JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Government of Rajasthan established

Faculty of Education and Methodology

Faculty Name- JV'n Dr. Md Meraj Alam

Program- BA (Hons) Economics 2nd Semester

Course – Macroeconomics II

**Digital session name** – Samuelson's Theory of Business Cycles: Part-1

Explanation to the Samuelson's Model of Business Cycle:

Samuelson in his seminal paper convincingly showed that it is the interaction between the multiplier and accelerator that gives rise to cyclical fluctuations in economic activity.

The multiplier alone cannot adequately explain the cyclical and cumulative nature of the economic fluctuations.

An autonomous increase in the level of investment raises income by a magnified amount depending upon the value of the multiplier. This increase in income further induces the increases in investment through the acceleration effect. The increase in income brings about increase in aggregate demand for goods and services. To produce more goods we require more capital goods for which extra investment is undertaken.

Thus the relationship between investment and income is one of mutual interaction; investment affects income which in turn affects investment demand and in this process income and employment fluctuate in a cyclical manner. We have shown below in Fig. 13.4 how income and output will increase by even larger amount when accelerator is combined with the Keynesian multiplier.
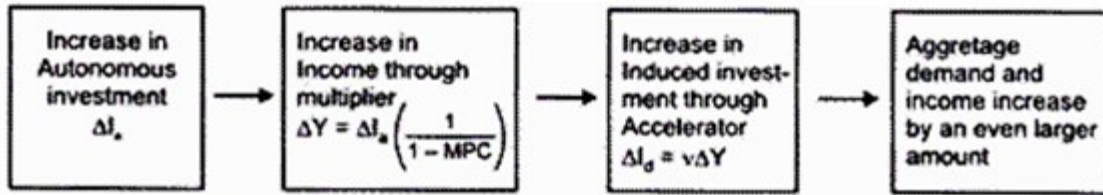
Fig. 13.4. *Combining Accelerator with Keynesian Multiplier*

where

ΔI_a = Increase in autonomous investment

ΔY = Increase in Income.

$\frac{1}{1-MPC}$ = Size of multiplier where MPC = Marginal propensity to consume.

ΔI_d = Increase in induced investment

v = Size of accelerator.

Source: Internet

Fluctuations in investment are the main cause of instability in a free private enterprise economy. This instability further increases due to the interaction of the multiplier and accelerator. The changes in any component of aggregate demand produce a multiplier effect whose magnitude depends upon the marginal propensity to consume.

When consumption, income and output increase under the influence of multiplier effect, they induce further changes in investment and the extent of this induced investment in capital goods industries depends on the capital-output ratio, that is, the interaction between the multiplier and accelerator without any external shocks can give rise to the business cycles whose pattern differs depending upon the magnitudes of the marginal propensity to consume and capital-output ratio.

The model of interaction between multiplier and accelerator can be mathematically represented as under:

$$Y_t = C_t + I_t \qquad \qquad ...(i)$$
$$C_t = C_a + c\,(Y_{t-1}) \qquad ...(ii)$$
$$I_t = I_a + v\,(Y_{t-1} - Y_{t-2}) \qquad ...(iii)$$

Source: Internet

where Y_t, C_t, it stand for income, consumption and investment respectively for a period t, C_a stands for autonomous consumption, I_a for autonomous investment, c for marginal propensity to consume and v for the capital-output ratio or accelerator.

From the above equations it is evident that consumption in a period *t* is a function of income of the previous period Y_{t-1}. That is, one period lag has been assumed for income to determine the consumption of a period. As regards induced investment in period t, it is taken to be the function of the change in income in the previous period. This means that there is two periods gap for changes in income to determine induced investment.

In the equation (iii) above, induced investment equals $v(Y_{t-1} - Y_{t-2})$ or $v(\Delta Y_{t-1})$. Substituting equations (ii) and (iii) in equation (i) we have the following income equation which states how changes in income are dependent on the values of marginal propensity to consume (c) and capital-output ratio v(i.e., accelerator).

$$Y_t = C_a + c(Y_{t-1}) + I_a + v(Y_{t-1} - Y_{t-2}) \qquad ...(iv)$$

In static equilibrium, the level of income determined will be:

$$Y = Ca + cY + I$$

This is due to the fact that in static equilibrium, given the data of the determining factors, the equilibrium level of income remains unchanged, that is, in this case, $Y_t = Y_{t-1} = Y_{t-2} = Y_{t-n}$ so that period lags have no influence at all and accelerator is reduced to zero. Thus, in a dynamic state when autonomous investment changes, the equation (iv) describes the path which a disequilibrium system follows to reach either a final equilibrium state or moves away from it. But whether the economy moves towards a new equilibrium or deviates away from it depends on the values of marginal propensity to consume (c) and capital-output ratio v (i.e., accelerator).

By taking different combinations of the values of marginal propensity to consume (c) and capital- output ratio (v), Samuelson has described different paths which the economy will follow. The various combinations of the values of marginal propensity to consume and capital-output

ratio (which respectively determine the magnitudes of multiplier and accelerator) are shown in Fig. 13.5.

Course Outcome: The goal of this paper will be to expose the students to the basic principles of macroeconomics. The emphasis will be on thinking like an economist and course will illustrate how economic concepts can be applied to analyse real-life situations. In this course, the students are introduced to money and interest, theories of inflation, rate of interest, trade cycle and growth models.