

# THE PROCESS OF ECONOMIC GROWTH

## Chapter Outline :

- Introduction
- The Concept and Nature of Economic Growth
  - Short-term Vs Long-term Growth
  - Cumulative Nature of Growth
- Calculating the Growth Rate
  - Some Difficulties in the Computation and Comparison of Growth Rates
- Rostow's Stages of Economic Growth
  - Stage-I : The Traditional Society
  - Stage-II : Pre-Conditions for Take-off
  - Stage-III: The Take Off
  - Stage-IV: Drive to Maturity
  - Stage-V : Age of High Mass Consumption
- The Four Pillars of Economic Growth
  - Natural Resources
  - Human Resources
  - Capital Formation
  - Technological Progress
    - Technological Change and Production Function
    - Factor Bias of Technological Improvement
- Quality of Economic Growth
  - Pace of Growth in Relation to Population
  - Product Composition and Value Addition
  - Income Distribution
  - Employment
  - Resource Consumption
  - Impact on Environment
  - Foreign Dependence
  - Impact on the Quality of Life of People
- Conclusion: Implications for the Corporate Manager

## INTRODUCTION

Economic growth is generally defined as a process in, which the real national output of a country increases over a period of time. Both economists and business managers are keenly interested in economic growth, as it is one of the key indicators of a country's economic performance. High and continuous economic growth brings about a sustained increase in the flow of a wide variety of goods and services and leads the country to rising levels of industrialization and advancement. Economic growth is one of the leading factors behind the rising quality of life of the people and provides economic and political strength to the government. The resources of the governments of the advanced or developed countries are enormous which enable them to defend their countries and to provide proper medicare, sanitation, infrastructure, education and social security to their population.

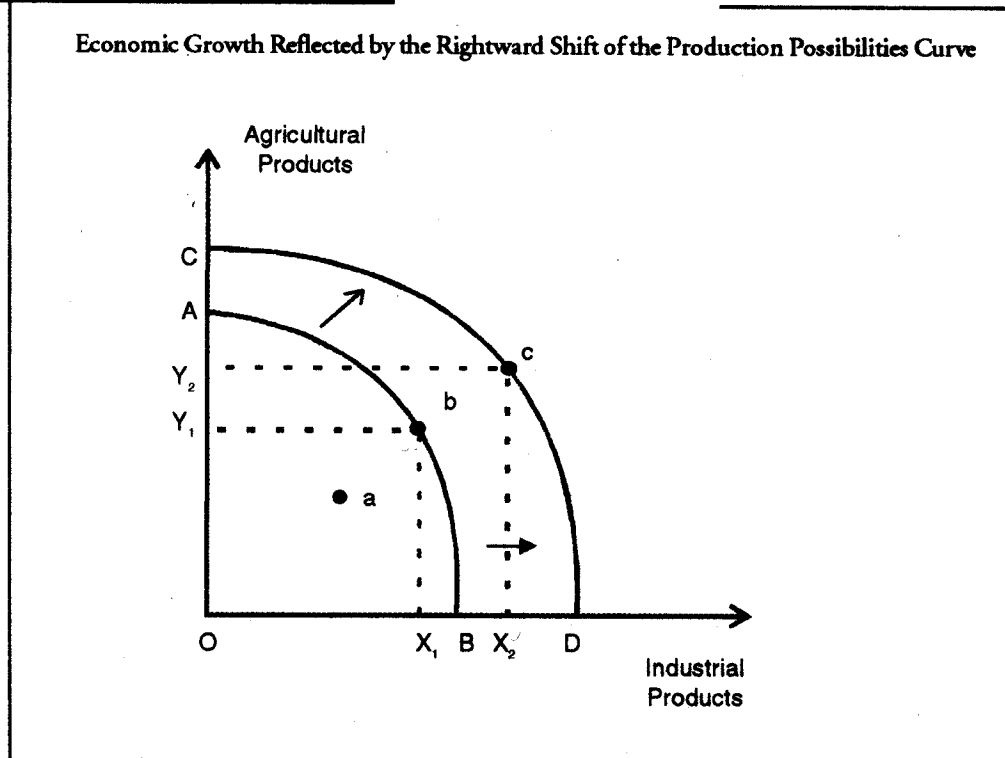
The importance of economic growth to a business manager lies in the fact that it sets the growth environment and determines the total size of the market in which his organisation seeks its share. Of still greater importance is the rate and pattern of growth in the perspective of which it formulates its strategy and business planning. Countries with low or stagnating rates of growth are seen to face poverty, unemployment, illiteracy, malnutrition and diseases and even social tensions. These circumstances inhibit the growth of domestic business and repel foreign enterprise.

## THE CONCEPT AND NATURE OF ECONOMIC GROWTH

Though economic growth signifies increase in real national output, it is potential output, which is emphasized, in the formal concept. Potential output refers to the capacity of a country to produce goods and services when its various resources are fully employed. It is possible that a country's capacity to produce remains unchanged but its actual output increases due to utilization of its unemployed or unused resources. For example, if all the firms in a country produce at 40 per cent of their total capacity in a particular year (due to, say, power shortage or lack of demand) and in the next year these organisations produce at 60 per cent of their capacity to produce, it would be misleading to conclude that the country is experiencing economic growth.

The concept of economic growth based on potential or full employment output is best illustrated by the use of a production-possibilities curve (PPC). Curve AB shows all possible combinations of industrial (produced in the industrial sector) products and agricultural products when all the resources of the country are fully employed.

