

## [Academic Script] [Economics Growth (Part I)]

Subject:

**Course:** 

**Business Economics** 

B.A., 4<sup>th</sup> Semester, Undergraduate

Paper No. & Title:

Paper – 401 Macroeconomics-II

Unit No. & Title:

Unit - 4 Economics Growth

**Lecture No. & Title:** 

1: Economics Growth (Part I)

### **Objectives:**

- To understand the meaning of economic growth and sources of economic growth
- **2.** To understand the concept of Potential output and feasible output
- **3.** To understand the long-run growth with the help of Solow Model.

## Introduction:

Growth in literal terms is defined as an increase in once ability. That is it denotes the increase in one's capacity. In economics, growth means ability to produce more output with available resources, by either reallocation of resources, or by enhancing the available resources with the help of technology, education etc. We are going to learn about economic growth here along with various sources of economic growth and also understand what long-run growth is.

**Definition:** Economic growth is a long-term expansion of the productive potential of the economy. Growth can be long term or short term, in both the cases there is slight difference. Let us understand the meaning of long-run as well as short run growth.

**Short-run growth:** In short-run we are concern with annual percentage change in real national output which is also known as GDP. That is economic growth is caused by an increase in aggregate

demand (AD). If there is spare capacity in the economy then an increase in AD that is aggregate demand will cause a higher level of real GDP that is real national output.



Friends understand that aggregate demand can increase for following reasons:

- 1. Lower interest rates
- 2. Increased wages.
- 3. Increased government spending
- 4. Fall in value of sterling which makes exports cheaper and increases quantity of exports(X).
- 5. Increased consumer confidence, which encourages spending.

- 6. Lower income tax which increases disposable income of consumers and increases consumer spending.
- 7. Rising house prices, which create a positive wealth effect and encourages homeowners to spend more.

**Long-run growth:** Long-run growth is represented by increase in potential GDP and thus the country's long-run aggregate supply curve shifts outward. Long-run is basically expansion of productive potential by enhancing capacity of land, labour, or entrepreneur, with the help of technology or education. Now the question arises how one shall decide if there is economic growth in the country? The answer is to determine the level of growth one need to check rate of growth considering the following points:

- Every biography has its own pros and cons, hence every economy, every factor of the given economy works differently at a given point in time.
- In the world of globalization, planning only for one's county is not sufficient. Other world economies also matter equally for the significant growth of the economy.

#### **Determinants of Growth:**

Let us now focus on some of the main determinants of economic growth – that are common for both developing as well as developed countries, to start with

- **Capital stock:** Growth in physical capital stock i.e. investment in equipment, tools or machines etc. leading to a rise in capital per employee. It is also known as capital deepening.
- Labour Force: With the improvement in education level there is growth in the size of the active labour force available for production. The growth in the quality of labour can also attributed to skills, if the available human resources are educated with the required skills the quality of labour increases.
- With increase in educational level Technological progress and innovation is achieved thereby improves productivity i.e. higher GDP achieved per hour worked.
- A stable government is also the source of economic growth. This includes - maintaining the rule of law and macro-economic stability.



Friends we have understood the key determinants of economic growth. As mentioned earlier economic growth shifts the production curve upward and hence there is a total shift in aggregate supply.

### Figure

Friends understand change in supply curve differs in long-run and short-run. Aggregate supply is the total value of goods and services produced in an economy. The aggregate supply curve shows the amount of goods that can be produced at different price levels. Hence will understand the factors affecting in short-run and factors affecting it in long-run.

In the short-run, capital is fixed. Firms can alter variable factors of production, such as labour. The SRAS is viewed as elastic, because in the short-run firms can increase output by getting workers to do so by doing overtime.



In the figure we can observe that the Short-run aggregate supply curve (SRAS) has shifted to the left. This could be caused by rising oil prices or increase in cost of production. Thus, factors affecting the SRAS curve are

- 1. Price of raw materials
- 2. Cost of labour
- 3. Levels of tax and subsidies

After SRAS curve there is long-run aggregate supply curve (LRAS). The classical view sees Aggregate supply curve as inelastic in the long term. The classical view sees wages and prices as flexible, therefore, in the long-term the economy will maintain full employment. In full-employment we are using all our resources to its exhaustive level that means the supply curve becomes vertical straight line.



