Subject – Macroeconomics

Notes Unit 4 Part B

By -

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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 1930s. But Keynes later further refined it. F.A. Kahn developed the concept of multiplier with reference to the increase in employment, direct as well as indirect, as a result of initial increase in investment and employment.

Keynes, however, propounded the concept of multiplier with reference to the increase in total income, direct as well as indirect, as a result of original increase in investment and income. Therefore, whereas Kahn's multiplier is known as 'employment multiplier', Keynes's multiplier is known as investment or income multiplier.

The essence of multiplier is that total increase in income, output or employment is manifold the original increase in investment. For example, if investment equal to Rs. 100 crores is made, then the income will not rise by Rs. 100 crores only but a multiple of it.

If as a result of the investment of Rs. 100 crores, the national income increases by Rs. 300 crores, multiplier is equal to 3. If as a result of investment of Rs. 100 crores, total national income increases by Rs. 400 crores, multiplier is 4. The multiplier is, therefore, the ratio of increment in income to the increment in investment. If ΔI stands for increment in investment and AY stands

for the resultant increase in income, then multiplier is equal to the ratio of increment in income (Δy) to the increment in investment (ΔI). Therefore $k = \Delta Y/\Delta I$ where k stands for multiplier.

Now, the question is why the increase in income is many times more than the initial increase in investment. It is easy to explain this. 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 time more.

Derivation of Investment Multiplier:

How much increase in national income will take place as a result of an initial increase in investment can be expressed in the following mathematical form:

Increase in income

Or

$\Delta Y = 100 + 100 \times 4/5 + 100(4/5)^2 + 100(4/5)^3 + 100(4/5)^4$

$= 100[1 + (4/5) + (4/5)^2 + (4/5)^3 + (4/5)^4]$

But the above series is one of geometric progression. Therefore, increase in income (ΔY)

= 100 1/1-4/5

= 100 X 1/1/5

= 100 x 5

= 500

It is thus clear that if the marginal propensity to consume is 4/5, the investment of Rs. 100 crores leads to the increase in the national income by Rs. 500 crores. Therefore, multiplier here is equal to 5. We can express this in a general formula.

If ΔY stands for increase in income, ΔI stands for increase in investment and MPC for marginal propensity to consume, we can write the equation (i) above as follows:

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

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

$\Delta Y/\Delta I$ measures the size of the multiplier. Therefore,

Size of multiplier or k = 1/1-MPC

It is clear from above that the size of multiplier depends upon the marginal propensity to consume of the community. The multiplier is the reciprocal of one minus marginal propensity to consume. However, we can express multiplier in a simpler form. As we know that saving is equal to income minus consumption, one minus marginal propensity to consume will be equal to marginal propensity to save, that is, 1 – MPC = MPS. Therefore, multiplier is equal to

1/1 – MPC = 1/MPS

Algebraic Derivation of Multiplier:

The multiplier can be derived algebraically as follows:

Writing the equation for the equilibrium level of income we have

$Y = C + I$

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

$\Delta Y = \Delta C + \Delta I$

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 marginal propensity to consume which is also assumed to remain constant. Therefore, change in consumption can occur only if there is change in income. Thus

Theory of Multiplier -

$\Delta C = b\Delta Y$

Substituting (3) into (2) we have

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

$\Delta Y – b\Delta Y = \Delta I$

ADVERTISEMENTS:

$\Delta Y (1 – b) = \Delta I$

Or

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

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

As b stands for marginal propensity to consume

$\Delta Y/\Delta I = 1/1 - MPC = 1/MPS$

This is the same formula of multiplier as obtained earlier. Note that the value of multiplier $\Delta Y/\Delta I$ will remain constant as long as marginal propensity to consume remains the same.

Calculating the Size or Value of Multiplier:

It follows from above that the size or value of multiplier is the reciprocal of marginal propensity to save. Therefore, we can obtain the value of multiplier if we know the marginal propensity to consume or the marginal propensity to save of the community. Given the size of multiplier form the net increase in investment, we can find out the total increment in income that will occur as a result of investment.

If the marginal propensity to consume of a community is equal to 2/3, we can find out the size of multiplier as under:

Multiplier, k = 1/1-MPC

$1/1\text{-}2/3 = 1/1/2 = 3$

Likewise, if the marginal propensity to consume is equal to ½ or 0.5, then the multiplier:

$1/1\text{-}1/2 = 1/1/2 = 2$

Assumptions of Multiplier Theory:

In our above explanation of multiplier, we have made many simplifying assumptions. First, we have assumed that the marginal propensity to consume remains constant throughout as the income increases in various rounds of consumption expenditure. However, the marginal propensity to consume may differ in various rounds of consumption expenditure.

But this constancy of marginal propensity to consume is a realistic assumption, since all available empirical evidence shows that marginal propensity to consume is very stable in the short run. Secondly, we have assumed that there is a net increase in investment in a period and no further indirect effects on investment in that period occur or if they occur, they have been taken into account so that there is a given net increase in investment.

Further, we have assumed that there is no any time-lag between the increase in investment and the resultant increment in income. That is, increment in income takes place instantaneously as a result of increment in investment. J.M. Keynes ignored the time-lag in the process of income generation and therefore his multiplier is also called instantaneous multiplier. In recent years, the importance of time lag has been recognised and concept of dynamic multiplier has been developed on that basis. But in an elementary study as the present one the time lags will be ignored as was done by Keynes.

Another important assumption in the theory of multiplier is that excess capacity exists in the consumer goods industries so that when the demand for them increases, more amounts of consumer goods can be produced to meet this demand. If there is no excess capacity in consumer goods industries, the increase in demand as a result of some original increase in investment will bring about rise in prices rather than increases in real income, output and employment.

