CHAPTER 6

DETERMINATION OF INCOME, EMPLOYMENT AND OUTPUT

In the previous chapter we saw the components of aggregate demand. In the Keynesian framework, the equilibrium level of output is determined solely by the level of aggregate demand. The first section of this chapter will show the determination of the equilibrium level of output in the Keynesian framework. Then, the concept and working of the multiplier will be introduced. The second section will deal with the problems of excess and deficient demand, followed by the measures to correct these problems.

Determination of Equilibrium Level of Output

We shall confine our analysis of 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. The absence of the government sector and the foreign sector means that income equals output, which is equal to Gross National Product.

Output Determination by Consumption plus Investment Approach

We may show output determination using the consumption plus investment (C+I) approach. This is illustrated in Fig. 6.1, which shows total spending or aggregate demand plotted against output or income. The line CC is the consumption function, showing the desired level of consumption corresponding to each level of income. We now add desired investment (which is at fixed level I_o to the consumption function. This gives the level of total desired spending or aggregate demand, represented by the $C + I_o$ curve. At every point, the $(C + I_o)$ curve lies above the CC curve by an amount equal to I_o.

The 45° line will enable us to identify the equilibrium. At any point on the 45° line, the aggregate demand (measured vertically) equals the total level of output (measured horizontally).

The economy is in equilibrium when aggregate demand, represented by the $C + I_0$ curve is equal to the total output.

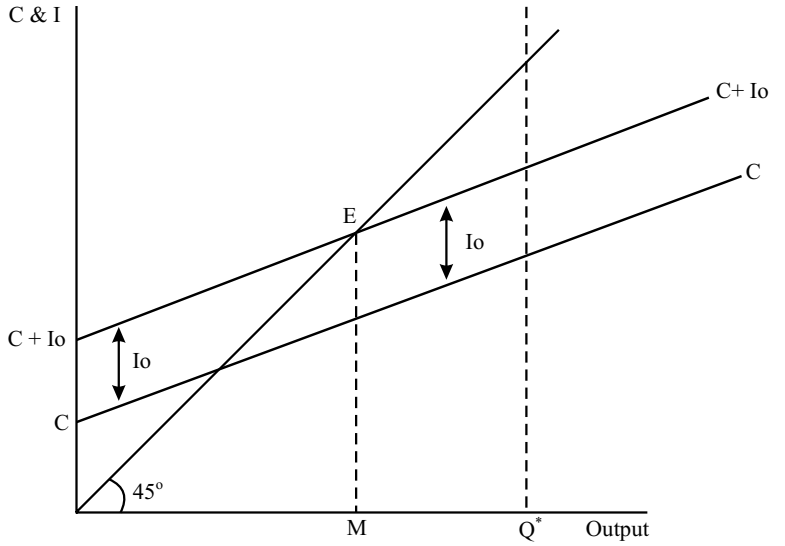

Fig. 6.1: *Output Determination by Consumption plus Investment approach*

The aggregate demand ($C + I_0$) curve shows the desired level of expenditure by consumers and firms corresponding to each level of output. The economy is in equilibrium at the point where the $C + I_0$ curve intersects the 45° line - point E in Fig. 6.1. At point E, the economy is in equilibrium because the level of desired spending on consumption and investment exactly equal the level of total output. The level of output corresponding to point E, is the level of output ^{0}M. Thus, ^{0}M is the equilibrium level of 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 increases or decreases until the two are equal again.

Consider the case when the economy is at a level of output greater than the equilibrium level M in Figure 6.1. At any such greater level of output, the $C + I_o$ line lies below the 45° line, that is, planned spending is less than planned output. This means that consumers and firms together would be buying less goods than firms were producing. This would lead to an unplanned, undesired increase in inventories of unsold goods (representing goods neither sold to households for consumption nor bought by firms for investment). Firms would then respond to this unplanned inventory increase by decreasing employment and hence output. This process of decrease in output will continue until the economy is back at output level M, where again aggregate demand equals planned output and there is no further tendency to change.

Consider another case when the economy is at a level of output less than the equilibrium level ^{0}M. At any such lower level of output, the $C + I_o$ line lies above the 45° line, that is, planned spending is more than planned output. This means that consumers and firms together would be buying more goods than firms were producing. 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 in output will continue until the economy is back at output level ^{0}M, where again aggregate demand

