Theory of Multiplier

THE CONCEPT OF MULTIPLIER

The theory of multiplier occupies an important place in the modern theory of income and employment. The concept of multiplier was first of all developed by F.A. Kahn in the early 1930

The essence of multiplier is that total increase in income, output or employment is manifold the original increase in investments.

The multiplier is, therefore, the ratio of increment in income to the increment in investment.

$$k = \Delta Y / \Delta I$$

where k stands for multiplier.

Algebraic Derivation of Multiplier

Writing the equation for the equilibrium level of income in a two-sector economy we have

$$Y = C + I \qquad (1)$$

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

$$\Delta Y = \Delta C + \Delta I \qquad (2)$$

In the Keynesian consumption function,

$$C = a + bY$$

Therefore, change in consumption can occur only if there is change in income. Thus

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

Continue…

Substituting (3) into (2) we have

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

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

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

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

$$\Delta Y/ \Delta I = 1 /1 - b$$

As b stands for marginal propensity to consume.

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

Calculating the Size or Value of Multiplier

The multiplier tells us how much increase in income occurs when autonomous investment increases by ` 1 unit , that is, investment multiplier is

$$\Delta Y / \Delta I$$

and its value is equal to

$$1 / 1-b$$

where b stands for marginal propensity to consume (MPC). Thus, multiplier

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

In other words, the size of multiplier is equal to

$$1/ 1\text{-}MPC = 1/ MPS$$

Continue…

- Now, the 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

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

Given the size of multiplier, we can find out the increase in income (ΔY) resulting from a certain increase in investment (ΔI) by using the multiplier relationship. Thus

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

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

If marginal propensity to consume is equal to 0.8, with the increase in investment by ₹ 100 crore, the increase in income will be :

$$\Delta = \Delta I \times \frac{1}{1-b} = 100 \times \frac{1}{1-0.8}$$

$$100 \times \frac{1}{0.2} = 100 \times 5 = 500 \text{ crore.}$$

A Numerical Problem on Multiplier

Problem 1. *Suppose the level of autonomous investment in an economy is ₹ 200 crore and consumption function of the economy is :*

$$C = 80 + 0.75Y$$

(a) What will be the equilibrium level of income?

(b) What will be the increase in national income if investment increases by ₹ 25 crore?

Solution. (*a*) For equilibrium level of income,

$$Y = C + I \quad \ldots(i)$$

where

$$C = 80 + 0.75Y$$

$$I = 200 \text{ crore}$$

Substituting the values of C and I in (*i*) we have

$$Y = 80 + 0.75Y + 200$$

$$(Y - 0.75Y) = 80 + 200 = 280$$

$$0.25\ Y = 280$$

$$Y = 280 \times \frac{100}{25} = 1120$$

Equilibrium level of income is therefore equal to 1120 crore.

(*b*) How much increase in income will occur as a result of increase in investment by ₹ 25 crore depends on the size of multiplier. The size of multiplier is determined by the value of marginal propensity to consume. In the given consumption function ($C = 80 + 0.75Y$) marginal propensity to consume is equal to 0.75 or $\frac{3}{4}$. Thus,

$$\text{multiplier} = \frac{1}{1 - MPC} = \frac{1}{1 - \frac{3}{4}} = 4$$

Thus, with increase in investment by ₹ 25 crore, national income will rise by $25 \times 4 = 100$ crore.

Problem 2. *Suppose in a country investment increases by ₹ 100 and consumption is given by $C = 10 + 0.6Y$ (where C = consumption and Y = income). How much increase will there take place in income ?*

Solution.