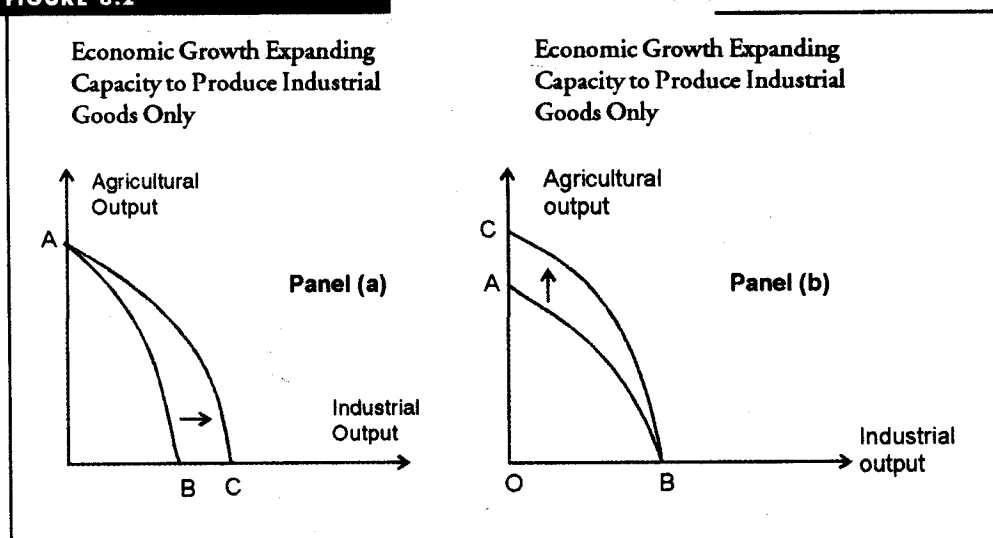
FIGURE 8.1



Points on a production possibilities curve indicate the potential or capacity of the country to produce during a particular time period (say, a year). For example, point 'a' shows that the country has the potential or capacity to produce  $OX_1$  units of industrial and  $OY_1$  units of agricultural output. If some of the resources (like labour, capital, entrepreneurship or raw materials) remain idle, unutilized, unemployed or inefficiently utilized, the country will end up producing at a point (say, b) somewhere within the space OAB. In the absence of growth, any point above the curve AB, say C, is unattainable.

Economic growth (resulting from, say, resource increase or technological improvement) expands the capacity of the economy to produce, which is shown by the rightward and upward shift of the PPC from AB to CD position. The extent of the shift depends upon the magnitude of growth. The point C, which was unattainable earlier, now becomes attainable (as it lies on CD) after growth.

FIGURE 8.2



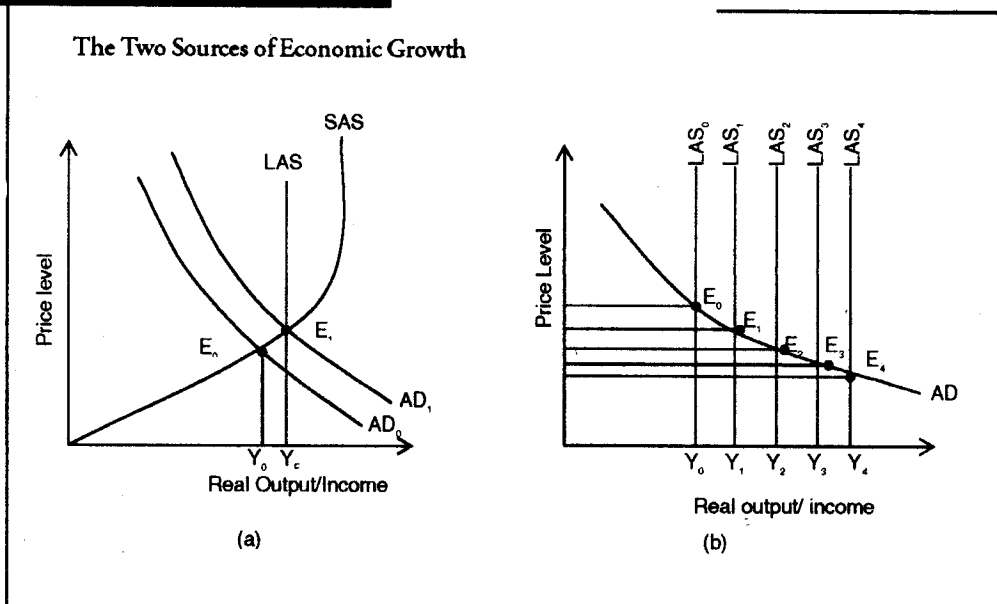
### SHORT-TERM VS LONG-TERM GROWTH

Generally speaking, economic growth means increased capacity in a large number of product lines so that the expanded PPC cuts larger distance on both the axes. In certain cases, it is possible that production capacity expands in a few or only one product group. Advances in agricultural land would increase capacity or potential to increase agricultural products only (though over longer period, it would increase capacity to produce industrial products as well). Similarly, advances in shipbuilding technology would enhance capacity to produce ships and shipping services only. These cases are shown in Panels (a) and (b) of **Figure 8.2**.

In actual practice, however, it is very difficult to measure potential output and changes in it. The reason is that there is no economy in which all resources are fully employed. At the economy level, it is virtually impossible to determine the extent of idle resources inefficiency in resources used. Further, technological developments continuously take place over thousands of product lines leading to increased capacity of the firms to produce. These developments are difficult to keep track of. For these reasons, changes in real national product or income are taken as the basis for measuring economic growth. Economic growth therefore results where:

- extent of resource employment is increased (or equivalently to recessionary gap is decreased) so that national income increases towards its potential level; and
- potential income itself is increased through sustained investment, progressive resource utilization or productivity growth. These two cases of growth are exhibited in **Figure 8.3**.

FIGURE 8.3



Panel (a) shows that in the short run aggregate supply (SAS) increases along SAS in response to rising price level, which provides improving profit margins. As supply constraints appear, SAS tends to become vertical. Aggregate demand (AD) is negatively sloped as demand increases with falling price level.  $Y_f$  is the full employment or potential output. At equilibrium  $E_0$ ,  $Y_0 < Y_f$  is the **recessionary gap** caused by the deficiency of aggregate demand. When demand increases to  $AD_1$  full potential output is achieved (which is equivalent to a point on the production possibilities curve shown in Figure 8.2). Panel (b) shows successive increases in long run aggregate supply raising potential income in the process of growth.  $F_t$  could be generated by increasing resource availability, technological progress or rising productivity of labour and capital.

### CUMULATIVE NATURE OF GROWTH

Economic growth has a cumulative effect on national income. Table 8.1 shows the cumulative effects of alternative rates of growth on a hypothetical national income of 100 over five decades:

Table 8.1: Effect of Alternative Rates of Growth of National Income Over Five Decades

Year	Rate of growth (per annum)			
	1%	3%	5%	7%
2000	100	100	100	100
2010	111	135	165	201
2030	135	246	448	817
2050	165	448	1218	3312

The Table shows that at 5 per cent annual growth rate, income rises almost 4.5 times in three decades and 12 times in five decades. At 7 per cent growth income doubles in first one decade, 8 times in 3 decades and 33 times in five decades. Growth rate of about 5 per cent is generally considered to be medium, 3 per cent modest and 1 per cent low. Growth rate of 7 per cent is on the higher side but a number of countries (like in East Asia, including Japan) have been seen to grow at around 7 per cent over considerable time horizons. Negative growth rate do sometimes occur but they are quite uncommon and mean contraction in the size of output over time.

### CALCULATING THE GROWTH RATE

The average annual rate of economic growth can be calculated by applying the compound interest formula to national income figures. If gross national product is  $Y_0$  in the base (or beginning) year and  $Y_n$  in the  $n$ th year, then average annual growth rate ( $r$ ) over  $n$  years can be calculated as:

$$Y_n = Y_0 (1 + r)^n \quad \text{or, using logarithms,}$$

$$\text{Log } (1+r) = 1/n (\text{log } Y_n - \text{log } Y_0)$$

The value of  $r$  can be easily calculated from this equation.

