupee change in consumption.

MPC is positive and its value ranges between 0 and 1. This means that consumption increases with income, but a rupee increase in income causes less than a rupee increase in consumption.

Example, if b is 0.90, a rupee increase in income causes a 0.90, a rupee increase in consumption. The consumption function can be plotted on a graph with the help of a numerical example. Consider a consumption function given by $C = 100 + 0.8 Y$. This is an equation of a straight line, the consumption function will have a constant

Table 1 : Consumption, Income and Marginal Propensity to Consume

Consumption C	Change in Consumption C	Income Y	Change in Y	Marginal Propensity to consume (MPC) = (2)/(4) = C/ Y
(1)	(2)	(3)	(4)	(5)
100	-	0	-	-
180	80	100	100	(80/100) = 0.8
260	80	200	100	(80/100) = 0.8
340	80	300	100	(80/100) = 0.8
420	80	400	100	(80/100) = 0.8
500	80	500	100	(80/100) = 0.8
580	80	600	100	(80/100) = 0.8



- Along the 45° line has the property that at any point the vertical distance and horizontal distance are equal. Consumption expenditure (Along Y-axis) exactly equals to Income (along X-axis). At any point on the 45° line, consumption expenditure exactly equals income.
- The 45° line tells whether consumption spending is equal to, greater than, or less than the level of income.
- The consumption function crosses the 45° line at point B. This point is known as the breakeven point because the consumption is exactly equal to the income. In diagram, income and consumption breakeven at Rs. 500.
- Before point B consumption function lies above the 45° line OR consumption expenditure is **greater than** income. This is also called (DISSAVINGS). It means selling of assets or borrowing money for current consumption.
- After point B consumption function lies below the 45° line OR consumption expenditure is **less than** the level of income. Therefore, income, which is not consumed, is saved. Savings can be measured in the graph as the vertical distance between the consumption function and the 45° line.

Consumption and Savings

Income that is not spent on consumption is saved, that is

$$S = Y - C$$

By definition, saving is equal to income minus consumption.

The consumption function with the above equation implies a savings function. Savings function relates the level of saving to the level of income. Substituting the consumption function into the above equation we get the saving function.

$$\begin{aligned}
 S &= Y - C \\
 &= Y - (\bar{C} + bY) \text{ (Since } C = \bar{C} + bY) \\
 &= Y - \bar{C} - bY \\
 S &= -\bar{C} + (1 - b)Y
 \end{aligned}$$

\bar{C} is the amount of savings done at zero level of income. \bar{C} is positive, therefore \bar{C} savings is positive OR there is negative savings (Dissavings) at zero level of income and dissavings is the amount of \bar{C} (**autonomous consumption**). This is because of the fact that $Y = C + S$ (whether S is positive or negative). The slope of the savings function is $(1 - b)$. The slope of the savings function gives the increase in savings per unit increase in income. This is known as the Marginal Propensity to Save (MPS) Since b is less than one it follows that $(1 - b)$ and therefore MPS is positive.

Example; if MPC (b) = 0.8, then MPS $(1 - b) = 0.2$. This means that for every one rupee increase in income, savings increase by 0.2 rupee. Consumption function and the corresponding savings function is shown as:

$$\begin{aligned}
 S &= \bar{C} + (1 - b)Y \\
 &= -100 + (1 - 0.8)Y \\
 S &= -100 + 0.2Y
 \end{aligned}$$

