Chapter 4

Income Determination

We have so far talked about the national income, price level, rate of interest etc. in an ad hoc manner – without investigating the forces that govern their values. The basic objective of macroeconomics is to develop theoretical tools, called models, capable of describing the processes which determine the values of these variables. Specifically, the models attempt to provide theoretical explanation to questions such as what causes periods of slow growth or recessions in the economy, or increment in the price level, or a rise in unemployment. It is difficult to account for all the variables at the same time. Thus, when we concentrate on the determination of a particular variable, we must hold the values of all other variables constant. This is a stylisation typical of almost any theoretical exercise and is called the assumption of *ceteris paribus*, which literally means 'other things remaining equal'. You can think of the procedure as follows – in order to solve for the values of two variables x and y from two equations, we solve for one variable, say x, in terms of y from one equation first, and then substitute this value into the other equation to obtain the complete solution. We apply the same method in the analysis of the macroeconomic system.

4.1 Ex Ante and Ex Post

In the chapter on National Income Accounting, we have come across terms like consumption, investment, or the total output of final goods and services in an economy (GDP). These terms have dual connotations. In Chapter 2 they were used in the accounting sense – denoting actual values of these items as measured by the activities within the economy in a certain year. We call these actual or accounting values **ex post** measures of these items.

These terms, however, can be used with a different connotation. Consumption may denote not what people have actually consumed in a given year, but what they had planned to consume during the same period. Similarly, investment can mean the amount a producer plans to add to her inventory. It may be different from what she ends up doing. Suppose the producer plans to add Rs 100 worth goods to her stock by the end of the year. Her planned investment is, therefore, Rs 100 in that year. However, due to an unforeseen upsurge of demand for her goods in the market the volume of her sales exceeds what she had planned to sell and, to meet this extra demand, she has to sell goods worth Rs 30 from her stock. Therefore, at the end of the year, her inventory goes up by Rs (100 – 30) = Rs 70 only. Her planned investment is Rs 100 whereas her actual, or ex post, investment is Rs 70 only. We call the planned values of the variables – consumption, investment or output of final goods – their **ex ante** measures.

In a theoretical model of the economy the **ex ante** values of these variables should be our primary concern. If anybody wants to predict what the equilibrium value of the final goods, output or GDP will be it is important for her to know what quantities of the final goods people plan to demand or supply. We must, therefore, learn about the determinants of the ex ante values of consumption, investment or aggregate output of the economy.

Ex Ante Consumption: What does planned consumption depend on? People spend a part of their income on consumption and save the rest. Suppose your income increases by Rs 100. You will not use up this entire extra income but save a certain fraction, say 20 per cent, of it to build up a cushion of savings for the period when you cease to earn income, or for meeting large expenses in future. Different people plan to save different fractions of their additional incomes (with the rich typically saving a greater proportion of their income than the poor), and if we average these we may arrive at a fraction which will give us an idea of what proportion of the total additional income of the economy people wish to save as a whole. We call this fraction the **marginal propensity to save** (**mps**). It gives us the ratio of total additional planned savings in an economy to the total additional income of the economy. Since consumption is the complement of savings (additional income of the economy is either put into additional savings or used for extra consumption by the people), if we subtract the mps from 1, we get the **marginal propensity to consume** (**mpc**), which, in a similar way, is the fraction of total additional income that people use for consumption. Suppose, mpc of an economy is c, where $0 < c < 1$. If the total income of the economy increases from 0 to Y, then total consumption of the economy should be

$$C = c\,(Y - 0) = c.Y$$

However, it is not precisely so. We have forgotten something here. If the income of the economy in a certain year is zero, the above equation tells us that the economy has to starve for an entire year, which is, obviously, an outrageous idea. If your income is zero in a certain period you use your past savings to buy certain minimum consumption items in order to survive. Hence we must add the minimum or subsistence level of consumption of the economy in the above equation, which, therefore, becomes

$$C = \overline{C} + c.Y \qquad (4.1)$$

where $\overline{C} > 0$ is the minimum consumption level and is a given or exogenous item to our model, which, therefore, is treated as a constant. The equation tells us that as the income of the economy increases above zero, the economy uses c proportion of this extra income to increase its consumption above the minimum level.

Ex Ante Investment: Investment is defined as addition to the stock of physical capital (such as machines, buildings, roads etc., i.e. anything that adds to the future productive capacity of the economy) and changes in the inventory (or the stock of finished goods) of a producer. Note that 'investment goods' (such as machines) are also part of the final goods – they are not intermediate goods like raw materials. Machines produced in an economy in a given year are not 'used up' to produce other goods but yield their services over a number of years.