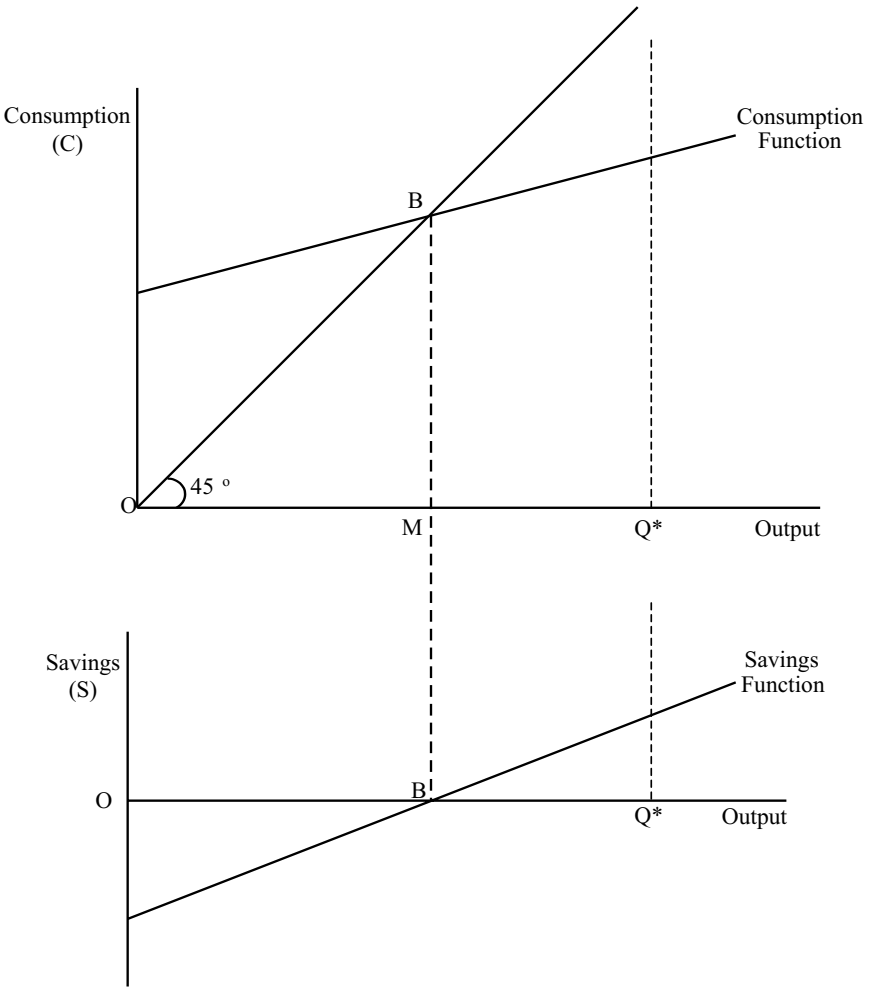

Fig 6.2: *The Consumption Function and the corresponding Savings Function*

equals planned output and there is no further tendency to change.

Output Determination Using the Savings Functions and the Investment Schedule

Savings Function

Figure 6.2 shows the consumption function and the corresponding savings function. Is it not similar to Fig. 5.2? Recall that each point on the consumption function shows desired or planned consumption at that level of income. Each point on the savings function shows the desired or planned saving at that income level.

The two functions are closely related, since income always equals consumption plus saving. Therefore, these can be called complementary curves. The level of output $^{0}Q^{*}$ is the full-employment level of output.

Investment schedule

We have seen in the previous chapter that the level of investment demand depends mainly upon the interest rate. Here, however, for simplicity, we shall assume that firms plan to invest exactly the same amount every year, regardless of the level of output.

If we plot on a graph the level of investment demand at every level of output (and therefore income), we will have the investment schedule. Figure 6.3 shows the investment schedule.

Since firms plan to invest the same amount I_o regardless of the level of output, the investment schedule will be a horizontal line. This is because every point on the investment schedule lies at the same height above the horizontal axis. That is, the level of investment demand is the same at every level of output.

Equilibrium Output

By examining the interaction of savings and investment, we can find the equilibrium level of output. Fig. 6.4 combines the savings function of Fig. 6.2 and the investment schedule of Figure 6.3.

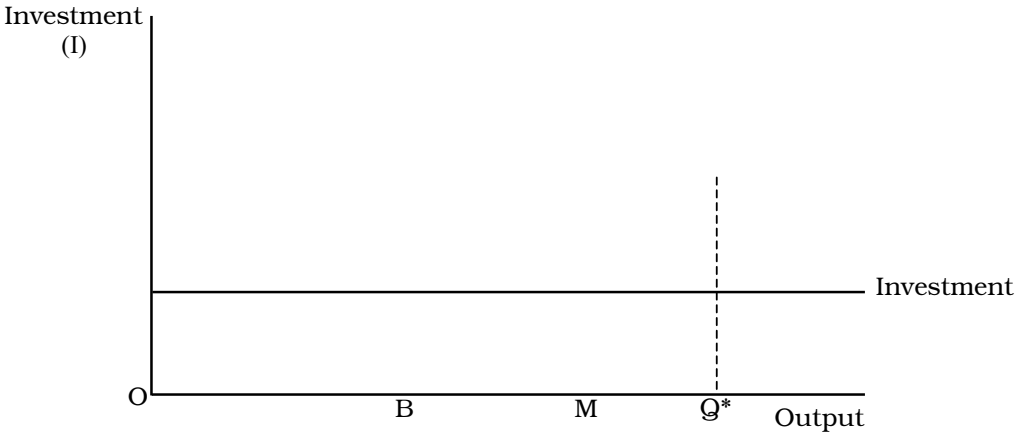

Fig 6.3: *The Investment Schedule*

We see that the savings function and the investment schedule intersect at point E. This point corresponds to a level of output M, which is the equilibrium level of output.

This intersection of the savings function and the investment schedule gives the equilibrium towards which, output will gravitate.

Meaning of the Equilibrium

Point E is the point of intersection of the savings function and the investment schedule. Thus, only at point E will planned savings of households equal planned investment of firms. When planned savings and planned investment are not equal, output will tend to adjust up or down till they are equal again.

The savings function and the investment schedule of Fig. 6.4 represent planned levels of savings and investment respectively. Thus, at output level ^{0}M, firms plan to invest an amount equal to ME. Also, households plan to save an amount equal to ME. However, in general, there is no necessity for actual saving (or investment) to be equal to planned saving (or investment). This may be due to mistakes, incorrect forecasting of events, or for a variety of other reasons. In any case, actual savings or investment might be different from planned savings or investment.

We will look at the mechanism of how output adjusts until planned savings and planned investment are equal, under three separate cases.

The first case is where the economy is at a level of output equal to ^{0}M. At this level of output, planned savings of households equals planned investment of firms. Since the plans of households and firms are satisfied, they will be content to continue doing exactly what they had been doing till then. Thus, output, employment and income will remain the same. In this case, it is rightly called an equilibrium.

