Simple Keynesian Model (SKM): Assumptions, Conditions and Defects

Aggregate Supply Function

It refers to the total supply of goods and services in the economy. The derivation of the Keynesian aggregate supply schedule is illustrated in the next figure. Keynes used the classical production function to derive his aggregate supply schedule i.e. Y= f(K,L).

Given the production function and technology, the level of real income (Y) depends on the supply and use of the productive resources, viz., capital (K) and labour (L). In the short run, the stock of capital K is assumed to be constant. Therefore, short run output depends on the level of employment (L), capital remaining constant. Thus, the short run production function may be written as Y= f(L, $\overline{K}$)

As the curve shows, real output (Y) increases with the increase in labour employment, but MPP_L= ΔY/ΔL goes on decreasing. The relationship between labour employment and the real output forms the basis of the Keynesian aggregate supply curve.

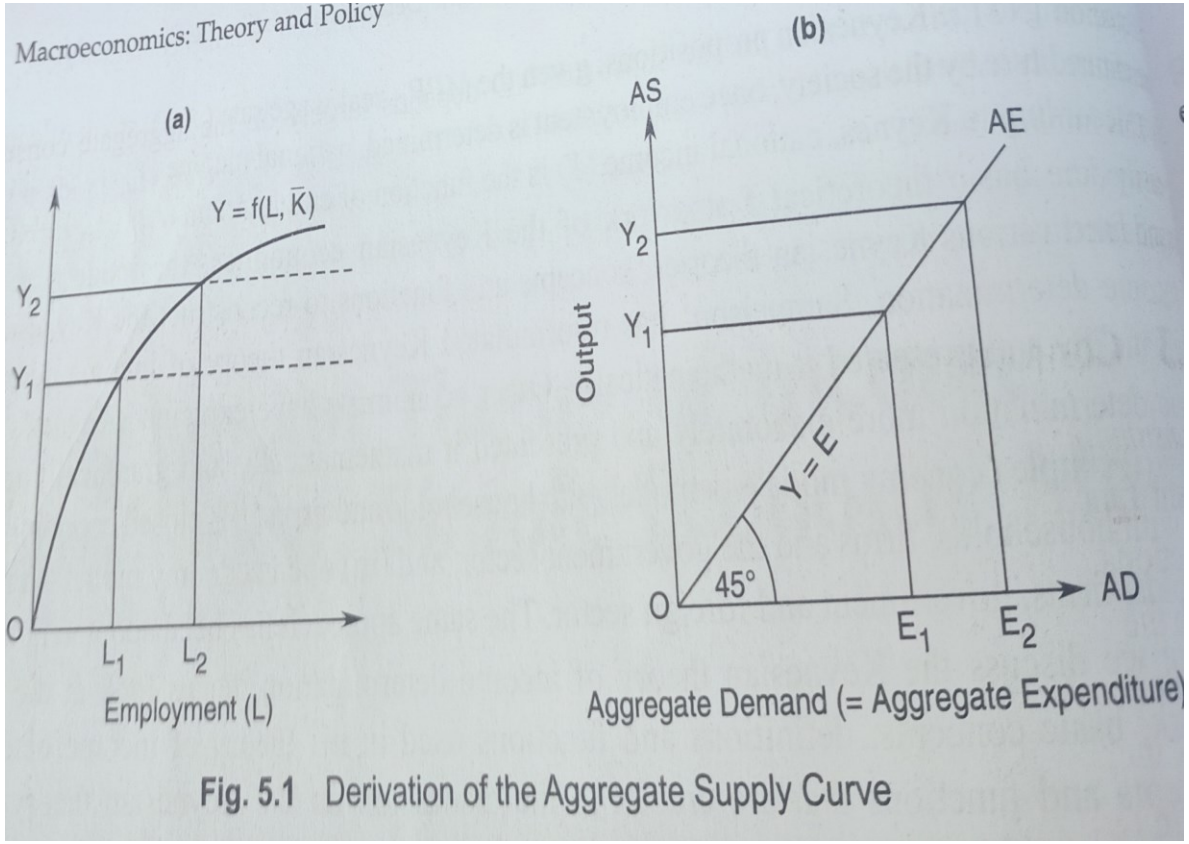


Fig. 5.1 Derivation of the Aggregate Supply Curve

Derivation of the Aggregate Supply Curve

The logic behind the increase in real output with increase in employment is given as follows. The value of real output (Y) measured on the Y axis, equals the aggregate supply price, that is, the price that producers expect to realize when total output