In a more detailed form, growth rate can be calculated using prices and quantities of individual products or product groups. While calculating the real rate of growth, prices must be kept constant. This is necessary to prevent the effect of rising prices on measurement of real or physical output. The most popular method is to apply prices of some pre-selected base year to the output of any subsequent year. Using this approach we have **Laspeyres Index (LI)** which evaluates GNP of a particular year at the prices of a pre-determined base year. This index is based on the ratio between the total value of a large number of products calculated by multiplying  $n$ th (current) year quantities by base year price and the total value of the products in the base year (i.e. base year quantities by base year prices. Thus, if total number of products in the current and base year is 's' then

$$LI = \frac{q_{n1}P_{01} + q_{n2}P_{02} + \dots + q_{ns}P_{0s}}{q_{01}P_{01} + q_{02}P_{02} + \dots + q_{0s}P_{0s}}$$

Where  $n$  = current year,  $o$  = base year,  $q$  = quantity of a particular product,

$P$  = price of a particular product,  $s$  = total number of products produced in the economy in base and current years. Using the summation notation,

$$LI = \frac{\sum_{i=1}^s q_{ni}P_{0i}}{\sum_{i=1}^s q_{0i}P_{0i}}$$

The calculation of growth rate using this Index is illustrated in **Box 8.1**.

**Box 8.1**

**Calculation of growth rate using Laspeyres Index**

For the sake of simplicity, imagine that only two products A and B are manufactured the prices (in Rs.) of which are given as  $p_0$  and  $p_n$  and units sold (in millions) are given as  $q_0$  and  $q_n$  for the years 1997 and 2002, respectively.

Product	$P_0$	$P_n$	$q_0$	$q_n$	$P_0q_0$	$P_0q_n$	$P_nq_0$	$P_nq_n$
A	20	30	40	50	800	1000	1200	1500
B	10	4	60	100	600	1000	240	400
Total					1400	2000	1440	1900
Laspeyres' Index					100	143	-	-
Paache's Index					-	-	100	132

Over the five years period 1997-2002, there has been 43 per cent growth in real output using Laspeyres Index. Using Paache Index, the five year growth is 32 per cent. Paache Index gives a depressed value of growth as the price of product B has fallen substantially.

Growth rate can also be calculated using Paasche Index (PI) which is basically similar to Laspeyres Index but uses current year prices rather than base year prices:

$$PI = \frac{\sum_{i=1}^s q_{ni} \cdot p_{ni}}{\sum_{i=1}^s q_{0i} \cdot p_{0i}}$$

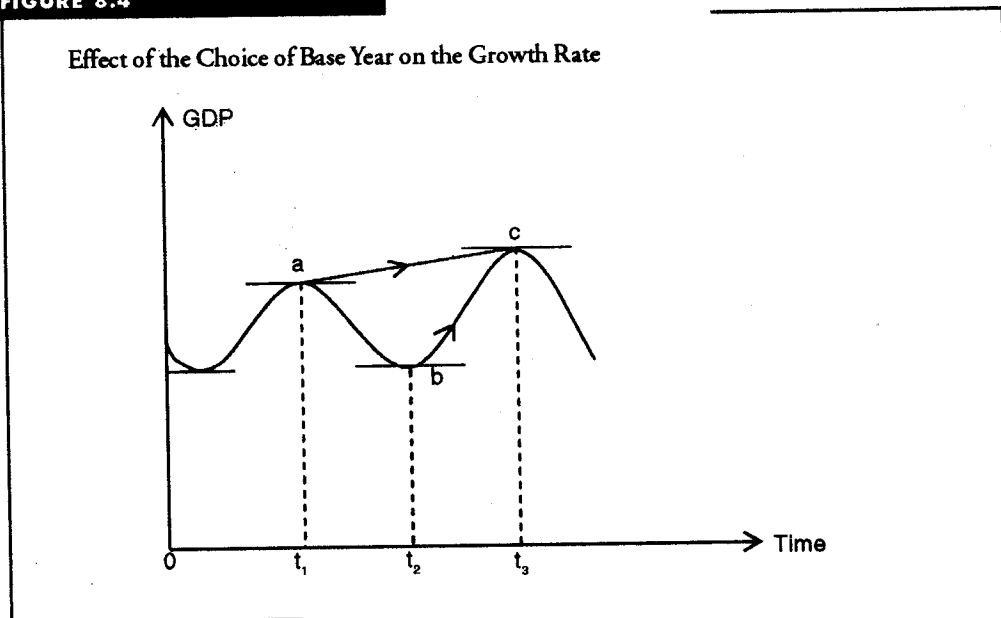
Because of differences in the sets of prices used, the two indices give different growth rates on the same data. In case of knowledge technology-intensive products like computers, microwave ovens, TVs, DVDs, and pharmaceuticals whose prices are known to fall as sales volumes increase, **Paasche Index** gives a depressed value as compared to **Laspeyres Index**. This can be seen in the illustration of **Box 8.1**

The value of the growth rate greatly depends upon the choice of the base year. The base year, in fact, must be a normal period from the point of view of business activity so that it serves as a rational point of reference and comparison. If, for example, the base year is selected in a period of recession or depression then the growth rate between this year and a current normal year will be on the higher side.

To avoid such biased results, growth rate is often calculated on peak-to-peak basis when an economy experiences trade cycles (discussed in Chapter 9). **Figure 8.4** shows the movement of GDP over time. It peaks at time  $t_1$  and  $t_3$  and is at its lowest at point  $b$  corresponding to the time

$t_2$  which is the situation of depression. If  $t_1$  is taken as the base year, growth takes place along the path  $ac$  and if  $t_2$  is taken as the base year, growth takes place along  $bc$  which is much higher than that indicated by  $ac$ . This presents an exaggerated or misleading picture. Peak-to-peak comparison gives a more realistic and rational picture.

**FIGURE 8.4**



### **SOME DIFFICULTIES IN THE COMPUTATION AND COMPARISON OF GROWTH RATES**

Computation of growth rate in a country involves comparison of aggregate output at two different points of time. Complications are created when the time period over which the growth rate is calculated or compared is large. Between any two years, product categories by codes or nomenclatures may remain the same but could differ widely in terms of quality, utility, use and product life. This raises the problem of comparison. For example, it would be absurd to evaluate Pentium-4 computer of today at the base year price of PC 386 about a decade ago because the two products widely differ in characteristics through commonly classified as 'computers'. Similarly, technology-driven products like ovens, automobiles, entertainment, electronics and air-conditioners cannot be rationally evaluated at past prices.