The second case is where the economy is at a level of output greater than ^{0}M. At the corresponding level of

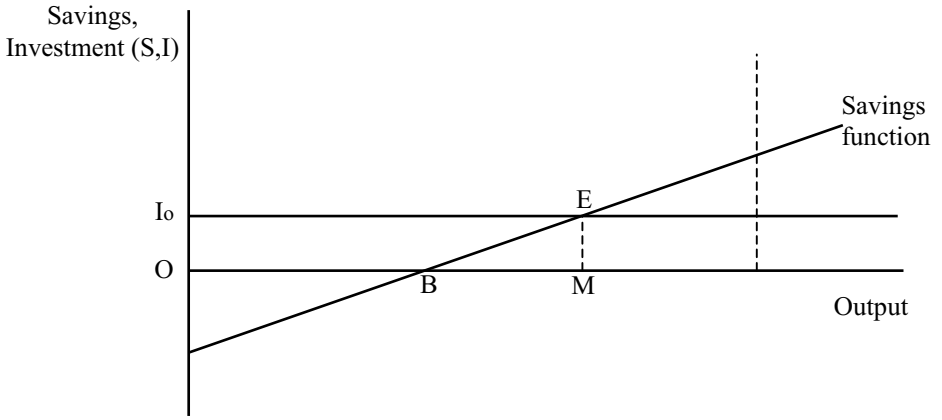

Fig 6.4: *Intersection of the Savings Function and the Investment Schedule*

income, the savings function lies above the investment schedule. Therefore, at this level of income households are saving more, that is, they are refraining from consuming by an amount greater than firms are investing. The effect of this will be to cause an undesired, unplanned build-up of inventories of unsold goods. The effect of an undesired, unplanned inventory build-up is to increase the actual level of investment to a level greater than the planned level of investment.[1] Since firms' plans have not materialized, they will act in order to correct the situation. In order 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 at output level ^{0}M, where planned savings equals planned investment, equals actual investment, and there is therefore no further tendency to change.

The third case is where the economy is at a level of output less than ^{0}M. At the corresponding level of income, the savings function lies below the investment schedule. Therefore, at this level of income households are saving an amount less than firms plan to invest. Households are thus, refraining from consuming 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. Thus, the actual level of investment will be less than the planned level of investment. Again, since firms' plans have not materialised, they will act in order to correct the situation. In order to increase inventories to the desired, planned level, firms will increase production and increase employment. The effect of this will be to increase output till the economy returns to output level ^{0}M, where planned savings equal planned investment, planned investment equals actual investment, and there is thus no further tendency to change.

All three cases lead to the same inference. The only equilibrium level of output is M, where planned saving equals planned investment. At any other level of output, the discrepancy between planned saving and planned investment will cause firms to change their production and employment levels, thereby returning the economy to the equilibrium output and employment.

Planned versus Actual Amounts

Till now we have repeatedly used the words 'planned' or 'desired' and 'actual' amounts of consumption, investment, output, etc. There is a difference between (a) the amount of planned or desired consumption or investment, given by the consumption function or by the investment demand function, and (b) the actual amounts of consumption or investment that is measured after the accurrence.

The distinction between the two emphasises the fact that output is at equilibrium only when firms and consumers are actually on their schedules of desired spending and

[1] Actual investment equals planned investment plus unplanned investment. The unplanned investment changes due to unplanned inventory increase or decrease.

investment. As measured by the National Income Accounts, savings will always be identically equal to investment in a two-sector economy. This is because

$$C + S \equiv Y \equiv C + I$$

$$Y \equiv C + I$$

and $$Y \equiv C + S,$$

$$C + S \equiv C + I$$

Therefore, $S \equiv I$.

However, actual investment will differ from planned investment when actual sales are unequal to planned sales and firms thus face an unplanned build-up or reduction in inventories. Only when the level of output is such that aggregate demand equals planned output will there be no tendency for output, income and employment to change.

A Numerical Example

A numerical example will show why the equilibrium level of output occurs when planned spending and planned output are equal. Table 6.1 shows an example using a consumption function and the associated savings function.

The consumption function is

$C = 1000 + 0.67Y$

The associated savings function is

$S = -1000 + 0.33Y$

Column (2) represents the level of planned consumption at various levels of income. The values in column (2) are derived from the consumption function used above. Column (3) represents the levels of planned saving at various levels of income. The values in column (3) are derived from the savings function used above. Column (5) is a reproduction of column (1). Column (6) shows the level of aggregate demand at various levels of income – it is the sum of consumption demand in column (2) and investment demand in column (4). It shows what firms actually manage to sell.

The level of income at which consumption is exactly equal to income (that is, all income is consumed), and

Table 6.1: Determination of Output (All Figures in Rs. Crores)

Output and Income	Planned consum-ption	Planned Saving (3)=(1)–(2)	Planned Invest-ment	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

therefore, savings is exactly equal to zero is known as the break-even level of income. In our example, the breakeven level of income is Rs.3600 crores.

Now, 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. Thus, MPS is a constant and is equal to 1/3 and MPC is a constant and is equal to 2/3.

Investment is assumed to be exogenous. Firms plan to invest a constant amount of Rs.200 crores as shown in column (4). That is, at each level of income, firms plan to purchase Rs.200 crores of investment goods.

Consider the top row of the Table 6.1. If firms are producing Rs.4200 crores of output, then the planned spending or aggregate demand is only Rs.4000 crores. In this situation, there will be an unplanned accumulation of inventories to the tune of Rs.4200 crores – Rs.4000 crores = Rs.200 crores. Firms will respond to this unplanned inventory build-up by sealing down their operations and thus output will decrease.

The opposite case is represented by the bottom row of Table 6.1. Here, firms are producing Rs.2700 crores of output but aggregate demand is Rs.3000 crores. In this situation, there will be an unplanned decrease in inventories to the tune of Rs.3000 crores – Rs.2700 crores = Rs.300 crores. Firms will respond to this unplanned inventory decrease by expanding their operations, thus causing an increase in output.

Thus, when firms as a whole are temporarily producing more than they can sell, they will contract their operations, causing output to fall. When they are temporarily selling more than their current production, they will expand their operations, causing output to rise.

