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Study Notes

Joan Robinson's Model of Economic Growth and Capital Accumulation

Introduction

- A major approach to growth theory was provided in 1956 by Mrs. Joan Robinson in her classic book 'The Accumulation of Capital'.
- The main contribution of Mrs. Robinson to Post-Keynesian growth economics lies in her successful bid to integrate the classical value and distribution theory with Keynes' saving-investment theory into a synthesized coherent system.

Assumptions

1. The economy is assumed to be closed one i.e. there is no foreign trade.
2. Such an economy reflects the conditions of a competitive, laissez-faire capitalism.
3. There are only two factors of production viz; capital and labour.
4. The technical horizon is assumed to be given and constant
5. The technical coefficient of production are fixed.
6. Labour is in abundance and entrepreneur employs as much labour as they wish.
7. The entire national Product is distributed between the 'entrepreneurs' and the workers
8. Entrepreneur constitutes the only saving-investing class in the economy and workers assumed to be consumed whatever they earn.
9. Price level is assumed to be constant.

The Model

- On these assumptions, Mrs. Robinson builds her verbal model which has been formalized by Prof. K. K. Kurihara.
- The net national income in the Robinson model is conceived of as being composed of the total wage bill and the total profits. As such the distribution of the income of the economy among the 'entrepreneurs' and the 'wage-earners' can be represented by the following relation:

$$pY = wN + \Pi pK$$

Where Y= Net national Product

N = Number of employed workers

Π = Gross Profit rate (with interest rate)

K = Amount of capital stock

p = Average price of output. Being used to produce the output Y

w = Money wage rate in the economy

Rearranging, we get

$$\Pi pK = pY - wN$$

$$\text{or } \Pi K = Y - (w/p)N$$

$$\text{or } \Pi = Y - (w/p)N/K$$

$$\text{or } \Pi = Y/N - (w/p)K/N$$

$$\text{or } \Pi = p - (w/p) / Q$$

Where $p = Y/N$, i.e., the labour productivity and $Q = K/N$, Le, the capital-labour relation.

- The equation indicates that the profit rate is a function of the labour productivity (P), real wage rate (w/p) and the capital labour relation (Q).
- For maximizing profits, the entrepreneurs must operate on these variables in conformity with the equation above.
- The profit rate can be increased with the increase in the labour productivity, decrease in the real wage rates and the capital-labour relation.
- Now, the expenditure side of the economy is represented by the familiar Keynesian identity, viz

$$Y = C + I$$

$$\text{And } S = I$$

Where C, S, I are consumption, savings and investment respectively.

- As savings in Mrs. Robinson's Model are the sole prerogative of the entrepreneurs, wage-earners being assumed to consume their entire incomes; profits are, therefore meant to be ploughed directly into investment. We can write the equation in following form:

$$S = \Pi K = I$$

- Instead of I, we can substitute ΔK which is the increase in real capital.
i.e.; $\Delta K = \Pi K$
or, $\Pi = \Delta K / K$
for getting equilibrium, we simply have to juxtapose the income and expenditure sides.
- Thus, equilibrium condition (s) are

$$\Pi = p - w/p / Q = \Delta K / K$$

- This equilibrium condition manifests a double-sided relationship between the rate of profit and rate of accumulation. On the one hand, it tells us that the rate of accumulation going on in a particular situation determines the level of profits obtainable there from.
- It determines the rate of profit which the entrepreneurs would expect on their investment. On the other hand, the equilibrium condition shows that the rate of profit itself governs the rate of accumulation. Anything that determines the rate of profit would also determine the rate of growth of capital.

- Accumulation and profit are, therefore, linked with each other in a circular way. "If they have no profit, the entrepreneurs cannot accumulate and if they do not accumulate they have no profit." Thus, the basic mechanism underlying Mrs. Robinson's growth model is the desire of the firms to accumulate and the urge to accumulate is dependent on the expected rate of profit.

The Golden Age

- The situation of smooth steady growth with full employment arising out of the equality of the 'desired' and 'possible' rates of accumulation has been designated by Mrs. Robinson as the 'golden age' equilibriums.
- Suppose Q is constant under the conditions of full employment, from the equation $K/N = Q$ we get,
 $K = QN$
 $\therefore \Delta K = \Delta NQ$
 Or $\Delta N / N = \Delta K / Q$
 Or $\Delta N / N = \Delta K / Q / N = \Delta K / Q / K/Q$ (since $N = K/Q$)
 Or $\Delta N / N = \Delta K / K$
- The equation implies that if Q is constant at the full employment level, their labour and capital grow at the same rate. This is the situation of 'golden age' equilibrium. The equality between the desired and possible rates of accumulation coexists with full employment of labour and capital. Besides, both labour and capital grow at the same rate. The economy is thus on a tranquil steady growth path - "a steady rate of accumulation that rolls smoothly on its way". There is harmony in all respects.
- The entrepreneurs are in a state of equilibrium. As their desired rate of accumulation is being realized, the wage-earner's, on the other hand, are in equilibrium state because there comes to prevail an overall harmony in the demand and supply of labour.