is sold at a given price. As shown in panel (a) of the figure, if producers expects a demand equal to OY1, they will employ labour OL2, and supply goods and services worth OY2, and so on. It means that the aggregate supply (AS) is always equal to the aggregate demand (AD) for output, i.e., AD=AS at all the levels of output. This relationship between AD and AS forms the basis of Keynesian aggregate supply function. In panel b, Y axis measures the aggregate supply (AS) and X axis measure the aggregate demand (AD) in terms of aggregate expenditure(AE). The relationship between aggregate demand and aggregate supply is shown by a 45degree line, AE. The 45-degree aggregate supply line implies that aggregate demand equals aggregate supply at all levels of output. The aggregate supply line AE represents the Keynesian aggregate supply function.

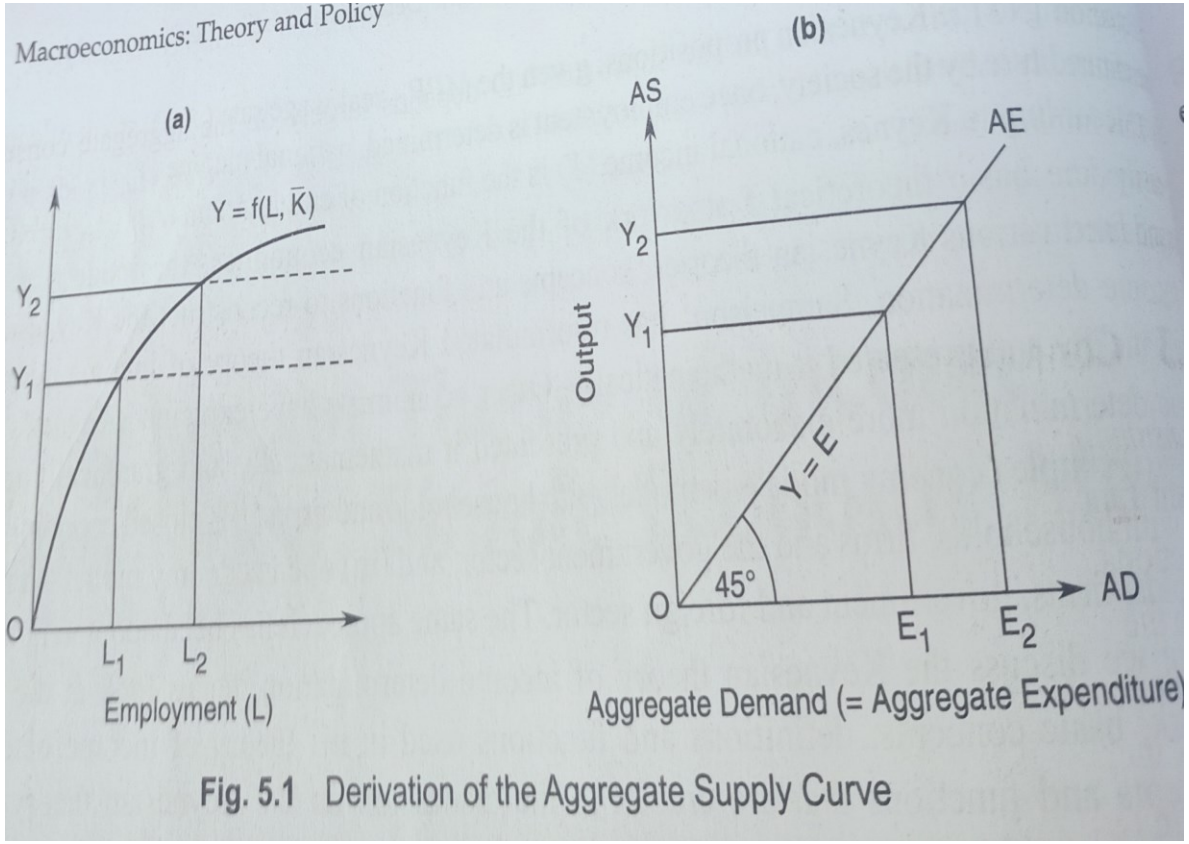


Fig. 5.1 Derivation of the Aggregate Supply Curve

Aggregate Demand Function: 2-sector model

- *Aggregate demand*, or *AD*, refers to the amount of total spending on domestic goods and services in an economy. Strictly speaking, AD is what economists call total planned expenditure. AD≡ C+I
- Variable I is assumed to be determined exogenously and to remain constant in the short run. The short run aggregate demand function can thus be expressed as AD≡ C+$\bar{I}$
- $Where\ \bar{I} = constant\ investment.$