Investment decisions by producers, such as whether to buy a new machine, depend, to a large extent, on the market rate of interest. However, for simplicity, we assume here that firms plan to invest the same amount every year. We can write the ex ante investment demand as

$$I = \overline{I} \tag{4.2}$$

where $\overline{I}$ is a positive constant which represents the autonomous (given or exogenous) investment in the economy in a given year.

Ex Ante Aggregate Demand for Final Goods: In an economy without a government, the ex ante aggregate demand for final goods is the sum total of the ex ante consumption expenditure and ex ante investment expenditure on such goods, viz. $AD = C + I$. Substituting the values of C and I from equations (4.1) and (4.2), aggregate demand for final goods can be written as

$$AD = \overline{C} + \overline{I} + c.Y$$

If the final goods market is in equilibrium this can be written as

$$Y = \overline{C} + \overline{I} + c.Y$$

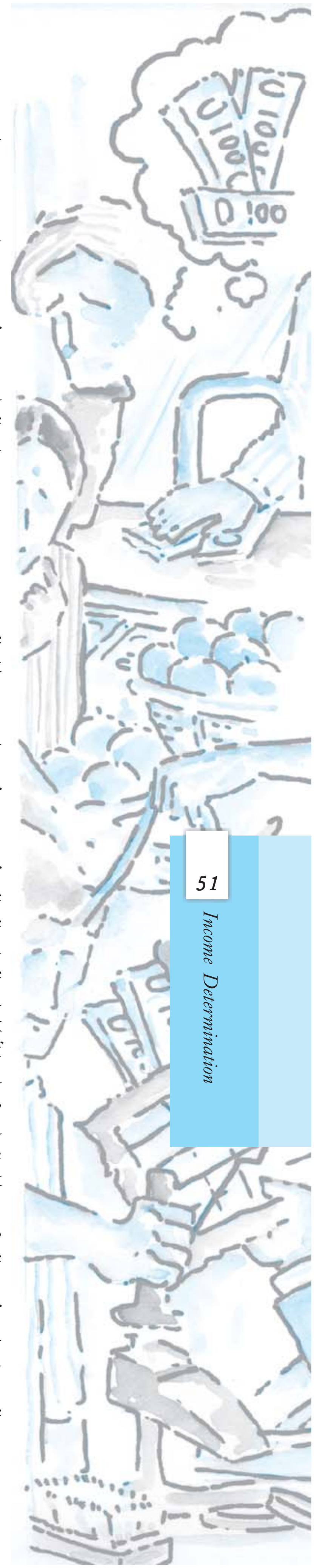
where Y is the ex ante, or planned, supply of final goods. This equation can be further simplified by adding up the two autonomous terms, $\overline{C}$ and $\overline{I}$, making it

$$Y = \overline{A} + c.Y \tag{4.3}$$

where $\overline{A} = \overline{C} + \overline{I}$ is the total autonomous expenditure in the economy. In reality, these two components of autonomous expenditure behave in different ways. $\overline{C}$, representing subsistence consumption level of an economy, remains more or less stable over time. However, $\overline{I}$ has been observed to undergo periodic fluctuations.

A word of caution is in order. The term Y on the left hand side of equation (4.3) represents the ex ante output or the planned supply of final goods. On the other hand, the expression on the right hand side denotes ex ante or planned aggregate demand for final goods in the economy. Ex ante supply is equal to ex ante demand only when the final goods market, and hence the economy, is in equilibrium. Equation (4.3) should not, therefore, be confused with the accounting identity of Chapter 2, which states that the ex post value of total output must always be equal to the sum total of ex post consumption and ex post investment in the economy. If ex ante demand for final goods falls short of the output of final goods that the producers have planned to produce in a given year, equation (4.3) will not hold. Stocks will be piling up in the warehouses which we may consider as *unintended accumulation of inventories*. It is not a part of planned or ex ante investment. However, it is definitely a part of the actual addition to inventories at the end of the year or, in other words, an ex post investment. Thus even though planned Y is greater than planned $C + I$, actual Y will be equal to actual $C + I$, with the extra output showing up as unintended accumulation of inventories in the ex post I on the right hand side of the accounting identity.