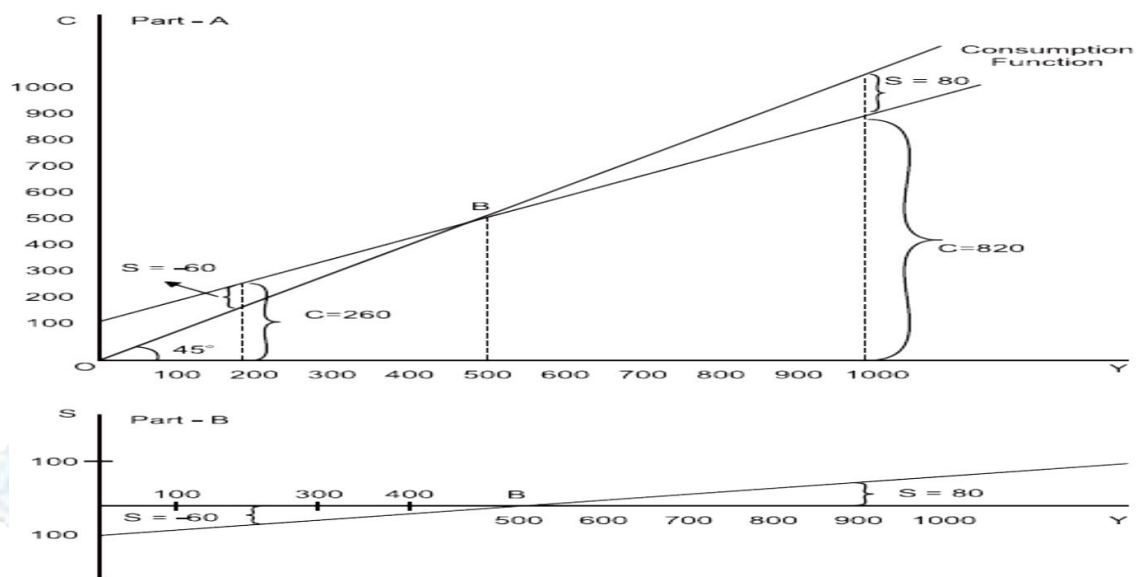
Consumption - Saving Relationship

Y	Change in Y ΔY	C	Change in C ΔC	MPC $\Delta C/\Delta Y$	Saving S	Change in S ΔS	MPS $\Delta S/\Delta Y$	C+S	MPC+MPS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0	-	100	-	-	-100	-	-	0	-
100	100	180	80	0.8	-80	20	0.2	100	1
200	100	260	80	0.8	-60	20	0.2	200	1
300	100	340	80	0.8	-40	20	0.2	300	1
400	100	420	80	0.8	-20	20	0.2	400	1
500	100	500	80	0.8	0	20	0.2	500	1
600	100	580	80	0.8	20	20	0.2	600	1

Two things should be noted:

- (a) **Consumption plus saving everywhere equals income:**
- (b) **MPC + MPS = 1:** The sum of MPC and MPS is equal to one. This means that the part of the increase in income, which is not consumed, is saved. This is because income is either consumed or saved.

Fig 2: The consumption Function and its associated Savings Function



- Part A of diagram shows consumption function and Part B shows savings function. At point B (Break-even point) Savings=0 or Consumption equals income (Y=C).
- **Before points B** consumption function lies above the 45o line (consumption is more than income), therefore, savings is negative (Dissavings).
- **After point B**, consumption function lies below the 45o line (consumption is less than income), therefore, savings is positive.

Average Propensity to Consume and Save

At any particular level of income, the ratio of consumption to income is called the Average Propensity to Consume (APC). The APC gives the average consumption - income relationship at different levels of income.

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

At any particular level of income, the Average Propensity to Save (APS) is the ratio of savings to income. Therefore:

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

The sum of the APC and APS is always equal to one. This is because income is either consumed or saved. The proof of this statement is as follows:

$$Y = C + S$$

Dividing both sides of the equation by Y we have

$$\frac{Y}{Y} = \frac{C}{Y} + \frac{S}{Y} \quad \text{Thus} \quad 1 = APC + APS$$

Using the earlier examples of consumption function and savings function, the values of APC and APS for every level of income can calculated as follows:

Average Propensity to Consume and Save

Y	C	APC (2)/(1)	S	APS (4)/(1)	APC+APS
(1)	(2)	(3)	(4)	(5)	(6)
0	100	-	-100	-	-
100	180	1.8	-80	-0.8	1
200	260	1.3	-60	-0.3	1
300	340	1.13	-40	-0.13	1
400	420	1.05	-20	-0.05	1
500	500	1	0	0	1
600	580	0.97	20	0.03	1
700	660	0.94	40	0.06	1

APC continuously declines as income increases and APS continuously increases as income increases. This means that as income increases, the proportion of income saved increases and the proportion of income consumed decreases.