In the short run, AD depends largely on aggregate consumption expenditure. Aggregate demand consists of two parts—consumption demand and investment demand.

Consumption Function: Most important functions in the Keynesian theory of income determination

- As the demand for a good depends upon its price, similarly consumption of a community depends upon the level of income. In other words, consumption is a function of income. The consumption function relates the amount of consumption to the level of income. When the income of a community rises, consumption also rises. The consumption expenditure is a positive function of income i.e., when consumption increases positively with increase in income. According to Keynes, the positive relationship between income and consumption is based on a "fundamental psychological law" that men are disposed as a rule and on an average to increase their consumption as their income increases, but not as much as the increase in their income
- $C=f(Y)$, $\Delta C/\Delta Y>0$
- The nature and extent of the relationship between income and consumption is interpreted by propensity to consume.
- $C=a+by$
- Let consumer's income increase by ΔY and consumption increase by ΔC. Therefore, the consumption function is given as $C+\Delta C= a+b(Y+\Delta Y)$

$\Delta C=a+bY+b\Delta Y-C = C+b\Delta Y-C=b\Delta Y$

$\Delta C/\Delta Y=b$

$C=200+0.75Y$

When aggregate income increases by Rs 100, aggregate consumption increases by Rs 75.

How much consumption changes in response to a given change in income depends upon the average and marginal propensity to consume. Thus, the propensity to consume of a community can be known by the average and marginal propensity to consume. Average propensity to consume is the ratio of the amount of consumption to total income. Therefore, average propensity to consume is calculated by dividing the amount of consumption by the total income. Thus,

APC = C/Y, where

APC stands for average propensity to consume,

C for the amount of consumption, and

F for the level of income.

In Table, it will be seen that at the level of income Rs 1000 crores, consumption expenditure is equal to Rs. 750 crores. Therefore, the average propensity to consume is here equal to 750/1000 = 0.75. Likewise, when the income rises to Rs. 1200 crores, consumption rises to Rs. 900 crores.

Therefore, the average propensity to consume will be 900/1200 = 0.75. In this schedule of consumption function, the average propensity to consume is the same at all levels of income. Keynesian consumption function CC is shown in Fig. 6.3.

Income (Rs. in crores) Y	*Consumption (Rs. in crores)* C	*Average Propensity to Consume* $\left(\frac{C}{Y}\right)$	*Marginal Propensity to Consume* $\left(\frac{\Delta C}{\Delta Y}\right)$
1000	750	$\frac{750}{1000} = 0.75$	—
1100	825	$\frac{825}{1100} = 0.75$	$\frac{75}{100} = .75$
1200	900	$\frac{900}{1200} = 0.75$	$\frac{75}{100} = .75$
1300	975	$\frac{975}{1300} = 0.75$	$\frac{75}{100} = .75$
1400	1050	$\frac{1050}{1400} = 0.75$	$\frac{75}{100} = .75$
1500	1125	$\frac{1125}{1500} = 0.75$	$\frac{75}{100} = .75$
1600	1200	$\frac{1200}{1600} = 0.75$	$\frac{75}{100} = .75$

Income Determination in the Simple Keynesian Model

Assumptions

1. Only 2 sectors- households and firms
2. Aggregate Demand consists of aggregate consumer demand (c) and aggregate investment demand (I). Thus, aggregate demand (AD) = C+I and there is no leakage or injection
3. No government interference
4. Closed economy
5. In the business sector i.e. in the firms there are no corporate savings or retained earnings. The total profit is distributed as dividend.
6. All prices, including the factor prices are constant
7. The supply of capital and technology are given

Income and Output Determination

Aggregate Demand-Aggregate Supply Approach (AD-AS) or Income Expenditure Approach