Only when the level of output in column (5) is equal to aggregate demand in column (6) will output be in equilibrium. Firms' sales will be just enough to justify continuing their current level of aggregate output. Thus, aggregate output will neither expand nor contract, and will be in equilibrium. The equilibrium level of output in our example is Rs.3600 crores.

The Multiplier

A change in the investment spending will affect output and therefore employment. It is logical that an increase in fixed investment will increase the level of output and employment through increase in productive capacity. 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.

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

For example, if an increase in investment of Rs.100 crores causes an increase in output of Rs.300 crores, then the multiplier is 3. If, instead the resulting increase in output is Rs.400 crores, then the multiplier is 4.

We may derive an expression for the multiplier as follows:

At equilibrium, we have

$Y = C + I$

i.e., income equals the sum of consumption plus investment.

We can use the consumption function to substitute C with the expression $\bar{C}$ +bY, to give

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

$$\text{so } Y - bY = \bar{C} + I$$

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

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

Since b is nothing but the MPC, we have

$$Y = \frac{1}{(1-MPC)}(\bar{C} + I)$$

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.

As we can see, the size of the multiplier depends on value of the MPC.

Since 0 < MPC < 1, the multiplier will be greater than 1. Hence, a change in investment will cause a 'multiple' change in output.

The actual size of the multiplier depends on the value of MPC. For example, if MPC is 2/3, then the multiplier is 3. If MPC be at 4/5, the multiplier is 5.

A numerical example will enable us to see the operation of the multiplier. Let the MPC be at 4/5. Suppose there is an increase in investment of Rs.1000, which results in the construction of a new building. Then, the builder, the architect and the labourers together will get an increase in income of Rs.1000. Since the MPC is 4/5, they will together spend 800 (4/5 of Rs.1000) on new consumption goods. The producers of those consumption goods will thus have an increase of Rs.800 in their incomes. Since their MPC is also 4/5, they will in turn spend Rs.640 (4/5 of Rs.800, or 4/5 of 4/5 of Rs.1000). This will cause an increase in income of other people by Rs.640. This process will go on, with each new round of spending (and therefore increase in income) being 4/5 of the previous round.

Thus, an endless chain of secondary consumption spending is set in motion by the primary investment of Rs.1000. However, not only is the chain of secondary consumption spending endless, it is also ever-diminishing. Eventually, the sum of the secondary consumption expenditures will be a finite amount.

We can calculate the total increase in consumption plus investment spending and therefore the total increase in income as follows:

Rs. 1000	=	1 × Rs.1000
+		+
Rs.800		4/5 × Rs.1000

+	+
Rs. 640	$(4/5)^2 \times$ Rs. 1000
+	+
Rs. 512	$(4/5)^3 \times$ Rs. 1000
+	+
Rs. 409.6	$(4/5)^4 \times$ Rs. 1000
+	+
⋮	⋮
Rs. 5000	[1/{1-(4/5)}] × Rs. 1000 Multiplier

We have said that the chain of secondary consumption spending is an endless ever-diminishing chain, whose sum is a finite amount.

We may find the sum of the total increase in spending by using the formula for the sum of an infinite geometric progression.

The sum of the total increase in spending and the total increase in income is:

$$\Delta Y = 1 \times \text{Rs.}1000 + (4/5) \times \text{Rs.}1000 + (4/5)^2 \times \text{Rs.}1000 + (4/5)^3 \times \text{Rs.}1000 + \ldots$$

$$\Delta Y = \text{Rs.}1000 + [\,1 + (4/5) + (4/5)^2 + (4/5)^3 + \ldots\}$$

The term in square brackets is of the form of the sum of an infinite geometric progression, whose first term is 1 and where constant multiplier 'r' is 4/5.

The formula for the sum of such an infinite geometric progression is 1/(1–r). In our case,

r = 4/5, therefore the sum of the geometric progression is

$$1/[1 - (4/5)] = 5$$

Replacing the term in the square brackets by 5, we have

$$\Delta Y = \text{Rs. } 1000 \times 5$$

$$\Delta Y = \text{Rs. } 5000$$

We can see that with an MPC of 4/5, the multiplier is 5.

We may also express multiplier in terms of the marginal propensity to save, that is MPS.

$$\text{Multiplier} = \frac{1}{1 - \text{MPC}}$$

Since MPS= 1 – MPC, we have

$$\text{Multiplier} = \frac{1}{\text{MPS}}$$

i.e., if MPS were 1/x, then the multiplier would be x.

In our example, the MPS is 1/5. Let the investment expenditure increase by Rs.1000 crores. Planned saving will have to rise till it equals the new and higher level of investment, in order to bring output to a new equilibrium. The only way that saving can rise is for income to rise. With an MPS of 1/5 and an increase in investment of Rs.1000 crores, income must rise by Rs.5000 crores to bring to forth Rs.1000 crores of additional saving to match the new investment. Hence, at equilibrium, Rs.1000 crores of additional investment induces Rs.5000 crores of additional income, in line with our multiplier arithmetic.

Problems of Excess and Deficient Demand and Measures to Correct Them

Thus far, we have studied the determination of output, income and employment in the Keynesian framework. The equilibrium level of output, income and employment were 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 is for a level of output more than full-employment level of output, then it is known as excess demand. We will take up the problems of and remedies for excess and deficient demand individually.

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 an under-employment equilibrium. Figure 6.5 depicts the situation of deficient demand.

The Y-axis measures consumption demand, investment demand, and their sum the aggregate demand. The X-axis measures the level of output and income. OQ^* is the full employment level of output and income. $(C+I)_o$ and $(C+I)_1$, are two parallel aggregate demand curves, differing only by the amount of investment expenditure.

