

Module 5
Growth Theories
(Lectures 33, 34, 35 & 36)

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Module 5

Lecture 33

Topics

5.1 Growth Theory I

5.1.1 HarrodDomar Model

5.1 Growth Theory I

- The discussion on the Keynes-Classics debate centered around the cyclical fluctuation in the economy and the ways to correct it.
- This is just one part of macroeconomics, the other part being the growth theories which discuss the long run trend of national income.
- The development of growth theories has three distinct phases:
 1. Harrod-Domer model of growth (1947-48)
 2. Neo-classical growth Models pioneered by Solow and Swan (1956)
 3. Endogenous growth models (1962-)

5.1.1 HarrodDomar Model

- Even though economists are talking about economic growth for ages, the first formal growth model was worked out only in 1947-48, right after the Second World War
- The remarkable growth story of Soviet Union through forced savings triggered interests in growth. It was specially because after the second World War Soviet Union emerged as one of the super power.
- Moreover, after the WW II, World Bank was established with the announced goal of reconstructing the world economies. Hence, understanding the process of growth became essential.
- Rostow's stages of growth can be seen as the precursor of the Harrod-Domer model. According to Rostow's theory there are five stages of development which are:

1. The traditional society
 2. Preconditions for takeoff
 3. Takeoff
 4. The drive to maturity
 5. The age of high mass-consumption
- It is the take off stage where Rostow predicted that the rate of savings and investment would rise from 5% of the national income to 10%. Hence, this is the stage an economy will take off to the path of high growth. But Rostow did not have a proper theory identifying the path leading to take off.
 - The growth theories which Harrod and Domar independently arrived at had a simple view of the economy. In this model production function is the fixed coefficient production function meaning that the capital-output ratio is a constant.

$$\frac{K}{Y} = v \quad (1)$$

- Because v is constant, we can also write

$$\frac{\Delta K}{\Delta Y} = v \quad (2)$$

- From the relationships that $\frac{\Delta K}{v} = \Delta Y$ and $\frac{K}{v} = Y$ we can derive

$$g = \frac{\Delta Y}{Y} = \frac{\Delta K}{v} \times \frac{v}{K} = \frac{\Delta K}{K} \quad (3)$$

- This means that the rate of growth of output is exactly equal to the rate of growth of capital.
- Net change in capital stock is given by

$$\Delta K = I - \delta K \quad (4)$$

Where I represents investment and δ is the rate of depreciation.

- Putting the saving investment equality (and assuming that savings is a constant fraction of income) in the last equation we get

$$\Delta K = sY - \delta K = sY - \delta vY = Y(s - \delta v) \quad (5)$$

- Hence, the growth rate can be represented as

$$g = \frac{\Delta Y}{Y} = \frac{\Delta K}{vY} = \frac{Y(s - \delta v)}{vY} = \frac{s - \delta v}{v} \quad (6)$$

This means that higher the savings rate higher is the growth rate.

- This formula can be written as

$g = \frac{s}{v} - \delta$	(9)
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Assuming $\delta = 0$ this is simply $g = \frac{s}{v}$

- Then per capita income $\frac{Y}{L}$ grows at the rate

$\gamma = \frac{\Delta Y}{Y} - \frac{\Delta L}{L} = \frac{s}{v} - n$	(10)
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- Where n is the rate of population growth rate. In steady state, where all variables such as labor, capital and income grow at the same rate it must be the case that $\frac{s}{v} = n$
- However, Harrod assumed that s , v and δ from equation (9) are technologically or institutionally determined. Hence, there is no guarantee that the actual growth rate will be equal to the warranted growth rate given by s/v . This leads to the famous Knife Edge instability of Harrod model. If actual growth is slower than the warranted rate, it implies excess capacity i.e. the growth of a country's productive capacity is outstripping its effective demand.
- Similarly, in the steady state, there is no guarantee that $\frac{s}{v} = n$ will hold true.
- If $n > \frac{s}{v}$ population is growing at a higher rate than that of capital. There will be continuously rising unemployment.
- If $n < \frac{s}{v}$ capital and income will grow at the rate $\frac{s}{v}$. After that growth will be constrained by labor force.

- Hence, steady state can only happen if $\frac{s}{v} = n$.
- Hence, Harrod-Domar theory characterizes an economy with fundamental instability. In this model there is no guarantee that the system, once perturbed will come back to the equilibrium. This property implies an inherent instability in the capitalist system.
- Robert Solow however found the reason behind getting such a result. It was an implication of the assumption of the fixed coefficient production function. Solow in his model assumed the standard neo-classical production function and the result changed radically. We shall see this in the next lecture.