C+I=C+S

Y= C+I

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

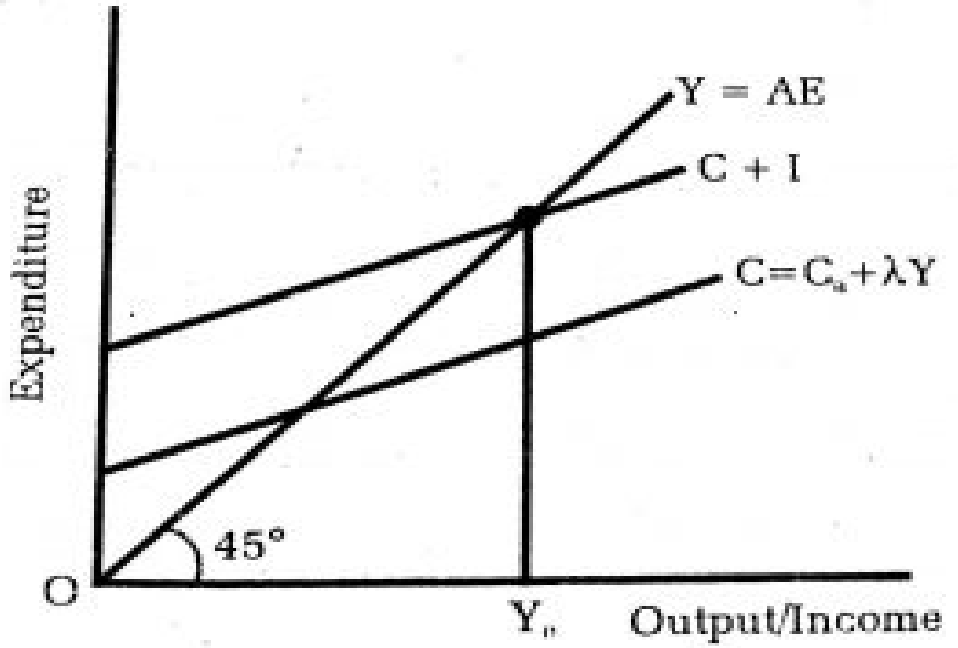
Y(1-b)= a+ $\bar{I}$

Y=a+ $\bar{I}$/1-b

Determination of Consumption

C=a+bY

C=a + b(a+$\bar{I}$/1-b)=a+b/1-b (a+ $\bar{I}$)



Numerical Example

C=100+0.75Y, $\bar{I} = 200$. $Find\ equilibrium\ level\ of\ income\ and\ consumption$.

Savings and Investment Approach

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

$\bar{I} = S$

As , S=Y-C and C=a+bY

S=Y-(a+bY)

S= Y-a-bY

S=-a+(1-b)Y

200=-100+(1-0.75)Y =1200

To see whether OY_E is a stable equilibrium income, we consider OY_1 or OY_2 level of income. If the deviation from OY_E level of income gets corrected or if the equilibrium income OY_E is attained after deviation, then equilibrium is said to be a stable one. At OY_1 level of income, investment (injection) exceeds saving (leakage). Aggregate demand must exceed aggregate output. This will result in an unplanned reduction of inventories to meet excess demand. Consequently, output will rise until planned saving and planned investment are equal.

Similarly, at OY_2 level of income, since saving exceeds investment, aggregate demand falls short of aggregate supply. Hence, an excess supply of commodities will appear leading to an unplanned accumulation of inventories. This will act as an incentive to cut back output. Output will continue to decline until point E is reached where OY_E equilibrium level of national income is determined. Thus, $OY_£$ is a stable equilibrium.

The condition for stability is that the saving curve must be positively sloped. MPS is the slope of the saving function. To have stability, the value of MPS must be positive but less than one. Remember that MPS is complementary to MPC. If MPC < 1, then MPS must be less than one since MPC + MPS = 1. Thus, the condition for stability in equilibrium income in both the approaches is the same, i.e., 0 < MPC < 1.