Demand for Private Investment

Demand for private investment refers to the planned or ex-ante (Planned) investment expenditure by the firms. It includes addition to the stock of physical capital and change in inventory. For simplicity sake it is assumed that the investment expenditure is autonomous. **This means investment decisions are not influenced by any of its determinants, including output. Demand for Private Investment remains constant at each level of income. The main reason behind this is that Investment decision are based on the Rate of Interest on investments rather than the level of Income in the economy.**

Aggregate Supply

It is total quantity of goods and services produced in the economic territory of a country. It refers to the planned aggregate output (Supply) in the economy.

It is assumed that in the short run the prices of goods do not change and the elasticity of supply is infinite (Perfectly Elastic). At the given price level, output (Supply) can be increased till all resources are fully employed. **The level of output income and employment in an economy move together in the same direction till full employment is reached.** Increase in output (Supply) means, increase in level of employment and increase in level of income. Decrease in output (Supply) means less employment and lower level of income.

Determination of Equilibrium Level of Output, Income & Employment

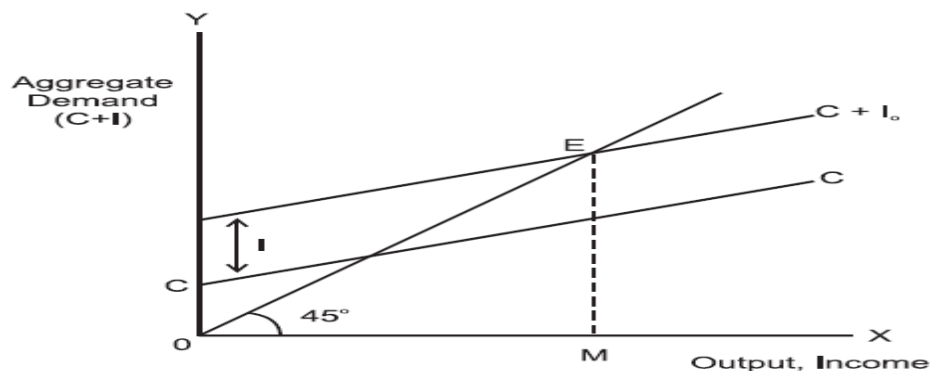
We will consider the determination of the equilibrium level of output to an economy with only two sectors, households and firms. Hence, the only components of aggregate demand will be consumption demand and investment demand.

I. Consumption plus Investment Approach (C+I Approach)

The consumption function shows the desired (planned level) of consumption corresponding to each level of income. The aggregate demand or (C + I_o) curve shows the desired level of expenditure by consumers and firms corresponding to each level of output. At

any point on the 45° line, the aggregate demand (Y-axis) equals the total level of output (X-axis). The economy is in equilibrium when aggregate demand is equal to the total output.

Determination of Equilibrium of Income and Employment (C+I Approach)



The economy is in equilibrium at the point where the $C + I_0$ curve intersects the 45° line. At point E, the economy is in equilibrium because the level of desired spending on consumption and investment exactly equals the level of total output.

The Adjustment Mechanism

Equilibrium occurs when planned spending equals planned output. When planned spending is not equal to planned output, then output will tend to adjust up or down until the two are equal again.

When the economy is at a level of output less than the equilibrium level, the $C + I_0$ line lies below the 45° line OR planned spending is less than planned output. This means that consumers and firms together buy less goods than firms produce (Deficient Demand). This leads to an unplanned undesired increase in inventories of unsold goods. Firms would respond to this unplanned inventory increase by decreasing employment and output. This process of decrease continues till the economy is back at equilibrium output level and there is no further tendency to change.

When the economy is at a level of output greater than the equilibrium level the $C + I_0$ line lies above the 45° line OR planned spending is more than planned output. This means that consumers and firms together would be buying more goods than firms were producing (Excess Demand). This would lead to an unplanned, undesired decrease in inventories. Firms would then respond to this unplanned inventory decrease by increasing employment and hence output. This process of increase continues till the economy is back at equilibrium output level and there is no further tendency to change.