#### **Types of Economic Growth:**

Economic Growth can be of three major types

**Balanced Growth:** As the name suggests it is balancing growth between rural and urban, rich and poor, and eradicating imbalances between all the sectors of economy. It plans the policies in such a way that there is balance between the sectors and within the sectors too. Balanced growth also targets to achieve internal as well as external balances i.e. it tries not to achieve disequilibrium in Balance of Payment.

**Sustainable Growth:** It means that the current rate of growth is not so fast that future generations are denied the benefit of scarce

non-renewable resources, resources, such as and а clean environment. It believes in achieving current growth, without limiting resources for future generation. Sustainable growth is more preferred over balanced growth as it believes in achieving targets keeping in stability, financial stability mind macroeconomic and even environmental stability.

**Inclusive Growth:** This type of growth believes in expanding the horizon of the growth achieved. That is it believes in raising the median per capita income. Like Balanced growth model, inclusive growth also tries to minimise the economical gap between poor and rich. It tries to improve opportunities for all the groups.

Growth as we have understood, is an increase in the total output of the economy for given period of time. Output is bifurcated in two main types Potential Output and Feasible Output.

## **Potential Output**

Potential Output can be described as what an economy can produce when all its resources such as workforce, equipment, technology, natural resources and others are fully utilized. Thus, potential output is an expected rate of growth in an economy within given period of time.

Potential output is achieved when an economy challenges its limits and hence there is shift in the vertical AS curve towards right. Thus, we observe an increase in the supply. An economy that produces at its potential output can be called as working at full employment. Hence with such possible increase in output also defines the Potential growth of an economy.

**Feasibility Output:** The purpose of the economic feasibility assessment is to determine the positive economic benefits to the organization that the proposed system will provide. It includes quantification and identification of all the benefits expected. This assessment typically involves a cost/ benefits analysis.This also involves questions such as how much time is available to build the new system, when it can be built, whether it interferes with normal business operations, type and amount of resources required, dependencies, and developmental procedures with company revenue prospectus.

## Solow Model:

The Solow growth model allows us a dynamic view of how economy is affected by savings over period of time. Solow model of economic growth is a postulate of linking output to the input of capital and labour. There are certain assumptions of the model as:

- > One composite commodity is produced.
- Output is regarded as net output after making allowance for the depreciation of capital.
- There are constant returns to scale. In other words, the production function is homogeneous of the first degree.

- The two factors of production, labour and capital, are paid according to their marginal physical productivities.
- Prices and wages are flexible.
- > There is perpetual full employment of labour.
- > There is also full employment of the available stock of capital.
- > Labour and capital are substitutable for each other.
- > There is neutral technical progress.
- > The saving ratio is constant.

# The Model:

Given these assumptions, as there is neutral technical progress the production function is

# $\mathbf{Y} = \mathbf{F} (\mathbf{K}, \mathbf{L})$

Where Y = output K = capital and L = Labour. As we have mentioned in assumptions that there is constant returns to scale, hence we divide both the side by L = Labour we get:

# Y/L=F(K/L,1)

Hence, per worker is a function of capital per worker. We write this as,

# y=f(k)

# Figure:



In the figure it is observed that on Y axis output per worker is given wherein on X axis capital per worker is given. On the curve f(k) we have MPK – which depicts the change in output perworker for change in capital per worker.

On observing the slope of this function, we get the marginal product of capital per worker as

## MPK = f(k+1)

It tells us the change in output per worker that results when we increase the capital per worker by one.

We begin with per worker consumption and investment. (Government purchases and net exports are not included in the Solow model). This gives us the following per worker national income accounting identity.

## Y=C+I

Given a savings rate (s) and a consumption rate (1-s) we can generate a consumption function.

c = (1- s) y...which makes our identity,

**i** = **s**\***y** ...so investment per worker equals savings per worker.

The Solow model long run equilibrium occurs at the point where both (y) and (k) are constant. These are the endogenous variables in the model. The exogenous variable is (s).