In international comparisons, such difficulties are further accentuated. Differences in quality and product design become more marked in international comparisons. Further, to enable comparison, prices in one currency have to be converted into the other using prevailing exchange rates. In most of the developing countries, exchange rates are artificially maintained through exchange controls and domestic macroeconomic policies at levels which greatly deviate from the market, or competitive levels. Similarly, there are differences in the methods of collecting and



averaging prices. In developing countries, a large part of the output being in the unorganized sector remains outside the national income accounting and is a reason for the understatement of the growth figures. Estimation and comparison of the growth rates, therefore, must be seen in the light of these limitations.

## **ROSTOW'S STAGES OF ECONOMIC GROWTH**

Economic growth essentially is a long-term process. It is the outcome of a complex interaction between a large number of economic, political and social variables over a period of time. During the process of economic growth, the economic and social characteristics of a country change significantly. W W Rostow divides the historical evolution and total process of economic growth into five distinct stages, spread over centuries, through which an economy passes. Using this approach, all the countries of the world can be divided into these categories depending upon the stage through which they are passing. In his analysis, Rostow highlights the broad characteristics of economies at different stages of growth and explains the impulses and drivers of growth at each stage. Each stage has its own environment for business. Rostow's work has generated considerable interest and controversy over the process of economic growth. The five stages are briefly described as follows.

### **STAGE-I: THE TRADITIONAL SOCIETY**

At this stage, science and technology of a country are underdeveloped. This is because either the technology is unavailable or it is not properly applied. There is little inducement to innovate due to unfavourable attitude of the masses towards materialism or physical world. Underdeveloped technology is responsible for constrained production function in different lines of production. Low level of technology is labour-driven and keeps labour productivity and wages low. The result is that the level of output is modest with slow rate of growth and given this environment, there exists a ceiling beyond which output is difficult to increase. There is predominance of agriculture and a predominant majority of labour force is engaged in it. Whatever increases in agriculture take place are more due to extensive cultivation rather than through technological improvements. Due to lack of private enterprise in agricultural infrastructure, state plays a dominant role in irrigation and other measures for agricultural development. Industrial activity at this stage is limited though it shows a tendency to grow. In both, agriculture and industry, production methods are largely labour-intensive. There is widespread social backwardness, low vertical mobility of labour, hierarchical social structure and close connections between limited capital class on the one hand and political leaders and bureaucracy on the other. Political power is concentrated in and controlled by a few property-owning groups. Overall growth rate of the economy is low and the rate of investment (aggregate investment as percentage of national income) is generally less than 5 per cent.

### **STAGE-II: PRE-CONDITIONS FOR TAKE-OFF**

This is the transitory stage of an economy for take-off stage in which growth is a normal condition. Rostow identifies two broad patterns of transition from traditional society to the take-off stage.

### Pattern-I

It is the general case in which fundamental changes in the social and political structure and in the techniques of production are required for the development of the take-off conditions. Historically, this pattern has been found in most parts of Europe, and in a number of countries in Africa, Asia and the Middle East.

### Pattern-II

This pattern typically found in Australia, North America and New Zealand did not involve any structural changes in the social, political or cultural systems or values and developed conditions for take-off without disruption or shift of the social continuum.

Rostow's pre-conditions for take-off are both descriptive and prescriptive. These are descriptive in the sense that these were historically found to be present in countries which achieved take-off in later stages. The conditions are a prescription because these are considered to be essential for attaining the take-off stage. The major pre-conditions for take-off are the following:

- The traditional economy makes major attempts to convert itself into an industrial economy. There is an increase in the rate of investment beyond 5 per cent.
- There is a radical shift in attitude towards application of science for industrialization. There are substantial changes in the techniques of production and conditions of work.
- There is a sharp rise in the emergence of an entrepreneurial class, with changed attitude towards risk. New investments take place particularly in extractive industries and modern manufacturing enterprises.
- Banks and other financial institutions emerge in a significant way, which mobilize savings and facilitate capital formation.
- The scope of trade and commerce, both internal and external, expands and the concepts of national economy and economic nationalism spread fast.
- There is a substantial build-up of social overhead capital (i.e. infrastructure) particularly transport and communication to exploit natural resources, expand markets and develop and enlarge commercial activities. Government plays a major role in this regard.
- Application of science and technology improves agricultural productivity substantially. It meets food requirement of the population and raw material needs of the industry.
- Government plays a centralized and effective economic role.
- There are structural changes in social and cultural values and attitudes leading to improved work culture, faith in the spirit of private enterprise and materialism.

At the 'preconditions for take-off' stage, the rate of investment and the growth of real output far outstrip the rate of population growth. When the pre-conditions are fully established, the economy, in the process of economic growth, gets poised to enter the take-off stage.

### STAGE-III: THE TAKE-OFF

This stage is known as the 'great watershed' in the growth march of a country. It is triggered by a sharp stimulus provided by industrial revolution, a political or social revolution, a path-breaking innovation or a series of innovations or a highly favourable business environment. During this stage, there is sharp acceleration in the growth rate, which sustains over a relatively short span of time as compared to other stages. According to Rostow, it may, on the average, last for about two decades, after which growth rate normalizes and continues in the normal course.

During the take-off stage, the rate of productive investment is above 10 per cent and one or few leading sectors show a high rate of growth. According to Rostow, the leading sectors provide the 'agricultural bone structure' for this stage of economic growth. These sectors are the main drivers of growth of the economy. The economy surges ahead on the strength of the primary growth sectors, which receive the first stimulus for growth and show a high rate of growth. The growth process receives further push from the supplementary growth sectors the development of which is a consequence of or is concomitant to the development of the primary growth sectors. In the third round of impact, derived growth sectors join the other engines of growth. These are the sectors the development of which is derived from the primary and supplementary growth sectors. Banking sector growth, for example, is derived from the growth of trade and commerce. Derived growth sectors also expand in direct response to increases in income, population, industrial production and other variables.

The growth of the leading sectors in the take off stage depends upon:

- a) the extent to which the sectors received the support of demand (domestic and foreign)
- b) how new technology and capacity expansion are introduced in the sectors
- c) to what extent initial capital and profits are available in the sectors.

The effect of the leading sectors on the economy greatly depends on the forward and backward linkages of the growth sectors with other sectors of the economy. For attaining the take-off stage, it is necessary that a socio-political institutional framework must exist to exploit the growth impulse and make growth a sustained process.

### STAGE-IV: DRIVE TO MATURITY

It is defined as a stage in which modern technology has been effectively applied to most of the resources and sectors. Leading sectors of the take off stage lose their historical significance and are replaced by new industries depending upon the nature of technological development and resource endowments. The leading sectors in this stage also depend upon the nature of take off that the country experienced earlier and the forces of growth unleashed by it. These are also shaped by government policies to a good extent. The average rate of investment continues to be above 10 per cent and the economy has the capacity to withstand unexpected economic shocks.

