

Joan Robinson's Model of Economic Growth

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Joan Violet Robinson
(1903-1983)

- British economist Joan Robinson was arguably the only woman born before 1930 who can be considered a great economist.
- She was in the same league as others who received the Nobel Prize; indeed, many economists expected her to win the prize in 1975.
- **It did not happen.**

Selected Works

1933. *The Economics of Imperfect Competition*. London: Macmillan. 2d ed., 1969.

1937. *Introduction to the Theory of Employment*. London: Macmillan.

1942. *An Essay on Marxian Economics*. London: Macmillan.

1956. *The Accumulation of Capital*. London: Macmillan.

1962. *Economic Philosophy*. London: C. A. Watts.

1970. *The Cultural Revolution in China*. London: Penguin Books.

1971. *Economic Heresies: Some Old-fashioned Questions in Economic Theory*. London: Macmillan.



1. 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 attempt to

integrate

the classical value and distribution theory

with

Keynes' saving-investment theory

into a synthesized rational system.



Fundamental propositions

1. The capital formation depends on the manner of distribution of income.
2. The rate at which labour is utilized depends upon the supply of capital and that of labour.



Basic Assumptions :

- 1) Closed economy: there is no foreign trade.
- 2) No progress in technology
- 3) Fixed coefficient of production
- 4) Laissez-faire capitalism: no government interventions
- 5) Two factors of production: capital and labour.

Additional Assumptions

- Two classes: workers and capitalists, among whom the national income is distributed.
- Workers save nothing and spend their wage income on consumption.
- Capitalists consume nothing, but save and invest their entire income for capital formation.
- There is no change in the price level.
- Saving is a function of profit.



Determinants of Growth:

- 1) **Thriftiness Conditions:** Determination of savings
- 2) **Technical Conditions:** Number and quality of labour and its growth and technical knowledge
- 3) **Wage bargain:** determination of money wage
- 4) **Market:** nature of market is not necessarily PC
- 5) **Investment Policy:** Investment decisions by Firms
- 6) **Finance:** Financial institutions, rate of interest and monetary policy



The Model:

The thrust of this model has been on capital accumulation and capital is considered an engine of growth.

Hence, this model is known as *capital accumulation model of growth*.

Mrs. Joan Robinson builds her verbal model which has been formalized by Prof. K.K. Kurihara.

Using the notations adopted by Prof. K.K. Kurihara we describe below the working of Mrs. Robinson's model.



The Model:

Income Point of View

Net national income (Y) is the sum of the total wage bill (W) and total profit (Π)
W is the real wage multiplied by the number of workers (N) and total profits are equal to profit rate (π) multiplied by the amount of capital (K).

That is,

$$Y = W + \Pi$$

$$Y = \frac{W}{P} N + \pi K, \text{ Where } P = \text{Average Price level}$$

$$\text{or, } \pi K = Y - \frac{W}{P} N$$

$$\text{or, } \pi = \frac{Y - \frac{W}{P} N}{K} = \frac{\frac{Y}{N} - \frac{W}{P}}{\frac{K}{N}} = \frac{\rho - \frac{W}{P}}{\theta}$$

Where ρ = Labour Productivity (Y/N) and θ = Capital Labour Ratio

$$\text{i.e., } \pi = \frac{\rho - \frac{W}{P}}{\theta}$$

The above equation indicates that the profit rate is a function of labour productivity and real wage rate and capital labour ratio



Expenditure Point of View

Now the expenditure side of the economy is represented by the familiar Keynesian identity namely.

$$Y = C + I$$

And at equilibrium

$$S = I$$

where, C, S and I have the usual meaning.

In Robinson's model wage earners spend all of their wage income on consumption, while profit takers (i.e., entrepreneurs) save and invest all of their profit income.

That is,

$$S = \pi K = I$$

Again,

$$I = \Delta K$$

Therefore,

$$\pi K = \Delta K$$

$$\text{or, } \pi = \frac{\Delta K}{K} = k$$

Where k is the rate of capital accumulation.



For getting the equilibrium we simply have to compare the **income** and **expenditure** sides.

The equilibrium condition is:

$$\pi = \frac{\rho - \frac{W}{P}}{\theta} = \frac{\Delta K}{K} = k$$

That is, for the economy to be in equilibrium, rate of profit (π) must be equal to the rate of capital accumulation (k).

This equilibrium condition manifests a double-sided relationship between π and k .

- On the one hand, it tells us that the k is going on in a particular situation determines the level of profits obtainable there from.
- On the other hand, the equilibrium condition shows that the π itself governs the k . Anything that determines the π would also determine the k .

k and π are, therefore, linked with each other in a ***circular way***.

"if they have no profit, the entrepreneurs can not 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 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 θ is constant under the conditions of full employment.

That is,

$$\mathbf{K/N = \theta}$$

$$\text{or, } \mathbf{N = K / \theta}$$

$$\text{or, } \mathbf{\Delta N = \Delta K / \theta}$$

$$\text{or, } \frac{\Delta N}{N} = \frac{\frac{\Delta K}{\theta}}{N} \quad (\text{Deviding both sides by } N)$$

$$\text{or, } \frac{\Delta N}{N} = \frac{\frac{\Delta K}{\theta}}{\frac{K}{\theta}} \quad (\text{as } N = \frac{K}{\theta})$$

$$\text{or, } \frac{\Delta N}{N} = \frac{\Delta K}{K}$$



- This implies that if capital-labour ration (θ) is constant at the full-employment level, then 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.
- The economy is thus on a steady growth path– “a steady rate of accumulation then rolls smoothly on its way”. There is a harmony in all respects.



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:

$$\frac{\Delta N}{N} > \frac{\Delta K}{K} \dots \dots \dots (1)$$

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 rise 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.