At this point, we can introduce a government in this economy. The major economic activities of the government that affect the aggregate demand for final goods and services can be summarized by the fiscal variables Tax (T) and Government Expenditure (G), both autonomous to our analysis. Government, through its expenditure G on final goods and services, adds to the aggregate



demand like other firms and households. On the other hand, taxes imposed by the government take a part of the income away from the household, whose disposable income, therefore, becomes $Y_d = Y - T$. Households spend only a fraction of this disposable income for consumption purpose. Hence, equation (4.3) has to be modified in the following way to incorporate the government

$$Y = \bar{C} + \bar{I} + G + c(Y - T)$$

Note that $G - c.T$, like $\bar{C}$ or $\bar{I}$, just adds to the autonomous term $\bar{A}$. It does not significantly change the analysis in any qualitative way. We shall, for the sake of simplicity, ignore the government sector for the rest of this chapter. Observe also, that without the government imposing indirect taxes and subsidies, the total value of final goods and services produced in the economy, GDP, becomes identically equal to the National Income. Henceforth, throughout the rest of the chapter, we shall refer to Y as GDP or National Income interchangeably.

4.2 Movement Along a Curve versus Shift of a Curve

We shall be using graphical techniques to analyse the model of the economy. It is, therefore, important for us to learn how to read a graph. Let us now plot two variables a and b on the horizontal and vertical axes on a graph depicting the equation of a straight line of the form $b = ma + \varepsilon$, where $m > 0$ is called the slope of the straight line and $\varepsilon > 0$ is the intercept on the vertical (i.e. b) axis (Fig. 4.1). When a increases by 1 unit the value of b increases by m units. These are called movements of the variables *along the graph*.

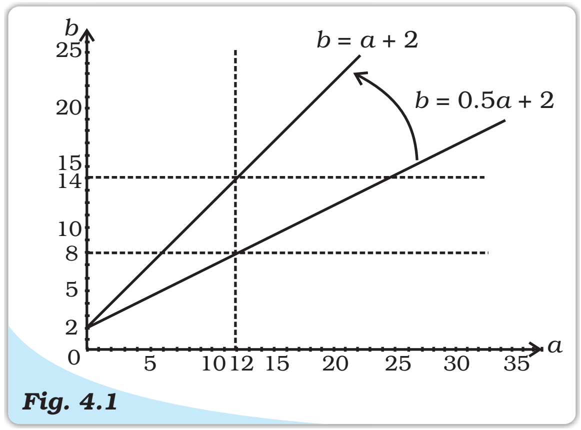


Fig. 4.1

A Positively Sloping Straight Line Swings Upwards as its Slope is Doubled

Consider a fixed value for ε equal to 2. Let m take two values $m = 0.5$ and $m = 1$, respectively. Corresponding to these values of m we have two straight lines, one steeper than the other. The entities ε and m are called the parameters of the graph. They do not appear as variables on the axes, but act in the background to regulate the position of the graph. As m increases in the above example the straight line swings upwards. This is called a **parametric shift** of a graph.

Since a straight line of the above form has another parameter ε, we can observe another type of parametric shift of this line. To see this hold m constant at 0.5 and increase the intercept term ε from 2 to 3. The straight line now shifts in parallel upwards as shown in Fig. 4.2.

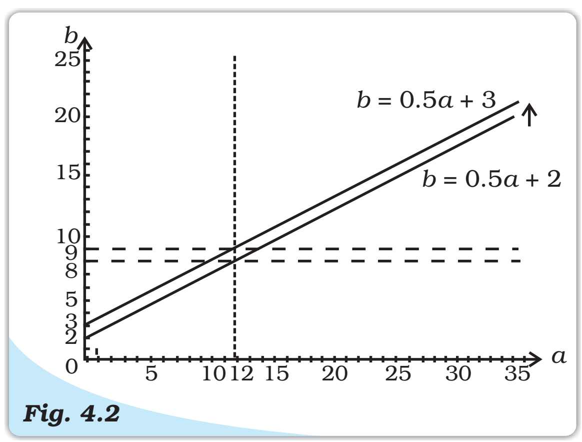


Fig. 4.2

A Positively Sloping Straight Line Shifts Upwards in Parallel as its Intercept is Increased

Consider, next, the following two equations representing a downward and an upward sloping straight line, respectively

$y = z - x$, and, $y = 1 + x$, $z \geq 0$

In the first equation z appears as an intercept parameter. Hence for increasing values of z starting from zero, the first straight line will undergo parallel upward shifts as depicted in Fig. 4.3. Consequently, its points of intersection with the second straight line will move up along the second line as shown in Fig. 4.3.