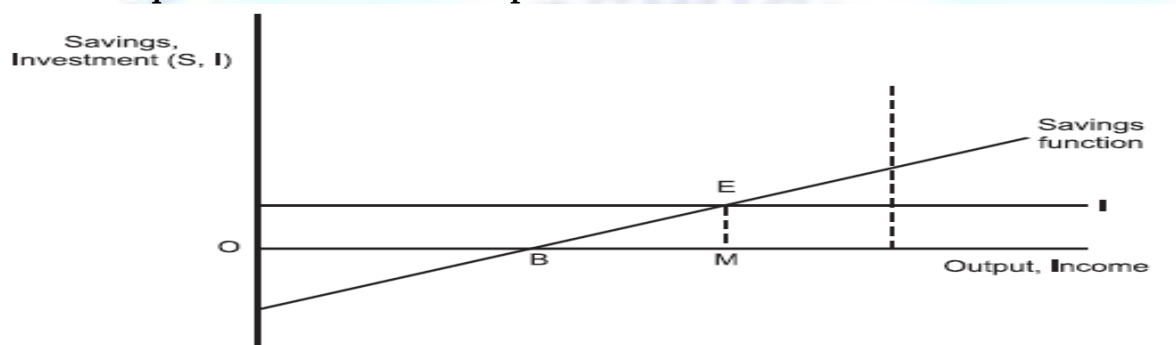
II. Savings plus Investment Approach (S+I Approach)

Each point on the savings function shows the desired or planned savings at that income level. It is assumed that firms plan to invest exactly the same amount every year, regardless of the level of output. The investment demand curve is a horizontal line. The level of

investment demand is the same at every level of output. Plans of both households and firms are satisfied. Thus output, employment and income will remain the same. It can be rightly called equilibrium.

Equilibrium Output

The savings function and the investment schedule intersect at point E, which corresponds to output OM (equilibrium level of output). **At point E, planned savings of households' equals planned investment of firms. At Equilibrium output, firms invest an amount equal to what households plan to save.**



Adjustment Mechanism

When planned savings and planned investment are not equal, output will tend to adjust up or down till they are equal again.

When economy is at a level of output where **savings is greater than investment OR at this level of income households are saving more by abstaining from consumption by an amount greater than firms are investing. This will create an undesired, unplanned build-up of inventories of unsold goods.** To reduce the unsold inventories to the desired level firms will cut back production and reduce employment. The effect of this will be to reduce output until the economy returns to equilibrium and there is no further tendency to change.

When the economy is at a level of output where **savings is less than investment OR at this level of income, households are saving an amount less than firms plan to invest.** Household refrain from consumption by an amount less than firms plan to invest. **The effect of this will be to cause an unplanned, undesired reduction in inventories of unsold goods.** The actual level of investment will be less than the planned level of investment. In order to increase inventories, firms will increase production and increase employment. The effect of this will be to increase output till the economy returns to equilibrium, where planned savings equals planned investment and planned investment equals actual investment and there is no further tendency to change.

A numerical example to show why the equilibrium level of output occurs when planned spending and planned output are equal in given below in the table. The consumption function and the savings function are as follows:

Consumption function: $C = 1000 + 0.67Y$

Savings function: $S = -1000 + 0.33Y$

Output and Income	Planned Consumption	Planned Saving (3)=(1)-(2)	Planned Investment	Output and Income (5) = (1)	Aggregate Demand (6)=(2)+(4)	Tendency of Output to
(1)	(2)	(3)	(4)	(5)	(6)	(7)
4200	3800	400	200	4200>	4000	Decrease
3900	3600	300	200	3900>	3800	Decrease
3600	3400	200	200	3600=	3600	Equilibrium
3300	3200	100	200	3300<	3400	Increase
3000	3000	0	200	3000<	3200	Increase
2700	2800	-100	200	2700<	3000	Increase

The level of income at which consumption is exactly equal to income (savings is zero) is known as the break-even level of income (Rs. 3000 crores).

Each change of income of Rs. 300 crores causes a change of Rs. 100 crores in saving and a change of Rs. 200 crores in consumption OR MPS is 1/3 (MPS=0.33) and MPC is 2/3 (MPC = 0.67). Investment is assumed to be constant amount of Rs.200 crores at each level of income.

When firms produce Rs. 4200 crores of output, then the planned spending or aggregate demand is only Rs. 4000 crores. There will be an unplanned accumulation of inventories of Rs, 200 crores (Rs. 4200 crores - Rs. 4000 crores) Firms will respond to this unplanned inventory build-up by scaling down their operations and thus output will decrease.