## **Steady State Equilibrium**

By substituting f(k) for (y), the investment per worker function (i = s\*y) becomes a function of capital per worker

The investment required to maintain capital per worker k, depends on population growth n, and the depreciation rate, d. This depreciation investment per worker *dk* is added to *nk*, the investment per worker to maintain capital-labour ratio for the growing population.

 $\Delta \mathbf{k} = \mathbf{i} - (\mathbf{n} + \mathbf{d})\mathbf{k}$ ...substituting for (i) gives us,

$$\Delta k = s^* f(k) - (n + d)k$$

Figure:



In the figure it is given that, if our initial allocation of (k) were too high, (k) would decrease because depreciation exceeds investment. If our initial allocation were too low, k would increase because investment exceeds depreciation.At the point where both (k) and (y) are constant it must be the case that,

 $\Delta \mathbf{k} = \mathbf{s}^* \mathbf{f}(\mathbf{k}) - (\mathbf{n} + \mathbf{d})\mathbf{k} = \mathbf{0}\mathbf{or},$ 

#### s\*f(k) = (n + d)k

This occurs at our equilibrium point  $k^*$ . At  $k^*$  depreciation equals investment.

Thus Solow Model shows that the growth process is stable. No matter where the economy starts, forces exist that will push the economy over time to a steady state. We know that steady state is at the point where s\*f(k)=(n+d)k. What happens if we increase savings? This would increase the slope of our investment function and cause the function to shift up. This would lead to a higher steady state level of capital. Similarly a lower savings rate leads to a lower steady state level of capital.

This can be explained with the help of a figure, where  $k^*$  is the steady state capital per worker and  $y^*$  is output per worker when the  $s^*f(k)$  curve intersects the (n+d)k curve at point E. An increase in the saving rate from s to  $s_1$  shifts the saving curve sf(k)upward to  $s_1f(k)$ . The new steady state point is  $E_1$ .

When the saving rate increases from s to  $s_1$  with no change in the growth rate of labour force (n), the capital per worker will continue to rise  $k_1^*$  which will raise output per worker to  $y_1$  and so will the growth rate of output increases.

#### Figure:



#### Summary:

In this session we learnt about economic growth, its various determinants and types. We also learnt about Solow-Model. The Solow Growth model is a dynamic model that allows us to see how our endogenous variables capital per worker and output per worker are affected by the exogenous variable savings. We also saw how parameters such as depreciation enter the model, and finally the effects that initial capital allocations have on the time paths toward equilibrium.

#### **Glossary:**

**Economic Growth:** Economic growth is a long-term expansion of the productive potential of the economy. Growth can be long term or short term, in both the cases there is slight difference. Let us understand the meaning of long-run as well as short run growth.

**Short run growth:** In short-run we are concern with annual percentage change in real national output.

**Long-run growth:** Long-run growth is represented by increase in potential GDP and thus the country's long-run aggregate supply curve shifts outward.

**Capital Stock:** Growth in physical capital stock i.e. investment in equipment, tools or machines etc. leading to a rise in capital per employee. It is also known as capital deepening.

**Labour Force:** With the improvement in education level there is growth in the size of the active labour force available for production. The growth in the quality of labour can also attributed to skills, if the available human resources are educated with the required skills the quality of labour increases.

**Balanced growth:** It is balancing growth between rural and urban, rich and poor, and eradicating imbalances between all the sectors of economy. It plans the policies in such a way that there is balance between the sectors and within the sectors too.

**Feasible Output:** The purpose of the economic feasibility assessment is to determine the positive economic benefits to the organization that the proposed system will provide. It includes quantification and identification of all the benefits expected.

**Potential Output** 

Potential Output can be described as what an economy can produce when all its resources such as workforce, equipment, technology, natural resources and others are fully utilized.

## **References:**

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- Blanchard, O & Johnson (2005) "Macroeconomics (6th Edition)", Pearson Education, New Delhi.
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# Assignments:

- ✓ Explain what is economic growth and state its types
- ✓ Explain the shift in Production Possibility Curve.
- ✓ Why is economic growth important and discuss its various determinants
- ✓ Discuss in detail the Solow Model with its assumption and critics.