Stability of 'Golden Age' equilibrium: If certain forces operate so as to disturb the 'golden age' equilibrium of the economy, equilibrating mechanisms automatically comes into being to restore the equilibrium.

The divergence from the 'golden-age' equilibrium path will take place if:

- $\Delta N/N > \Delta K/K$ or
- $\Delta N/N < \Delta K/K$

In case (a), the population will grow faster than the capital stock. This, signifies the situation of underemployment with the prevalence of surplus labour, money wage rates get depressed. But if price level is to remain unchanged the real wages will have to fall.

Now if real wages start falling, then as is clear from the basic equilibrium equation, the rate of profit will ascend gradually. As such the rate of growth of capital accumulation will go on moving up till it catches up with the rate of growth of population. And the 'golden-age' equilibrium, would

thus, again to be established. However, the equilibrium would fail to be restored if the money wages remain inflexible or if the price level falls in consonance with the fall in the money wages.

Case (b) or the second possibility for divergence from the 'golden age' equilibrium occurs where $\Delta N/N < \Delta K/K$, i.e., the rate of population growth falls short of the growth rate of capital-stock. Such a situation manifests a state of excess capital accumulation. It can be seen that under such circumstances, appropriate changes in the capital-labour ratio (Q) or the labour productivity (P) can help to regain the 'golden age' equilibrium.

Limping golden age: Under this age, steady rate of accumulation coexists with unemployment. It is just possible that sufficient capital stock with a composition quite appropriate to the desired rate of accumulation exists. But it may not be enough in so far as the employment of the entire labour force is concerned. The steady rate of accumulation is taking place, but the conditions of full employment have not been achieved. Mrs. Robinson christens such a state of affairs as the 'limping golden age'.

The intensity of the limp may be of different degrees depending on the rate of fall or rise in employability vis-a-vis the labour force. If the rise in the level of employment occurs at a rate smaller than that of labour force, unemployment would increase with time. The limp in this case is rather severe. However, if the rise in the level of employment occurs at a rate greater than that of labour force employment would increase more rapidly than the labour force, And, therefore, unemployment will shrink with time and the economy approached full employment rather quickly. The limp here is thus mild and it tends to die away in the long run. As such this age will be a transient one.

Leaden Age: It, in fact, is a special case of a 'limping golden age' in which the degree of unemployment is increasing due to inadequate rate of accumulation.

Restrained golden age: This is an age of full employment but the 'desired rate' of accumulation happens to exceed the 'possible rate' determined by the rate of growth of labour force plus the rate of technological progress. The possible rate is kept down by factors such as financial stringency or monopsony in the labour market, so that the 'realised rate' of growth is kept down to the level of the 'possible rate'. It may so happen that the stock of capital is appropriate to the desired rate of accumulation and the full employment has already been achieved. But it may fail to be realized on account of its being rest aimed by a stunted rate of growth of labour force and the rate of technical progress.

Bastard golden age: It denotes a situation where unemployment prevails but the real wages remain rigid downwards. As such the rate of accumulation is prevented from increasing in the absence of technical progress. The ultimate cause of less than adequate growth of capital stock may lie in the existence of an 'inflationary barrier'.

For the rate of accumulation to be raised, it is necessary to lower down the real wages. But generally, there is some level of minimum acceptable real wages so that when prices rise, some increase in money wages follows due to the attempts of the organized labour to resist the erosion of real wages below the minimum acceptable level. Thus, the attempts to raise the rate of

accumulation would be arrested by the inflationary rise in money wages. This is the 'bastard golden age'.

Criticisms

1. Only the various forms of Growth Process: This model provides only a frame work of studying the various forms of growth process. We cannot predict on the basis of the model as to what possibly shall be the succeeding phase or type of growth. The different types of growth that have been analyzed are left as 'isolated islands' in her model. The inter-connecting straits have not been explored.
2. Mrs. Robinson studies that the prime variable of her model, viz., the rate of capital accumulation gets adjusted to the population growth via adjustments in wage rate, profit rate and labour productivity. This tantamount to suggest redistribution of income through relative factor prices, but it would be more practical and realistic to deploy fiscal and monetary measures for making adjustment in capital growth with population growth.
3. Neglects Role of State: In Robinson model, state has been completely left out of the picture. It is indeed unrealistic and precarious to rely solely on the private entrepreneurs for the achievement of a stable growth of the economy in tune with the requirements of a growing population and rapidly changing technology.
4. Wrong Assumption of constant technique: This model is carried out under the assumption of a given and constant technological horizon, but is unrealistic. For instance, under the given technical conditions when the rate of accumulation happens be higher than what is required for achieving the 'golden age' equilibrium, it will ipso facto alter the pace of technological progress. What is likely to happen in this case is that due to the pressure on the labour-supply, labour-saving innovations and inventions would be stimulated. Besides, there will be inducement for quick diffusion and introduction of labour-displacing technical improvements which had so far been held back due to an abundant and cheaper supply of labour.
5. It neglects the role of institutional factors as social cultural and institutional changes, on which the development of the economy considerably depends.