When firms produce Rs. 2700 crores of output, aggregate demand is Rs. 3000 crores. There will be an unplanned decrease in inventories worth Rs. 300 crores (Rs. 3000 crores - Rs. 2700 crores). Firms will respond to this unplanned inventory decrease by expanding their operations and increasing output.

The Multiplier

A change in the investment spending will affect output and therefore employment. **Conversely, a decrease in investment will decrease the level of output and employment. The operation of the multiplier ensures that a change in investment causes a change in output by an amplified amount, which is a multiple of the change in investment.**

Multiplier is the number by which the change in investment must be multiplied to determine the resulting change in output.

For example, if investment increase by Rs. 100 crores and it causes an increase in output of Rs. 300 crores, then the multiplier is 3. We can derive an expression for the multiplier as follows:

At equilibrium, $Y = C + I$ (Income equals the sum of consumption plus investment)

$$Y = \bar{C} + by + I \quad \text{OR} \quad Y - by = \bar{c} + I \quad \text{OR} \quad Y(1 - b) = \bar{C} + I$$

$$\text{OR} \quad Y = \frac{1}{1-b} \bar{C} + I \quad \text{Since } b = \text{MPC} \quad Y = \frac{1}{\text{MPC}} \bar{C} + I$$

To find out the effect of a change in investment on income, we differentiate the equation to obtain.

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

So, (Change in income) = (Multiplier) (Change in Investment)

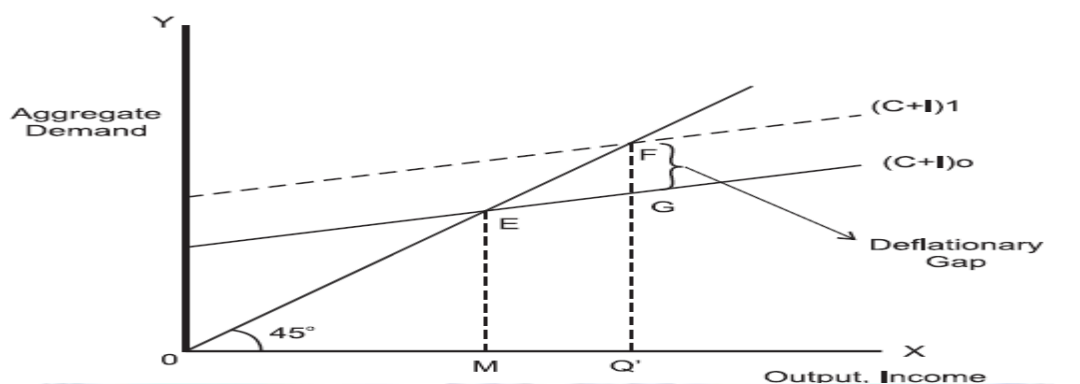
The multiplier is equal to $1/(1-MPC)$. It is the number by which the change in investment must be multiplied in order to determine the resulting change in output. The size of the multiplier depends on value of the MPC. A change in investment will cause a multiple change in output. The actual size of the multiplier depends on the value of MPC.

Problems of Excess and Deficient Demand and Measures to Correct Them

According to the Keynesian framework, the equilibrium level of output, income and employment is determined solely by the level of aggregate demand. **The economy will be in full-employment equilibrium if the aggregate demand is for an amount of output that is equal to the full-employment level of output. If the aggregate demand is for an amount of output less than the full employment level of output, then it is known as deficient demand. If the aggregate demand for a level of output is more than full-employment level of output, then it is known as excess demand.**

Problem of Deficient Demand

If aggregate demand is for a level of output less than the full-employment level, then a situation of deficient demand exists. Deficient demand gives rise to a 'deflationary gap', which causes the economy's income, output and employment to decline, thus pushing the economy into under-employment equilibrium.



For the economy to be at full-employment equilibrium, the aggregate demand should be for a level of output equal to the full-employment level of output OQ' . Suppose, that the aggregate demand is for a level of output is less than QF , which is less than the full-employment level. This level of aggregate demand corresponds to point G on the aggregate demand curve $(C+I)_0$. This results in a situation of deficient demand. The resulting deflationary gap (FG) is created due to deficient demand.

Deflationary gap is the difference between the level of aggregate demand required to establish the full-employment equilibrium and the actual level of aggregate demand. The deflationary gap is a measure of the amount of deficiency of aggregate demand.