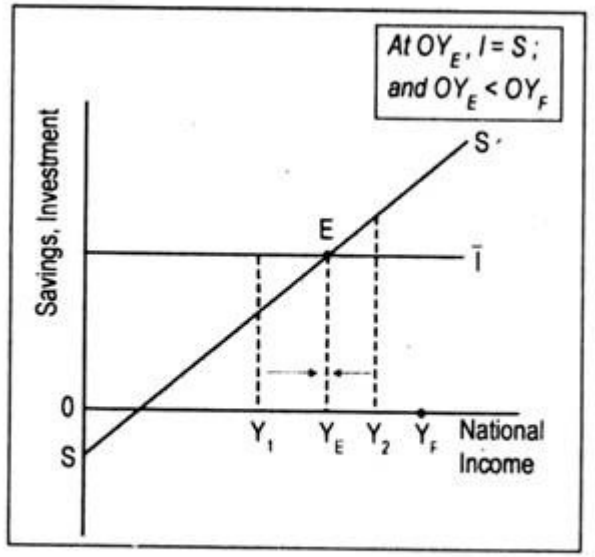


Fig. 3.12: Equilibrium Income: Saving-Investment Approach

- **The Components of Aggregate Demand:**
- Since the level of income in the SKM is determined by aggregate demand, we have to study the factors determining each component (viz., consumption, investment and government expenditure). Since consumption and saving on the one hand, and government expenditure and taxes on the other are mirror image concepts, we have to study the determinants of saving and the role of taxes.
- Since private consumption expenditure is the most important component of aggregate desired expenditure, our discussion starts with consumption.
- **i. Consumption:**
- According to Keynes the level of consumption expenditure is a stable function of disposable income which is national income less taxes paid ($Y_d = Y – T$). Although consumption is affected by various other variables (called non-income determinants of consumption), income is the main factor influencing consumption.
- This is why in his discussion of consumption function. Keynes ignored all other factors influencing consumption.
- **The Keynesian short-run consumption function showing consumption-income relationship is expressed as:**
- $C = a + bY_d$
- $a > 0, b < 1$ …(9)
- This income-consumption relation is shown in Fig. 8.2. Here the intercept term, a indicates autonomous consumption which has no relation to Y_d. The parameter, 'b', is slope of the function, i.e., $b = \Delta C/\Delta Y$. It is called the marginal propensity to consume (MPC).
- It gives the increase in consumer expenditure per unit increase in Y_d. It can be defined as the ratio of the change in C brought about by certain change in Y_d. Consumption is primarily induced expenditure, meaning expenditure that depends directly on the level of income.
- According to Keynes 'b' is greater than zero but less than one. In other words, it lies in-between zero and one. This simply means that consumption will increase with an increase in disposable income ($b > 0$) but the increase in consumption will be less than the increase in disposable income ($b < 1$).

