THE ACCELERATOR THEORY OF INVESTMENT

Presented by:-

LALIT CHANDRA DOLEY

V.P. & Associate Professor,
Dept. of Economics,
Silapathar College, Silapathar.

The simple Acceleration Theory of Investment is associated with the names of writers like Aftalion (1911), J.M. Clark (1917) and Frisch (1933). The basic fact which underlies the acceleration principle is that the *induced investment is a function of the change in the level of output*. Clark's exposition of this principle sets out to explain two important facts

(i) A special technological relationship exists between the demand for the final output and for the capital goods necessary to turn out that level of output, and

(ii) The demand for capital goods is more volatile than that for the final products.

Assumption : The acceleration theory of investment is based upon the following assumptions:

(i) Capital-output ratio or the acceleration coefficient is fixed.

(ii) There is no, excess capacity in the consumer goods industries.

(iii) There is surplus productive capacity in the capital goods industries.

(iv) The change in demand for output is permanent.

(v) The supply of funds is elastic.

(vi) There is simultaneity between the production and demand and output and the supply of inputs. It means there is absence of time lags between them.

Originally the accelerator or the acceleration co-efficient was defined as *a ratio of net induced investment to a change in the consumption expenditure.* In this sense, it can be expressed as

$$\beta = \frac{I_t}{\delta C}$$

where β is the acceleration co-efficient, I_t is the current net induced investment and 5C is the change in the demand for consumer goods (or consumption expenditure). If consumption spending changes by Rs. 100 crore and it leads to increase in induced investment by Rs. 300 crore, the co-efficient p will be determined as 3.

Later the accelerator was broadly interpreted as *a ratio of induced investment to a prior change in income or output*. The investment has Come to be related to the output on the ground that the demand for capital goods cannot be derived only from the consumption spending but the direct demand for them must also be taken into account.

- We start with the assumption that the desired capital stock (K_t) is a fixed proportion of potential output ($\overline{Y}_t$) and that proportion is denoted as β, then

$$K_t = \beta \overline{Y}_t$$

Further if we assume that the productive capacity is being fully utilized the potential output (Y_t) will be equal to the actual output ($\bar{Y}_t$) so that

$$K_t = \beta Y_t \qquad \text{..... } (i)$$

If there is no time lag between output and capital, stock and p remains constant over time, the relation will hold even in (t-1) period.

$$K_{t-1} = \beta y_{t-1} \qquad \text{..... } (ii)$$

Subtracting *(ii)* from *(i)*, we get

$$K_t - K_{t-1} = \beta Y_t - \beta Y_{t-1}$$

$$\text{or} \quad K_t' - K_{t-1} = \beta(Y_t - Y_{t-1}) \qquad \text{....}(iii)$$

The net investment is defined as a change in capital stock, therefore

$$K_t - K_{t-1} = I_t \qquad \text{.....}(iv)$$

Substituting *(iv)* in *(iii)*

$$I_t = \beta (Y_t - Y_{t-1}) \qquad \text{.....} (v)$$

This equation is understood as the acceleration equation and the acceleration co-efficient (β) can be determined as

$$\beta = \left(\frac{I_t}{Y_t - Y_{t-1}} \right)$$

If an increase in output by Rs. 200 crore leads to rise in capital stock by Rs. 600 crore.

$$\beta = \frac{600}{200} = 3$$

It clearly signifies that the acceleration co-efficient in its rigid form is not much different from the marginal capital-output ratio or the capital coefficient. In any time period, the volume of gross investment (I_g) includes the net investment induced by an increase in demand (I_t) and the replacement investment (I_r).

$$I_g = I_t + I_r$$

The replacement investment is a function of the rate of depreciation or replacement of the stock of capital. Larger the stock of capital, larger will be the demand for capital goods for the purpose of replacement and vice-versa. The rate of depreciation or replacement is determined by the durability of the capital assets. Longer the durability of the capital assets, if the stock of capital remains unchanged, smaller will be the replacement investment component, and hence smaller will be the rate of replacement. Similarly, the shorter durability will mean a relatively higher replacement, co-efficient and consequently I_r will be a significant component of I_g.

$$I_g = I_t + I_r$$

$$= \beta(Y_t - Y_{t-1}) + \alpha K_t$$

If the accelertion co-efficient β is equal to 3, $(Y_t - Y_{t-1}) = \delta Y_t$ is Rs. 400 crore, the stock of capital (K_t) is Rs.1000 crore and the replacement co-efficient *(α)* is 1/5, the volume of gross investment will be determined as:

$I_g = \beta\delta Y_t + \alpha K_t,$

$= 3 \times 400 + 1/5 \times 1000$

$= 1200 + 200 =$ Rs. 1400 crore

Thus, a rise in output by Rs. 400 crore involves an increase in gross investment by Rs. 1400 crore.

The operation of the acceleration principle can be explained through a hypothetical example. It is supposed that the output of automobiles in the initial period is Rs. 100 crore and each unit of output requires 3 units of capital so that acceleration co-efficient (β) is 3. Further the durability of an automobile is 10 years so that durability co-efficient (α) is 1/10.

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