Effect of Deficient demand on the economy

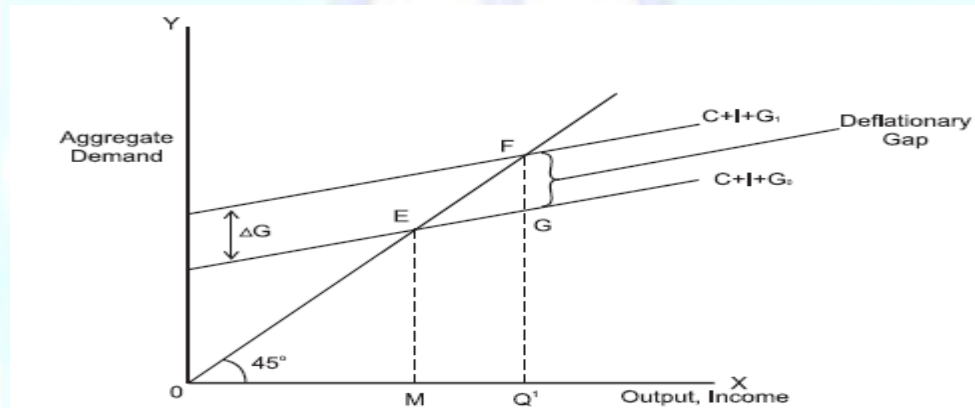
Deflationary gap will set in motion forces that will cause a decline in the economy’s output, income and employment. Firms will experience an unplanned build-up of inventories of unsold goods. They will respond by reducing employment and cutting back production. This will reduce the economy’s output income and employment, until a new equilibrium is reached at point E. Thus, the deficient demand caused deflationary gap and has pushed the economy into under-employment equilibrium.

Remedies for Deficient Demand

In order to remedy the problem of deficient demand, the aggregate demand has to be increased by an amount equal to the deflationary gap. The aggregate demand may be increased by taking remedy to fiscal policy, monetary policy or both.

Fiscal Policy Measures

Fiscal policy measures to increase aggregate demand may be done by either increasing the level of government expenditure or by reducing the amount of taxes. If the government expenditure is increased by an amount equal to the deflationary gap, it will restore the economy to the full employment equilibrium. The effect of increase in government expenditure can be shown as:



The new level of aggregate demand is $C+I+G_1$ corresponding to a higher level of government expenditure G_0 . This level of aggregate demand is sufficient to keep the economy at the full employment equilibrium, thus increase in government expenditure by an amount FG will eliminate the problem of deficient demand.

Similarly, reducing taxes will increase disposable income. This increase in disposable income will push up consumption expenditure. Firms will also respond to increased consumption by increasing output. This process will continue till equilibrium is reached.

Monetary Policy Measures

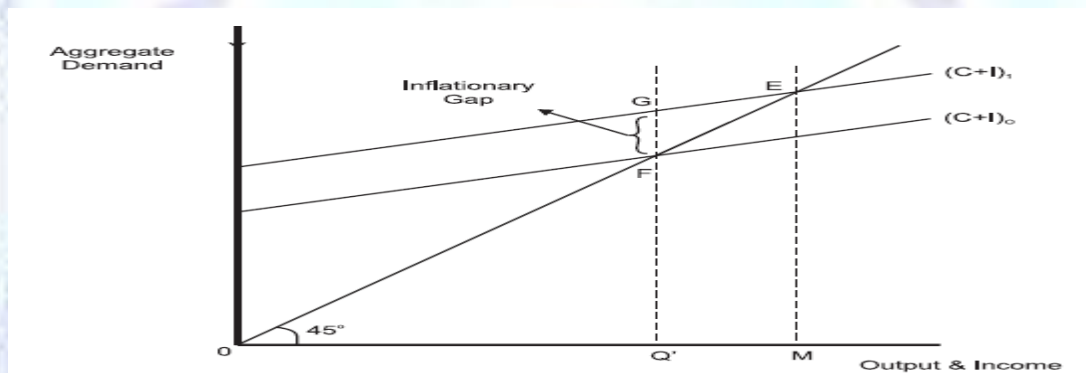
The aim of the monetary policy measure is to cause an increase in the investment expenditure by firms.