The *second possibility* of divergence from the 'golden age' equilibrium occurs where

$$\text{or, } \frac{\Delta N}{N} < \frac{\Delta K}{K} \dots \dots \dots (2)$$

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 or the labour productivity can help to regain the 'golden age' equilibrium.

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



Types of Golden Age:

Robinson gives various types of Golden age as discussed below:

A) Limping Golden Age:

B) Restrained Golden Age:

C) Bastard Golden Age:



Types of Golden Age....

A) Limping golden age:

- Steady rate of accumulation coexists with unemployment.
- Existing capital stock may not be enough for the employment of the entire labour force (LF).
- The *intensity of the limp* may be of different degrees depending on the rate of fall or rise in employability vis-a-vis the LF.
 - ✓ *Mild limp and die away in the LR:*
 - If the rise in the level of employment occurs at a rate greater than that of LF, employment would increase more rapidly than the LF.
 - 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.
 - ✓ *Severe Limp:*
 - However, If the rise in the level of employment occurs at a rate smaller than that of LF, unemployment would increase with time.
 - The limp in this case is rather severe.



Types of Golden Age...

- This Limping Golden Age will be a transient one.
- If the limp is severe, i.e., the degree of unemployment is increasing due to inadequate rate of accumulation, then the Limping Golden Age will transform in to the **Leaden age**.
- Therefore , **Leaden Age** is a special case of a 'limping golden age'.



Types of Golden Age:

B) Restrained Golden Age:

- It is the situation where actual growth rate of capital is lower than the desired growth rate.
- This is due to the operation of certain bottlenecks as of high rate of interest and rationing of credit.
- During this period, firms cannot maintain the high rate of growth despite the technical progress in the economy.
- Mrs. Joan Robinson coined it Restrained Golden Age.



Types of Golden Age:

C) Bastard Golden Age:

- It is the age where unemployment prevails but real wages remain rigid downwards.
- As a result, the rate of accumulation cannot increase in the absence of technical progress.
- Therefore, the Bastard Golden Age implies that stock of capital equipment does not grow faster because of inflation barrier.
- A Bastard Golden Age may be of two types—High level and Low level.
 - ✓ A *high level bastard age* is one which steps in at a fairly high level of real wages when organised labour stalls the efforts to reduce the real wage rate. In such a situation, the rate of accumulation is limited by the inflation barrier.
 - ✓ A *low level bastard age* steps in when the real wage rate is at the minimum level. The minimum standard of life sets a limit to the rate of accumulation. The Bastard Golden Age exists in those countries where there is a large surplus of labour.



Types of Platinum Age:

- The growth rate of output and employment are given from outside and technical advance is zero.
- The development parameters are considered to be rigid.
- The steady growth cannot occur in initial stages due to rigidity of development parameters.

Types of platinum ages

1. **Galloping Platinum Age**
2. **Creeping Platinum Age**
3. **Bastard Platinum Age**



Types of Platinum Age:

1. Galloping Platinum Age:

- It reflects the case of an economy experiencing a rising rate of profit and rising capital intensity of production but unemployment still prevails
- . In this age, the rate of capital accumulation accelerates rapidly from low level to high level.
- The rate of profit rises as the real wage rate falls.
- As a result, less mechanised methods of production are chosen at each round of investment to increase the employment at a faster rate.



Types of Platinum Age:

2. Creeping Platinum Age:

This age begins with full employment situation where the rates of accumulation and profit are very high and techniques of low capital intensity are being installed.

The consequent fall in the rate of profit will bring down the desired rate of accumulation.

As the rate of profit falls, more mechanised techniques will be chosen at each round of investment.

This process will continue until the rate of accumulation comes down approximately equals the rate of growth of labour force.



Types of Platinum Age....

3. Bastard Platinum Age:

- The Bastard Platinum Age looks like to Bastard Golden age.
- k is increasing and W/P remain constant even in the face of *technical progress*.
- Acceleration of capital accumulation can take place without causing inflation.



Conclusions

- In *golden age*, the initial conditions are appropriate to steady growth.
- In *limping golden ages*, the actual realization growth rate is limited only by the desired rate.
- In a *bastard golden age*, the possible rate is limited in a different way i.e., by real wages at the tolerable minimum.
- Both in a *limping golden age and a bastard golden age*, the stock of capital in existence at any moment is less than sufficient to offer employment to all available labour.
- In the *limping golden age*, the stock of equipment is not growing faster for lack of **animal spirits**.
- In a *restrained golden age*, the realised growth rate is limited by the possible rate and kept down to it.
- In the *bastard age*, it is not growing faster because it is blocked by inflation barrier.
- In *platinum ages*, the initial conditions do not permit steady growth and the rate of accumulation is accelerating or decelerating as the case may be.”



References:

Sen, Amartya (1960), *Growth Economics*, Penguin Books.



Assignment

- 1) What is the main contribution of Robinson's growth model? (2)
- 2) State the fundamental propositions of Robinson's growth model (2)
- 3) What are the determinants of growth in Robinson's model? (2)
- 4) What do you mean by 'animal spirits'?
- 5) Present the Robinson's growth model from income point of view and expenditure point of view. Interpret the equilibrium condition in this model. (2+2+2)
- 6) What is golden age equilibrium? Explain whether the equilibrium is stable or not. (3 +3)
- 7) What are important features of limping golden age? What is leaden age? (4 + 2)
- 8) Distinguish between restrained golden age and bastard golden age. (2)
- 9) What do you mean by bastard age? Distinguish between two types of bastard age. (2+2)
- 10) State the features of creeping platinum age and galloping platinum age. What are the basic differences between them? (2+2+2)