For the economy to be at a full-employment equilibrium, the aggregate demand should be for a level of output equal to the full-employment level of output OQ^*. In other words, aggregate

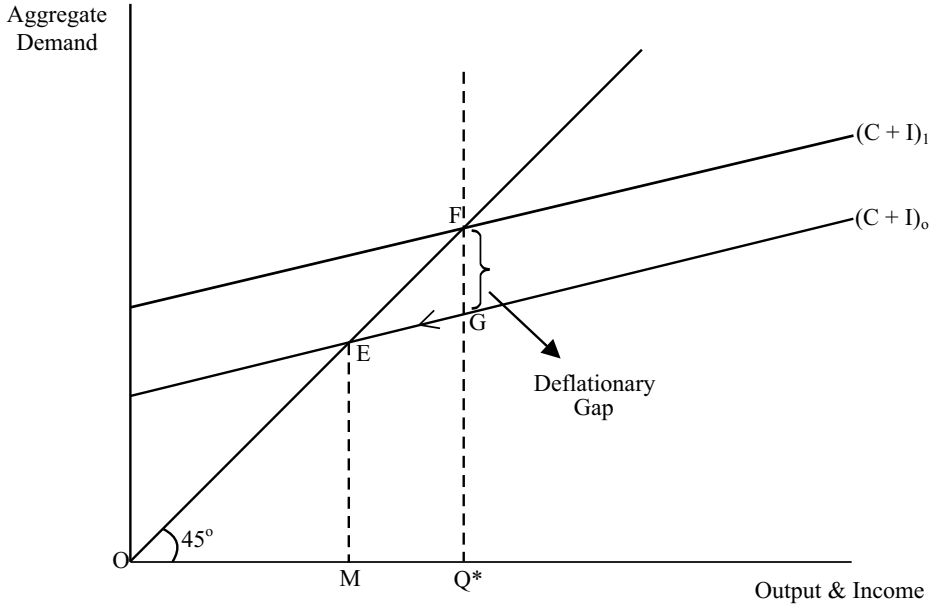

Fig 6.5: *Deficient Demand*

demand should be equal to Q^*F. The economy will then be in a full employment equilibrium, corresponding to the point F on the aggregate demand curve $(C+I)_1$, and the economy will produce full-employment level of output OQ^*.

Suppose, however, that the aggregate demand is for a level of output Q^*G. Q^*G is less than Q^*F. Then aggregate demand is for a level of output which is less than the full-employment level. This level of aggregate demand corresponds to point G on the aggregate demand curve $(C+I_o)$. This results in a situation of deficient demand. The resulting deflationary gap created due to deficient demand is represented in Figure 6.5 by FG.

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

The deflationary gap will set in motion forces that will cause a decline in the economy's output, income and employment. At point G, the aggregate demand curve $(C+I_o)$ lies below the 45° line. As a result, the aggregate demand Q^*G is less than the level of output OQ^*. 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. This is an equilibrium, because the aggregate demand EM is equal to output OM (since point E lies on the 45° line).

It will be noted that point E is an under-employment equilibrium. The equilibrium levels of output, income and employment corresponding to point E are less than the full

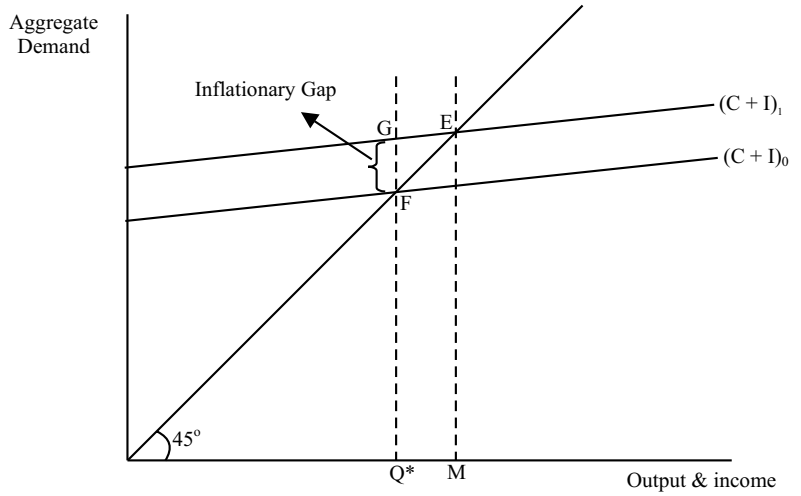

Fig 6.6: *Excess Demand*

employment levels of output, income and employment corresponding to point F. Thus, the deficient demand caused deflationary gap has pushed the economy into an under-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. Figure 6.6 depicts the situation of excess demand.

The X-axis measures the level of output and income. The Y-axis measures consumption demand, investment demand, and their sum, the aggregate demand. $0Q^*$ is the full employment level of output and income. $(C+I)_o$ and $(C+I)_1$, are two parallel aggregate demand curves, differing only by the amount of investment expenditure.

The economy will be in a full-employment equilibrium at point F on the aggregate demand curve $(C+I)_o$, and the economy will produce full-employment level of output OQ^*.

While analysing the output-cum-income axis, one important point must be kept in mind. The axis measures nominal output and income. Due to the peculiar shape of the Keynesian, aggregate supply curve (reproduced in Figure 6.7) prices are rigid till the full-employment level of output. Thereafter, the aggregate supply curve becomes perfectly inelastic with respect to prices.