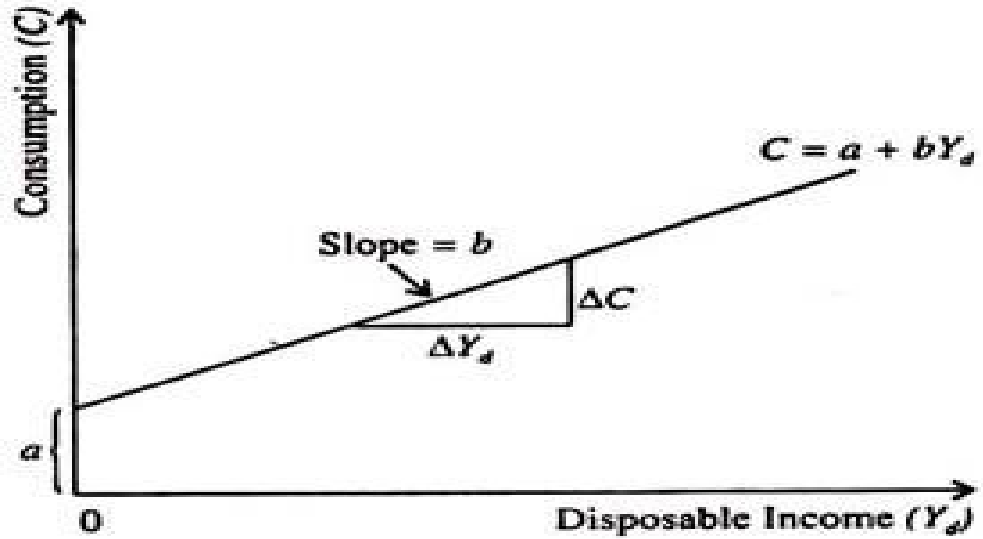


Fig. 8.2 The Keynesian Consumption Function

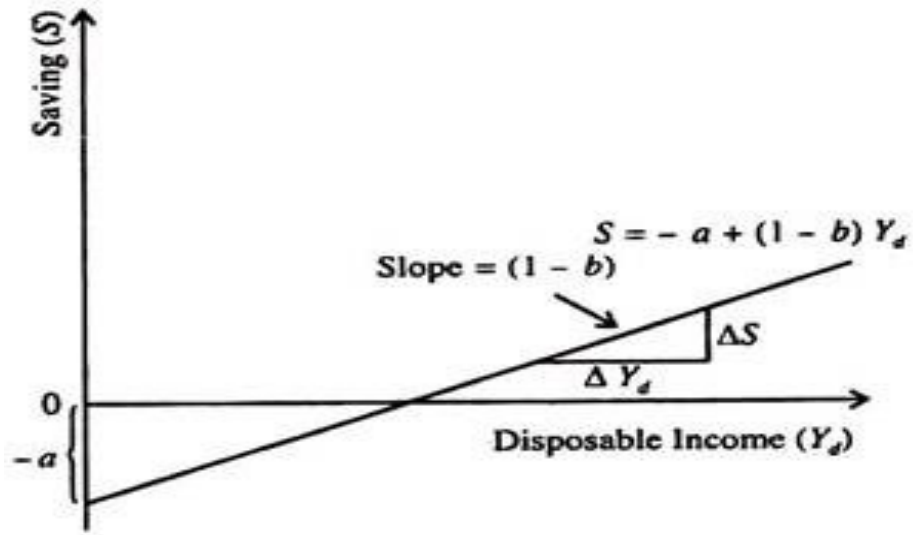


Fig. 8.3 The Keynesian Saving Function

ii. Investment:

- According to Keynes the level of aggregate demand (desired expenditure) depends on two things, viz., the desire to consume and the inducement to invest. So like consumption, investment is also a key variable in SKM. One main factor causing changes in equilibrium income in SKM is desired business investment expenditure.
- According to Keynes, national income in a closed economy moves up or down due to changes in aggregate demand and Keynes looked at those components of aggregate demand which were autonomous, i.e., independent of current income. Changes in autonomous (income-independent) components of aggregate demand cause national income to vary.
- According to Keynes there are two primary determinants of investment expenditure in the short-run the interest rate (which is a policy variable) and the expected rate of return on new investment projects, called the marginal efficiency of capital (MEC).
- If we assume that the rate of interest remains constant in the short run, then investment can be taken as determined solely by MEC, which is determined by the state of business expectations.
- Since investment depended upon expectations of the future (which could shift frequently, and at times drastically, in response to new information and events) and the future was uncertain, Keynes felt that investment was unstable. In the SKM all investment is taken as autonomous. Hence the investment demand schedule is a horizontal straight line with zero slope. This means that a fixed level of investment takes place at all levels of income.

Defects of the SKM:

- The simple Keynesian model, presented in this chapter, is incomplete. It ignores money and interest rates and fails to explain the behaviour of prices and wages. Yet the model is useful in more “ways than one.

- Firstly, the model clearly illustrates the role of aggregate demand in determining equilibrium income in a closed economy. No doubt aggregate demand plays a key role in determining income in the SKM. But it overstates the role of aggregate demand.

- In Keynes’ view, changes in autonomous expenditure, especially private investment demand, cause changes in equilibrium level of income. Changes in primary investment also induce changes in consumption spending. As a result, national income rises by a multiple of the initial increase in investment.

- The increase in national income is equal to the primary investment (autonomous) plus a chain of secondary consumption spending. According to Keynes, the root cause of unemployment and depression is inadequate investment, and a consequent low level of aggregate demand.

- The model also highlights the role of compensatory fiscal policy to stabilise the economy. Fiscal policy can be used to manage aggregate demand to restore equilibrium output which fluctuates due to unstable investment demand.

- Here we have considered a simple closed economy. However, the model can be extended to cover an open economy

Investment Multiplier

- Why the increase in income is many times more than the initial increase in investment?
- Suppose Government undertakes investment expenditure equal to Rs. 100 crores on some public works, say, the construction of rural roads. For this Government will pay wages to the labourers engaged, prices for the materials to the suppliers and remunerations to other factors who make contribution to the work of road-building.

