TOPIC:

SOLOW MODEL OF ECONOMIC GROWTH.

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Introduction:

Prof. Robert M. Solow made his model an alternative to Harrod-Domar model of growth.

It ensures steady growth in the long run period without any pitfalls. Prof. Solow assumed that Harrod-Domar's model was based on some unrealistic assumptions like fixed factor propostions, constant capital output ratio etc.

Solow has dropped these assumptions while formulating its model of long-run growth. Prof. Solow shows that by the introduction of the factors influencing economic growth, Harrod-Domar's Model can be rationalised and instability can be reduced to some extent.

He has shown that if technical coefficients of production are assumed to be variable, the capital labour ratio may adjust itself to equilib-rium ratio in course of time.

In Harrod-Domar's model of steady growth, the economic system attains a knife-edge balance of equilibrium in growth in the long-run period.

This balance is established as a result of pulls and counter pulls exerted by natural

growth rate (G_n) (which depends on the increase in labour force in the absence of technical changes) and warranted growth rate (G_w) (which depends on the saving & investment habits of household & firms).

However, the key parameter of Solow's model is the substitutability between capital & labour. Prof Solow demonstrates in his model that, "this fundamental opposition of warranted & natural rates turns out in the end to flow from the crucial assumption that production takes place under conditions of fixed proportions."

The knife edge balance established under Harrodian steady growth path can be destroyed by a slight change in key parameters.

Prof. Solow retains the assumptions of constant rate of reproduction & constant saving ratio etc. and shows that substitutability between capital & labour can bring equality between warranted growth rate (G_w) & natural growth rate (G_n) and economy moves on the equilibrium path of growth.

In other words, according to Prof. Solow, the delicate balance between G_w & G_n depends upon the crucial assumption of fixed proportions in production. The knife edge equilibrium between G_w & G_n and the instability of capitalist system.

In short, Prof. Solow has tried to build a model of economic growth by removing the basic assumptions of fixed proportions of the

Harrod-Domar model. By removing this assumption, according to Prof. Solow, Harrodian path of steady ~~state~~ growth can be freed from instability. In this way, this model admits the possibility of factor substitution.

Assumptions:

Solow's model of long run growth is based on the following assumptions:

1. The production takes place according to the linear homogeneous production function of first degree of the form

$$Y = F(K, L)$$

where Y = Output; K = Capital Stock; L = Supply of lab. force.

The above function is neo-classic in nature. There is constant returns to scale based on capital & labour substitutability & diminishing marginal productivities.

2. The relationship between the behaviour of savings & investment in relation to changes in output. ~~In this way~~ It implies that saving is constant fraction of the level of output. In this way, Solow adopts the Harrodian assumption that investment is in direct & rigid proportion to income.

3. The growth rate of labour force is exogenously determined. It grows at an exponential rate given by

$$L = L_0 e^{nt}$$

where L- Total available supply of labour.
& n- Constant relative rate at which labour force grows.

4. There is full employment in the economy.
5. The two factors of production are capital & labour & they are paid according to their physical productivities.
6. Labour & capital are substitutable for each other.
7. Investment is net of depreciation & replacement charges.
8. Technical progress does not influence the productivity & efficiency of labour.
9. There is flexible system of price-wage interest.
10. Available capital stock is fully utilized.

Following these above assumptions, Prof. Solow tries to show that with variable technical coefficient, capital labour ratio will tend to adjust itself through time towards the direction of equilibrium ratio. If the initial ratio of capital/labour ratio is more, capital & output will grow ~~more~~ more slowly than labour force & vice-versa.

To achieve sustained growth, it is necessary that the investment should increase at such a rate that capital & labour grow proportionately i.e. capital labour ratio is maintained.

Explanation of Solow's model of long-run growth

According to Prof. Solow, for attaining long run growth, let us assume that capital & labour both increase but capital increases at a faster rate than labour so that the capital labour ratio is high. As the capital labour ratio increases, the output per worker declines & as a result national income falls.

The savings of the community decline & in turn investment & capital also decrease. The process of decline continues till the growth of capital becomes equal to the growth rate of labour. Consequently, capital labour ratio and capital output ratio remain constant & this ratio is popularly known as "Equilibrium Ratio".

Prof. Solow has assumed technical coefficients of production to be variable, so that the capital labour ratio may adjust itself to equilibrium ratio. If the capital labour ratio is larger than equilibrium ratio, than that of the growth of capital & output capital would be lesser than labour force. At some time, the two ratios would be equal to each other.

In other words, this is the steady growth, according to Prof. Solow as there is the steady growth there is a tendency to the equilibrium path.

It must be noted here that the capital-labour ratio may be either higher or lower.

Like other economies, Prof. Solow also considers that the most important feature of an underdeveloped economy is dual economy. This economy consists of two sectors - capital sector or industrial sector and labour sector or agricultural sector. In industrial sector, the rate of accumulation of capital is more than rate of absorption of labour.

With the help of variable technical coefficients many employment opportunities can be created. In agricultural sector, real wages & productivity per worker is low. To achieve sustained growth, the capital labour ratio must be high & underdeveloped economies must follow Prof. Solow to attain the steady growth.

This model also exibits the possibility of multiple equilibrium positions. The position of unstable equilibrium will arise when the rate of growth is not equal to the capital labour ratio. There are other two stable equilibrium points with high capital labour ratio & the other with low capital labour ratio.

If the growth process starts with high capital labour ratio, then the development variables will move in forward direction with faster speed & the entire system will grow with high rate of growth. On the

other hand, if the growth process starts with low capital labour ratio then the development variables will more in foorward direction with lesser speed.

To conclude the discussion, it is said that high capital labour ratio or capital intension is very benegicial for the development & growth of capitalist sector & on the contrary, low capital-labour ratio or labour-intensive technique is benegicial for the growth of labour sector.