This has the following repercussions on the analysis of the output-cum-income axis of Figure 6.6. Uptil point Q^*, increases in nominal income and output correspond to increases in real income and output (since prices are constant). Beyond point Q^*, increases in nominal income and output do not correspond to any change in real income and output. This is because real income and output cannot increase beyond the full employment level, as all resources are

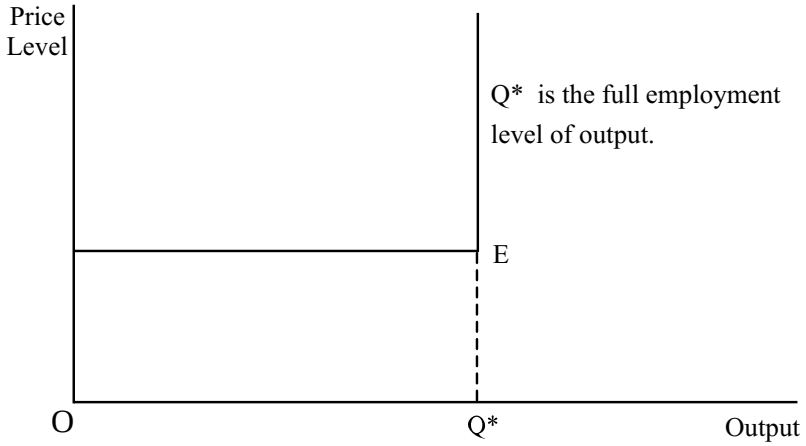

Fig 6.7: *Keynesian Aggregate Supply Curve*

already fully employed. The increases in nominal income and output are merely due to increases in the price level.

Suppose that the aggregate demand is for a level of output Q^*G, which is greater than the full-employment level of output. This level of aggregate demand corresponds to point G on the aggregate demand curve $(C+I)_0$. This is a situation of excess demand. The resulting inflationary gap, created due to the excess demand is represented in Figure 6.6 by FG.

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

The inflationary gap is so called because it sets in motion forces that will cause inflation or a rise in the price level. At point G, the aggregate demand curve $(C+I)_0$ lies above the 45° line. As a result, the aggregate demand Q^*G is greater than the level of output OQ^*. The effect of this will be to create demand pull inflation (an aggregate demand induced rise in the price level). The rise in price level, given the constant real output, will cause an increase in the nominal output until a new equilibrium is reached at point E. This is an equilibrium because the aggregate demand ME is equal to the output OM (since point E lies on the 45° line).

It will be noted that the real output and real income are the same at the new equilibrium E. Correspondingly, the equilibrium level of employment also is the same. All that has happened is that nominal output and income have increased due to an increase in the price level. Thus, the excess demand caused an inflationary gap, which caused inflation, and therefore, the price level to rise. In other words, the economy remains at a full-employment equilibrium, although at a higher price level.

The Government Sector

Before entering into a study of the measures to correct the problems of excess and deficient demand, it will be necessary to include the government sector in the economy. Then the economy under consideration becomes a three-sector economy; the three sectors being households, firms and government. It is well known that fiscal policy (Government expenditure and tax programmes) has a major impact on economic activity, specifically on output, employment and prices. In fact, it is this knowledge that led to the Keynesian policy of demand management through fiscal policy in order to correct excess of or deficiency of aggregate demand.

To simplify the analysis, we may focus on the effects of government expenditure with the total taxes collected held constant.[2] In the face of taxes, consumption is no longer a function of income – Rather, consumption is a function of disposable income.[3] However, under simplifying assumptions

[2] Taxes that do not change with income or other economic variables are called lump sum taxes.
[3] Disposable income equals income minus taxes.

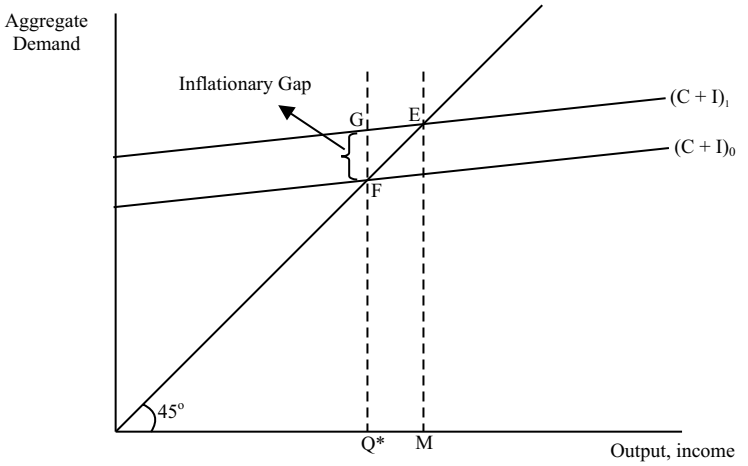

Fig 6.8: *Effect of Constant Tax on Consumption Function*

(absence of foreign trade, transfers, depreciation, etc.) we have output equals disposable income plus taxes. Since tax revenues are held constant, output and disposable income will always differ by the same amount. Thus, after taking into account such taxes, we can still plot the consumption function against output, rather than against disposable income.

We may plot the new consumption function as a parallel downward shift of the old consumption function. The justification of this is as follows. In the face of constant taxes, at every income level the disposable income will be less than the income level by the constant amount of the tax. The effect of this uniformly lower disposable income level is to cause a uniformly lower level of consumption. The decrease in consumption at every income level will be an amount MPC times the reduction in income. This is because MPC is the change in consumption for a given change in income. If income is reduced by the amount of tax, then consumption will be reduced by an amount equal to MPC times the tax.

Algebraically, the new consumption function is

$C^1 = \bar{C} + b\,(Y_d)$

Where Y_d is disposable income

$C^1 = \bar{C} + b\,(Y–T)$

where T is constant taxes

$C^1 = \bar{C} + bY - bT$

$C^1 = C – bT$

where C is the old consumption function

i.e. $C = \bar{C} + bY$,

Finally, we get $C - C^1 = bT$

This equation may be interpreted as follows:

The new consumption function is uniformly less than the old consumption function by an amount equal to the MPC times the decrease in income (i.e., the constant tax T). Since b and T are constants, we have the term bT being a constant. Therefore, we can

depict the new consumption function as a parallel downward shift of the old consumption function. The amount of the downward shift will be bT. The new consumption function is depicted in Fig. 6.8.

C is the old consumption function.

C^1 is the new consumption function in the face of taxes.