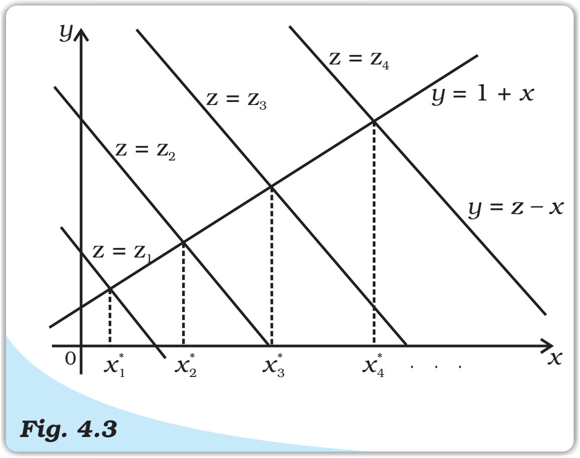


Fig. 4.3

Parametric Shift of z and Changing Equilibrium Values of x

Suppose we want to find out the relationship between z and equilibrium values of x. This can be obtained by plotting the points (x_1^*, z_1), (x_2^*, z_2), (x_3^*, z_3) etc. on a figure depicting the variables x and z on the horizontal and vertical axes, respectively, as shown in Fig. 4.4.

Note that in the (x, y) plane z was being treated as a parameter. But in the (x, z) plane z is a variable in its own right. What we have essentially done is the following – we have kept z constant while dealing with x and y in the second equation and solved for y in terms of x. Then we have plugged this solution in the first equation to derive the relationship between x and z. We shall be making use of this technique throughout this chapter.

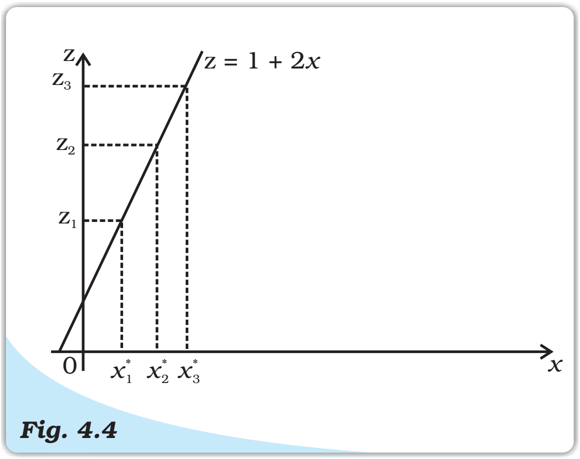
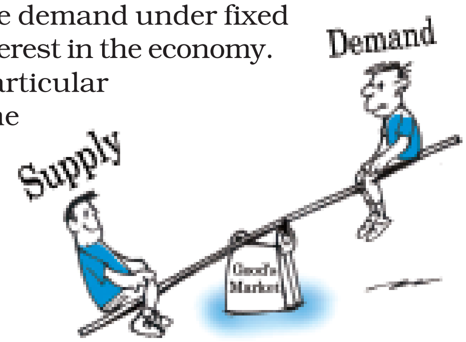


Fig. 4.4

Relationship between x and z

4.3 The Short Run Fixed Price Analysis of the Product Market

We now turn to the derivation of aggregate demand under fixed price of final goods and constant rate of interest in the economy. In order to hold price constant at any particular level, however, one must assume that the suppliers are willing to supply whatever amount consumers will demand at that price. If quantity supplied is either in excess of or falls short of quantity demanded at this price, price will change because of excess supply or demand. To avoid this problem, we assume that the elasticity of supply is infinite – i.e., supply schedule is



How will the producer try to update his production plans in order to avoid excess supply or demand? Discuss this in the classroom.

horizontal – at the fixed price. Under such circumstances, equilibrium output will be solely determined by the aggregate amount of demand at this price in the economy. We call it **effective demand principle**.

Note also the word short run. We assume that prices in the economy take some time to respond to the forces of excess supply or demand. In the mean time, producers try to update their production plans in order to avoid excess supply or demand. For instance, if they face an excess supply in the current production cycle they will plan to produce less in the next cycle so as to avoid accumulation of stocks in their warehouses. Note also that an individual producer is very small compared to the size of the national market and, therefore, she cannot affect market price on her own. An individual producer has to accept the price that prevails in the market. The aggregate price level in the economy changes only when adjustments in all markets of the economy fail to eliminate the excess demand or supply. Prices are, therefore, assumed to vary only in the long run.

4.3.1 A Point on the Aggregate Demand Curve

At a fixed price, the value of ex ante aggregate demand for final goods, AD, is equal to the sum total of ex ante consumption expenditure and ex ante investment expenditure. Under the effective demand principle, the equilibrium output of the final goods is equal to ex ante aggregate demand, as represented by equation 4.3

$$Y = \overline{A} + c.Y$$

where $\overline{A}$ is the total value of autonomous expenditure in the economy. Let us consider a numerical example to derive the value of the aggregate demand and hence equilibrium output in the economy at a fixed price. Suppose the values of the autonomous expenditures are $\overline{C} = 40$, $\overline{I} = 10$ and the value of mpc, $c = 0.8$. What will be the equilibrium value of Y ?