# **Frequently Asked Questions**

## **1. What is Endogenous growth theory?**

Endogenous growth can be defined as the notion that policies, internal processes and investment capital, rather than external factors, are chiefly responsible for economic growth.

# 2. State the two exogenous variables on which Solow Model is based on:

The Solow Model is based on following two exogenous variables:

- the rate of population growth and
- $\circ~$  the rate of technological progress

# **3. Define economic growth.**

Economic growth is a long-term expansion of the productive potential of the economy. Growth can be long term or short term, in both the cases there is slight difference. Let us understand the meaning of long-run as well as short run growth.

# 4. State the two important points to check the level of growth.

To determine the level of growth one need to check rate of growth considering the following points:

- Every biography has its own pros and cons, hence every economy, every factor of the given economy works differently at a given point in time.
- In the world of globalisation, planning only for one's county is not sufficient. Other world economies also matter equally for the significant growth of the economy.

# 5. State in brief determinant of growth.

The determinant of growth are:

- a) Expanding the Capital Stock,
- b) Increasing the active labour supply
- c) Extracting and selling natural resources
- d) Improving factor productivity and
- e) Driving innovation and enterprise.

## 6. What is feasible output?

The purpose of the economic feasibility assessment is to determine the positive economic benefits to the organization that the proposed system will provide. It includes quantification and identification of all the benefits expected.

## 7. What is potential output?

Potential Output can be described as what an economy can produce when all its resources such as workforce, equipment, technology, natural resources and others are fully utilized. Thus, potential output is an expected rate of growth in an economy.

#### 8. Explain Balanced growth

It is balancing growth between rural and urban, rich and poor, and eradicating imbalances between all the sectors of economy. It plans the policies in such a way that there is balance between the sectors and within the sectors too.

# 9. State difference between sustainable and inclusive growth.

Sustainable growth means that the current rate of growth is not so fast that future generations are denied the benefit of scarce resources, such as non-renewable resources, and a clean environment.

Whereas, Inclusive growth believes in expanding the horizon of the growth achieved. That is it believes in raising the median per capita income. Like Balanced growth model, inclusive growth also tries to minimize the economical gap between poor and rich. It tries to improve opportunities for all the groups

# **10.** How improvement in Labour force will lead to economic growth?

With the improvement in education level there is growth in the size of the active labour force available for production. The growth in the quality of labour can also attributed to skills, if the available human resources are educated with the required skills the quality of labour increases.

Multiple Choice Questions 1. If the actual GDP rises and stays above potential output							
	then there is price						
a.	Rise	b.	Falls				
c.	Constant	d.	All of the above				
2.	Limit for potential growth	toand					
	institutional constraints.						
a.	Man-made	b.	Natural				
c.	Both a & b	d.	None of the above.				
3.	Growth provides higher standard of living and reduces						
	·						
a.	Unemployment	b.	Employment				
с.	Income	d.	Saving				
Λ							
4.	Growth makes country more						
a.	Self reliant and	b.	Wealth increases				
	independent						
c.	All of them	d.	Population increases				

5.	In terms of economics the potential output considered a							
a.	GDP	b.	NDP					
c.	Natural Gross	d.	National Income					
	Domestic Product							
6.	The quality means improvement and this improvement							
	should be in	and						
a.	Business and Human capital	b.	Technology and Business					
c.	Technology and	d.	All of the above					
	Human capital							
7	A feasibility study allo		to investigate the					
/.	A leasibility study and	ws						
7.	possible negative and	positive	outcome of a project before					
/.	possible negative and investing too much tin	positive ne and m	outcome of a project before noney.					
<b>7.</b> a.	possible negative and investing too much tin Project Managers	positive ne and m b.	outcome of a project before noney. Managers					
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9.	Technology symbolises the quality of					
a.	Production	b.	Consumption			
c.	Savings	d.	Income			

# **10.** Education is one of the best methods to improve the

- a. Quality of minerals
- b. Quality of human capital

c. Both a & b

d. None of the above