This is as regards the effect of taxes on consumption demand. We may now turn to the effect of government expenditure G on aggregate demand. Recall that in a three-sector economy, where the three sectors are households, firms and government; aggregate demand is equal to the sum of consumption, investment and government expenditure. Figure 6.9 shows the effect of G on aggregate demand. For simplicity, we consider government expenditure to be a constant amount. The new aggregate demand curve C+I+G lies parallel above the old 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.

Thus, the inclusion of government expenditure in aggregate demand causes a parallel upward shift by an amount G, in the aggregate demand curve.

We are now in a position to return to the measures that can be taken to remedy the problems of excess and deficient demand. In the following discussion, aggregate demand will be taken to mean the sum of consumption, investment and government expenditure, since we are now considering a three-sector

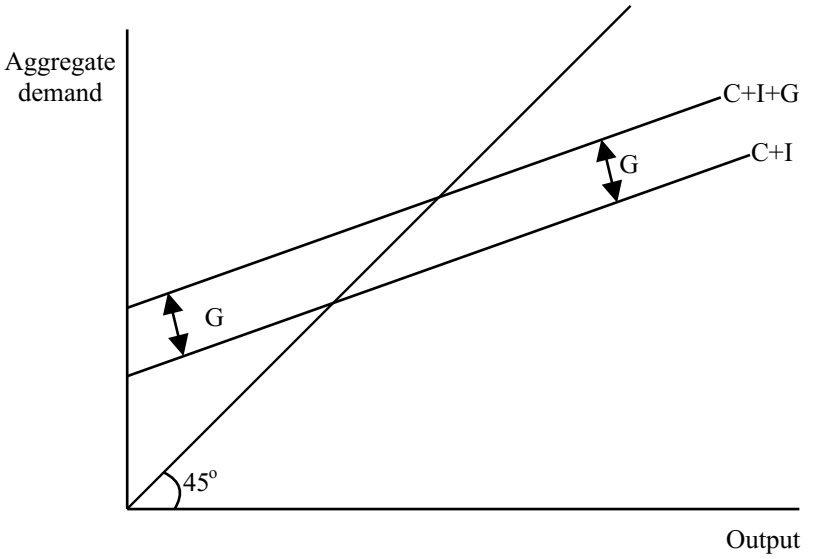

Fig 6.9: *The Effect of Government Expenditure on Aggregate Demand*

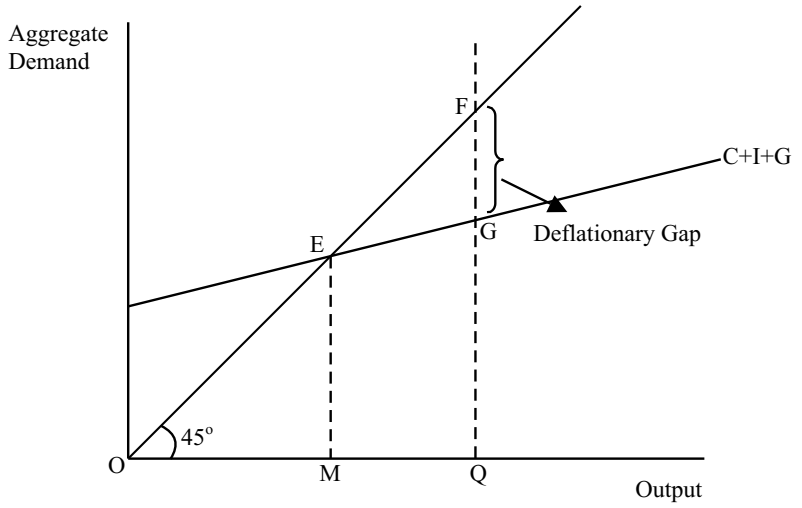

Fig 6.10: *Deficient Demand in a Three-sector Economy*

economy. This modification to the definition of aggregate demand does not however change the nature of or definition of excess and deficient demand.

We will first consider the remedy to the problem of deficient demand.

Remedy for Deficient Demand

As we have seen earlier, if aggregate demand is for a level of output less than the full employment level of output, then a situation of deficient demand exists. Figure 6.10 depicts the situation of deficient demand in the context of the three-sector economy.

In order to remedy the problem of deficient demand, the aggregate demand has to be increased by an amount equal to the deflationary gap. This will move the economy to the full employment equilibrium at point F.

The aggregate demand may be increased by taking recourse to fiscal policy, monetary policy or both.

Fiscal Policy Measures

We shall first consider the fiscal policy measures to increase aggregate demand. This 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. This increase in government expenditure is shown in Figure 6.11.

The new level of aggregate demand is $C+I+G_1$ corresponding to a higher level of government expenditure G_1. This level of aggregate demand is sufficient to keep the economy at the full employment equilibrium, thus

eliminating the problem of deficient demand. Thus,increase in government expenditure by an amount FG will eliminate the problem of deficient demand.

The other fiscal policy measure that will increase aggregate demand is the reduction in the level of taxes. A reduction in the level of taxes will increase the disposable income by the amount of the reduction in taxes. As a result, consumption demand will increase by an amount of MPC times the increase in disposable income. The increase in consumption demand will increase the aggregate demand by an equal amount. Thus, by lowering the taxes, the aggregate demand may be increased.

This way, by a mix of fiscal policy measures of increasing government expenditure and decreasing the level of taxes, the level of aggregate demand may be increased, thus combating the problem of deficient demand.