Consider $Y = 200$, as a trial solution. At this output, the value of the ex ante consumption expenditure is $C = \overline{C} + 0.8.Y = 40 + (0.8)200 = 200$, ex ante investment expenditure is $I = \overline{I} = 10$ and ex ante aggregate demand is $AD = C + I = 200 + 10 = 210$. At the level of output $Y = 200$ the value of ex ante aggregate demand is 210, which denotes a situation of excess demand. Clearly, $Y = 200$ is not the equilibrium level of output in the economy.

Consider, next, the output level $Y = 300$. Calculations similar to the above case shows that the value of ex ante aggregate demand will be

$$\overline{A} + cY = \overline{C} + \overline{I} + cY = 50 + (0.8)300 = 290.$$

The ex ante aggregate demand falls short of the output and there is excess supply. Hence, $Y = 300$ is also not the equilibrium level of output in the economy.

Finally, consider $Y = 250$. At this output, $AD = 50 + (0.8)250 = 250$. We have ultimately hit the correct value of Y, at which aggregate demand equals aggregate supply. $Y = 250$ is, therefore, the equilibrium output of the economy at the fixed price-interest rate combination.

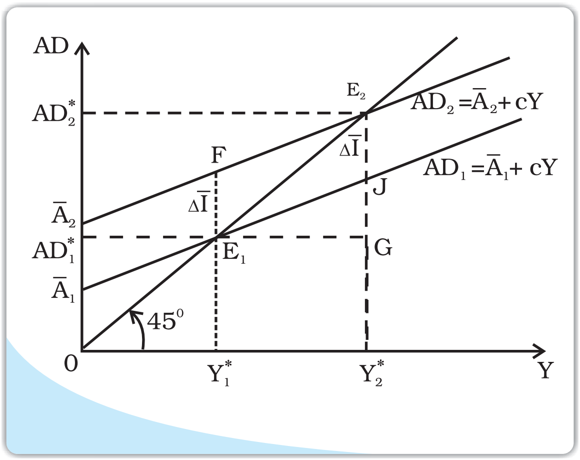
4.3.2 Effects of an Autonomous Change on Equilibrium Demand in the Product Market

What are the determinants of the equilibrium value of aggregate demand at fixed price? In other words, what governs whether the equilibrium aggregate demand would be 250 or 210 or 290 in the above example? The equilibrium output and aggregate demand at the fixed price-interest rate is derived by solving the equation $Y = AD = \bar{A} + cY$. It is an equation involving only one variable, Y. The solution of the equation is

$$Y = \frac{\bar{A}}{1-c} \qquad (4.4)$$

The value of Y will, therefore, depend on the values of the parameters on the right hand side, which are $\bar{A}$ and c in this case. In the above example, the equilibrium value of aggregate demand, 250, and hence the position of the single point on the aggregate demand schedule that we have derived so far, will depend on the values of these parameters. Compare the equation $AD = \bar{A} + cY$ with the equation of a straight line of the standard form: $b = \varepsilon + ma$, as discussed in section 4.2. $\bar{A}$ is the intercept parameter and c is the slope parameter of this equation. When c increases, the straight line representing the equation of aggregate demand will swing upwards. On the other hand, as $\bar{A}$ increases, the straight line will shift in parallel upwards. However, $\bar{A}$ is only a composite term, representing the sum of $\bar{C}$ and $\bar{I}$, which are, therefore, the truly shifted parameters of the AD line. Suppose $\bar{I}$ increases from 10 to 20. What will happen to equilibrium output and aggregate demand?

Figure 4.5 above depicts the situation. The lines AD_1 and AD_2 correspond to the two values of $\bar{A}$, viz. $\bar{A}_1$ and $\bar{A}_2$, respectively. These values differ by $\Delta\bar{I} = 10$, the increment in the autonomous investment. Slope of the AD lines is $0 < c < 1$ and their intercepts on the vertical axis are $\bar{A}_1$ and $\bar{A}_2$, respectively. Note that, AD lines are flatter than the 45° line since the slope of the latter line is equal to 1 (tan 45° = 1). The 45° line represents points at which aggregate demand and output are equal. Thus, when the level of autonomous expenditure in the economy is A_1, the AD_1 line intersects the 45° line at E_1, which is, therefore, the equilibrium point. The equilibrium values of output and aggregate demand are Y_1^* and AD_1^* (= 250), respectively.