In this stage, labour force undergoes major changes. There is a steady fall in the proportion of labour engaged in agriculture. The skills, productivity and real wages of the workers increase and their outlook towards work becomes modern. Workers get more organized and have greater social security. There is also a change in the character of entrepreneurship and management. Managers become more scientific and professional in approach. The society's concern for human

cost of economic prosperity increases and over time gets more interested in human welfare. Rostow has identified the following years or periods for certain countries when they achieved take off and drive to maturity (Table 8.2).

Table 8.2: Approximate Periods of Take-off and Drive-to-maturity Stages of Selected Countries

Country	Take-off year period	Drive-to-maturity year
Great Britain	1783-1802	1850
United States	1843-1860	1900
France	1830-1860	1910
Germany	1850-1873	1910
Japan	1878-1900	1940
Russia	1890-1914	1950
Canada	1896-1914	1950
India	1952	-

Source: W.W.Rostow, 1960, *Stages of Economic Growth*, (London: Cambridge University Press), p. 38 and 39.

## STAGE-V: AGE OF HIGH MASS CONSUMPTION

In Rostow's analysis, this is the ultimate stage in the process of economic growth. At this stage a country has high level of technological maturity with huge production capacity. Its forces shift from production (or supply) to consumption (or demand) and welfare of the society. The country's major concern, in fact, is to strike a good balance between production, consumption and human welfare and in this balance the country's resource endowments, political leadership and cultural values play a major role.

At this stage, a country seeks to enlarge its external power and influence. Internally, the state gets a welfare character seeking a more equitable distribution of wealth and income through such measures as progressive taxation and social security. Trade and commerce expand tremendously in this stage and there is mass consumption of consumer goods (beyond minimum needs) like automobiles and electric gadgets and devices. Historically, USA achieved this stage first in 1920s followed by Great Britain in 1930s and Japan and Western Europe in 1950s.

Rostow has given a brilliant analysis of the different growth stages through which a country passes, specifying the characteristics of each stage and specifying the requirements to shift to the next stage of growth. The analysis has certain theoretical and technical shortcomings. It has poor empirical base. The division between the different stages is not clear-cut and many characteristics overlap. The concept of take off is most imprecise and is described in very loose and general

terms. The whole process is largely descriptive and does not build a theory of growth. It typically fails to highlight the forces and processes of growth that take the country from one stage to the other. Further, growth is unrealistically believed to be linear and unidirectional.

In today's world, it is difficult to assign the countries of the world to Rostow's different stages of economic growth. Most of the countries exhibit mixed characteristics which cut across different stages of growth. For example, in India vast agricultural and rural segments exhibit characteristics of a traditional society whereas a number of sectors like automobiles and information technology have crossed the take-off stage. A large number of developing countries exhibit economic dualism which is characterized by the co-existence of a traditional backward sector (like agriculture and handicrafts) and an ultra-modern sector including, for example, shipping, hotels, telecommunications, printing and information technology. Such a country is difficult to classify into Rostow's stages.

Nevertheless, Rostow's work provides valuable insights to a business manager for understanding the characteristic of economic growth and its triggers and drivers. Economic growth, as pointed out earlier, is the result of a complex interaction of economic and non-economic forces and in a particular business environment configuration a business manager must be able to understand the factors and processes of change both at the national and sectoral level. In particular, he has to visualize how and over what time the growth will enter the next phase and what risks and opportunities will be unfolded by the change. In this context, Rostow's work is interesting and useful.

## THE FOUR PILLARS OF ECONOMIC GROWTH

A large number of economic and non-economic variables are at work behind a growth process. However, the engine of growth is fuelled by the following four sets of resources.

### NATURAL RESOURCES

Natural resources covering available land, forests, minerals, fuels, rivers and water bodies and environment quality are a major determinant of a country's potential output. These are the gifts or endowments of nature. The availability of natural resources by itself does not guarantee growth; it is their utilization by other factors of production like labour and capital that leads to growth. Availability and use of natural resources has had a great impact on the growth of such countries as Canada, USA, Norway and Australia. Countries like Japan, which have deficient or little natural resources, have to spend heavily on the import of necessary raw materials or make foreign investments for their economic growth. Resource deficiency combined with technological backwardness drives countries towards stagnation, poverty and deprivation. At the same time it must be remembered that reckless exploitation of natural resources (like deforestation) may upset ecological balance and prove counter-productive in the long run. That is why the economists and environmentalists the world over are concerned with the issues of sustainable development.

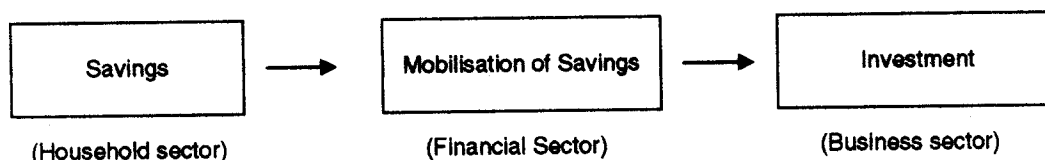
## HUMAN RESOURCES

Human resources refer collectively to the quantum and quality of the workforce and are among the key determinants of economic growth. The number of people in the workforce directly depends on the population size and structure as well on the flows of migration and immigration. The aggregate supply of labour at various levels of skills is measured in terms of man-days or man-hours (or precisely person-hours, including women). The quality of human resources depends upon education, training, skills, attitudes towards work, desire for self-improvement and even cultural outlook and is reflected in its efficiency and productivity. Productivity of human resources further depends upon the organisational culture and system, managerial effectiveness, motivation and the overall work environment. The immediate factors affecting human resource productivity are the technological standard of the capital equipment on which the labour works, the job design and the labour-capital ratio. Health, literacy, work discipline and social security greatly enhance the productivity of human resources. Human resources are the single most important factor behind technological change and innovation, which is explained in the subsequent sections as the fourth pillar of growth.

## CAPITAL FORMATION

Capital formation is the process by which savings of the community are converted into productive capital or investment. It can be measured as changes in capital stock over a period of time. It is also sometimes referred to as capital accumulation. It is vital for economic growth and the financial institutions play a critical role in the mobilization of savings and making these available to the business sector for investment. This role of the financial institution is called financial intermediation. The basic purpose of the institutions is to connect savers and investors by spreading information, providing brokerage and other financial services, developing financial products acceptable to savers and investors, creating asset liquidity and transforming risk.