Keynes's multiplier was evolved in the context of advanced capitalist economies which were in grip of depression and in times of depression and there did exist excess capacity in the consumer goods industries due to lack of aggregate demand. The Keynesian multiplier effect is very small in developing countries like India since there is not much excess capacity in consumer goods industries.

In our above analysis of the multiplier process we have taken a closed economy, that is, we have not taken into account imports and exports. If ours were an open economy, then a part of the increment in consumption expenditure would have been made on imports of goods from abroad.

This would have caused increment in income in foreign countries rather than within the country. This will reduce the value of the multiplier. Imports are important leakage from the multiplier process and we have ignored them in our above analysis for the purpose of simplicity.

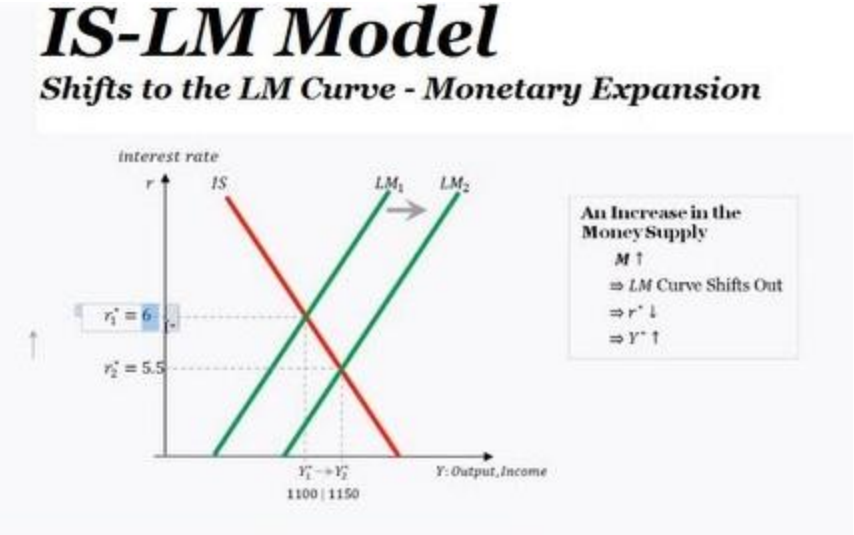
It is worth noting that multiplier not only works in money terms but also in real terms. In other words, multiple increments in income as a result of a given net increase in investment does not only take place in money terms but also in terms of real output, that is, in terms of goods and services. When incomes increase as a result of investment and these increments in income are spent on consumer goods, the output of consumer goods is increased to meet the extra demand brought about by increased incomes.

Therefore, real income or output, increases by the same amount as the increment in money incomes, since the prices of goods have been assumed to be constant. Of course, we have assumed, as has been mentioned above, that there exists excess productive capacity in the consumer goods industries so that when the demand for consumer goods increases, their production can be easily increased to meet this demand. However, if due to some bottlenecks output of goods cannot be increased in response to increasing demand, prices will rise and as result the real multiplier effect will be small.

IS-LM Model -

The IS-LM model appears as a graph that shows the intersection of goods and the money market. The IS stands for Investment and Savings. The LM stands for Liquidity and Money. On the vertical axis of the graph, ‘r’ represents the interest rate on government bonds. The IS-LM model attempts to explain a way to keep the economy in balance through an equilibrium of money supply versus interest rates.

The IS-LM is also sometimes called the Hicks-Hansen model.



In order to gain a full understanding of how the four components work together, it is important to first understand what each component means on its own.

Investment -

In macroeconomics, an investment is defined as a quantity of goods purchased in a period of time that are not consumed or used in that time. Investment increases as interest rates decrease.

Savings -

Savings, sometimes known as deferred consumption, is income that is not spent. As interest rates fall, savings also fall, as most households take advantage of lower interest rates to make purchases.

Liquidity -

Liquidity refers to the demand for and amount of real money, in all of its forms, in an economy. Those who part with liquidity, in the form of saving or investing, are rewarded through interest payments or dividends.

Money -

Money is a any verifiable record or item that can be used as a means of paying for goods and services.

Putting IS-LM Together

The IS curve describes the goods market. The IS curve slopes down and to the right, representing the fact that as interest rates fall, people and businesses try to invest more in long-lasting goods like houses, cars, and equipment. When interest rates fall, families also tend to put less away for savings and spend more on consumer goods. Thus, the effect of a falling interest rate is an increase in GDP through greater investment and less personal savings.

The LM curve describes the money market. The LM curve slopes up and to the right. It represents what economists call the money market. As the economy expands, banks and other financial institutions need funds to support the extra investment. To get those funds, they encourage consumers to deposit more of their cash into longer term deposits like certificates of deposit or bonds.

The IS relationship and LM relationship create opposing forces. On the one hand, a falling interest rate tends to cause the economy to expand. On the other hand, an expanding economy causes interest rates to rise. Where the two curves meet, the forces are balanced and the economy is in equilibrium.

Why the IS-LM Curve Is Flat at Zero

Another tactic the Fed can use to increase the amount of money circulating in the economy is to lower interest rates. Lower interest rates make it easier for households and businesses to borrow money from banks. The loans that banks make inject more money into the economy and allow it to recover from the recession.

When interest rates hit zero, however, increases in the money supply have no effect. Households and businesses no longer have an increased incentive to take out loans. The extra money sits in banks without being spent. This is the reason the LM curve is flat at zero. Economists call the inability of interest rates to go below zero the zero lower bound.

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