- The total cost will amount to Rs. 100 crores. This will increase incomes of the people equal to Rs. 100 crores. But this is not all. The people who receive Rs. 100 crores will spend a good part of them on consumer goods. Suppose marginal propensity to consume of the people is 4/5 or 80%.

- Then out of Rs. 100 crores they will spend Rs. 80 crores on consumer goods, which would increase incomes of those people who supply consumer goods equal to Rs. 80 crores. But those who receive these Rs. 80 crores will also in turn spend these incomes, depending upon their marginal propensity to consume. If their marginal propensity to consume is also 4/5, then they will spend Rs. 64 crores on consumer goods. Thus, this will further increase incomes of some other people equal to Rs. 64 crores.

- In this way, the chain of consumption expenditure would continue and the income of the people will go on increasing. But every additional increase in income will be progressively less since a part of the income received will be saved. Thus, we see that the income will not increase by only Rs. 100 crores, which was initially invested in the construction of roads, but by many times more.

Derivation of Investment Multiplier:

- Writing the equation for the equilibrium level of income we have

- $Y = C + I$ … (1)
- As in the multiplier analysis we are concerned with changes in income induced by changes in investment, rewriting the equation (1) in terms of changes in the variables we have

- $\Delta Y = \Delta C + \Delta I$ … (2)

- In the simple Keynesian model of income determination, change in investment is considered to be autonomous or independent of changes in income while changes in consumption are function of changes in income.

- In the consumption function,

C = a + bY where a is a constant term, b is MPC which is also assumed to be constant. Therefore, change in consumption can occur only with the change in income.

$$\Delta C = b\Delta Y \qquad \ldots(3)$$

Substituting (3) into (2) we have

$$\Delta Y = b\Delta Y + \Delta I$$

$$\Delta Y - b\Delta Y = \Delta I$$

$$\Delta Y(1 - b) = \Delta I$$

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

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

As b stands for marginal propensity to consume,

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

- The multiplier tells us how much increase in income occurs when autonomous investment increases by Rs. 1, that is, investment multiplier $\Delta Y/\Delta I$ is and its value is equal to 1/1-b where b stands for marginal propensity to consume (MPC). Thus, multiplier $=\Delta Y/\Delta I = 1/$ 1-b equals marginal propensity to save (MPS) the value of investment multiplier is equal to 1/1-b = 1/s where s stands for marginal propensity to save. In other words, the size of multiplier is equal to 1/1- MPC = 1/MPC Thus, the value of multiplier can be obtained if we know either the value of MPS or MPS.

- Now, higher the marginal propensity to consume (b) (or the lower the value of marginal propensity to save (s), the greater the value of multiplier. For example, if marginal propensity to consume (b) is 0.8, investment multiplier is

$$\frac{\Delta Y}{\Delta I} = \frac{1}{1-08} = \frac{1}{0.2} = 1 \times \frac{10}{2} = 5$$

If *MPC* or $b = 0.75$, multiplier is

$$= \frac{\Delta Y}{\Delta I} = \frac{1}{1-0.75} = \frac{1}{0.25} = \frac{100}{25} = 4$$

Applicability of the Multiplier Theory

The theory of multiplier does not generally apply to Less Developed Countries (LDC)-Why?

- According to the multiplier theory, the higher the MPC, the higher the rate of multiplier. It is equally true that the lower the income, the higher the MPC. The World Bank's development reports show that the LDC have a lower per capita income and lower rate of savings and investment compared to the developed countries (DC). The lower rate of savings indicates have a higher relatively higher MPC. This implies that the multiplier must be higher in LDCs than that of DCs. It follows that the rate of economic growth resulting from additional investment must be much higher in the LDC than in DC. In reality this is not true. The multiplier and the rate of growth are both lower in LDC compared to DC. This creates a paradoxical situation which is called "Keyne's MPC and the multiplier paradox'. Hence, logic of Keynesian multiplier does not apply to the LDC.
- A considerable time lag between the increasing demand and forthcoming supply. This tends to widen the difference between the multiplier linking up increments of money investment with increments of money income and that linking up increments of investments with increments of total output with the result that the money income and prices rise much faster than the real income and output.
- Characteristics of LDCs:

A predominant agricultural sector

A vast distinguished unemployment

Low level of capital equipment

Low level of technology and technical know-how

Paradox of thrift and the multiplier

When all households become thrifty or they decide to save more, and consume less, the level of income and savings of the nation tend to decline. This is what known as paradox of thrift which is illustrated through saving-investment approach to income determination.