The process can be depicted as follows:



In a wider sense, capital formation also covers human capital covering education, healthcare and training, which are important for the development of human resources. However, the popular definition is focused on real or physical capital including plant and machinery, factory buildings, working capital, transport, communication and the like. Capital formation increases the capacity of an economy to produce (potential output). How much of the capacity is utilized in actual production depends upon the availability of the complementary factors of production and the state of aggregate demand. When savings fall short of the demand for investment (due to high

level of consumption or low productivity to save), foreign investment is required to fill the gap. If foreign investment is not forthcoming, growth rate tends to fall in this situation. There are basically six types of savings available for capital formation:

- Voluntary savings of the household sector;
- Retained earnings of the private corporate sector which could be invested for expansion or diversification;
- Profits of the public sector which are invested or appear as income of the government which could be invested;
- Taxes as government revenue which could be invested;
- Deficit financing (also called 'forced savings as it leads to rise in prices forcing people to consume less); and
- Foreign sources including grants, foreign deposits and borrowings or import reduction, which make available resources for investment.

### **TECHNOLOGICAL PROGRESS**

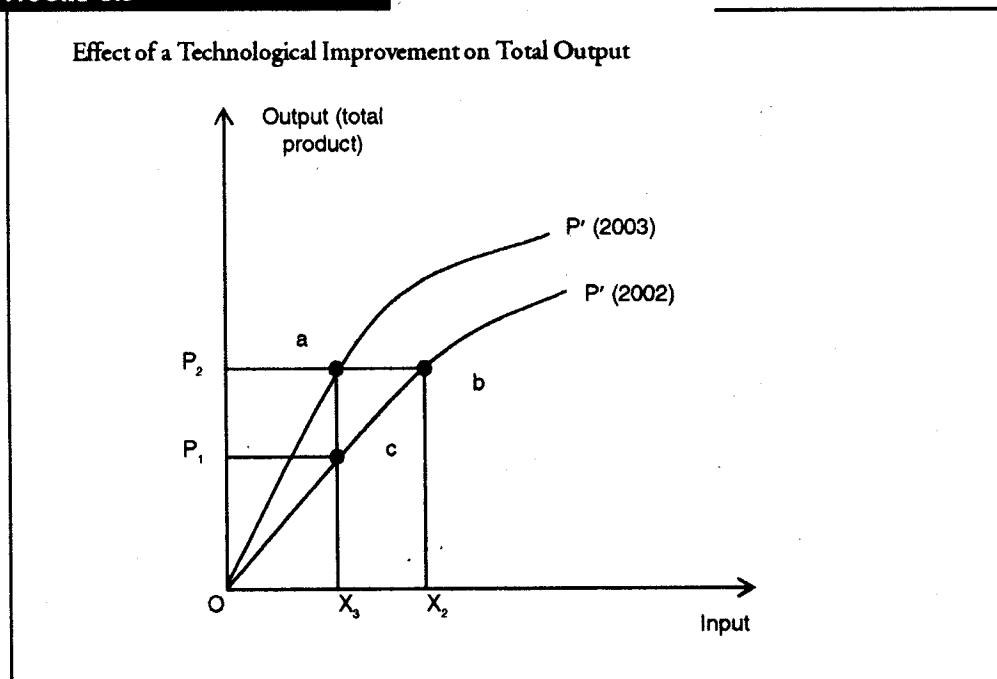
Technological progress, as the fourth ingredient of economic growth, refers to improvements in techniques, methods or processes of production of goods and services. It could be based on a new invention, a new innovation, a new factor combination or an application of basic science and technology. A technological improvement may lead to any one or more of the following:

- Increased capacity to produce;
- Increase productivity (increased output per unit of labour or capital or both).
- Reduction in wastage;
- Improved product quality and product design;
- Lower cost per unit and hence lower possible competitive price; or
- Introduction of a new product.

### **Technological Change and Production Function**

Technological progress manifests itself in product innovation (causing new or improved products) or process innovation (causing improvements in production techniques due to new engineering knowledge or skills). Improved technology working on the existing resources (labour, capital, raw materials etc.) raises the production function (or total output curve) as shown in **Figure 8.5**. The logic is that new technology requires lesser amount of resources (including time) per unit of output and the resources so saved are used for further production.

FIGURE 8.5



OP is the production function showing relation between input and output (total product) for the year 2002. As technology improves in the year 2003, the function shifts position to  $OP'$ . The effect of technological progress can be understood in two ways - one for the same level of input  $OX_1$ , economy realizes greater output ( $OP_1$  to  $OP_2$ ), secondly and alternatively, the same effect can be visualized by looking at the output level  $OP_2$ . At old technology indicated by OP,  $OP_2$  output level requires  $OX_2$  amount of input whereas at new technology only  $OX_1$  input is required. Thus, for  $OP_2$  output, new technology causes resource saving of  $X_1X_2$ , which can be used for further output in the next round of production.

In an economy, regular changes in technology over a wide range of industries and output is a source of continuous growth. Improved or new products, and a number of these at lower prices, lead to increase in demand, which supports production and growth. New technologies are commonly seen in such areas as entertainment, electronics, computers, pharmaceuticals, automobiles, electrical gadgets, defense equipment, air-conditioners and aircrafts. Technological changes could be triggered by an invention, an innovative idea, a strong need or problem of the society (remember, necessity is the mother of invention), a new management system or even a new R&D policy of the government.

### Factor Bias of a Technological Improvement

A technological improvement may have a bias towards a factor of production. Depending upon this bias, technological changes may be classified as labour-saving, capital-saving or neutral. A labour-saving technological change saves upon labour causing the production process to become more capital-intensive (as capital/labour ratio increases). A capital saving process saves upon



capital requiring each worker to work with less capital. It makes production process more labour-intensive so that capital-labour ratio falls. Neutral technological progress saves upon labour and capital in equal proportion so that the capital-labour ratio remains constant. The design of technological change is greatly affected by the price of capital (i.e. the rate of interest) and the price of labour (i.e. the average rate of wages). Most technological improvements in modern societies are labour saving type resulting in what is known as capital deepening (use of more capital per worker). This raises many issues relating to employment and wages of workers.

## QUALITY OF ECONOMIC GROWTH

For economic growth to be meaningful, it must lead to an improvement in the overall quality of life of the people. Such issues relate to economic development as contrasted to economic growth, which emphasizes quantitative aspect of output. Economic development stresses the quantitative aspects of growth and tends to evaluate its impact on society. A high-quality growth would raise the standard of living of the society as a whole and a low-quality growth, for example, could rapidly exhaust a country's natural resources, damage the physical environment, cause greater inequalities between the rich and the poor and even escalate social tensions on a wider scale. Some of the main indicators of the quality of growth are discussed below.