Multiplier, $$k = \frac{\Delta Y}{\Delta I}$$

or $$\Delta Y = k.\,\Delta I \qquad \ldots(i)$$

Now, multiplier, $$k = \frac{1}{1 - MPC}$$

In the given consumption function, $MPC = 0.6$

Multiplier, $$k = \frac{1}{1-0.6} = \frac{1}{0.4} = \frac{1}{\frac{4}{10}} = \frac{1}{\frac{2}{5}} = 2.5$$

Substituting the value of $k = 2.5$ and $\Delta I =$ ₹ 100 in (i) above, we have

$$\Delta Y + 2.5 \times 100 = 250$$

Problem 3. *What increase in investment is needed to raise income by ₹ 4,000 crore, if MPC is 0.75 ? How much increase will there be in consumption and saving due to this increase in income?*

Solution. How much increase in investment is required to raise income by ₹ 4,000 crore depends on the value of multiplier and the size of multiplier (k) depends on the marginal propensity to consume (MPC). Thus,

Multiplier $$k = \frac{1}{1 - MPC} = \frac{1}{1 - 0.75} = \frac{1}{0.25} = 4$$

Now, $$k = \frac{\Delta Y}{\Delta I}$$

or $$\Delta I = \frac{\Delta Y}{k} \qquad \ldots(i)$$

Substituting the value of ΔY and k in (i), we have

$$\Delta I = \frac{4000}{4} = 1000$$

Thus, investment should be increased by ₹ 1,000 crore to achieve ₹ 4,000 crore increase in income.

Given MPC = 0.75, the increase in consumption will be $4000 \times 0.75 =$ ₹ 3000 crore and increase in saving will be $4000 \times 0.25 = 1000$ crore.

Break

Money : Nature, Functions and Role

Difficulties of Barter System and Invention of Money

Barter System: exchange of goods for the other goods

The following are the main difficulties which were found in the barter system.

1. Double Coincidence of Wants
2. Lack of a Standard Unit of Account
3. Impossibility of Subdivision of Goods
4. Lack of Information.

EVOLUTION OF MONEY

Use of Commodities as Money.

In the beginning it was commodities which was selected as a medium of exchange and thus came to be used as money. Bows, sea shells, beads, arrows, furs and skin etc. were adopted as money at different times.

Use of Metallic Money

The superiority of precious metals like gold and silver for monetary use. They are easily handled and stored, they do not deteriorate, they have just the right degree of scarcity

Use of Paper Money

In the beginning paper money, that is, paper notes were simple claims to and substitutes for metallic money. But in the course of time paper money came to be regarded as money itself. Full Reserve System

Definition of Money

"Money can be defined as anything that is generally acceptable as a means of exchange and that at the same time acts as a measure and a store of value"

Two important things about money emerge from the above two definitions of money.

First, Money has been defined in terms of the functions it performs. That is why some economists have said that **money is what money does**. That is, money is any thing which performs the functions of money.

Secondly, an essential requirement of any kind of money is that it must be **generally acceptable** to every member of the society

FUNCTIONS OF MONEY

1. **Medium of Exchange**.

The function of medium of exchange that money performs has become possible because money has enabled us to separate the act of buying from the act of selling and thus avoids double coincidence of wants.

2. Measure of Value or a Unit of Account.

Money serves as a yardstick for measuring the value of goods and services. As the value of all goods and services is measured in a standard unit of money, their relative values can be easily compared.

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3. Standard of Deferred Payment

Deferred payments mean those payments which are to be made in the future. If a loan is taken today, it would be paid back after a period of time.

4. Store of Value

Money being the most **liquid of all assets** is a convenient form in which to store wealth, that is, money can be held as an asset. Money would perform the store of value function properly if it remains stable in value.

FORMS OF MONEY

Money of Account.

Money of account is the monetary unit in terms of which the accounts of a country are kept and transactions settled, i.e., in which general purchasing power, debts and prices are expressed. The rupee is, for instance.

Limited and Unlimited Legal Tender

A legal tender currency is one in terms of which debts can be legally paid. A currency is unlimited legal tender when debts upto any amount can be paid through it.

Standard Money In old days the standard money was a full bodied money, i.e., *its face value was equal to the real or intrinsic worth of the metal it contained*. But now-a-days in almost all countries of the world, even the standard money is only a token money i.e., the material contained in it is very much less than the face value written on it.

Fiat Money

The paper money is also not backed by gold or silver and is generally acceptable by the public as a medium of exchange and for settlement of debts because of the fiat (i.e., legal order or sanction) of the government.

Bank Money

Demand deposits of banks are usually called bank money