Monetary Policy Measures

The problem of deficient demand can also be solved by taking resort to monetary policy measures. The aim of the monetary policy measure is to cause an increase in the investment expenditure by firms. This may be done in a two step manner. The first step is to increase the availability of credit. This may be done by reducing the reserve ratios, thus giving commercial banks greater ability to create credit. The next step is to lower the interest rate by increasing the supply of money. The purpose of this step is to ensure the off take of the increased credit by firms. Recall that there is an inverse relationship between the rate of interest and the level of investment demand. If the economy's Central Bank[4] lower the

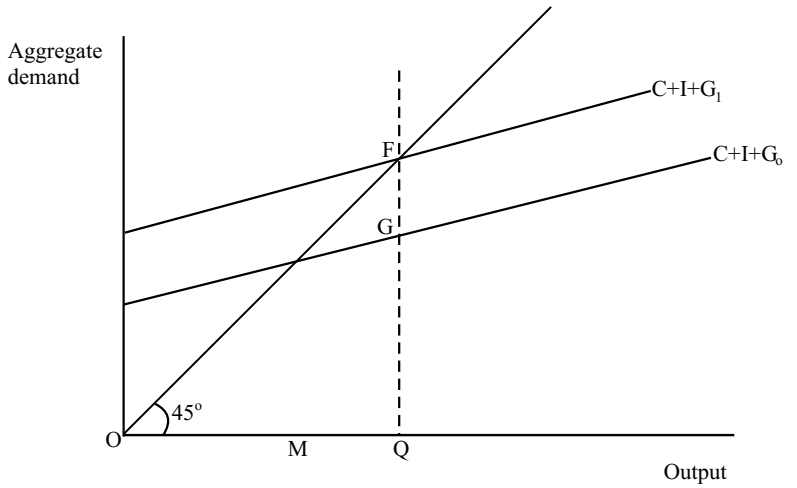

Fig 6.11: *Increase in Government Expenditure*

[4] Reserve Bank of India (RBI) is the Central Bank for the Indian Economy.

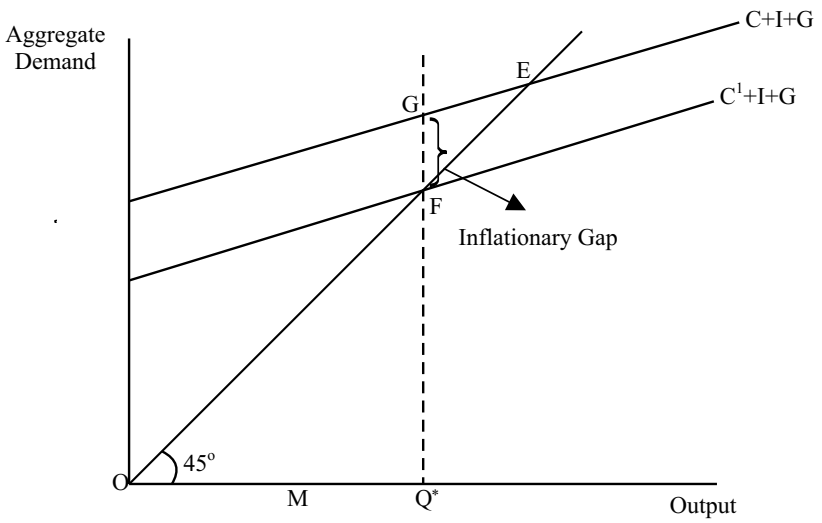

Fig 6.12 *Excess Demand in the Context of the Three-sector Economy*

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 a full-employment equilibrium.

Remedy for Excess Demand

As we have seen earlier, if aggregate demand is for a level of output greater than the full employment level of output, then a situation of excess demand exists. Figure 6.12 depicts the situation of excess demand in the context of the three-sector economy.

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 Measures

The fiscal policy measures to reduce aggregate demand are (a) reducing the government expenditure, and (b) increasing the amount of taxes. For example, where tax was uniformly Rs.300 crores at every level of income, it may be increased to say Rs.400 crores at every level of income. If the tax rate is increased it will uniformly reduce the disposable income, thus causing a parallel downward shift of the consumption function. Consequently, the level of aggregate demand will fall. If the amount of taxes is increased sufficiently so that aggregate demand

falls enough to eliminate the inflationary gap, then the economy will come back to the full employment equilibrium, without inflation.

In Figure 6.12, if taxes are raised such that aggregate demand falls from C+I+G to C^1+I+G, then the price level falls and inflation is successfully combated.

Thus, reduction of aggregate demand by an amount GF through the mechanism of increasing the taxes eliminates the problem of excess demand.

Alternatively, the level of aggregate demand may be reduced by reducing the amount of government expenditure. A mix of fiscal policy measures of reducing government expenditure and increasing the taxes are employed to combat excess demand.

Monetary Policy Measures

Contrary to keynesian emphasis on fiscal measures for correcting encess/ deficient demand, the monetary policy measure to combat the problem of excess demand will operate through a reduction in the investment demand by firms. Recall that there is an inverse relationship between the rate of interest and the level of investment demand. If the economy's Central Bank were to increase the interest rate, then there would be a decrease in investment demand.

This decrease in investment demand would cause a decrease in aggregate demand. Thus, by sufficiently raising the interest rate, the Central Bank may decrease investment demand and therefore, aggregate demand, until the inflationary gap is eliminated, and the price level reduced.

SUMMARY

- The equilibrium level of income is that level of income where the aggregate demand equals the level of output, and the level of planned savings equals planned investment.
- A situation of deficient demand arises if the aggregate demand is for a level of output that is less than the full-employment level of output. This gives rise to a deflationary gap.
- A situation of excess demand arises if the aggregate demand is for a level of output that is more than the full-employment level of output. This gives rise to an inflationary gap.
- The introduction of government sector means that aggregate demand is now equal to the sum of consumption, investment and government expenditure.
- The government sector impacts the level of aggregate demand through both government expenditure and taxes.
- Excess and deficient demand may be corrected through fiscal policy and monetary policy measures.

EXERCISES

1. What is equilibrium income?
2. What is the difference between planned and actual investment?
3. What is multiplier?
4. What is deficient demand?
5. What is excess demand?
6. How does the introduction of the government sector affect the economy?
7. How can the problems of excess and deficient demand be combated?