### PACE OF GROWTH IN RELATION TO POPULATION

This indicator refers basically to the adequacy of growth. Any rate of growth, which is less than the rate of population growth, means declining output per capita (i.e. per person). For the growth rate to be considerable, it must exceed the population growth rate. One major weakness of this indicator is that a rising per capita output does not mean increased availability to all the citizens of a country. For this we will have to find out the distribution of income in that country and how the incomes of the various segments of society are rising in the growth process. However, per capita income is still widely used as a measure to classify different countries at different levels of economic development, as it is convenient.

**Product Composition and Value Addition:** Qualitative economic growth has a wide production base and a high value added ratio. Countries growing on the basis of a few specialized product lines are inherently unstable and generate most of the income in a narrow range of sectors. That way, majority of the sectors don't participate in the growth process and remain stagnant. The benefits of new technology also remain concentrated to a few sectors. This causes unbalanced growth and widens income and wealth disparities in a country. From the society's point of view, economy must grow through increased production of 'socially desirable' products. These are the items of mass consumption (like steel, food products, building materials, textiles etc.) and those selective products (like x-ray machines, medical equipment), which solve the specific problems of the society. Such products are contrasted to 'negative' products (or bads) like alcoholic drinks, tobacco products, horse-race shows, and lottery games etc., which do not promote society's welfare. In the same way, in a resource constrained economy, production of luxury products like entertainment parks, perfumes, sports cars and the like may not merit social priority. Similarly, value-added ratio (value added as percentage of total value of production) is an important indicator of qualitative growth. Value addition in extractive industries, agriculture and food processing

industries is much less as compared to the same in computers, automobiles, electronic products and pharmaceuticals.

**Box 8.2**

**How is Lorenz Curve used to measure inequality in income distribution?**

Lorenz curve provides a way for measuring income inequalities. Figure 8.6, depicts the curve O'abO, which relates percentages of population with percentages of income. Point b, for example, shows that bottom 20 per cent of population accounts for 10 per cent of national income and point a shows that 80 per cent of population accounts for 60 per cent of national income (or, equivalently, top 20 per cent population accounts for 40 per cent of national income). If income were equally distributed, then income distribution would be distributed along the diagonal oo'. But this is only a theoretical possibility - a reference point from which income inequality can be measured.

One such measure of income inequality is called Gini Co-efficient ( $\pi$ ) calculated as:

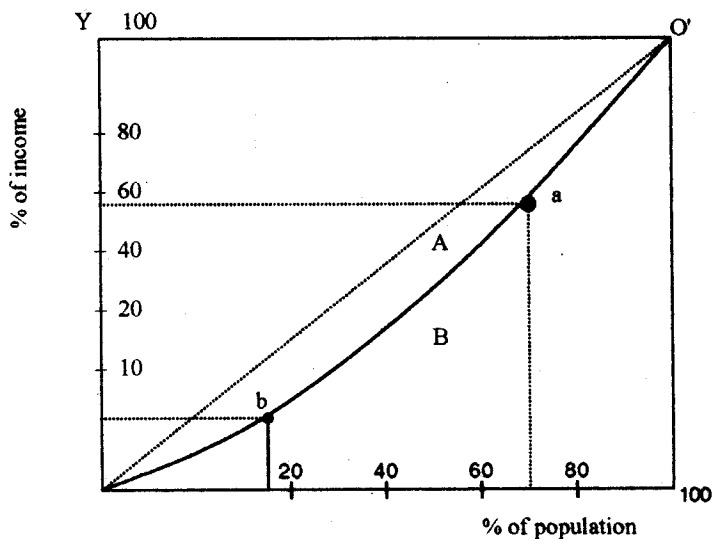
$$p = \frac{A}{A+B}$$

Where A is the area bounded by the diagonal OO' and the Lorenz Curve O'abo and B is the area below the curve. Obviously, if A = 0 then  $\pi = 0$  and if B = 0,  $\pi = 1$ . At  $\pi = 0$  we have perfect equality of income and at  $\pi = 1$  there is perfect inequality of income (one man owning everything and everyone else nothing), both being theoretical extremes. Actual value of p therefore, lies between 0 and 1. The closer the value of  $\pi$  to 1, the greater will be the income inequality and vice-versa.

The Lorenz Curve of Income Distribution

**FIGURE 8.6**

The Lorenz Curve of Income Distribution



## **INCOME DISTRIBUTION**

For the benefits of growth to be dispersed, it is essential that the income generated is widely distributed. This is possible when the growth process is broad-based and balanced with most of the sectors contributing to it. The state, through its fiscal policy operations has a great potential to alter the pattern of output and income distribution.

Slow growing economies with sharp income inequalities show mass poverty, malnutrition, illiteracy and various other social deprivations. In fact, a narrowly-founded growth process breeds inequality and the resulting problems. It further leads to low saving capacity, low productivity, and low wages and keeps the overall system at low-level equilibrium. A type of growth with better income distribution generally require a proactive role of the government through redistribution policies covering taxation, welfare expenditure and social infrastructure. The benefits of growth must ideally reach the largest sections of society.

## **EMPLOYMENT**

Growth to be socially relevant and meaningful must create and provide jobs on an expanding scale. Employment expansion is not a necessary outcome of growth. As pointed out earlier, if economic growth is triggered by labour-saving technological progress, the economy could see conditions of jobless growth. Growth can't co-exist with raising unemployment as deficiency of demand would eventually occur slowing down the tempo of growth. A good-quality growth must create jobs at a rate that fully takes care of the current rate of growth of labour supply and clears at least a part of the unemployment backlog. Unemployment denotes waste of human resources, causes social tensions and may even create political problems in the long run. Again, the role of the state is important in motivating adoption of appropriate technologies, developing employment-oriented schemes and providing some minimum financial support to the unemployed.

## **RESOURCE CONSUMPTION**

A rational growth must not deplete an economy's non-renewable resources (like coal, petroleum, metal ores) at an accelerated pace so as to leave empty mines, barren lands and treeless earth surfaces for prosperity. Economic growth must be based on technologies that save upon resources and minimize the production of resource-intensive products. Reckless exploitation of resources promotes present growth at the expense of future growth and this type of growth is generally unsustainable in the long run. Fast consumption of natural resources upsets the ecological balance and may undermine bio-diversity.

## **IMPACT ON ENVIRONMENT**

A good-quality growth has least impact on physical environment. Some environmental damage is inevitable in the course of infrastructural development (like multipurpose river valley projects) and industrialization. Environmental issue, in this case, is basically related to technology. The so called 'clean' or 'green' technologies are least polluting and save public resources meant to combat pollution and related ill-effects. A polluting growth causes tremendous health loss to the community and reduces productivity of human resources. Environment conscious governments tend to adopt measures to check pollution and encourage industries to undertake pollution-control measures.

Quality standards are also prescribed to motivate industries to adopt environment friendly production processes.