The schedule marked C-I shows the constant investment and the schedule marked PS shows the normal planned saving schedule. The investment and saving schedules intersect at point E, determining the equilibrium level of income at OY1 where S=I=EY1.

Now let the society decide to become thrifty i.e. to cut down the consumption and increase the savings, say by AE. As a result the saving schedule shifts upward P'S' intersecting investment schedule at point F. Consequently, the point of equilibrium shifts from E to F and the equilibrium level of income falls from OY1 to OY0. As the figure shows, planned savings too fall from AY1 to FY0. Note that FY0<AY1. The decline in the equilibrium level of saving shows the paradox of thrift and the people get poorer with a larger saving

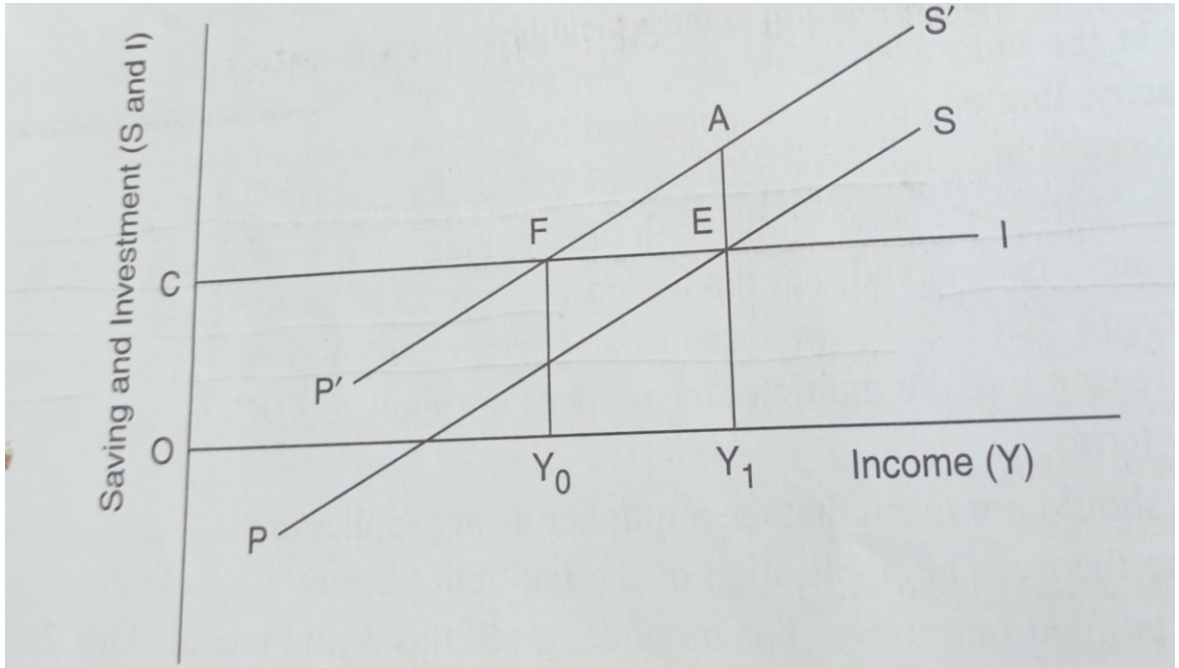


Fig. 6.2 Paradox of Thrift

- The process through which the paradox of thrift works to reduce the savings is the process of reverse multiplier because increased saving is virtually a withdrawl from the circular flow of income. This implies savings are not invested either because there is full employment or people do not want to invest due to high rate of risk. This leads to inverse multiplier.
- If people decide to increase their savings by cutting down their consumption expenditure, the demand for consumer goods and services tends to decline. The decline in the demand results in bulid up of inventories (unsold stock of goods and services) of the business firm. Therefore, they cut down their production. This leads to decline in incomes. Since savings is a function of income, fall in the income causes decline in the savings.