Equilibrium Output and Aggregate Demand in the Fixed Price Model

When autonomous investment increases, the AD_1 line shifts in parallel upwards and assumes the position AD_2. The value of aggregate demand at output Y_1^* is Y_1^*F, which is greater than the value of output $0Y_1^* = Y_1^*E_1$ by an amount E_1F. E_1F measures the amount of excess demand that emerges in the economy as a result of the increase in autonomous expenditure. Thus, E_1 no longer represents the equilibrium. To find the new equilibrium in the final goods market we must look for the point where the new aggregate demand line, AD_2, intersects the 45° line. That occurs at point E_2, which is, therefore, the new equilibrium point. The new equilibrium values of output and aggregate demand are Y_2^* and AD_2^*, respectively.

Note that in the new equilibrium, output and aggregate demand have increased by an amount $E_1G = E_2G$, which is greater than the initial increment in autonomous expenditure, $\Delta\bar{I} = E_1F = E_2J$. Thus an initial increment in the autonomous expenditure seems to have a spill-over effect on the equilibrium values of aggregate demand and output. What causes aggregate demand and output to increase by an amount larger than the size of the initial increment in autonomous expenditure? We discuss it in section 4.3.3.

4.3.3 The Multiplier Mechanism

Clearly, 250 is no longer the equilibrium value of output or aggregate demand. With $\overline{I}$ = 20, aggregate demand in the economy will be equal to 40 + 20 + (0.8) 250 = 260 from equation (4.4), which is greater than the output Y = 250 by the amount of the increment in the autonomous investment ($\Delta \overline{I}$ = 10). There is excess demand in the economy and producers will have to run down their inventory to meet this extra demand. Thus, in the next production cycle, they revise their production plan upwards, i.e. increase the value of their planned supply of output by 10 to restore equilibrium in the final goods market.

In the absence of a government imposing indirect taxes or disbursing subsidies, the value of the total output of final goods or GDP is equal to National Income. The production of final goods employs factors such as labour, capital, land and entrepreneurship. In the absence of indirect taxes or subsidies, the total value of the final goods output is disbursed among different factors of production – wages to labour, interest to capital, rent to land etc. Whatever is left over is appropriated by the entrepreneur and is called profit. Thus the sum total of aggregate factor payments in the economy, National Income, is equal to the aggregate value of the output of final goods, GDP. In the above example the value of the extra output, 10, is distributed among various factors as factor payments and hence the income of the economy goes up by 10. When income increases by 10, consumption expenditure goes up by (0.8)10, since people spend 0.8 (= mpc) fraction of their additional income on consumption. Hence, in the next round, aggregate demand in the economy goes up by (0.8)10 and there again emerges an excess demand equal to (0.8)10. Therefore, in the next production cycle, producers increase their planned output further by (0.8)10 to restore equilibrium. When this extra output is distributed among factors, the income of the economy goes up by (0.8)10 and consumption demand increases further by $(0.8)^2 10$, once again creating excess demand of the same amount. This process goes on, round after round, with producers increasing their output to clear the excess demand in each round and consumers spending a part of their additional income from this extra production on consumption items – thereby creating further excess demand in the next round.

Let us register the changes in the values of aggregate demand and output at each round in Table 4.1.

Table 4.1: The Multiplier Mechanism in the Final Goods Market

	Consumption	*Aggregate Demand*	*Output/Income*
Round 1	0	10 (Autonomous Increment)	10
Round 2	(0.8)10	(0.8)10	(0.8)10
Round 3	$(0.8)^2 10$	$(0.8)^2 10$	$(0.8)^2 10$
Round 4	$(0.8)^3 10$	$(0.8)^3 10$	$(0.8)^3 10$
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	etc.

The last column measures the increments in the value of the output of final goods (and hence the income of the economy) in each round. The second and third columns measure the increments in total consumption expenditure in the economy and increments in the value of aggregate demand in a similar way. Note that the increments in final goods output in successive rounds are gradually diminishing. After a large number of rounds, therefore, the size of the increments will be virtually indistinguishable from zero and subsequent round effects will not practically contribute anything in the total volume of output. We say that the round effects on final goods output represent a convergent process. In order to find out the total increase in output of the final goods, we must add up the infinite geometric series in the last column, i.e.

$$10 + (0.8)10 + (0.8)^2\, 10 + \cdots\cdots \infty$$

$$= 10\,\{1 + (0.8) + (0.8)^2 + \cdots\cdots \infty\} = \frac{10}{1-0.8} = 50$$

The increment in equilibrium value of total output thus exceeds the initial increment in autonomous expenditure. The ratio of the total increment in equilibrium value of final goods output to the initial increment in autonomous expenditure is called the **output multiplier** of the economy. Recalling that 10 and 0.8 represent the values of $\Delta \overline{I} = \Delta \overline{A}$ and mpc, respectively, the expression for the multiplier can be written as

$$\text{The output multiplier} = \frac{\Delta Y}{\Delta \overline{A}} = \frac{1}{1-c} \qquad (4.5)$$

where ΔY is the total increment in final goods output and c = mpc. Observe that the size of the multiplier depends on the value of c. As c becomes larger the multiplier increases.