### **FOREIGN DEPENDENCE**

Self-reliance is one of the foremost objectives of macroeconomic policies particularly in developed countries. Self-reliant growth is generally preferred as the benefits of growth are retained domestically. Growth that takes place predominantly on the strength of foreign capital and foreign demand makes the economy highly dependent on the outside world. Self-reliance is not a closed-economy concept. In a globalising world, international trade and investment freely take place. But what is emphasized is that a country's growth should not be critically dependent on other countries. Countries with heavy inflow of foreign investment face huge interest and dividend outflows straining the balance of payments position. Similarly, heavy imports of capital and consumer goods discourage domestic production and cause foreign exchange outflow. A growth process must strengthen the economy in terms of its own demand and production base. The impact of changes in foreign economic conditions on the domestic economy in such cases is minimal. Self-reliant growth is generally founded on a strong domestic R&D base and human resources.

### **IMPACT ON QUALITY OF LIFE OF PEOPLE**

A qualitative growth must improve the overall quality of the life of people. It must attack poverty, unemployment, illiteracy, social backwardness, malnutrition, diseases and other social problems. A balanced growth, covering most of the sectors of the economy creates widespread income and employment opportunities and diffuses its benefits over larger sections of society. Further, the growth which is self-sustaining does not depend much on state support; rather it adds to the public resources which can be used to promote welfare and quality of life of the people through provision of sanitation, healthcare, education, water supply, roads, electricity and information. In any case, growth must enable the government to meet the basic needs of the society, including, social security.

United Nations Development Programme (UNDP) in its annual Human Development Report ranks countries on the basis of a composite Human Development Index (HDI) which combines a number of such indicators as life expectancy, educational attainment, water supply, hunger and healthcare. In its latest report for the year 2000, (released in July 2002) India's rank in the world was 124 (compared to 130 in the year 1999). Such indices were also developed in the past to measure changes in the quality of life.

### **CONCLUSION: IMPLICATIONS FOR THE CORPORATE MANAGER**

An understanding of the process of economic growth enables a business manager to analyse given growth situations and draw lesson or implications for business policy and strategy. The manager can understand the causative factors and drivers of growth and have a fairly good idea as to what extent the growth process will continue. A rising or high rate of growth spells prosperity condition's and a good business manager re-strategise business operation to exploit emerging opportunities. Ability to make reasonable forecasts about business environment based on currant growth scenario lies in the heart of business planning.

## Key Terms

Capital accumulation	Exchange rate	Neutral technological progress
Capital deepening	Financial intermediation	Production possibilities curve
Capital-labour ratio	Ginni co-efficient	Reversionary gap
Deficit financing	Life expectancy	Value-added ratio
Economic dualism	Lorenz curve	Vertical mobility
Exchange control		

## Supplementary Readings

- Adelman, Irma (1961), *Theories of Economic Growth and Development* (Stanford: Stanford University Press).
- Beckerman, Wilfred, (1984), *National Income Analysis* (New Delhi: Universal).
- Chakraborty, Sukhmoy (1988), *Development Planning: The Indian Experience* (Bombay: Oxford University Press).
- Dholakia, Bakul H and Ravindra H Dholakia (1998), *Theory of Economic Growth and Technical Progress* (N. Delhi: MacMillan).
- Dornbusch, Rudiger, Stanley Fischer and Richard Startz (2001), *Macroeconomics* (N. Delhi: Tata McGraw Hill).
- Hicks, J R (1963), *Capital and Growth* (N.Y.: MacMillan).
- Meier, Gerald M. (1986), *Leading Issues in Economic Development* (Delhi: Oxford University Press).
- Mellor, John W. (1976), *The New Economics of Growth: A Strategy for India and the Developing World* (N.Y.: Cornell University Press).
- Rostow, W.W. (1952), *The Process of Economic Growth* (N.Y.: W.W. Norton).
- Samuelson, P.A. and William D. Nordhaus (1998), *Economics* (New Delhi: Tata McGraw-Hill).
- Stiglitz, Joseph E (2000), 'Development Thinking at the Millennium', Keynote Address, *Annual World Bank Conference on Development Economics*.
- Todaro, Michael P (1985), *Economic Development in the Third World* (Hyderabad: Orient Longman)

## Long Questions

1. What is the relevance of actual and potential GDP of a country for the investment decisions of a business firm? How can a firm decide its lines of production in view of the composition of the GDP?
2. How can a multinational company determine the stage of economic growth of a host country in terms of Rostow's parameters? How can the firm decide its mode and scale of entry according to the stage of growth of the foreign country?
3. What precautions should a business manager take while interpreting growth rate of an economy? What are the problems involved in international comparison of economic growth rates?
4. Explain Rostow's various stages of economic growth. In which stage would you place Indian economy as at present?
5. Discuss business opportunities unfolded by a country in (a) take-off stage and (b) 'Drive-to-maturity stage of an economy. How can these opportunities be exploited by a business firm?

6. Discuss business environment of a country in Rostow's each stage of economic growth of a country.
7. What are the 'quality of growth' indicators? What is significance of these indicators for a business managers?
8. What are the four basic pillars of economic growth? What factors affect the strength of each pillar?

### Short Questions

---

1. What is economic growth? Explain economic growth as a process.
2. Differentiate between potential and actual output.
3. What is production possibilities curve? What factors can produce a shift of the curve?
4. Distinguish between short-run and long-run economic growth. Illustrate the distinction graphically.
5. How is the rate of growth of an economy calculated? How does the choice of the base year affect its value?
6. Enumerate the main difficulties in the computation of the growth rate of an economy.
7. What are the characteristics of the take-off stage of an economy in the Rostow's theory?
8. What is 'drive to maturity'? What characteristics does an economy exhibit at this stage?
9. Give three basic points illustrating the role of the human resources in economic growth.
10. Explain and illustrate the concept of capital formation.
11. Explain and illustrate the concepts of neutral and biased technological improvements.
12. Give five leading indicators of the quality of economic growth.

### Practical Assignments

---

1. Study the basic economic indicators of three countries each in South Asia, Latin America and Africa and determine the stage of growth of each country in the Rostow's framework. Discuss the results in the class.
2. Hold a brainstorming session on 'How can we reduce difficulties in the computation of growth rate of an economy?' Prepare a written summary report on the outcome of the session and discuss it intensively in a smaller and focused group of students.
3. You are the manager of a multinational company producing consumer electronic products. Identify the countries which are in the 'drive-to-maturity' stage and build a team to discuss your investment plan in the country of your choice.
4. Prepare a comprehensive term paper on the quality of economic growth in India specifically highlighting the significance of growth quality for a business manager.
5. Hold a group discussion with the objective to find out the growth stage of Indian economy as at present, in terms of Rostow's parameters.