The **first step** is to increase the availability of credit. This may be done by reducing the reserve ratios (Cash/Variable Reserve Ratio), thus giving commercial banks greater ability to create credit.

The next step is to lower the interest rate (Bank Rate) by increasing the supply of money. If Central Bank lowers the interest rate, then there would be an increase in investment demand. This increase in investment demand would cause an increase in aggregate demand. Thus, by sufficiently lowering the interest rate, the Central Bank may increase investment demand and therefore aggregate demand, until the economy is restored to full-employment equilibrium.

Problem of Excess Demand

If aggregate demand is for a level of output more than the full employment level, then a situation of excess demand exists. Excess demand gives rise to an inflationary gap; which causes a rise in the price level or inflation.



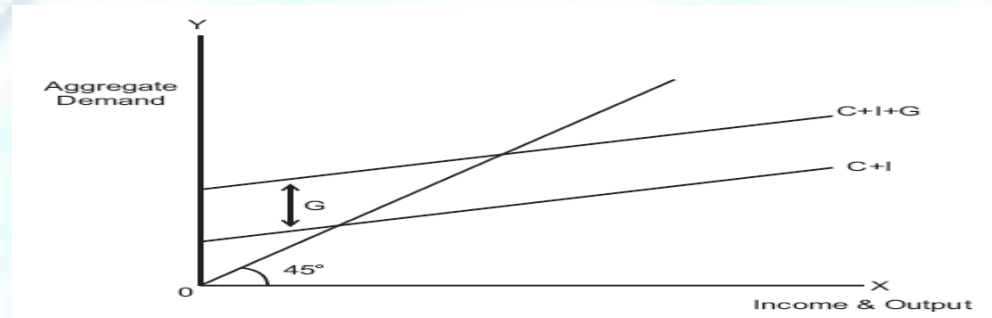
The economy will be in at full-employment equilibrium at point F on the aggregate demand curve $(C+I)_0$ and the economy will produce full-employment level of output OQ' . Up to point Q' actual (Ex-Post) income and output equals to planned (Ex-Ante) income and output. Beyond point Q' actual income and output is not equal to planned income and output because all resources are already fully employed and it is not possible to increase actual income and output any further. This causes the price level to rise (Inflation).

Inflationary gap is the amount by which the actual aggregate demand exceeds the level of aggregate demand required to establish the full-employment equilibrium. Inflationary gap is a measure of the amount of the excess of aggregate demand.

Effect of Excess demand on the economy

The inflationary gap is so called because it sets in motion forces that will cause inflation or a rise in the price level. The effect of this will create demand pull inflation (an aggregate demand induced rise in the price level). There will be rise in price level, given the constant real output. In other words, the economy remains at full-employment equilibrium, although at a higher price level.

In a three sector economy where the three sectors are house-holds, firms and government, aggregate demand is equal to the sum of consumption, investment and government expenditure. Considering government expenditure to be a constant amount, the new aggregate demand curve $C+I+G$ will lie parallel to aggregate demand curve $C+I$. This is because; at every level of output the vertical distance between the $C+I$ curve and the $C+I+G$ curve is the constant amount of government expenditure. Inclusion of government expenditure in aggregate demand causes a parallel upward shift by an amount G in the aggregate demand curve.



Remedy for Excess Demand

In order to remedy the problem of excess demand, the aggregate demand has to be reduced by an amount equal to the inflationary gap. This will keep the economy at full employment equilibrium but will lower the price level and thus combat the inflation. The aggregate demand may be reduced by taking recourse to fiscal policy or to monetary policy.

Fiscal Policy Measure

Reduce Government Expenditure: Reduction in government expenditure will reduce aggregate demand and remove the inflationary gap. The fall in government expenditure should be equal to the inflationary gap.

Increase rate of personal taxes: This will decrease disposable income and consequently consumption expenditure. The process will continue till excess demand is corrected.

Monetary Policy Measures

The monetary policy measure to combat the problem of excess demand will operate through a reduction in the investment demand by firms. If the economy's Central Bank were to increase the interest rate (Bank Rate), then there would be a decrease in investment demand. This decrease in investment demand would cause a decrease in aggregate demand until the inflationary gap is eliminated, and the price level reduced.