

Notes for private circulation

SYBCOM

By

Prof. Manjiri Gondhalekar

Department of Business Economics

- 1 Investment of multiplier
- 2 The principle of Accelerator

The Theory of Multiplier

The investment multiplier explains the effect of increase in investment and increase in income through change in investment. The concept of multiplier is an important concept in macro economies.

Actually the concept of multiplier was developed by R. F. Khan in 1931 where he explained the effect of investment on employment. It was known as employment multiplier. Lord J.M. Keynes reanalyzed the concept to study the effect on income. According to Keynes, change in investment brings change in income which is multiples of the change in investment. Therefore Keynesian multiplier is called as investment multiplier.

When the level of investment increases by some amount, (ΔI) the equilibrium level of income increases by multiple amount (ΔY) .

Investment multiplier is a ratio of final change in income to initial change in investment.

$$K = \frac{\Delta Y}{\Delta I}$$

Where k- multiplier, ΔY - Change in income, ΔI - Change in investment

Suppose investment increases by Rs.400 and income increases by Rs. 2000 then

$K = \frac{2000}{400} = 5$, in other words increase in income will be 5 times of increase in investment.

The concept of multiplier can also be defined in terms of MPC

$$K = \frac{1}{1 - mpc}, \text{ 1-mpc is MPS therefore, } K = \frac{1}{mps}$$

Suppose MPC is .2 $K = \frac{1}{1 - .2} = 1.25$ The size of multiplier depends on the size of MPC. Higher the MPC higher is the value of multiplier. As MPC always is greater than zero and less than one, multiplier is greater than one and less than infinity. $1 < k < \infty$

Working of the multiplier

As investment increases, it generates employment and leads to increase in consumption expenditure. Consumption generates demand and further stimulates investment. This cycle goes on and ultimately income increases which is multiples of original investment. The process is cumulative. The concept of multiplier is based on following assumptions.

- 1 There is increase in investment
- 2 There is unemployment in the economy
- 3 Consumer goods are available in the market

4 Resources are available

5 There is a capacity in consumers goods industry

6 MPC remains constant

On the basis of these assumptions the working of multiplier can be explained with the help of following example.

Example

Suppose original investment is Rs. 2000, MPC is 0.6 multiplier works as indicated in the following table.

Original change in investment (ΔI)	Induced increase in income (ΔY)	Change in consumption	Change in Savings
2000	2000	1200	800
	1200	720	480
	720	432	288
	432	289.2	172.8
	289.2	173.52	115.68

	5000	3000	2000

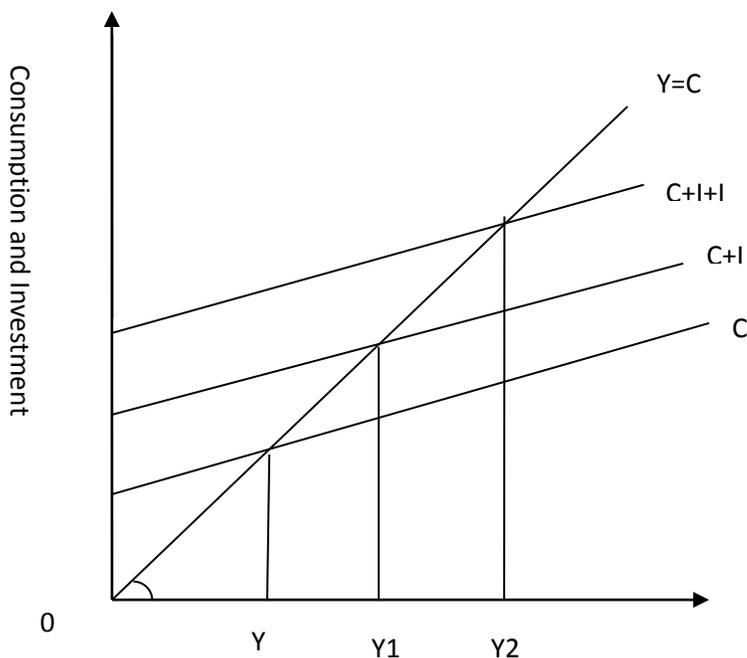
Original increase in investment Rs. 2000 leads to increase in income by Rs.2000. As MPC is .6, 60% of income is spent on consumption therefore consumption becomes Rs.1200. Remaining 40% is saved. Savings are Rs. 800.

In the second round, out of income generated Rs.1200, Rs. 720 is spent on consumption (60%) remaining Rs. 480 is saved.

In third round Rs. 720 becomes income out of which Rs. 432 is spent on consumption which comes in the income flow in the next round. This goes on till the original investments brings about total income equal to Rs. 5000(i.e. 2.5 times of original change in investment)As $K = \frac{1}{1-mpc}$,

$K = \frac{1}{1-.6} = 2.5$, $2000 \times 2.5 = 5000$. Thus original investment of Rs. 2000 brings 2.5 times increase in income.

Working of the multiplier can be explained with the help of following diagram.