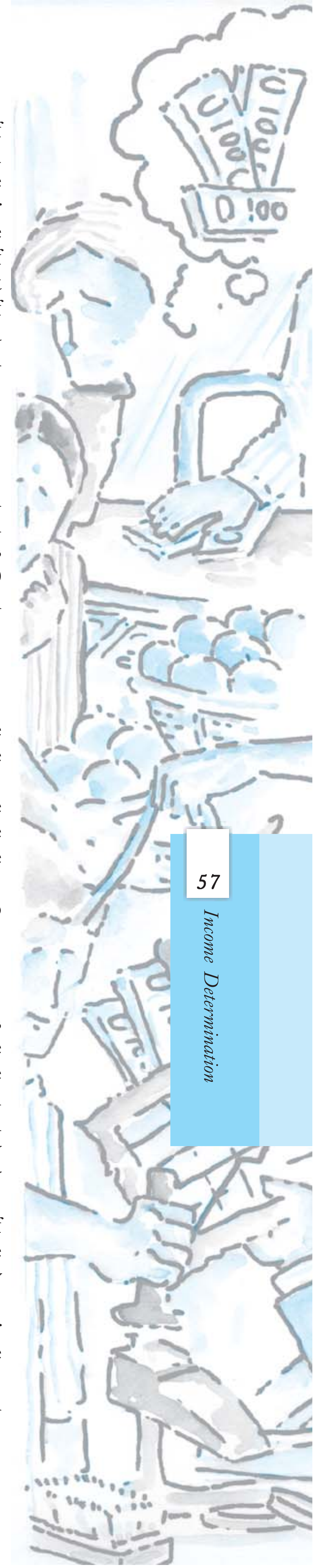
Referring back to our example, an increment in autonomous expenditure by 10 increases total output and aggregate demand in the economy by 50. The value of the multiplier is 5. To cross check our calculation, let us compute the value of aggregate demand and output at the new equilibrium with $\overline{I} = 20$. From equation (4.4) the value of output in the new equilibrium will be equal to

$$Y_2^* = \frac{40 + 20}{1-0.8} = 300$$

This shows that our computation of the multiplier is indeed correct.

We shall conclude the fixed price-interest rate analysis of the final goods market with an interesting counter-intuitive fact – or a 'paradox'. If all the people of the economy increase the proportion of income they save (i.e. if the mps of the economy increases) the total value of savings in the economy will not increase – it will either decline or remain unchanged. This result is known as the **Paradox of Thrift** – which states that as people become more thrifty they end up saving less or same as before. This result, though sounds apparently impossible, is actually a simple application of the model we have learnt.

Let us continue with the example. Suppose at the initial equilibrium of $Y = 250$, there is an exogenous or autonomous shift in peoples' expenditure pattern – they suddenly become more thrifty. This may happen due to a new information regarding an imminent war or some other impending disaster, which makes people more circumspect and conservative about their expenditures. Hence the mps of the economy increases, or, alternatively, the mpc decreases from 0.8 to 0.5. At the initial income level of $AD_1^* = Y_1^* = 250$, this sudden decline in mpc will imply a decrease in aggregate consumption



spending and hence in aggregate demand, $AD = \bar{A} + cY$, by an amount equal to (0.8 – 0.5) 250 = 75. This can be regarded as an autonomous reduction in consumption expenditure, to the extent that the change in mpc is occurring from some exogenous cause and is not a consequence of changes in the variables of the model. But as aggregate demand decreases by 75, it falls short of the output $Y^*_1 = 250$ and there emerges an excess supply equal to 75 in the economy. Stocks are piling up in warehouses and producers decide to cut the value of production by 75 in the next round to restore equilibrium in the market. But that would mean a reduction in factor payments in the next round and hence a reduction in income by 75. As income decreases people reduce consumption proportionately but, this time, according to the new value of mpc which is 0.5. Consumption expenditure, and hence aggregate demand, decreases by (0.5)75, which creates again an excess supply in the market. In the next round, therefore, producers reduce output further by (0.5)75. Income of the people decreases accordingly and consumption expenditure and aggregate demand goes down again by $(0.5)^2 75$. The process goes on. However, as can be inferred from the dwindling values of the successive round effects, the process is convergent. What is the total decrease in the value of output and aggregate demand? Add up the infinite series $75 + (0.5)\,75 + (0.5)^2\,75 + \cdots \infty$ and the total reduction in output turns out to be