In the diagram a line going from 45° indicates $y=c$, C is consumption curve. As there is change in investment, the total expenditure line becomes C+I. With change in investment income changes from OY to OY1. With increase in income consumption expenditure and investment expenditure further increases. As investment further changes total

expenditure curve shifts upwards and becomes C+I+I curve. An equilibrium situation change which brings further increase in income from OY1 to OY2. **Increase in income is multiples of increase in investment.**

Limitations:

1 Assumption of constant MPC: is wrong MPC may change.

2 Multiplier period: It has been assumed that multiplier period is absent that is there is no time lag between receipt of income and spending , but actually there can be a time lag between receipt of income and its spending.

3 Investment: Multiplier effect depends on investment. Regular increase in investments may not be possible always.

4 Availability of Consumers Goods: If consumer's goods are not available in required quantity, increased income will not be spent on consumption and as a result MPC will fall so as multiplier.

5 Availability of Resources: Working of multiplier depends on availability of resources, if resources are not available; working of the multiplier gets affected.

Leakages in the working of the multiplier:-

The multiplier effect of the increase in investment on income and employment may leak out due to the following factors.

Paying off debts – When a part of the increase in income is used for paying back the debts taken by people, instead of spending on consumption, the value of the multiplier will be reduced.

Holding idle cash balances – If people hold a part of their increase in income as idle cash balances and do not use it for consumption, it arrests the working of multiplier and the value of multiplier.

Imports – If a part of an increase in income is spent on imports the value of the multiplier will be low, because income spent on imports will not generate income and output in the domestic country, but will generate income in other countries from where goods are imported.

Taxation – Taxation is another important leakage in the multiplier process because a part of increase in income may be used for a payment of taxes.

The above various leakages reduce the desired effects of the multiplier out of a given increase in investment.

The Principle of Accelerator

The multiplier studies the impact of initial investment on income, but change in consumption due to change in income may further increase investment. The accelerator principle studies the effect of change in income on investment.

The concept of accelerator was developed by J.M. Clark in 1917. It was further developed by Hicks and others.

Investment or demand for capital goods is derived demand. It depends upon the demand for consumption goods. Production of any amount of consumption goods requires capital several times of the consumption goods. Any increase in demand for final output or consumption goods generates demand for capital goods which is much larger than the demand for consumption goods. Change in investment demand is multiples of the change in consumption demand. The ratio between net change in consumption expenditure and investment is accelerator coefficient.

In symbolic terms

$\alpha = \frac{\Delta I}{\Delta C}$, Where α is accelerator coefficient, C is change in consumption and ΔI is change in investment.

Example: Suppose net increase in consumption expenditure is 6 crs., Which leads to increase in investment by Rs.12 crs. Then accelerator coefficient is 2.

Value of accelerator depends upon **capital output ratio**. It indicates the amount of capital required to produce the given amount of consumption goods. The value of accelerator also depends upon the durability of an asset. If capital goods are durable, the value of capital output ratio is higher.

Working of the Accelerator

Prof. Kurihara explained how accelerator works by giving example.

Assumptions:

- 1 Demand for consumption goods is 1000 units
- 2 Capital to output ratio is 5
- 3 Life of capital goods is 10 years
- 4 There is absence of excess capacity, therefore investment increases with increase in demand for consumption goods
- 5 The accelerator coefficient is one.
- 6 Demand for consumption goods increases by 10% every year.

As capital output ratio is 5, 200 units of capital goods are required to maintain the constant flow of consumption goods. But as the life of the capital goods is 10 years, 200 units of capital goods will wear out within the time span of 10 years therefore every year we should make arrangement of **20** units of fresh capital goods. (investment) This investment is called as **replacement investment**.

As demand for consumption goods increases by 10% every year, it increases by 100 units every year, in order to produce additional 100 units of consumption goods, 20 more units of capital goods (investment) are required. This investment is called as **Induced investment**. The working of the accelerator is indicated in the following table.

period	consumption goods (output)	Desired Capital	Investment (replacement)	Investment (induced)	Total change investment
0	1000	200	----	----	---
1	1100	220	20	----	20
2	1200	240	20	20	40
3	1300	260	20	40	60
4	1400	280	20	60	80
5	1500	300	20	80	100

As indicated in the example, to produce 1000 units of consumption goods, 200 units of capital goods required. The accelerator coefficient is $\frac{\Delta I}{\Delta C} = \frac{20}{100} = 0.2$ this indicates that every time 20% more units of capital goods are required to produce additional consumption goods. For example in time period 4, 1400 consumption goods are required. In order to produce them $1400 \times 0.2 = 280$ more units of capital goods are required. This process continues till the life time i.e. 10 years.

Limitations

- 1 Capital out-put ratio is not constant- though it has been assumed to be constant.
- 2 Assumption of excess capacity- It has been assumed that there is no excess capacity in consumer goods industries, but actually if it exists accelerator will not work
- 3 Non availability of resources- If resources are not available in desired quantity, capital goods cannot be produced in desired quantity.
- 4 Change in consumption demand- If change in demand for consumer's goods is temporary; it will not result in increase in capital goods.
- 5 Non availability of funds- If finance is not available then it will become difficult to produce more capital goods.