$$\frac{75}{1-0.5} = 150$$

But that means the new equilibrium output of the economy is only $Y^*_2 = 100$. People are now saving $S^*_2 = Y^*_2 - C^*_2 = Y^*_2 - (\bar{C} + c_2.Y^*_2) = 100 - (40 + 0.5 \times 100) = 10$ in aggregate, whereas under the previous equilibrium they were saving $S^*_1 = Y^*_1 - C^*_1 = Y^*_1 - (\bar{C} + c_1.Y^*_1) = 250 - (40 + 0.8 \times 250) = 10$ at the previous mpc, $c_1 = 0.8$. Total value of savings in the economy has, therefore, remained unchanged.

In section 4.3.2, we had talked about two types of parametric changes in the position of the *AD* line. When $\bar{A}$ changes the line shifts upwards or downwards in parallel. When *c* changes, however, the line swings up or down. An increase in mps, or a decline in mpc, reduces the slope of the *AD* line and it swings downwards. We depict the situation in Fig. 4.6.

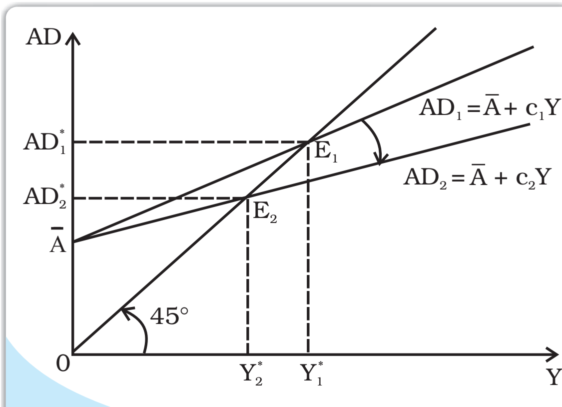


Fig. 4.6

Paradox of Thrift – Downward Swing of AD Line

At the initial values of the parameters, $\bar{A} = 50$ and $c = 0.8$, the equilibrium value of the output and aggregate demand from equation (4.4) was

$$Y^*_1 = \frac{50}{1-0.8} = 250$$

Under the changed value of the parameter $c = 0.5$, the new equilibrium value of output and aggregate demand is

$$Y_2^* = \frac{50}{1-0.5} = 100$$

The equilibrium output and aggregate demand have declined by 150. As explained above, this, in turn, implies that there is no change in the total value of savings.

Summary

When, at a particular price level, aggregate demand for final goods equals aggregate supply of final goods, the final goods or product market reaches its equilibrium. Aggregate demand for final goods consists of ex ante consumption, ex ante investment, government spending etc. The rate of increase in ex ante consumption due to a unit increment in income is called marginal propensity to consume. For simplicity we assume a constant final goods price and constant rate of interest over short run to determine the level of aggregate demand for final goods in the economy. We also assume that the aggregate supply is perfectly elastic at this price. Under such circumstances, aggregate output is determined solely by the level of aggregate demand. This is known as effective demand principle. An increase (decrease) in autonomous spending causes aggregate output of final goods to increase (decrease) by a larger amount through the multiplier process.

Key Concepts

Aggregate demand
Equilibrium
Ex post
Marginal propensity to consume
Unintended changes in inventories
Parametric shift
Paradox of thrift
Aggregate supply
Ex ante
Ex ante consumption
Ex ante investment
Autonomous change
Effective demand principle
Autonomous expenditure multiplier

Exercises

1. What is marginal propensity to consume? How is it related to marginal propensity to save?
2. What is the difference between ex ante investment and ex post investment?
3. What do you understand by 'parametric shift of a line'? How does a line shift when its (i) slope decreases, and (ii) its intercept increases?
4. What is 'effective demand'? How will you derive the autonomous expenditure multiplier when price of final goods and the rate of interest are given?
5. Measure the level of ex-ante aggregate demand when autonomous investment and consumption expenditure (A) is Rs 50 crores, and MPS is 0.2 and level of income (Y) is Rs 4000 crores. State whether the economy is in equilibrium or not (cite reasons).
6. Explain 'Paradox of Thrift'.

Suggested Readings

1. Dornbusch, R. and S. Fischer. 1990. *Macroeconomics*, (fifth edition) pages 63 – 105, McGraw Hill, Paris.